



Photo by: Indian Space Research Organisation

Indian Space Policy for the Private Sector

The Draft Space Activities Bill and its Challenges

BY Meera Rohera

In 2017, the Indian Department of Space (DOS) released the Draft Space Activities Bill, a proposed bill setting goals and regulations for the private space industry. The Draft Bill was drawn up as a result of several startup companies in India expressing interest in space activities and the need to create an appropriate legal environment for private industry. In 2020, the Government of India announced that private companies would be allowed to play a more active part in India's space sector. The government introduced these policy reforms intending to leverage the private sector to make it one of the most self-reliant, spacefaring

nations. Space is a booming industry around the world—current estimates predict that the revenue generated by the global space industry could increase to over \$1 trillion annually by 2040.¹ For decades, India's renowned space agency, the Indian Space Research Organisation (ISRO), has independently launched and maintained India's space program as one of the best in the world.² But in this rapidly growing environment, the Indian government has recognized that it cannot harness the demand for space-based activities and services on its own. The new developments in the DOS

¹ "Space: Investing in the Final Frontier," Morgan Stanley, accessed September 24, 2021, <https://www.morganstanley.com/ideas/investing-in-space>.

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intend to open the floodgates for indigenous private companies to propel India's odyssey in space forward.

Whether the Draft Bill is conducive to private industry is a contentious issue. There are differences in the level of optimism among the government, industry leaders, and space and legal experts. Although both government and industry display a high level of optimism on the future of the private sector in space, the substance of the policy deserves scrutiny to ensure its feasibility. The key question facing policy makers in India is *will these policy changes successfully bolster the Indian space sector?* This paper explores the challenges and opportunities in growing the private space sector in India under the Draft Space Activities Bill.

History of India's Space Program

India's space program began with the inception of the Indian National Committee for Space Research (INCOSPAR) in 1962. In 1969, INCOSPAR was superseded by ISRO, formally institutionalizing the space program. India's space capabilities have come a long way since 1969. ISRO launched its first satellite, *Aryabhata*, in 1975; commissioned the Indian National Satellite System in 1983; sent its first lunar probe, *Chandrayaan-1*, to the Moon in 2008; reached Mars on its first attempt in 2014; and controversially (but successfully) conducted its first direct-ascent anti-satellite test (ASAT) in 2019.³ ISRO's current focus is on the Geosynchronous Satellite Launch Vehicle (GSLV)

Mark II, which recently failed to launch due to difficulties in the cryogenic upper stage, and the *Gaganyaan* crewed orbital spacecraft that plans to launch on the GSLV Mark III. While ISRO saw recent success completing a third long-duration hot test of the liquid propellant Vikas Engine for the crewed GSLV Mark III launch, the launch date has been delayed from December 2021 to 2023.⁴ Amid the COVID-19 pandemic, ISRO supported various State governments with geospatial tools and location-based solutions to track and fight COVID,⁵ and it also developed three

