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Navigating the Orbital Economy: Reforming India's Dispute Resolution Framework for Contractual Commercial Outer Space Activities

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ABSTRACT

The New Space Age is characterised by a dynamically evolving global orbital economy shaped by diverse outer space opportunities, technologies and actors. That change acts as a catalyst, facilitating a marked transition of the outer space sector from a state-centric model to a multi-stakeholder, commerce-oriented ecosystem. India, with its significant activities and distinctive aspirations, stands at the forefront of this paradigm shift. The expansion of the Indian outer space sector enables the progressive participation of private entities throughout the space value chain, producing a transformation that outpaces the national legal infrastructure and creating an urgent need for specialised dispute resolution mechanisms governing contractual commercial outer space activities. At present the Indian space sector operates under executive policies rather than comprehensive national legislation, which leaves stakeholders in the commercial outer space sector without adequate statutory or institutional guidance in the event of a dispute. The existing international and domestic space law mechanisms remain structurally ill-equipped to govern private commercial liability, and that complexity is compounded by the limited functional autonomy of IN-SPACe, the absence of space-specific adjudicatory expertise, and enforcement difficulties under existing dispute resolution mechanisms. Through an exploratory doctrinal analysis of India's existing legal framework and its interface with international space law, this article identifies critical gaps and proffers a coherent statutory architecture for contractual commercial dispute resolution in the outer space sector. Examining the typology of contractual disputes, the adequacy of existing alternative dispute resolution mechanisms, and the structural weaknesses of India's space governance framework, the article proposes the enactment of comprehensive national legislation. It underscores the importance of incorporating mandatory arbitration clauses and of the statutory recognition of the PCA Optional Rules for Arbitration of Disputes Relating to Outer Space Activities 2011, working towards a sector-specific approach to outer space dispute resolution in India.

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Keywords: *Commercial space disputes, Indian space sector, PCA Optional Rules, Space economy, Dispute resolution, Outer space governance, Arbitration*

I. INTRODUCTION AND RESEARCH QUESTION

A. The new space age and India's commercial outer space ambitions

The New Space Age is characterised by the profound transformation of the outer space sector from a state-controlled model to a multifaceted commercial ecosystem¹ involving States and non-state entities, driven by commercialisation, rapid technological progress and emerging economic opportunities,² a start-up investment culture, sustainability potential³ and public-private and international collaboration. Scientifically and strategically significant, its growth both reflects and reshapes the wider investment landscape.⁴

The scale and complexity of space activities make exclusive State control impractical.⁵ Public-private partnerships introduce innovation, capital and operational diversity, risk-sharing, cost reduction, the alignment of public objectives with private innovation and resource optimisation, reshaping governance structures and operational models while sustaining long-term growth and market expansion.^{6,7,8} The varied character of State involvement among spacefaring nations calls for governance that enables private participation while retaining State authority.⁹

¹ Francisco Del Canto Viterale, *What Is NEW in the New Space Age?*, RIV. TRIM. SCI. AMMIN., no. 1, 2026, at 1, <https://doi.org/10.32049/RTSA.2026.1.02>.

² *Id.* at 8-15; Narayan Prasad, *Space Law for Space Commerce or Vice Versa: A Chicken-and-Egg Situation for Space Commerce in India*, in COMMERCIALISATION AND PRIVATISATION OF OUTER SPACE: ISSUES FOR NATIONAL SPACE LEGISLATION 105, 105-08 (R. Venkata Rao & Kumar Abhijeet eds., 2016); K.R. Sridhara Murthi, *Potentials of Private Participation in the Indian Space Sector: Policy and Legal Needs*, in *id.* at 3.

³ Scott Atkins, *Outer Space: The New Frontier for Restructuring and Insolvency*, NORTON ROSE FULBRIGHT (May 2022), <https://www.nortonrosefulbright.com/en-in/knowledge/publications/102a426e/the-commercialisation-of-outer-space>.

