Mapping India's Spacetech Industry & Regulatory Landscape A Launchpad for Innovation and Growth

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Foreword

The Indian space sector is undergoing a remarkable transformation.

With increased private participation, over 523 private companies and research institutions are now actively contributing to the industry.¹ This collaborative effort is propelling India's space economy forward, and is projected to reach \$44 billion by 2033, capturing nearly 10% of the global market.²

The government has allocated nearly \$1.6 billion for the Department of Space (DoS), which oversees the Indian Space Research Organisation (ISRO) and other space-related activities.³ However, the landscape is rapidly evolving as private investors increasingly recognize the potential of space ventures. Since 2014, there has been a significant surge in investments, particularly in satellite manufacturing and launch services, with \$233 million invested across more than 30 deals by July 2023.⁴

This manual aims to provide comprehensive insights into the industry overview, investment landscape, legal considerations, tax incentives, and intellectual property rights essential for stakeholders in the space tech ecosystem.

This manual is designed to be a valuable resource for industry players, investors, policymakers, and legal professionals who are driving and supporting the growth of India's space technology sector.

Welcome to the new frontier of space exploration and innovation in India.

If you have any doubts or need further information, please reach out to us at garima@treelife.in.

¹ <u>https://sansad.in/getFile/annex/262/AU621.pdf?source=pqars</u>

² https://inspace.service-now.com/sys_attachment.do?sys_id=c4547416877d711082e163d70cbb35d3

³https://www.theweek.in/news/sci-tech/2024/02/05/will-the-increase-in-fund-allocation-help-the-dos-in-dealing-wit.html ⁴https://telecom.economictimes.indiatimes.com/news/portal-in-portal/satcom/indias-private-space-sector-soared-in-last-<u>decade/109069315</u>



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Introduction: Understanding Spacetech



What is spacetech?

Space technology, often shortened to spacetech, refers to the application of engineering and technological advancements for the exploration and utilization of space. It encompasses a vast array of disciplines, from designing and launching satellites to developing advanced propulsion systems for efficient space travel. Ground infrastructure, robotics, space situational awareness, and even life sciences for human spaceflight all fall under the umbrella of spacetech.⁵

What all activities does it include?

The spacetech industry includes various critical activities such as:

- **Satellite Manufacturing:** Developing and producing satellites for communication, Earth observation, navigation, and other purposes.
- Launch Services: Providing the infrastructure and technology to launch satellites and other payloads into space.
- **Space Research:** Conducting scientific studies and experiments to explore space and develop new technologies.
- **Space-Based Applications:** Utilizing data and services derived from space technologies for various sectors, including agriculture, disaster management, urban planning, and telecommunications.
- **Space Exploration:** Missions to explore the Moon, Mars, and beyond, involving both crewed and uncrewed spacecraft.
- **Space Debris Management:** Technologies and strategies for tracking and mitigating space debris to ensure safe operations in orbit.
- **Commercial Spaceflight:** Services and technologies related to space tourism and commercial crewed missions.
- **Space Law and Policy:** Development of legal frameworks and policies to govern activities in space, including international cooperation and regulation.

⁵ <u>https://it.telangana.gov.in/initiatives/spacetech/</u>



Key Activities in Indian Space Technology Sector

Satellite Manufacturers

These companies design and build satellites for applications such as communication, Earth observation, and navigation. Public-private collaborations, like PSLV-C53, are advancing satellite and launcher manufacturing in India.

Launch Service Providers

Emerging private companies aim to offer competitive and cost-effective launch solutions.

Space Tech Startups

Developing innovative solutions in areas like remote sensing analysis, space debris management, and space-based internet.

Research Institutions

Universities and research institutes play a pivotal role in developing new technologies and fostering innovation in the space sector, maintaining India's competitive edge in space research and technology development.

The focus is now shifting towards commercialization, with private companies leveraging space data and ISRO's commercial arm, New Space India Limited (NSIL), facilitating private participation in launch services.



Recent Trends in Spacetech

- Increased Private Sector Involvement: Companies like SpaceX⁶, and Blue Origin, are reducing costs through reusable rockets and commercial space services. In India, private companies like Skyroot Aerospace⁷ and Agnikul⁸ Cosmos are making significant strides in developing launch vehicles and other space technologies.
- Miniaturization and Cost Reduction: Advances in technology are making satellites smaller, cheaper, and more accessible. The Indian space agency has successfully demonstrated its capability with missions like the Mars Orbiter Mission (Mangalyaan) and Chandrayaan, which were accomplished at a fraction of the cost.
- International Collaboration: Countries are increasingly collaborating on space missions and sharing resources to achieve common goals. India actively collaborates with several countries and space agencies, such as NASA, Roscosmos, and the European Space Agency (ESA).

Overview of Key Areas

In the following sections, we will delve into the key aspects of India's space tech industry:

- Key Participants in the Space Technology Sector: Exploring the roles of government entities, private companies, and regulatory bodies in driving India's space capabilities.
- Segments of the Indian Private Spacetech Sector Upstream, Downstream & Auxiliary: Analyzing the three primary segments of the spacetech industry and their respective activities and contributions.
- 3. Use Case Analysis Downstream & Upstream: Providing detailed examples of how space technologies are being utilized across various sectors and the innovations driving the industry forward.

⁸https://www.financialexpress.com/business/defence-agnikul-pioneers-worlds-first-rocket-with-fully-3d-printed-engine-all __details-on-what-it-means-for-indias-defence-capabilities-3507909/

⁶ <u>https://www.nasa.gov/launch-services-program-rockets/</u>

²https://www.thehindu.com/news/national/hyderabad-based-skyroot-successfully-test-fires-kalam-250-stage-2-of-vikram -1-space-launch-vehicle/article68001573.ece



Key Participants in the Space Technology Sector

The Indian spacetech ecosystem involves a blend of public and private entities working collaboratively to advance the country's space capabilities.



and more ...



Segments of the Indian Private Spacetech Sector – Upstream, Downstream & Auxiliary

Upstream Segment

Upstream activities involve the design, development, and production processes necessary for creating space infrastructure and technology. These encompass material supply to the integration and launch of space vehicles, ensuring successful deployment and operation of spacecraft and satellites.