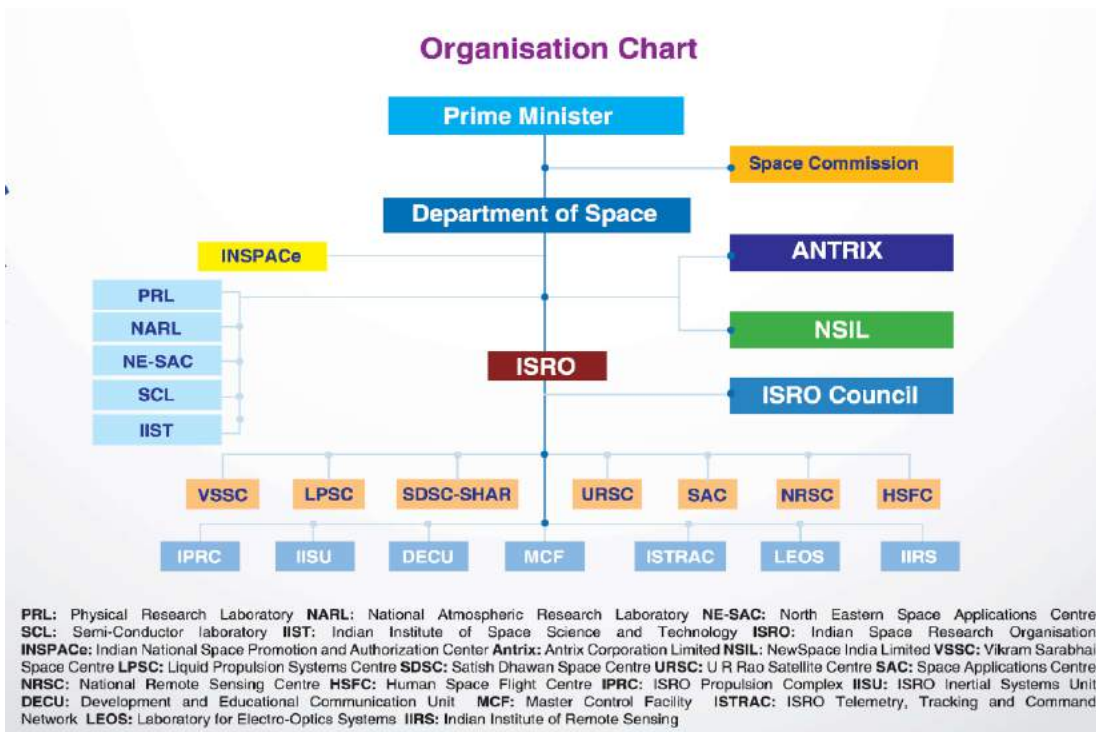


Figure 1 Space Organizational Chart. Source: Indian Space Research Organisation, <https://www.isro.gov.in/about-isro/organisation-structure>.

³ "ISRO's Timeline from 1960s to Today," ISRO, accessed September 24, 2021, <https://www.isro.gov.in/about-isro/isros-timeline-1960s-to-today>.

⁴ "Third Successful Vikas Engine Long Duration Hot Test for Gaganyaan Program," ISRO, accessed September 24, 2021,

<https://www.isro.gov.in/update/14-jul-2021/third-successful-vikas-engine-long-duration-hot-test-gaganyaan-program>.

⁵ "Covid-19 Apps," ISRO, accessed September 24, 2021, <https://www.isro.gov.in/covid19>.

different types of ventilators and transferred the technology to industry for manufacture.⁶

ISRO has been the center of the country's space program since its inception. While Figure 1 shows that ISRO reports to the Department of Space, the hierarchy seems to be superfluous in actuality. ISRO has historically spearheaded the Indian space program. It is important to note that ISRO and the DOS have the same headquarters in Antariksh Bhavan in Bangalore, and interestingly, are housed on the same website under ISRO's name (<https://www.isro.gov.in/>). Additionally, the Chairman of ISRO, Dr. Kailasavadivoo Sivan is the Secretary of the DOS and the Chairman of the Space Commission, which is responsible for the creation and application of space policy to promote the development of space science and harnessing technology to benefit India socially and economically.⁷

ISRO carries out end-to-end space activities—from the design and development of launch vehicles and spacecraft, through launch and post-launch activities. One of its most prominent achievements is the Polar Satellite Launch Vehicle (PSLV), an expendable medium-lift rocket designed and operated for multi-satellite deployment campaigns at a relatively low cost. ISRO, with the Antrix Corporation Ltd., has launched hundreds of Indian and foreign satellites into space, helping make India a global player in the smallsat launching market.

Formed in 1992, Antrix is the commercial arm of ISRO, responsible for marketing ISRO products like satellite communications (SATCOM), launch, remote sensing, spacecraft and subsystems, and ground infrastructure services to foreign entities.⁸ In 2019, however, a new nodal agency called NewSpace India Ltd. (NSIL) was created by the Government of India with a nearly identical purpose. It focuses on PSLV production, SSLV manufacturing, launch services, satellite-based services, and satellite manufacturing and subsystems.⁹ The creation of NSIL has been described as part of moving towards a demand-driven approach to bolster the space industry, but the government has not made it clear why the almost identical Antrix cannot play that part. This is suspected to be the aftermath of the Antrix-Devas deal, where Antrix canceled an agreement with Devas Multimedia to lease them the S-band satellite spectrum to launch satellite-based applications on mobile phones. Devas turned to international arbitration, and Antrix now owes them \$1.2 billion in compensation.¹⁰ If Antrix goes bankrupt, NSIL could fill the gap left behind and be there to take its place—however, a U.S. federal court recently allowed Devas investors to track down Antrix's assets, including transferred assets to the Government of India and NSIL.¹¹

Indian private industry has been active in the space sector for over four decades, producing over 80% of ISRO components, and private firms are engaged in the manufacturing of satellites for ISRO. These private

⁶"Isro Develops Three Types of Ventilators to Battle Covid-19," Hindustan Times, June 07, 2021, accessed September 24, 2021. <https://www.hindustantimes.com/india-news/isro-develops-three-types-of-ventilators-to-battle-covid19-101623053775130.html>.

⁷Federation, International Astronautical, "Indian Space Research Organisation (ISRO)," IAF, accessed September 24, 2021. [https://www.iafastro.org/membership/all-members/indian-space-research-organisation-\(isro\).html](https://www.iafastro.org/membership/all-members/indian-space-research-organisation-(isro).html).