⁴ Gordon Rausser et al., *Public-Private Partnerships in Fostering Outer Space Innovations*, 120 PROC. NAT'L ACAD. SCI. U.S.A. e2222013120 (2023); Avishai Melamed et al., *Going to Outer Space with New Space: The Rise and Consequences of Evolving Public-Private Partnerships*, 68 SPACE POL'Y 101626 (2024); Walter Peeters, *Evolution of the Space Economy: Government Space to Commercial Space and New Space*, 19 ASTROPOLITICS 206, 206-22 (2021).

⁵ Wichuta Teeratanabodee, *Public-Private Partnerships in Outer Space: Implications for the Defence and Security Sector* (S. Rajaratnam Sch. of Int'l Stud., Working Paper No. 344, Mar. 24, 2025), <https://rsis.edu.sg/wp-content/uploads/2025/03/WP344.pdf>; Shinichi Takata & Kazuyoshi Hidaka, *New Public-Private Partnership Based on the Interactive Collaboration in the Space Sector*, 231 ACTA ASTRONAUTICA 25, 25-36 (2025); Rausser et al., *supra* note 4.

⁶ Teeratanabodee, *supra* note 5; Takata & Hidaka, *supra* note 5; Rausser et al., *supra* note 4; Moon Kim, *Coherence to Choices: Informing Decisions on Public-Private Partnerships in the Space Sector* (RAND Corp. 2023), https://www.rand.org/pubs/rgs_dissertations/RGSDA2739-1.html.

⁷ Jack B. Chaben, *Extending Humanity's Reach: A Public-Private Framework for Space Exploration*, 13 J. STRATEGIC SEC. 75, 75-98 (2020).

⁸ Sridhara Murthi, *supra* note 2, at 3; Matthew Weinzierl, *Space, the Final Economic Frontier*, 32 J. ECON. PERSP. 173, 173-92 (2018).

⁹ Sridhara Murthi, *supra* note 2, at 3-12; SPACE BUSINESS: EMERGING THEORY AND PRACTICE 27-54 (Arto Ojala et al. eds., 2024).

India's experience as one of the foremost spacefaring nations of the New Space Age reflects this global trajectory. Historically, the Indian Space Research Organisation (ISRO) developed and operated a State-controlled programme.¹⁰ Capacity constraints, the imperative of cost-effectiveness and strategic ambition gradually opened the Indian space programme to private players.¹¹ Direct and indirect collaboration now spans all three levels of the Indian space value chain.¹² The Government has publicised that shift and has stated its resolve to establish private players as independent stakeholders.¹³ Inadequate legal and institutional frameworks nevertheless leave a governance gap, particularly in resolving contractual commercial space conflicts.¹⁴

B. The problem: dispute resolution in commercial outer space activities

Outer space commercialisation has generated a complex web of contractual relations between the State and private parties across the value chain. Given the limits of international outer space law in its application to commercial space activities and to the involvement of private parties, the task of governance falls upon spacefaring nations, through comprehensive national legislation incorporating a sector-specific dispute resolution mechanism.¹⁵

This article argues that India's reliance on fragmented executive policies and state-centric dispute resolution mechanisms is inadequate for a commercialised space economy, and that a statutory dispute resolution framework harmonising conventional and alternative dispute redressal (ADR) mechanisms is critical. The legislative vacuum poses a direct threat to India's commercial space ambitions, because a thriving commercial sector requires legal predictability. Centred on five questions, the article examines (i) the nature and typology of contractual disputes arising from commercial outer space activities in India and their inherent complexities, (ii) the adequacy of international outer space law in addressing private commercial disputes,

¹⁰ Sridhara Murthi, *supra* note 2, at 4-6.

¹¹ Rajeshwari Pillai Rajagopalan & Dimitrios Strokos, *The Transformation of India's Space Policy: From Space for Development to the Pursuit of Security and Prestige*, 69 SPACE POL'Y 101633 (2024).