Satellites, Launch Vehicles & Their Components: From materials supply,

design, development, testing till integration into launch vehicles.

Space Infrastructure Development: Development of critical space

infrastructure, including launch pads and facilities.

Development of Hardware & Software for Assisting Spacecraft Launch: Ground

 support equipment and software for space systems testing and launch operations.

Space Stations, Space Tourism, In-Orbit Services & Space Manufacturing

 Activities: Services for commercial space operations, space tourism, and in-orbit manufacturing.

Companies/Startups



Downstream Segment

Downstream activities involve the utilization and application of space-based data and services, focusing on the development and deployment of satellite-based products for various sectors. The four key types are:

- Earth Observation (EO): Involves services for storing, analyzing, and developing applications and platforms to provide insights from satellite data, aiding in agriculture, infrastructure development, insurance, and environmental monitoring.
- Positioning, Navigation & Timing Services (PNT): Covers GNSS data services and the development of applications and platforms for tracking assets, navigation, and time synchronization for logistics and financial transactions.
- Satellite Communications (Satcom): Focuses on using communication satellites for broadcasting, communication, and internet connectivity, including providing internet access to remote areas and supporting telecommunication services.
- Space-Based Services Catering to Strategic Purposes: Dedicated to services and applications for national security and strategic interests, including space situational awareness, space tourism, manufacturing in space, and in-orbit services.

Companies/Startups





Auxiliary Segment in the Indian Space Sector

01.

Space Insurance Services

Space insurance plays a vital role in mitigating risks by providing financial protection against risks in space missions, enabling companies to undertake ambitious projects confidently. 02.

Space Education, Training & Outreach Programs

Offers programs to equip professionals with skills in satellite technology, space missions, and data analysis, ensuring industry growth.

03.

Collaborations & Technology Transfers

Collaborations and technology transfers between private firms, research entities, and government bodies are crucial for innovation. These partnerships foster the development and commercialization of new space solutions through the exchange of intellectual property.

04.

Commercialization of Spin-Off Products

Technologies developed for space missions often find terrestrial applications, benefiting various sectors such as aerospace, automotive, and environmental monitoring. The commercialization of these spin-off products drives revenue and technological advancement.



Use Case Analysis - Downstream & Upstream

	Downstream	
Earth observation	Satellite communications	Positioning, Navigation and Timing (PNT)
Agriculture	Commercial Broadband	Navigation for Enterprises and Toll Collection
Sustainability and Biodiversity Conservation	Broadcasting	Drone Guidance
Disaster Management	Banking, Financial Services and Insurance	Railways
Natural Resource Management	Maritime Communications	
Fisheries	Civil Aviation	
Urban Planning and Development	Education	()
Infrastructure Planning and Development	Health	Application area Focus sector
	Upstream	
Spacecraft Design and Manufacturing	Launch Services	Ground Stations and Infrastructure
Satellite Manufacturers	Launch Service Providers	Ground Segment Operators
Rocket Manufacturers	Public-Private Partnerships	Infrastructure Development

These tables provide a clear and concise overview of the various applications and focus sectors in both downstream and upstream segments of the Indian space sector.



Industry Overview – Global & India Perspective



Global Perspective

The global space economy, valued around \$630 billion in 2023, is experiencing robust growth exceeding global GDP. **Experts predict it to reach \$1.8 trillion by 2035 growing at an average of 9% per annum.**⁹ This expansion will be primarily driven by advancements in space-based and space-enabled technologies, including communications, positioning, navigation, timing, and Earth observation.



India's Estimated Space Economy from 2023 - 2040

In contrast, India's space economy was estimated at \$9.6 billion in 2020, holding a 2–3% share in the global space economy. It is projected to grow to \$13 billion by 2025 and \$44 billion by 2033, capturing nearly 10% of the global share. Additionally, an investment of \$25 billion is envisioned over the next 10 years. Consulting firm Arthur D. Little predicts a potential market size of \$100 billion by 2040 for the Indian space sector.

While India's estimates are lower compared to global figures, the country has significant potential to capture a larger share of the global market if it reaches the

⁹https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/space-the-1-point-8-trillion-dollar-opportunity <u>-for-global-economic-growth</u>



anticipated \$1.8 trillion valuation by 2035. Strategic investments, policy support, and innovation will be key to leveraging this potential and positioning India as a major player in the global space economy.



Government Funding¹⁰ and Notable Global Space Tech Companies

The global space economy is booming, with significant investments from governments around the world and the emergence of notable space tech startups driving innovation. The following map highlights government funding allocations and key startups in major space-faring regions, providing a snapshot of the vibrant and competitive landscape of the space industry.

¹⁰ Disclaimer: The government funding data for all the countries is referred from official government websites.

Note (For US): This budget does not include additional military and private sector contributions which can raise the total to around USD 60–70 billion.



India's Space Technology Industry

At the heart of this landscape lies the Indian Space Research Organisation (ISRO), a government agency under the Department of Space. Renowned for its cost-effective missions and technological advancements, ISRO has an impressive track record that positions India as a key player in the global space industry.¹

Key Achievements and Capabilities of ISRO

Extensive Mission Portfolio

Over 124 Spacecraft Missions:

Mars Orbiter Mission (Mangalyaan) and Chandrayaan missions to the Moon

Proven Launch Vehicle Experience

94 Launch Missions -

Includes successful launches of the Polar Satellite Launch Vehicle (PSLV) and the Geosynchronous Satellite Launch Vehicle (GSLV).

Global Standing

ISRO is the 6th Largest Space Agency

Thriving Space Tech Startup Ecosystem

- There are now over 200+ active spacetech startups in India (as of December 2023).
- Since 2016, Indian spacetech startups have collectively raised more than USD 350 million in funding. This continued growth in funding reflects investor confidence in the sector's potential.

Global Launch Service Provider

424 Foreign Satellite Launches for 34 Countries

Reliable and cost-effective launch service provider for international clients.

\$279 Million+ Revenue

India has earned over \$279 million from launching foreign satellites

Global Agreements

Six Agreements with Four Countries (2021-2023): Commercial potential of \$141 million in revenues

Pioneering Private Space Companies

SKYROOT

Skyroot Aerospace remains the first private Indian

company to successfully launch a rocket into space (November 2022).

pixel

Pixxel continues to be the first Indian private startup to successfully launch its satellite, Shakun-

tala, into low Earth orbit (November 2023).