⁸"Welcome to Antrix," Antrix, accessed September 24, 2021. <https://antrix.co.in/>.

⁹"NSIL," Welcome to NSIL, accessed September 24, 2021, <https://www.nsilindia.co.in/>.

¹⁰Surendra Singh / TNN / Oct 30, 2020, "ISRO: Devas Wins 9-year-old Legal Battle against Antrix as US Court Awards It \$1.2 Billion Compensation: India News - Times of India," The Times of India, accessed September 24, 2021. <https://timesofindia.indiatimes.com/india/devas-wins-9-year-old-legal-battle-against-antrix-as-us-court-awards-it-1-2-billion-compensation/articleshow/78951639.cms>.

¹¹"US Court Allows Devas Investors to Track down ISRO Commercial Arm Antrix's Assets to Recover \$1.3 Billion Compensation," The Indian Express, August 19, 2021, accessed September 24, 2021. <https://indianexpress.com/article/cities/bangalore/us-court-devas-antrix-isro-1-billion-compensation-7460733/>.

companies act as vendors to ISRO, supplying manufactured space goods based on ISRO needs. Given that there have been no other domestic buyers for space components, ISRO has been their sole customer for these goods. Overall, this creates a ‘supply-driven Indian commercial space sector, as the private industry does not have the ability to address global demand for space services or innovate to fill demand gaps within the country itself — they simply supply to ISRO. While this has been relatively successful to date, it may be unable to adapt to the booming global space industry.

A consequence is that the private sector is not a big exporter of space systems and components as most companies, with the exception of Accord Global Technology Solutions and Saankhya Labs, do not have products to export to begin with. Their sole focus is meeting ISRO’s supply needs. Additionally, the private space sector is regulated under India’s export control system for SCOMET items, that is for ‘Special Chemicals, Organisms, Materials, Equipment, and Technologies’ that are dual-use. Although, these regulations on items that have both civilian and military uses are standard and similar to other countries.

Reasoning for the Draft Bill

In 2020, Finance Minister Nirmala Sitharaman announced the opening of India’s space sector to private industry, saying “We will allow private players to benefit from ISRO’s assets and give them a level-playing field to boost India’s space sector further.”¹² Unlike before, Indian private space companies can now actively

participate in the domestic and international space economy instead of solely supplying to ISRO.

Similarly, the DOS has expressed interest in encouraging private sector participation in space but has identified two hurdles to its goal. In a 2020 webinar on ‘Unlocking India’s Potential in Space Sector,’ ISRO’s Chairman Dr. K. Sivan explained that first, “there was no mechanism available in the country to extend any kind of technology or infrastructure support to [private industry].”¹³ The success of private industry can be improved with technology transfers and access to ISRO’s facilities for research and development. Two memoranda of understanding signed between ISRO and space start-ups Skyroot, a space manufacturer and launch service provider, and Agnikul, another new startup developing its own small-lift launch vehicle, give the companies access to ISRO facilities and expertise.¹⁴

Second, Dr. Sivan expressed that “there was no regulatory mechanism to control the private sector activities.”¹⁵ Due to the national security importance of space, along with the regulatory requirements under international law, the onus of monitoring all space activities falls on the national government. Space has become a strategic sector, and thus the government has an interest in new technologies being developed, particularly if they are dual use for both civil and national security interests. Since India is party to the Outer Space Treaty, the Liability Convention, and the Registration Convention, the responsibility of any destruction or damage lies with the government. An

¹² Achom, Debanish, "Space Travel, ISRO Facilities Opened To Private Sector: Government," NDTV.com, May 16, 2020, accessed September 24, 2021. <https://www.ndtv.com/india-news/future-projects-for-planetary-exploration-outer-space-travel-to-be-open-for-private-sector-nirmala-sitharaman-2229930>.

¹³ YouTube, “Webinar on Unlocking India’s Potential in Space Sector”, ISRO, August 20, 2020, accessed September 24, 2021. <https://www.youtube.com/watch?v=xBlnc3957M8>.

¹⁴ Chethan Kumar / TNN / Updated: Sep 18, 2021, "Isro: Pvt Space Activity Gains Pace, 2 Firms Ink Key Pacts with Isro, 3rd Opens New

Lab, 4th Readies for Launch: India News - Times of India," The Times of India, accessed September 26, 2021.

<https://timesofindia.indiatimes.com/india/pvt-space-activity-gains-pace-2-firms-ink-key-pacts-with-isro-3rd-opens-new-lab-4th-readies-for-launch/articleshow/86313514.cms>.

¹⁵ YouTube, “Webinar on Unlocking India’s Potential in Space Sector”, ISRO, August 20, 2020, accessed September 24, 2021. <https://www.youtube.com/watch?v=xBlnc3957M8>.

adequate regulatory and monitoring capacity is thus crucial.