¹² Sridhara Murthi, *supra* note 2, at 5; Rose Croshier, *What Is Space Capability?*, in HANDBOOK FOR SPACE CAPABILITY DEVELOPMENT 33 (2023), <http://www.jstor.org/stable/resrep48711.9>; Rose Croshier, *How Does a State Develop Space Capability?*, in *id.* at 49-87, <http://www.jstor.org/stable/resrep48711.10>.

¹³ PRESS INFO. BUREAU, GOV'T OF INDIA, *Enhancing the Private Participation in Space Activities* (2023), <https://static.pib.gov.in/WriteReadData/specificdocs/documents/2023/apr/doc2023410179001.pdf>.

¹⁴ Sridhara Murthi, *supra* note 2, at 10; Sandeepa Bhat B., *On Drafting a Viable Model of National Space Legislation for India*, in COMMERCIALISATION AND PRIVATISATION OF OUTER SPACE: ISSUES FOR NATIONAL SPACE LEGISLATION 66, 66-77 (R. Venkata Rao & Kumar Abhijeet eds., 2016); Kumar Abhijeet, *State Practices Towards National Space Legislation*, in *id.* at 79-86; Ashok G.V., *Policy Framework for Commercial Space Activities*, in *id.* at 111-14; Ranjana Kaul & Ram Jakhu, *Regulation of Commercial Space Activities in India*, in SPACE LAW IN THE ERA OF COMMERCIALISATION 189, 189-212 (Sandeepa Bhat B. ed., 2010).

¹⁵ Luping Zhang, *The Modernization of Interstate Space Dispute Settlement Mechanisms*, 76 ADVANCES SPACE RSCH. 5535, 5535-45 (2025).

(iii) the sufficiency of existing international and national ADR mechanisms in resolving conflicts in the outer space sector, (iv) the gaps in India's legal and institutional space governance framework, and (v) the statutory and institutional reforms necessary to establish a coherent and effective sector-specific dispute resolution framework for the Indian commercial outer space sector.

II. COMMERCIALISATION OF SPACE AND THE NATURE OF DISPUTES

Addressing the first research question, this section examines the nature and typology of contractual disputes arising from commercial outer space activities in India, and analyses the complexities of outer space disputes.

A. India's commercial space sector: growth and transformation

Outer space commercialisation uses the sector for revenue generation through active State and non-State interaction,¹⁶ and poses numerous governance challenges.¹⁷ Conceived under the visions of Dr. Vikram Sarabhai and Dr. Homi J. Bhabha,¹⁸ and driven by ideals of nationalism, entrepreneurship and national security,¹⁹ the Indian space programme addressed a developing nation's socioeconomic needs and its aspirations to global standing.²⁰ Rooted in ingenuity, it reflected the scientific temper and developmental priorities of its people. From INCOSPAR in 1962 to ISRO in 1969, India consolidated its position as a leading spacefaring nation.²¹

This shift in the Indian space sector mirrors the global movement towards the New Space Age through private inclusion.²² ISRO provides private actors with institutional and resource support through active collaboration. At the institutional level, commercialisation advanced through Antrix Corporation Ltd. in 1992,²³ NewSpace India Limited in 2019,²⁴ and the Indian National Space Promotion and Authorisation Centre (IN-SPACe), which promotes private participation

¹⁶ *Commercialisation of Space: Opportunities and Challenges* (background paper, Jan. 24-25, 2013), https://www.mcgill.ca/iasl/files/iasl/2013-01-2425_space_commercialisation_background_paper.doc.

¹⁷ Kaul & Jakhu, *supra* note 14; Eng Teong See, *Commercialization of Space Activities: The Laws and Implications*, 82 J. AIR L. & COM. 145 (2017), <https://scholar.smu.edu/jalc/vol82/iss1/4>.

¹⁸ Rajagopalan & Stroikos, *supra* note 11.