Timeline: A Decade of Transformation in India's Space Journey

This decade has witnessed India's space program make significant strides, not just in terms of missions but also in embracing private participation and fostering a dynamic space ecosystem. Here are the key milestones that shaped the nation's space technology landscape:



Gaganyaan Program: This program is on track for a potential launch, aiming to send India's first crewed mission into space.



Fueling the Journey – PE/VC Activity



The Indian space industry is experiencing a surge in growth, fueled by a dynamic funding landscape. Here's an overview of the funding activity in the spacetech landscape.



Government Space Budget of India (2016-2025)

Annual budget allocation for India's space sector from 2016 to 2025

India's space budget by the Department of Space (DoS), which oversees the Indian Space Research Organisation (ISRO) and other space-related activities has allocated nearly **USD 1.6 billion for FY 24-25**.¹²

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https://www.theweek.in/news/sci-tech/2024/02/05/will-the-increase-in-fund-allocation-help-the-dos-in-dealing-wit.html



PE/VC Activity and Investment:



Year-on-Year Private Sector Funding in SpaceTech India (2010-2023)

The Indian space tech sector witnessed a significant jump in funding, attracting over **\$124.7 million in 2023**, **compared to \$67.2 million in 2021.** This reflects growing investor confidence in the sector's potential.¹³

¹³ https://pib.gov.in/PressReleasePage.aspx?PRID=1988864



Key Observations



There has been consistent year-on-year growth in funding from 2021 to 2023. The increase in funding can be attributed to several factors, including the liberalization of space policies, the success of high-profile missions (like the Mars Orbiter Mission), and the establishment of new startups that have successfully showcased their potential and attracted investors.



Focus Areas of Private Investments in India's SpaceTech Ecosystem

Satellite Manufacturing

Investment in the development and production of satellites for various purposes, including communication, Earth observation, and scientific research. Companies like Pixxel are prominent in this space, creating advanced Earth-imaging satellites to provide real-time data and analytics for various industries.¹⁰

Launch Services

Development of cost-effective and reliable launch vehicles to deploy satellites into orbit. Startups like Skyroot Aerospace¹¹ and Agnikul Cosmos are innovating with customizable and efficient launch solutions, making significant strides in this segment.

Earth Observation and Data Analytics

Leveraging satellite data for applications such as agriculture, environmental monitoring, and urban planning. Startups like SatSure focus on integrating space technology with artificial intelligence to provide decision intelligence for sectors like agriculture and financial services.¹²

Propulsion Systems

Development of advanced propulsion technologies for rockets and satellites. Bellatrix Aerospace, for instance, is known for its innovative rocket engines and propulsion systems, aiming to enhance the efficiency and cost-effectiveness of space missions.¹³

Integrated Space Solutions

Providing end-to-end space solutions, including satellite platforms, launch services, and ground station operations. Dhruva Space offers modular satellite platforms and comprehensive services to facilitate space-based operations for various clients.¹⁴

¹⁴https://www.pixxel.space/blogs/pixxel-raises-36-million-in-series-b-funding-to-advance-hyperspectral-satellite-constellat ion-and-data-platform

¹⁵<u>h</u>ttps://www.businesstoday.in/entrepreneurship/start-up/story/skyroot-aerospace-becomes-indias-highest-funded-spacet ech-start-up-with-275-million-investment-round-led-by-temasek-403947-2023-10-31

¹⁶https://timesofindia.indiatimes.com/business/india-business/space-startup-agnikul-cosmos-raises-200-crore/articleshow/ 104510406.cms#:~:text=CHENNAI%3A%20Space%20tech%20startup%20Agnikul,%2C%20Speciale%20Invest%2C%20and%20 others.

¹⁷ <u>https://www.businessoutreach.in/satsure-a-space-tech-startup/</u>

¹⁸https://www.forbesindia.com/article/leadership-awards-2024/bellatrix-aerospace-reimagining-space-mobility-and-satellite sasaservice/92173/1

¹⁹https://pib.gov.in/PressReleasePage.aspx?PRID=2018758#:~:text=Shri%20Sanjay%20Nekkanti%2C%20CEO%2C%20Dhruva%2 <u>0Space%2C%20said%2C%20%E2%80%9C,manned%20and%20unmanned%20space%20programs</u>.



Mapping India's Private Space Tech Startups and Investors

According to the government data, **India boasted 200+ spacetech companies**²⁰, **ranking 5th globally**. The Indian space tech ecosystem is attracting a growing pool of investors, both domestic and international. Here's a table mapping some of the major space tech companies and investors:

Company	Total Funding	Sub-sector	Notable Investors	Brief
A G N I K U L	\$40 M	Upstream	Celesta Capital, Rocketship.vc, Artha Venture Fund, and Artha Select Fund, Mayfield India, pi Ventures, Speciale Invest, BEENEXT	Building launch vehicles capable of taking micro and nanosatellites to Low Earth Orbit, on-demand.
	\$11.3 M	Upstream	BASF Venture Capital, Inflexor Ventures and Pavestone Capital	Full-suite in-space propulsion systems
DIGAMTARA	\$12M	Upstream	Kalaari Capital, Peak XV Partners, Campus Fund, Aditya Birla Ventures and Sidbi	Space debris mapping and analysis
pixel	\$71M	Downstream	Blume Ventures, Google, GrowX, Lightspeed, Techstars, Radical Ventures	High-resolution hyperspectral imaging satellites
SATSURE	\$20M	Downstream	Baring Private Equity Partners India, Omnivore, Techstars, Promus Ventures, Luckbox Ventures, and IndigoEdge Advisors, ICICI and Kotak Mahindra Ban	Decision intelligence from satellite data

Please note: This table is not exhaustive and only includes a selection of prominent investors. The space tech industry is dynamic, and new investors are constantly emerging.