Specific Language in the Draft Bill

Introduced as a public draft in November 2017, the Draft Space Activities Bill covered a variety of issues relating to commercial activities in the space sector including definitions, powers of the central government on space-related activities and actors, authorization and licensing registration of space objects and liability requirements, offenses and consequential penalties, and intellectual property rights. The Draft Bill aims to support the overall growth of Indian commercial space activities by creating a regulatory environment in compliance with international law and by addressing the previous hurdles to the goal of encouraging the private sector. There was no standard format consistent with how the government (ISRO and DOS) signed agreements with private players, and the Draft Space Activities Bill would make this more procedural. The Draft Bill was drawn up based on the Model Law on National Space Legislation¹⁶ that was submitted by the International Law Association to the Committee on the Peaceful Uses of Outer Space (COPUOS) as well as comparative studies of space acts of other space-faring nations.

Comments, if any, had to be sent in by December 21st, 2017. A year later in December 2018, the DOS announced that it had received a total of 52 responses from various stakeholders ranging from the aerospace industry and start-ups to lawyers and scientists.¹⁷ DOS

¹⁶ Draft Space Activities Bill, November 21, 2017, https://prsindia.org/files/bills_acts/bills_parliament/1970/Draft%20Space%20Activities%20Bill%202017.pdf.

¹⁷ "Bill on Commercialization of Space Activities Likely in 2019," Hindustan Times, December 30, 2018, accessed September 24, 2021. <https://www.hindustantimes.com/india-news/bill-on-commercialization-of-space-activities-likely-in-2019/story-2lxrwXC4ANBbfAY5nsvUM.html>.

¹⁸ Draft Space Activities Bill, November 21, 2017, https://prsindia.org/files/bills_acts/bills_parliament/1970/Draft%20Space%20Activities%20Bill%202017.pdf.

stated that concerns raised included the “scope of space activities, regulatory mechanism, licensing and authorization procedures, sharing of liability burden with a limit on damage costs, penal provisions, powers of Central Government, etc.”¹⁸ By July 2020, ISRO Chairman K. Sivan said that the Draft Space Activities Bill, along with a national space policy, was in the “final stages.”¹⁹ However, it is unclear what Sivan meant by ‘final stages’ as the Draft Bill has not passed through either of the two legislative houses of the Parliament of India. become legislation. It also has not been approved by the Cabinet nor been passed in Parliament. It is possible that the bill has been lowered in priority due to the COVID-19 pandemic. A clear lack of consensus for certain issues from Indian space stakeholders could also contribute to a slower approval process. ISRO has announced that it would also release a National Space Policy along with the final Space Activities Bill, but there has been no public release of such a policy.²⁰

Challenges to Implementation

The ISRO

The announcement by Finance Minister Nirmala Sitaraman on opening the space industry to private companies in 2020 seemed to be met with some hesitation by ISRO. In response, ISRO tweeted, “Department of Space will follow Government guidelines and enable private players to carry out space activities in the country.”²¹ This tweet clearly lacked

¹⁹ "Space Activities Bill, Space Policy in Final Stages: ISRO Chief," Business Today, accessed October 26, 2021. <https://www.businesstoday.in/latest/economy-politics/story/space-activities-bill-space-policy-in-final-stages-isro-chief-263149-2020-07-05>.

²⁰ Bubna, Vidhi, "The Upcoming Space Activities Bill in India and What It Needs to Address," Modern Diplomacy, September 10, 2020, Accessed September 24, 2021. <https://moderndiplomacy.eu/2020/09/11/the-upcoming-space-activities-bill-in-india-and-what-it-needs-to-address/>.

²¹ Isro, “Department of Space Will Follow Government Guidelines and Enable Private Players to Carry out Space Activities in the Country,”

enthusiasm and gives the impression that the DOS is merely following the decision, instead of being a driving force behind it. However, this is unsurprising due to the monopoly ISRO has enjoyed for decades. ISRO leadership may be uncomfortable with having private companies on a 'level-playing field' with a government institution, especially the possible readjustment that will emerge from private companies taking a larger part in space activities that have been a part ISRO's program for decades. ISRO may lobby to protect the organization's relative monopoly in space activities by trying to concentrate private industry activities in manufacturing rather than providing the full range of space services.

A repeated complaint raised in interviews with space industry leaders and experts is that the future of the private industry in India may still follow more of a supply-driven model because of the control ISRO wields. Additionally, because government-adjacent entities like NSIL and Antrix are pursuing similar commercial activities as private companies, there is deep concern that there will be pushback on which activities private space companies are allowed to participate in. Private companies suspect that ISRO will prioritize these government-affiliated organizations. This has a domino effect on investor confidence, as there is uncertainty that innovative technologies or intellectual property (IP) ripe for investment will obtain licensing and authorization by the government due to competition from government-affiliated organizations.