¹⁹ *Key Drivers for Growth in Indian Space Sector*, in INDIAN SPACE SECTOR REPORT 2025 (Wright Rsch.), <https://www.wrightresearch.in/encyclopedia/chapter-report/chapter-2-key-drivers-for-growth-in-indian-space-sector/> (last visited June 12, 2026).

²⁰ Sridhara Murthi, *supra* note 2, at 4; Rajagopalan & Stroikos, *supra* note 11.

²¹ Rajagopalan & Stroikos, *supra* note 11.

²² Hemant Jain & Dhruvi Bharwad, *Unlocking India's Space Economy: Frugal Innovation and Private Sector Integration*, 16 INT'L J. SCI. & TECH., no. 3 (2025), DOI 10.71097/ijst.v16.i3.7911.

²³ Antrix Corp. Ltd., *About Us*, ANTRIX, <https://www.antrix.co.in/Aboutus> (last visited June 12, 2026).

²⁴ NEWSPACE INDIA LTD., NSIL Brochure, <https://www.nsilindia.co.in/sites/default/files/u1/NSIL%20Brochure%20Single%20pages.pdf> (last visited June 12, 2026); PwC, *Preparing to Scale New Heights: Enhancing Private Participation in India's Commercial Space Sector* (Jan. 2020), <https://www.pwc.in/assets/pdfs/research-insights/2020/preparing-to-scale-new-heights.pdf>.

while meeting international obligations.²⁵ India also supports a strong and dynamic start-up culture that functions alongside ISRO.²⁶

Despite this progress, the Indian commercial space sector remains largely state-controlled and reflects a discord between State objectives and private sector aspirations. PwC assessed in January 2020 that Indian space commerce accounted for less than 1% of the global market.²⁷ Lacking a comprehensive governance framework, private participants rely upon executive policies to navigate market uncertainty.²⁸ Compounding these challenges is the discord between technological advancement, sectoral development and statutory protection, as domestic law struggles to keep pace.²⁹

B. Typology of disputes in commercial outer space activities

Commercial disputes may arise from a contractual relationship between actors engaged in any activity in the space value chain for return on investment and profit. These disputes may be classified as follows.

Commercial disputes. Commercial disputes between private entities *inter se*, between a State and a private entity, and between an international governmental organisation and a private entity,³⁰ arise from a commercial contractual agreement. The nature of the agreement depends upon the activity undertaken. The unique characteristics of outer space activities make these disputes complex, technical and cross-jurisdictional. Examples include disputes arising from technology-transfer agreements, public-private partnerships, the transfer of space assets, agreements for the launch of space objects, licensing agreements, space tourism and space debris collision.

Investor-related disputes. Outer space activities generate large returns, and this has been the primary reason for increased private sector participation in the industry. The volume of investment calls for legal and regulatory protection from the State. India is not a party to the

²⁵ INDIAN NAT'L SPACE PROMOTION & AUTHORISATION CTR., *About Us*, IN-SPACe, https://www.inspace.gov.in/inspace?id=inspace_about_inspace_v3 (last visited June 12, 2026).

²⁶ PRESS INFO. BUREAU, *supra* note 13.

²⁷ PwC, *supra* note 24, at 8 (data as at January 2020).

²⁸ Sridhara Murthi, *supra* note 2, at 4-8; Masafumi Hashimoto, *Public-Private Partnerships in Space Projects: An Analysis of Stakeholder Dynamics* (2009) (M.S. thesis, Massachusetts Institute of Technology), <https://dspace.mit.edu/bitstream/handle/1721.1/52751/501191812-MIT.pdf>.

²⁹ *Public-Private Partnerships: A Catalyst for the Space Economy*, NEW SPACE ECONOMY (May 26, 2023), <https://newspaceeconomy.ca/2023/05/26/public-private-partnerships-a-catalyst-for-the-space-economy/>; Rowan Hoover, *Space Law in the 21st Century: Is International Safety at the Whims of Private Companies?*, ST. ANDREWS L. REV. (Nov. 5, 2023), <https://www.standrewslawreview.com/post/space-law-in-the-21st-century-is-international-safety-at-the-whims-of-private-companies>.