²⁰ <u>https://sansad.in/getFile/annex/262/AU621.pdf?source=pqars</u>

Company	Total Funding	Sub-sector	Notable Investors	Brief
SKYROOT	\$95M	Upstream	Celesta Capital, Rocketship.vc, Artha Venture Fund, Mayfield India, Pi Ventures and Speciale Invest, Temasek	Developing responsive, reliable, and economical launch solutions
GALAX®Y®	\$3.85M	Downstream	Speciale Invest,Artha India Ventures, Zerodha founder Nithin Kamath, EaseMyTrip founder Prashant Pitti, Tracxn founder Abhishek Goyal	Multisensor imaging satellite for earth observation purpose

Please note: This table is not exhaustive and only includes a selection of prominent investors. The space tech industry is dynamic, and new investors are constantly emerging.





Legal and Regulatory Framework



The space technology sector in India operates under a comprehensive legal and regulatory framework designed to promote innovation, facilitate private sector participation, and protect national interests. This framework is governed by several key regulatory bodies and policies that ensure the sector's growth and compliance with both national and international standards.



Key Regulatory Bodies

S. No.	Regulatory Body	Role
1.	Department of Space (DoS)	 The apex body for space activities in India, DoS oversees policy formulation and implementation. DoS coordinates between ISRO, other government agencies, and private entities to ensure policies are in line with national objectives. It also represents India in international space forums.
2.	Indian Space Research Organisation (ISRO)	 As India's premier space agency, ISRO is responsible for the planning and execution of space missions, satellite launches, and space research. ISRO governs the operational aspects of space missions, including satellite deployment, mission planning, and research initiatives. It ensures adherence to safety protocols and technical standards.
3.	Indian National Space Promotion and Authorization Center (IN–SPACe)	 IN-SPACe acts as a regulatory body to promote and authorize space activities by non-governmental entities. Provides a single-window clearance for private sector space projects, ensuring they meet safety and compliance standards. IN-SPACe facilitates private sector participation by streamlining regulatory processes.
4.	NewSpace India Limited (NSIL)	 The commercial arm of ISRO, NSIL is responsible for promoting Indian space capabilities globally. Facilitates commercial satellite launches and space-related services, ensuring compliance

		with international trade laws. NSIL manages the commercialization of space products, technical consultancy services, and technology transfer.
5.	Antrix Corporation Limited (ACL)	 The marketing arm of ISRO, Antrix Corporation Limited is responsible for promoting and commercially exploiting space products, technical consultancy services, and transfer of technologies developed by ISRO. ACL deals with the commercialization of space products and services, including satellite transponder leasing, satellite launches through PSLV and GSLV, marketing of data from Indian remote sensing satellites, and the establishment of ground systems and networks. ACL ensures compliance with international trade and export control regulations.

Key Legislations and Policies

S. No.	Statue	Purpose	Provision
1.	ISRO Act (1969)	The ISRO Act was enacted to establish the Indian Space Research Organisation (ISRO) as the primary body responsible for India's space program.	The Act defines ISRO's mandate to conduct space research and exploration. It empowers ISRO to develop space technology, launch vehicles, and satellites, and to carry out research in space science. The Act also outlines the organizational structure and governance of ISRO, ensuring it operates under the guidance of the Department of Space.
2.	Satellite Communication Policy (1997)	This policy aims to foster the growth of a robust domestic satellite communication industry.	The policy provides guidelines for satellite communication services, including licensing procedures, spectrum allocation, and operational standards. It promotes the use of satellite technology for telecommunications, broadcasting, and internet services. The policy encourages private sector participation and aims to enhance India's capabilities in satellite communication.
3.	Revised Remote Sensing Data Policy (RSDP) (2011)	The RSDP regulates the collection, dissemination, and use of satellite remote sensing data.	The policy mandates that remote sensing data with a ground resolution of 1 meter or less be acquired only through government

			channels. It sets guidelines for data acquisition, processing, and distribution to ensure national security and strategic interests. The policy aims to balance data accessibility with security concerns, promoting the use of remote sensing data for sustainable development and disaster management.
4.	NRSC Guidelines (2011)	Issued by: ISRO's National Remote Sensing Centre (NRSC) These guidelines focus on regulating the acquisition and dissemination of remote sensing data.	The guidelines set standards for data handling, including data quality, accuracy, and security. They outline the procedures for data licensing, usage, and dissemination, ensuring that remote sensing data is used responsibly and in compliance with national policies.
5.	ISRO Technology Transfer Policy and Guildlines (2020)	To establish a framework for transferring technologies developed by ISRO and the Department of Space (DoS) to industry partners.	The policy facilitates the commercialization of ISRO's technologies, promoting their wider application in various industries. It includes guidelines for licensing, royalty agreements, and intellectual property rights. The policy aims to foster innovation and support the growth of the Indian space technology ecosystem by enabling industry access to advanced space technologies.

6.	Geospatial Guidelines, 2021	The Geospatial Guidelines aim to liberalize the geospatial data sector in India, promoting ease of access and utilization of geospatial data and private sector participation.	The Geospatial Guidelines, 2021, largely permit foreign investments up to 100% under the automatic route with limited foreign investment restrictions. These guidelines are relevant to satellite-generated data, a key component of the spacetech sector. Additionally, the guidelines remove specific restrictions on satellite-generated data, promoting the wider use of satellite imagery. The provisions also ensure alignment with national privacy laws and international treaties.
7.	Foreign Direct Investment (FDI) Policy	Allow for higher FDI limits (up to 74% for satellites, 49% for launch vehicles, and 100% for components).	The policy sets guidelines for foreign investments in space-related activities, encouraging international partnerships and collaboration. It aims to enhance the competitiveness of the Indian space industry by facilitating access to global markets and advanced technologies. However, clarification is needed on the definitions of "satellite data products" and the categorization of launch vehicle sub-components to ensure smooth implementation.

8	Constitution of India (Articles 51 & 73)	Upholds India's obligations under the Vienna Convention on the Law of Treaties.	These articles ensure that India complies with established legal principles for peaceful space exploration. Article 51 promotes international peace and security, while Article 73 extends the executive power of the Union to the exercise of rights under international treaties and agreements.
9.	Telecommunications Act (Upcoming)	To clarify regulations for satellite communication.	The Act will streamline processes for obtaining licenses and spectrum allocation for satellite communication services. It aims to enhance regulatory clarity, reduce bureaucratic hurdles, and promote the efficient use of satellite communication technology in India.
10.	Indian Space Policy (2023)	A transformative policy allowing private companies to offer satellite communication services using their own satellites or leased capacity.	The policy permits private entities to operate in both Geostationary (GSO) and Non-Geostationary (NGSO) orbits. It simplifies the approval process by designating IN-SPACe as the single nodal agency for all approvals, promoting ease of doing business and fostering innovation in the private space sector.
11.	Department of Telecommunications	To complement the 2023 Space Policy by	The reforms lower compliance requirements for



(DoT) – Satcom Reforms (2022)	expediting application processing times and simplifying procedures.	private companies, establish a clear roadmap for obtaining necessary clearances, and streamline regulatory
		processes. They aim to create
		a more conducive
		environment for the growth of
		the satellite communication
		industry.