A manifestation of this problem is in Chapter VI of the Draft Bill, which addresses miscellaneous issues not covered in other parts of the bill. Section 25 of Chapter VI states that any form of IP generated from any type of space activity will be deemed the property of the

government. Without the right to information and intellectual goods to create value with research and development, companies will likely be discouraged to continue contributing to space activities in India. As indicated in the conversations with space industry experts, space start-ups could shift to other countries that have more liberal legislation concerning IP and provide a better environment for securing investment. While it is understandable that the government would want to control or access the dual-use space technology or IP that protects or threatens national security, this is a big obstacle in stimulating India's commercial space market. It may be preferable if IP was examined on a case-by-case basis or if the government could access IP or control the use of IP without necessarily owning it.

Ambiguity and failure to address private industry needs

The public version of the 2017 Draft Space Activities Bill adequately identifies the international obligations India has under relevant UN charters and treaties. The explanatory note within the Draft Bill emphasizes that "non-governmental space activities are required to be licensed/ authorized and continuously supervised by a State in order to comply with treaty obligations."²² While this acknowledges India's international responsibilities, the legislation proposed falls short of being practical for private companies because of its general lack of specificity.

Chapter I lays out the scope of application and defines relevant terms in the Draft Bill, with section 1.2 stating that the legislation would extend to "all space objects of Indian origin in outer space."²³ The lack of clarity in outlining criteria for 'objects of Indian origin' creates ambiguity in the scope of application for this

Twitter, Twitter, 16 May 2020, <https://twitter.com/isro/status/1261645209173024769>.

²² Draft Space Activities Bill, November 21, 2017, https://prsindia.org/files/bills_acts/bills_parliament/1970/Draft%20Space%20Activities%20Bill%202017.pdf.

²³ Ibid.

section. How would it apply to, say, a company that has done its research, development, and testing for its satellites in India, but has a working entity in a foreign country that uses the same IP to make the satellites and launch them from that said country? More clarity is needed from the government to ensure a clear regulatory environment for Indian companies looking to get into the space market.

Chapter II of the Draft Bill outlines the regulatory mechanism for the space industry, giving power to the Central government in terms of calling for information, investigation, and making policy and planning decisions. Chapter III addresses developing state-run mechanisms for licensing and authorization. On licensing, the Draft Bill only states that space activities cannot jeopardize public health or the safety of individuals or property. This is consistent with the international obligations of India through the Liability Convention and does not compromise the sovereignty and national security of India. However, the Draft Bill does not offer any standard on which applications for licenses will be accepted or denied, and no timeframe for this due process is outlined. Timeframes for approval have been a recurring problem for private space companies in India, with permissions often taking years only to be rejected. Section 5 of Chapter III also makes insurance a prerequisite for any licensing approvals, with undefined insurance costs to be calculated with government discretion. Private industry reactions to this section included requests for more clarity on requirements, including insurance floors. As for the revoking of licenses, it states that the licensee would have a “reasonable opportunity of being heard,” which is highly ambiguous²⁴. Furthermore, there is no formal process for companies to appeal such decisions.

²⁴ Ibid.

²⁵ Ibid.

Similarly, Chapter IV Section 12 indemnifies the government of all liabilities arising from any space activity or in relation to the space object covered by the license provided. Section 26 of Chapter VI takes away any accountability held by the government “in respect of anything done in good faith in pursuance of any space activity under this Act or any rule or order made thereunder.”²⁵ It would again be beneficial to have an appeals process that gives private companies the ability to create more accountability and impartiality in the government’s actions and decisions.

There is a broad spectrum of space activities, ranging from the production of launch vehicles and satellites to operating satellites and ground stations to space-based services and resource utilization. The Draft Bill, however, legislates a single policy for the entire space industry. Mr. Narayan Prasad aptly wrote, “a national space legislation with blanket regulations to cover all companies, which could be pursuing activities as different as remote sensing and deep-space exploration, may not provide the regulatory clarity required.”²⁶

Overall, while the Draft Bill legislates policy in line with international law, it does not support the Indian private space industry with the regulatory certainty it needs to flourish. Currently, red tape and regulatory hurdles are a serious impediment for commercial space investment, which the Draft Bill does not entirely solve. In interviews with space industry leaders and experts, they expressed that the process of obtaining clearances and licensing still requires private companies to jump through numerous hoops—it is a lengthy, complicated, and grueling process. Hopefully, the creation of INSPACe will ease the process. The Draft Bill legislates how the government will hold private actors accountable without creating any accountability for itself. It is

²⁶ Prasad, Narayan, "Space Activities Bill, Meant to Boost Private Role, Will Create Confusion Instead," *ThePrint*, October 11, 2019. accessed September 24, 2021. <https://theprint.in/science/space-activities-bill-meant-boost-private-role-confusion/303950/>.

important for the government to ensure smooth processes for the space industry without unnecessary red tape, time delay, or corruption and middlemen. Lawyer Ashok G.V. wrote in 2019, “the right policy around the sector can mitigate the crisis created by poor investor sentiment and thus help emerging start-ups.”²⁷ A clearer policy will increase the predictability and security of investments, assuring returns and thus investor confidence. This would also be in the interest of the government, as it would help the space sector flourish with less federal investment.