³⁰ Frans G. von der Dunk, *Space for Dispute Settlement Mechanisms: Dispute Resolution Mechanisms for Space? A Few Legal Considerations*, in PROCEEDINGS OF THE FORTY-FOURTH COLLOQUIUM ON THE LAW OF OUTER SPACE 442 (2001).

Convention on the Settlement of Investment Disputes between States and Nationals of Other States, 1965, so investor-State claims involving India proceed under the UNCITRAL Arbitration Rules before ad hoc tribunals constituted under India's bilateral investment treaties.³¹

State-to-State disputes. These involve disputes between two States and are often subject to diplomatic dialogue and to resolution under art. IX of the Liability Convention.³² Diplomatic dialogue and good faith negotiation are of particular importance given the sensitivity of geopolitical relations among nations.

C. Why are space disputes distinctive?

Space disputes are distinctive for three reasons. First, the extraterrestrial character of outer space and the absence of territorial sovereignty there have significant implications for contracting. Since activities occur beyond national territory, traditional assumptions about the place of performance, the location of damage or the situs of assets become unclear.³³ Second, the international space treaties are predominantly state-centric in structure and substance, assigning rights, obligations, responsibility and liability to States alone. Since private actors are not recognised as subjects of international space law, their conduct is legally attributed to the State under whose jurisdiction they operate.³⁴ Finally, conflicts arising among diverse stakeholders in the space sector, and the mechanisms for their resolution, remain largely unaddressed within existing space law.³⁵ The non-recognition of private parties under the treaty mechanisms restricts their right to invoke treaty-based remedies directly; claims must instead be pursued

³¹ Convention on the Settlement of Investment Disputes Between States and Nationals of Other States, Mar. 18, 1965. India has neither signed nor ratified the Convention, and investor-State claims involving India are accordingly brought under the UNCITRAL Arbitration Rules before ad hoc tribunals constituted under India's bilateral investment treaties.

³² Laura Denise Jaroslavsky Consoli & Panagiotis Chalkias, *Space-Related Disputes (Part 1): The Current Landscape and Specific Intellectual Property Aspects*, DAILY JUS (Dec. 2024), <https://dailyjus.com/world/2024/12/space-related-disputes-part-1-the-current-landscape-and-specific-intellectual-property-aspects>; Scott Atkins, *Dispute Resolution and Restructuring in Outer Space*, NORTON ROSE FULBRIGHT (Sept. 2022), <https://www.nortonrosefulbright.com/en-in/knowledge/publications/5bf5d3bb/dispute-resolution-and-restructuring-in-outer-space>.

³³ Frans G. von der Dunk, *Technology and the Unique Challenges of Applying Law to the Realm of Outer Space and Space Activities*, 26 CHI. J. INT'L L. 57, 57-72 (2025), <https://chicagounbound.uchicago.edu/cjil/vol26/iss1/2>.

³⁴ Dan St. John, *The Trouble with Westphalia in Space: The State-Centric Liability Regime*, 40 DENV. J. INT'L L. & POL'Y 686 (2012); Belinda Bragg, *Governing in a Crowded Space: The Legal Regime for Space*, NSI (Aug. 15, 2025), <https://www.nsiteam.com/sma-publications/governing-in-a-crowded-space-the-legal-regime-for-space>; Tanja Masson-Zwaan, *New States in Space*, 113 AJIL UNBOUND 98, 98-102 (2019); Steven Freeland & Anja Nakarada Pecujlic, *How Do You Like Your Regulation, Hard or Soft? The Antarctic Treaty and the Outer Space Treaty Compared*, 30 NLSI REV. 11, 11-36 (2018), <https://repository.nls.ac.in/cgi/viewcontent.cgi?article=1191&context=nlsir>.