International Treaties

India is a signatory to several key space treaties, ensuring compliance with international norms for peaceful space exploration:

S. No.	Treaty	Provision
1.	Outer Space Treaty (1967)	The treaty includes guidelines on the non-appropriation of outer space, liability for space activities, and the prohibition of nuclear weapons in space. It promotes the peaceful use of outer space and international cooperation.
2.	Agreement on the Rescue of Astronauts (1968)	This agreement obligates countries to assist astronauts in distress and return them to their country of origin. It establishes protocols for the rescue and safe return of astronauts.
3.	Convention on International Liability for Damage Caused by Space Objects (1972)	The convention establishes a legal framework for liability and compensation for damages caused by space objects. It outlines procedures for resolving liability claims and determining compensation amounts.
4.	Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1979)	The agreement regulates activities on the Moon and other celestial bodies, emphasizing their use for peaceful purposes. It promotes international cooperation and prohibits the establishment of military bases on celestial bodies.
5.	Convention on Registration of Objects Launched into Outer Space (1975)	The convention mandates the registration of space objects launched by countries, ensuring transparency and accountability. It requires countries to provide details of their space objects, including orbit parameters and launch information.



Contractual Agreements for a Space Company in India

Establishing and operating a space company in India involves various contractual agreements²¹ to protect intellectual property, and manage commercial relationships effectively.

S. No.	Name of the Legal Agreement	Description		
	Regulatory Compliance			
1.	Licensing Agreements	These agreements ensure compliance for satellite launches and operations. They must include clauses for adherence to regulatory guidelines, renewal terms, and compliance with any changes in regulations.		
2.	Launch Service Agreements	These contracts outline terms for satellite launches using Indian vehicles, covering payload specifications, launch schedules, costs, risk allocation, insurance, and liability for launch failures or delays.		
Intellectual Property (IP) Protection				
3.	Technology Transfer Agreements	These agreements govern technology transfers from ISRO or other entities, defining the technology, IP ownership, usage rights, confidentiality, sublicensing, and further development.		
4.	Non-Disclosure Agreements (NDAs)	NDAs protect trade secrets and confidential information, defining confidential information, duration of obligations, and permitted disclosures.		
5.	IP Licensing Agreements	These agreements allow the use of patented technologies, trademarks, or copyrighted materials, specifying the license scope, usage rights, territorial limitations, royalty payments, and mechanisms for addressing infringement.		

²¹ In addition to the above agreements, space companies may also need to enter into other agreements, such as marketing agreements, sponsorship agreements, and international collaboration agreements. The specific agreements that a space company needs to enter into will depend on its specific business model and operations.

Commercial Contracts			
6.	Satellite Lease Agreements	These contracts specify terms for leasing satellite transponders or entire satellites, including lease periods, payment terms, service levels, maintenance, upgrades, and liability for interruptions.	
7.	Service Level Agreements (SLAs)	SLAs establish performance metrics and service quality standards for satellite communication services, defining KPIs, penalties, service monitoring, reporting, and dispute resolution mechanisms.	
8.	Joint Venture (JV) Agreements	JV agreements define roles, responsibilities, and contributions in joint projects, including profit sharing, management structure, exit strategies, IP ownership, confidentiality, and dispute resolution.	
Risk Management			
9.	Insurance Contracts	These contracts cover risks associated with satellite launches and operations, providing comprehensive coverage for pre-launch, launch, and in-orbit phases, including claim procedures.	
10.	Indemnity Clauses	Indemnity clauses allocate risk and liability, defining the scope of indemnity, covered events, third-party claims, defense obligations, and mutual indemnity arrangements.	
Operational Agreements			
11.	Ground Station Agreements	These contracts govern the use and operation of ground stations, defining access rights, maintenance, operational support, payment terms, service levels, and liability for interruptions.	
12.	Data Sharing and Usage Agreements	These agreements outline terms for sharing and using satellite data, defining data access rights, usage limitations, data security, privacy, compliance, ownership, licensing, and monetization.	



Intellectual Property (IP) for Space Tech Companies in India

The legal framework for Intellectual Property Rights (IPR) in India provides robust protection for space tech companies by protecting innovations, fostering creativity, and encouraging investment. The Indian government has established a legal framework to safeguard IPR in the space industry, ensuring that companies can secure and monetize their innovations.

S. No.	Types of IP	Description	Example
1	Trademark	 Function: Companies can register trademarks for their brands, logos, and other identifiers. This helps in building brand recognition and protecting against unauthorized use or infringement. Registration: Trademarks registration is optional but advisable, and once granted will be valid for 10 years, renewable every decade. 	BELLEATRIX AEROSPACE Propeiling Dreams Names, word-marks, logos, symbols, tag-lines, short sound marks, and more.
2	Copyright	 Function: Space tech companies can protect their software, technical manuals, and marketing materials under copyright law. Prevents unauthorized reproduction and distribution of proprietary content. Registration: The creator owns the copyright 60 years from creation before the work becomes public. 	Software code, satellite imagery, technical documentation, mission designs, manuals, and more. Example – Satellite mission documentation, control software
3	Patent	 Function: Space tech companies can file patents for new inventions related to space technology, including satellite components, launch vehicles, and software algorithms. Registration: The Act provides protection for 20 years from the date of filing, allowing companies to exclusively exploit their inventions. 	Rocket designs, propulsion systems, satellite components, drastically unique or different technology, and more Example – ISRO's cryogenic engine patents