Looking Forward

Why emphasize the private space sector?

The Draft Bill intends to promote and enhance the private space sector in order to supplement and build on India's long space legacy. In a press release, ISRO explained that “in order to enhance utilization and maximize benefits from the space assets, it is proposed to change the approach from ‘Supply Based Model’ to ‘Demand Based Model.’”²⁸ A demand-based model would allow for a private industry that develops and delivers solutions based on the identification of needs of the Indian and global space markets, instead of the current model, where the ISRO dictates the supply provided by private industry. The space industry could benefit from a more free market based approach.

Opening the space sector to private actors presents an opportunity for ISRO to prioritize certain space activities

over others. To put it in perspective, NASA’s budget in fiscal year 2020 was \$22.629 billion compared to the approximately \$1.798 billion ISRO budget—prioritization and privatization is crucial if India wants to be competitive with its international counterparts.²⁹ Given that the ISRO’s budget is so constrained (in 2021, it was approximately 0.4% of the total national budget³⁰), this shift in responsibility presents an opportunity to pass on some space missions to private actors. If ISRO transferred tried and tested technologies such as launch services and PSLV production to private sector companies, it would have more time and resources to focus on deep space scientific and technological research. Competition between new private sector firms could help build launch capabilities and services that are internationally competitive with other spacefaring nations and companies like SpaceX. Introducing private actors would let market efficiencies prevail and allow the better allocation of resources and technology development. NSIL must work on public-private partnerships for the PSVL and technology transfers.

Opening the space sector to private companies will also increase the diversity of the Indian space program. If commercial actors are allowed to service needs outside of ISRO, the market will be able to expand and find new niches in space activities. As of September 2021, the Indian space market is worth \$7 billion, which is 2% of the global space market.³¹ These new regulations could allow private companies the opportunity to enter the

²⁷V., Ashok G, "The Space Activities Bill- Does It Deliver?" ORF, accessed September 24, 2021. <https://www.orfonline.org/expert-speak/the-space-activities-bill-does-it-deliver-50019/>.

²⁸ "Opening Up Indian Space Sector For Private Sector –Reforms," ISRO, accessed September 24, 2021. <https://www.isro.gov.in/unlocking-india's-potential-space-sector/opening-indian-space-sector-private-sector--reforms>.

²⁹ "ISRO Budget 2020 Allocated ₹13,479 Crore for Space Exploration," Business Insider, February 01, 2020, accessed September 24, 2021. <https://www.businessinsider.in/budget/news/isro-space-budget-2020-allocation-and-updates/articleshow/73830948.cms>.

³⁰ "ISRO Will Transform in 2021 as India Pumps Big Money to Draw in Startups for the 'second Space Age'." Business Insider. February 04, 2021. Accessed December 03, 2021. <https://www.businessinsider.in/science/space/news/isro-will-transform-in-2021-as-india-pumps-big-money-to-draw-in-startups-for-the-second-space-age/articleshow/80683054.cms>.

³¹ Pricewaterhousecoopers "Preparing to Scale New Heights: Enhancing Private Participation in India's Commercial Space Sector," PwC, accessed September 24, 2021. <https://www.pwc.in/research-insights/2020/preparing-to-scale-new-heights.html>.

global market. Given its unique geographic and socio-economic position as compared to other space-faring nations, India could become a space service provider for other nearby regions in the global south. Companies could gain the expertise of adapting technologies to different regions, languages, and cultures and implement them where space markets are not yet fully developed.

Lastly, having an indigenous private space industry would lead to higher tax generation, job creation, and the export of services. As emphasized in the central government's MakeInIndia initiative and *Atmanirbhar Bharat* (which translates to Self-Reliant India), these policies could help to make India self-sustaining in the space sector through public-private partnerships while making it a more important part of the global space economy.

IN-SPACe: Regulate or Stimulate?