³⁵ G.S. Sachdeva, *State Responsibility for the Space Activities of Private Actors*, in COMMERCIALISATION AND PRIVATISATION OF OUTER SPACE: ISSUES FOR NATIONAL SPACE LEGISLATION 13, 13-30 (R. Venkata Rao & Kumar Abhijeet eds., 2016).

through States.³⁶ Questions of jurisdiction, applicable law and dispute resolution are left to domestic systems and to contractual arrangements.

III. LIMITS OF INTERNATIONAL SPACE LAW FOR COMMERCIAL DISPUTES

This section addresses the second research question and explores the adequacy of international outer space law in addressing private commercial disputes, analysing the structural adequacy of the treaty framework in the context of private commercial space activities.

A. The contract-driven nature of commercial space activities

The complexities of space commerce stem from its unique extraterrestrial character. Commercialisation and privatisation in the New Space Age transcend boundaries, underscoring the need for stringent contractual relations between parties.³⁷ The absence of territorial control³⁸ in space activities³⁹ makes contracts the primary mechanism through which commercial relationships, risk allocation and operational responsibilities are structured in the space sector.⁴⁰ Instruments such as the Outer Space Treaty embody principles of customary international law, among them State responsibility, non-appropriation and peaceful use, but do not regulate private transactions.⁴¹ As private entities engage more actively in the outer space sector, contracts become essential to define the rights and obligations that public international law leaves unaddressed.⁴²

³⁶ Convention on International Liability for Damage Caused by Space Objects arts. VIII-IX, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention]; Bin Cheng, *The 1972 Convention on International Liability for Damage Caused by Space Objects*, in STUDIES IN INTERNATIONAL SPACE LAW 287 (1997).

³⁷ Diane Howard, *Commercial Space*, SPACE SECURITY 1, 1-27 (2012), <https://commons.erau.edu/cgi/viewcontent.cgi?article=1910&context=publication>; Mike Mason et al., *Government Contracts Guide*, HOGAN LOVELLS (2024), https://www.hoganlovells.com/-/media/project/english-site/our-thinking/publication-embedded-media/pdfs/2024/hogan_lovelles_government_contracts_guide_for_space_and_satellite_15468.pdf.

³⁸ Abigail D. Pershing, *Interpreting the Outer Space Treaty's Non-Appropriation Principle: Customary International Law from 1967 to Today*, 44 YALE J. INT'L L. 149, 149-78 (2019), <https://openyls.law.yale.edu/server/api/core/bitstreams/53f751d8-60f8-41bc-a263-26bff3fd375f/content>.

³⁹ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies art. II, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty]; Ricky J. Lee, *Article II of the Outer Space Treaty: Prohibition of State Sovereignty, Private Property Rights, or Both?*, 11 AUSTL. INT'L L.J. 128 (2004).

⁴⁰ Brian Israel, *Space Resources in the Evolutionary Course of Space Lawmaking*, 113 AJIL UNBOUND 114, 114-19 (2019).

⁴¹ Catherine Penny, *Space Law: Dispute Resolution*, STEVENS & BOLTON (Jan. 21, 2025), <https://www.stevens-bolton.com/site/insights/articles/space-law-dispute-resolution>.

⁴² Howard, *supra* note 37.

B. Conflict resolution under international space law

The basis for outer space conflict resolution lies in international cooperation, a principle of customary international law articulated in the international space law instruments.⁴³ The UN Charter obliges Member States to pursue peaceful conflict resolution in conformity with the principles of justice and international law. Chapter VI urges disputing parties to pursue peaceful means of settlement, while Chapter VIII recognises regional arrangements and encourages the pacific settlement of local disputes.⁴⁴ On 22 July 2025 the Security Council unanimously adopted Resolution 2788 (2025), reiterating that framework, urging the effective use of the mechanisms under art. 33 and expressing readiness to exercise its investigative mandate under art. 34.⁴⁵