4	Design	 Function: Companies can register designs for components and products used in space technology, such as satellite bodies and ground station equipment. Registration: The Designs Act offers protection for registered designs enumerated as follows: Initial validity: A registered design certificate is valid for 10 years from the date of registration. Extension: The protection can be extended for an additional 5 years by filing an application and paying the prescribed fee. 	Satellite structures, rocket exterior designs, space module configurations, and more. Example – Exterior design of the GSLV Mk III rocket
5	Trade Secret	Function: Trade secrets are confidential, commercially valuable information known to a limited group and protected by the rightful owner through reasonable measures, typically including confidentiality agreements.	Manufacturing processes, proprietary algorithms, satellite data processing techniques, and more.
		Provisions: Although there is no specific legislation for trade secrets in India, they are protected under common law principles of confidentiality and contract law. Companies can use non-disclosure agreements (NDAs), confidentiality clauses, and other contractual arrangements to protect their trade secrets.	Example- Proprietary algorithms for satellite data compression and transmission



India's Foreign Direct Investment (FDI) Policy in the Space Sector

India's spacetech ecosystem is currently restrictive, with significant government oversight and limited avenues for private sector participation. However, the government has proposed amendments to liberalize the sector. The proposed FDI policy changes are intended to open up various segments of the space sector, addressing existing gaps and ambiguities in the current policy framework.

Existing FDI Policy

Existing foreign investment limits in the space sector are provided under Chapter 5 of the Consolidated FDI Policy Circular of 2020.²² The current norms do not recognize "space" as a sector in itself. Instead, space-related activities are primarily captured under the head – "satellites – establishment and operation."

Activity	FDI Threshold and Route
Satellites- establishment and operation, subject to compliance	up to a 100% through
with sectoral guidelines issued by the Department of	Government route
Space/ISRO	

Essentially, all foreign investments in companies undertaking activities related to the establishment and operation of satellites require government approval. This structure has led to a controlled environment where significant government oversight is necessary for foreign participation in the spacetech sector, potentially hindering the pace of innovation and growth.

Proposed FDI Policy 2024²³

The crux of the policy lies in the categorization of space-related activities and the corresponding FDI thresholds. Here's a breakdown of the key categories and their investment limits:

²² <u>https://dpiit.gov.in/sites/default/files/FDI-PolicyCircular-2020-29October2020_0.pdf</u>

²³ <u>https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2011523</u>

Activity	FDI Threshold and Route
Satellites-manufacturing & operation, satellite data products, ground segment & user segment	Up to 74% automatic, beyond 74% up to 100% under government route
Launch vehicles and associated systems or subsystems, creation of spaceports for launching and receiving spacecraft	Up to 49% automatic, beyond 49% up to 100% under government route
Manufacturing of components and systems/sub-systems for satellites, ground segment and user segment	Up to 100% automatic

Gaps in the FDI Policy 2024 for Space-Tech

The proposed FDI Policy 2024 aims to liberalize the spacetech sector, but certain gaps and ambiguities still exist that need to be addressed for it to be fully effective.

- Requirement to Comply with Sectoral Guidelines: The policy mandates that investee entities must comply with sectoral guidelines issued by the Department of Space, which counteracts the intended liberalization.
- Clarity on "Satellites Manufacturing & Operation": The term "satellites manufacturing & operation" does not explicitly cover spacecrafts that may not be categorized as satellites, creating potential ambiguity.
- 3. **Definition of "Satellite Data Products":** The term "satellite data products" conflicts with the Geospatial Guidelines, which allow up to 100% foreign investment under the automatic route for similar data products, which might lead to regulatory overlaps and conflicts.
- 4. **Overlapping Activities:** Companies engaged in activities spanning multiple categories (e.g., manufacturing components for both satellites and launch vehicles) must restrict foreign investments to the stricter category thresholds. This may necessitate business restructuring to comply with the new regulations.
- Grandfathering Existing Investments: The policy does not clearly address how existing investments, made under previous interpretations of the FDI rules, will be treated. Companies that received investments without explicit government approval may require post-facto government approval.



Tax Landscape for Space Tech Companies in India



Current Tax Provisions

The Indian government recognizes the potential of the space sector and has implemented several tax measures to encourage private participation.

- 1. Goods and Services Tax (GST) Exemption for Satellite Launches (July 2023)
 - Overview: The GST Council exempted private companies from GST on satellite launch services.
 - Impact: Private companies do not have to pay the 18% GST on launch services, reducing the cost of satellite launches.
 - Benefit: This exemption, previously only available to the government-owned New Space India Ltd. (NSIL), enhances the competitiveness of private players in the space sector.
- 2. Income Tax Exemptions: Companies engaged in space research and satellite launches may be eligible for tax exemptions under section 35(2AB) of the Income Tax Act, 1961 which provides a weighted deduction of 100% on expenditure incurred on scientific research and development (R&D) by in-house R&D centers recognized by the Department of Scientific and Industrial Research (DSIR).²⁴
- **3. Customs Duty Exemptions:** Under the Customs Act, 1962, specific components and equipment for satellite and space research may be exempt from customs duty.
- **4. Incentives for Startups:** Provides various financial incentives, grants, and subsidies for startups in the space technology sector. The provisions include:
 - Tax Holidays: Startups recognized by the Department for Promotion of Industry and Internal Trade (DPIIT) can avail of a tax holiday for three consecutive years out of the first ten years since incorporation.
 - Rebate on Filing Fees: Up to 80% rebate on patent filing fees and 50% on trademark filing fees.

²⁴ <u>https://www.in.kpmg.com/TaxFlashNews-INT/KPMG-Flash-News-Department-of-Scientific-and-Industrial-Research-2.pdf</u>

Specific Tax Rates and Figures

S. No.	Taxation	Applicable Tax	Additional
1.	Corporate Income Tax Rates	Standard Rate: 30% for domestic companies (plus applicable surcharge and cess).	 Concessional Rate: 25% for domestic companies with a turnover up to INR 400 crore in the previous year. 22% for companies opting for concessional regime under section 115BAA (subject to certain conditions)
2.	Surcharge and Cess ²⁵	Surcharge: 7% on income tax if taxable income is between INR 1 crore and INR 10 crore, 12% if above INR 10 crore.	Health and Education Cess: 4% on the income tax including surcharge.
3.	GST Rates	Standard Rate: 18% on goods and services.	Satellite launch services exempt from GST as of July 2023.
4.	Customs Duty Rates	Standard Rate: Scientific and technical instruments etc for launch vehicles and satellites and payloads - 5%	Exemption Rate: Satellites, payloads and ground equipment brought for testing them - 0%

²⁵ For companies opting for the concessional regime under Section 115BAA, a surcharge is levied at 10% and a cess at 4%, resulting in an effective tax rate of 25.168%.