In June 2020, the DOS set up the Indian National Space Promotion and Authorization Center (IN-SPACe) as an institutional mechanism to regulate, support, and stimulate private industry investment in the space sector. IN-SPACe offers some hope on the topic of conflict of interest between ISRO and private commercial activities. IN-SPACe is an autonomous body under DOS, which acts as a single-window nodal agency to permit, oversee, and facilitate the activities of Non-Governmental Private Entities (NGPEs). This is similar to the new Office of Space Commerce at the US Department of Commerce, which is intended to be a single point of contact for commercial space companies. Its role includes sharing the space technology, infrastructure, and premises of ISRO with NGPEs as a way to help create temporary facilities and monitor all activities.³² The future of IN-SPACe does look hopeful. It

is planned to have its own cadre empowered to take independent decisions including members from IN-SPACe, industries, academia, and DoS, along with an inbuilt monitoring mechanism. It will also have access to the Space Commission to solve disputes between the government and private companies, as well as a proposed organization like the Telecom Disputes Settlement and Appellate Tribunal (TDSAT) that would serve as an appellate body for solving conflict.

To ensure success, IN-SPACe needs to be able to act as a separate organization from ISRO. This would help avoid conflicts of interest that could arise in the case that it is not independent, such as IN-SPACe restricting licensing to maintain ISRO's monopoly on commercial space activities.

Several key IN-SPACe leadership positions were recently assigned, including the appointment of Mr. Pawan Kumar Goenka, the former Managing Director of Mahindra & Mahindra, as Chairman. The fact that Mr. Goenka is not an ex-ISRO official is a positive step for IN-SPACe. Dr. Susmita Mohanty, a space entrepreneur who has co-founded space companies in San Francisco, Vienna, and Bangalore and has worked with NASA and Boeing, remarked that the choice of the Chairman was promising. But, she pointed out four pitfalls that were made in selecting the board. First, she said that she was not sure if any of the candidates had worked in the aerospace sector abroad. While there was robust domestic experience, it would be better to have at least one candidate with credible understanding of and experience in the international aerospace industry. Foreign experience lends an international perspective and comparative understanding of developed versus emerging space economies – both vital for liberalizing India's private space sector. Second, she noted that there was no representation from the Indian NewSpace

³² "INSPACe Structure," ISRO, accessed September 24, 2021. <https://www.isro.gov.in/indian-national-space-promotion-and-authorization-center-space-structure>.

community of nearly fifty private space start-ups. If having prime contractors like Hindustan Aeronautics Limited (HAL) and Larsen & Toubro (L&T), traditional space manufacturers that historically supply to ISRO, is not considered a 'conflict of interest', it would only be fair to include a NewSpace startup on the Board. Third, she emphasized that there was only token female representation on the IN-SPACe Board—there is just one woman, Professor Preeti Aghaiayam from IIT Madras. At least 1/3 of the board should be women. India has no dearth of accomplished women working in science, tech, and innovation. Lastly, she said that the newly appointed Board's composition is such that strictly speaking IN-SPACe cannot be labeled a truly autonomous body. A large majority of the Board is directly or indirectly affiliated to ISRO—either as current or former employees, or as industrial contractors.

All eyes will continue to be on IN-SPACe's leadership and the actions and authorizations that will be made in the first years of the organization's lifetime. IN-SPACe could be at the forefront of bolstering India as a space power. It must put the effort in promoting and fairly regulating private industry while keeping international law and national security in mind. Should IN-SPACe's board continue to be filled with ISRO insiders, it is unlikely that the organization will achieve these goals.

Another positive step was the recent meeting held by ISRO where Dr. K Sivan interacted with large private firms, startups and academics that have proposed ideas to IN-SPACe. In that meeting, Dr. K Sivan also urged private industry to join the newly formed Indian Space Association (ISpA), an advocacy group representing stakeholders of the space industry.³³ ISpA could aid in bringing a streamlined industry perspective to IN-

³³NewIndianXpress, "Space Industry Advocacy Group ISpA Presents Roadmap to ISRO Chariman K Sivan," The New Indian Express, August 27, 2021, accessed September 24, 2021. <https://www.newindianexpress.com/nation/2021/aug/25/space-industry-advocacy-group-ispa-presents-roadmap-to-isro-chariman-k-sivan-2349768.html>.

SPACe, as well as the DOS, to help legislators and regulators take industry perspectives into account.

Space Sustainability

An area of potential improvement for the Draft Bill is space sustainability. Section 8 of Chapter III and Section 16 of Chapter V emphasize the requirement against damaging the environment on Earth or in outer space and elaborates on potential punishments if such damage is incurred. However, the Draft Bill lacks any further specific language related to space sustainability practices. The responsibilities of private space companies as described in the Draft Bill are vague, and it may be useful to have particular requirements on space sustainability explicitly included. During the 2018 Observer Research Foundation Kalpana Chawla Annual Space Policy Dialogue, Lt. Gen. Amit Sharma, the former Commander-In-Chief of the Indian Strategic Forces Command, stated that "given India's reliance on space assets, it must not shy away from framing the rules for space sustainability."³⁴ This advice must be taken seriously from all aspects of India's space enterprise.