Government Schemes



India has introduced several schemes to support and promote the space technology sector. Here are detailed descriptions of key government schemes and incentives available for spacetech companies:

S. No.	Scheme Name	Purpose + Benefit
1.	Startup India Seed Fund Scheme ²⁶	 Provides financial assistance to startups for proof of concept, prototype development, product trials, market entry, and commercialization. 1. Grants of up to Rs. 20 Lakhs for early stage development and trials and investment support up to Rs. 50 Lakhs for commercialization.
2.	Technology Development Fund Scheme (TDF) under DRDO ²⁷	 Supports the development of innovative defense technologies, including spacetech. 1. Covers development cost up to ₹1 crore and funding support up to 20% for associated incubators. 2. Partnerships with academia, allowing up to 40% contribution from academic institutions.
3.	iDEX (Innovations for Defence Excellence) ²⁸	 Promotes innovation and technology development in defense and aerospace sectors. 1. Provides up to INR 1.5 crore for prototype development and commercialization.
4.	Atal Innovation Mission (AIM) ²⁹	 Fosters innovation and entrepreneurship across various sectors, including spacetech through various programs. 1. Atal Tinkering Labs (up to INR 12 lakh per school), 2. Atal Incubation Centers (up to INR 10 crore over 5 years), and Atal New India Challenges (up to INR 1 crore over 3 tranches over 12–18 months).

²⁶ <u>https://seedfund.startupindia.gov.in/</u>

https://www.investindia.gov.in/technology-development-fund
 https://www.myscheme.gov.in/schemes/idex
 https://www.niti.gov.in/sites/default/files/2024-04/Manual%20%201.pdf



GIFT City IFSC: Pathway to Go Global for SpaceTech Companies



What is GIFT IFSC?

GIFT City (Gujarat International Finance Tec-City) is India's first International Financial Services Centre (IFSC), designed to position India prominently on the global financial landscape. GIFT City offers a favorable regulatory environment, cutting-edge infrastructure, and a robust ecosystem for business, industry, and international finance. SpaceTech companies can leverage GIFT IFSC to access global markets, attract investment, and collaborate internationally, making it an ideal gateway for scaling operations and innovation.

Integrating SpaceTech with GIFT IFSC

GIFT City IFSC is uniquely positioned to support the growing SpaceTech industry by providing a platform and fostering an ecosystem conducive to innovation and growth. Key aspects of this integration include:

- **1. Funding and Investment:** Venture capitalists, private equity firms, and institutional investors can fund SpaceTech startups and projects, facilitated by GIFT IFSC's regulatory framework and incentives.
- 2. Risk Management and Insurance: Specialized financial products, including risk management solutions and insurance services, cater to the unique needs of the SpaceTech industry.
- **3. International Collaboration:** GIFT IFSC serves as a hub for fostering international collaborations, leading to joint ventures, technology transfers, and knowledge exchange.
- **4. Regulatory Support:** A business-friendly regulatory environment helps SpaceTech companies navigate complex regulations and focus on innovation.



Permissible Sectors in GIFT IFSC

SpaceTech companies can cater to and be registered under several sectors within GIFT IFSC, enhancing their capabilities and market reach. Key permissible sectors include:



- **Banking and Financial Services:** Utilizing satellite data for risk assessment, fraud detection, and market analysis.
- Fintech: Leveraging geofencing and enhanced KYC processes using satellite imagery.
- **Insurance:** Providing precise risk assessments and tailored insurance products for agriculture and natural disaster management.

Use Case 1: Fintech and Insurance Companies

- 1. Risk Assessment: Satellite imagery can be used for precise risk assessment in insurance, evaluating areas prone to natural disasters like floods, earthquakes, or landslides.
- 2. Market Analysis: Fintech companies can analyze satellite data to identify potential markets, assess economic activity, and track infrastructure development.
- **3.** Fraud Detection: Advanced image analysis can help detect fraudulent claims in insurance by verifying the authenticity of reported incidents.
- 4. **Precision Agriculture Insurance:** Satellite data can provide accurate information on crop health and yield predictions, enabling insurers to offer tailored products to farmers.



Use Case 2: SpaceTech for Geofencing in BFSI Sector

- Geofencing for Payments: SpaceTech can provide precise geolocation data for setting up geofences, enhancing the security of digital transactions and enabling location-based payment services.
- Enhanced KYC: Satellite data can be used to verify the physical location of customers, improving the accuracy of Know Your Customer (KYC) processes and reducing fraud.
- **3. Compliance and Monitoring:** Financial institutions can use satellite imagery to monitor compliance with regulatory requirements, ensuring that physical assets and operations adhere to prescribed standards.

20 20 20 **IT/ITes Subsidies** Others **Tax Benefits** · World-class infrastructure CAPEX support up to 100% tax exemption INR 50 Cr for 10 years within a 15-year window • Strong regulatory framework OPEX support up to · Access to a large pool of skilled talent Reduced MAT/AMT INR 20 Cr per year of 9% on book profits · Proximity to international markets GST exemption Up to 100% reimbursement of employer's contribution of EPF

Benefits of Setting Up in GIFT IFSC

01.

Access to Global

Markets:

GIFT IFSC provides a strategic gateway for Spacetech companies to access global markets and investors.

02.

International Collaboration:

Opportunities to partner with international space agencies, financial institutions, and technology companies.

03. Regulatory Support:

Guidance and support in navigating international regulations and compliance requirements.