Two areas worthy of further exploration are space debris mitigation and satellite end-of-life disposal. The UN Office for Outer Space Affairs has a comprehensive document, the 'Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space', which outlines several mitigation measures that can be adopted. As a founding member of COPUOS and a signatory to the long-term sustainability guidelines, India should have direct provisions in the Draft Bill fulfilling the commitments it has made internationally. Additionally, for space debris mitigation, the government needs to begin by setting good standards

³⁴ "India Should Not Shy Away Framing Rules for Space Sustainability," ORF, accessed September 24, 2021. <https://www.orfonline.org/research/india-should-not-shy-away-framing-rules-for-space-sustainability/>.

itself and avoid creating unnecessary space debris as it did with its direct-ascent ASAT weapon test in 2019. It should also require all satellites and launch vehicles to have an end-of-life disposal plan to not create lingering debris in popular orbits.

Conclusion

India has reached an inflection point in space. The country can emerge as a leading space power in private sector innovation and sustainability, or it risks falling behind and slowly losing its spot as a leading spacefaring nation. The Draft Space Activities Bill is a momentous opportunity for the Indian space sector that has excited the commercial space industry and built investor confidence. A recent article titled “A Breath Of Fresh Air for Indian Startup” in GW Prime captures the new hope in the Indian space startup landscape.³⁵ It is important to ensure that it is not just ‘a breath’ but a whirlwind of government action and policy promoting the private space industry.

Even with the current optimism, the space sector could get stuck in a paradox. The government opened up commercial space to private companies to diversify space activities without spending its own money, but the Draft Space Activities Bill has shaken investor confidence in some respects. It seems that while ISRO wants more private sector participation, the organization is limiting participation to its existing suppliers and not fostering growth for new commercial companies to enter the sector. ISRO continues to list cutting-edge technology areas for development by industry, opportunities in selected science and

exploration missions, and tenders for private companies on its website.³⁶

However, this may only encourage the same supply-driven model that already exists. With current proposed regulations, titan space companies like SpaceX or Blue Origin will not be able to easily operate in India. Regulations related to IP and ambiguity in other regulations make it difficult for indigenous companies to compete globally and could lead to them leaving India to set up shop elsewhere in Europe or the United States.

Being a global space power has always been on the Indian agenda. Just as Vikram Sarabhai, regarded as the father of the Indian space program, said, “if we are to play a meaningful role nationally, and in the community of nations, we must be second to none in the application of advanced technologies to the real problems of man's society.”³⁷ India is chasing down that dream of being at the forefront of space technology to serve the needs of its people and the world. However, to do so, it must develop a robust portfolio in space with the help of indigenous private space companies.

There is a clear path forward, especially since India has the indigenous talent in science and engineering that it needs. First, the DOS must ensure that the private industry operates within the bounds of international law through regulation. Second, the DOS should nurture NewSpace startups with technology and infrastructure support while also giving these startups leeway to develop their own path and pursue market opportunities beyond the Indian government. It is important to ensure that IN-SPACE is a completely separate entity from ISRO to avoid conflicts of interest

³⁵ Sharma, Bhavna, "A Breath of Fresh Air for Indian Startups," GWPrime, September 21, 2021, accessed September 26, 2021, <https://www.gwprime.geospatialworld.net/business-and-industry-trends/a-breath-of-fresh-air-for-indian-startups/>.

³⁶"Announcement of Opportunities for NGPEs," ISRO, accessed September 24, 2021, <https://www.isro.gov.in/indian-national-space->

[promotion-and-authorization-center-space/announcement-of-opportunities-ngpes](https://www.isro.gov.in/indian-national-space-promotion-and-authorization-center-space/announcement-of-opportunities-ngpes).

³⁷ Business Standard, "Who Was Vikram Sarabhai, ISRO Founder, Vikram Sarabhai Discoveries, Vikram Sarabhai News," Business Standard, accessed September 24, 2021, <https://www.business-standard.com/about/who-is-vikram-sarabhai>.

and that the Draft Space Activities Bill satisfies regulatory and industry needs. Third, the Draft Bill should include normative provisions for sustainability in terms of hard guidelines on debris mitigation, end-of-life retirement, and environmental pollution.

In its current state, the Draft Space Activities Bill cannot adequately bolster the private space industry in India.

By allowing the private sector more freedom and

changing certain clauses, this new legislation could have a significantly greater impact. When the Draft Bill is brought for discussion in the parliament, the Indian government should pay heed to security and international law while also giving adequate consideration to industry needs. ▶

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