Conclusion



Anticipated Developments in India's Space Tech Ecosystem

- 1. Increased Foreign Direct Investment (FDI): Venture capital firms, private equity investors, and institutional investors are increasingly recognizing the potential of space tech, leading to a surge in funding for innovative projects and startups. This trend is expected to continue, driven by supportive government policies and a growing ecosystem of space tech entrepreneurs.
- Clarification Needed in FDI Policy: Compliance with sectoral guidelines issued by the DoS counteracts the intended liberalization, and terms like "satellites – manufacturing & operation" and "satellite data products" need clearer definitions to avoid regulatory overlaps and conflicts.
- **3. Rise in Public-Private Partnerships:** The government is fostering public-private partnerships (PPPs) to accelerate space tech innovations. Companies like Pixxel³⁰, Skyroot Aerospace, and Agnikul Cosmos are preparing for commercial launches, indicating robust growth in the sector.
- 4. Upcoming Incentives and Subsidies: The government is considering expanding GST exemptions to include satellites, launch vehicles, and ground equipment manufacturing to reduce operational costs for space tech companies.³¹ Additionally, there are discussions about increasing funding for technology development through schemes like the TDF and iDEX.³²
- 5. Advanced Technologies & Human Spaceflight: Development of reusable launch vehicles³³, next-generation propulsion systems, advanced satellite constellations and AI for mission planning, data analysis, and autonomous operations. The Gaganyaan mission, slated for 2025, which will be India's first crewed mission, showcasing ISRO's human spaceflight capabilities and bolstering India's position in the global space community.³⁴

³⁰<u>https://www.moneycontrol.com/technology/space-tech-startup-pixxel-on-course-to-launch-6-satellites-using-isro-spac</u> <u>ex-rockets-article-12733234.html</u>

³¹https://www.moneycontrol.com/news/business/budget/budget-2024-space-tech-industry-urges-govt-to-expand-gst-exe mption-to-satellites-launch-vehicles-12122931.html

³²https://indianexpress.com/article/explained/explained-sci-tech/why-budget-plans-for-deep-tech-and-research-fundingmatter-9149783/

³³ https://www.deccanherald.com/opinion/space-reusable-launch-vehicle-a-gamechanger-for-isro-1207216.html

³⁴https://www.space.com/india-reveals-astronauts-first-human-spaceflight-gaganyaan



Closing Statement

The Indian space technology sector is at a pivotal moment, characterized by unprecedented growth, innovation, and collaboration. This transformation is driven by a synergistic blend of public and private efforts, with over 523 private companies and research institutions now actively contributing to the industry. The sector's projected growth to \$44 billion by 2033, capturing nearly 10% of the global market, reflects the immense potential and strategic importance of India's space initiatives.

Government initiatives, including substantial budget allocations and policy reforms, have laid a robust foundation for the sector's expansion. The establishment of regulatory bodies like IN-SPACe and commercial entities such as NSIL has facilitated private sector participation, fostering a competitive and innovative environment. The proposed amendment in the FDI policy, along with the introduction of the Indian Space Policy 2023, has opened new avenues for international collaboration and private investments. The surge in private investments, particularly in satellite manufacturing and launch services, underscores the growing investor confidence in India's space capabilities.

In conclusion, the Indian space technology sector is poised for a transformative journey, with collaborative efforts from all stakeholders driving its ascent. This report serves as a comprehensive guide for industry players, investors, policymakers, and legal professionals navigating through the landscape of India's space tech ecosystem.

Frequently Asked Questions (FAQs)

1. What is spacetech?

Spacetech refers to the application of engineering and technological advancements for the exploration and utilization of space. It encompasses activities like designing and launching satellites, developing propulsion systems, space research, space-based applications, and commercial spaceflight.

2. What are the key activities included in spacetech?

Key activities in spacetech include satellite manufacturing, launch services, space research, space-based applications, space exploration, space debris management, commercial spaceflight, and the development of space law and policy.

3. What is the difference between upstream, downstream, and auxiliary segments in spacetech?

Upstream: Involves activities related to satellite manufacturing, launch services, and space research. This segment focuses on the development and deployment of space technology.

Downstream: Involves the utilization of space technology for various applications like telecommunications, Earth observation, navigation, and data services. It focuses on how space technology benefits various sectors on Earth.

Auxiliary: Includes supporting infrastructure and technologies essential for the functioning of upstream and downstream activities, such as ground stations, data processing centers, and regulatory frameworks.

4. How has private sector participation evolved in India's space tech industry?

Since 2014, private sector participation has increased significantly, with substantial investments in satellite manufacturing and launch services. By July 2023, \$233 million had been invested across more than 30 deals, reflecting growing investor confidence and the sector's potential.



5. What are the key government initiatives supporting the space tech sector?

Key initiatives include the establishment of regulatory bodies like IN-SPACe, commercial entities such as New Space India Limited (NSIL), and significant budget allocations. The Indian Space Policy 2023 is also crucial in promoting private sector participation and international collaboration.

6. How is India fostering international collaboration in space technology?

India promotes international collaboration through various initiatives and policies that encourage foreign investments and partnerships. The FDI policy allows up to 100% foreign investment through government route in certain activities, and entities like GIFT IFSC provide a platform for global engagement.

7. What tax incentives are available for space tech companies in India?

Tax incentives include GST exemptions on satellite launch services, income tax exemptions for R&D under section 35(2AB), and customs duty exemptions for specific space-related equipment. Startups may also benefit from various financial incentives, grants, and subsidies.

8. What are the key regulatory bodies in India's space tech sector?

Key regulatory bodies include the Department of Space (DoS), Indian Space Research Organisation (ISRO), Indian National Space Promotion and Authorization Center (IN-SPACe), NewSpace India Limited (NSIL), and Antrix Corporation Limited.

9. How can space tech companies protect their intellectual property (IP) in India?

Space tech companies can protect their IP through trademarks, copyrights, patents, design registrations, and trade secrets. The Indian legal framework provides robust protection to secure and monetize innovations in space technology.

10. How can startups and new entrants benefit from government schemes?

Startups can benefit from schemes like the Startup India Seed Fund Scheme, Technology Development Fund under DRDO, iDEX (Innovations for Defence Excellence), and the Atal Innovation Mission. These schemes provide financial



assistance, grants, and support for R&D, prototype development, and market entry.

11. What is GIFT City IFSC and how does it benefit space tech companies?

GIFT City (Gujarat International Finance Tec-City) is India's first International Financial Services Centre (IFSC), providing a favorable regulatory environment, cutting-edge infrastructure, and a robust ecosystem for business and international finance. Space tech companies can leverage GIFT IFSC to access global markets, attract investment, and collaborate internationally, making it an ideal gateway for scaling operations and innovation.

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