The Outer Space Treaty, 1967 (OST) is the foundational framework governing State conduct in outer space. Its principles are recognised as customary international law and are oriented towards the collective benefit of all humankind. Dispute resolution under the OST proceeds through good faith negotiation and diplomatic engagement rather than through formal mechanisms.⁴⁶ Art. III requires space activities to conform to international law, including the UN Charter's encouragement of referral to the International Court of Justice under art. 36(3).⁴⁷ The optional character of these mechanisms, and the reluctance of spacefaring nations to accept the compulsory jurisdiction of the Court, leave the OST framework without any clearly defined or mandatory dispute resolution mechanism.⁴⁸

Art. VI embodies State responsibility for national space activities undertaken by States, international organisations and non-governmental entities (NGEs).⁴⁹ It attributes wrongful acts arising from private activities to the authorising State.⁵⁰ States bear a mandatory responsibility for the authorisation of national activities and for their continuing supervision. In response to the Treaty's silence on private obligations, States have developed national space laws and licensing regimes requiring prior authorisation and compliance with regulatory conditions.⁵¹

⁴³ Penny, *supra* note 41.

⁴⁴ U.N. Charter arts. 1-2, 33-38, 52-54.

⁴⁵ S.C. Res. 2788 (July 22, 2025); U.N. SCOR, 80th Sess., 9962d mtg., U.N. Doc. S/PV.9962 (July 22, 2025).

⁴⁶ Outer Space Treaty, *supra* note 39, arts. III, IX; Penny, *supra* note 41; Susan Cone Kilgore, *Arbitration Rules for Disputes Arising from Outer Space Activity*, FED. LAW., Mar. 2018, at 59.

⁴⁷ U.N. Charter art. 36, para. 3; Outer Space Treaty, *supra* note 39, art. III.

⁴⁸ Penny, *supra* note 41.

⁴⁹ Outer Space Treaty, *supra* note 39, art. VI.

⁵⁰ *Id.* (States Parties bear international responsibility for national activities in outer space "whether such activities are carried on by governmental agencies or by non-governmental entities").

⁵¹ Bin Cheng, *Article VI of the 1967 Space Treaty Revisited: "International Responsibility," "National Activities," and "The Appropriate State"*, 26 J. SPACE L. 7 (1998); Sandeepa Bhat B., *State Responsibility and International Liability*, in INTERNATIONAL SPACE LAW IN THE NEW SPACE ERA: PRINCIPLES AND CHALLENGES 105, 105-22 (Sandeepa Bhat B. et al. eds., 2024).

Art. VII introduces liability for damage caused by space objects, imposing liability on States launching, procuring or permitting launches from their territory or facilities, for damage to another State or to its natural or juridical persons.⁵² Read with the Convention on International Liability for Damage Caused by Space Objects (the Liability Convention), it confirms that only States qualify as launching States capable of incurring international liability, thereby excluding private entities from direct liability.⁵³ Art. IX adopts a preventive approach to dispute settlement, obliging States to engage in consultations where proposed space activities may cause harmful interference with the activities of other States, although the absence of detailed procedural norms limits its practical effectiveness.⁵⁴ An expanding cast of actors in outer space increases State responsibility and liability, and heightens the significance of national authorisation and of the continuing supervision of private space activities.⁵⁵

One of the landmark episodes discussed in the context of dispute resolution for outer space activities is the Cosmos 954 incident. The Soviet satellite Cosmos 954, carrying a nuclear reactor powered by uranium-235, crashed over Canadian territory on 24 January 1978, scattering radioactive debris. Despite prior knowledge, the USSR did not warn Canada or disclose the dangers the satellite posed, which delayed clean-up. Recovery operations, named Operation Morning Light, cost over \$13.9 million. Canada claimed CAD 6,041,174.70 in damages under the Liability Convention and customary international law. The dispute was settled in 1981, the USSR paying three million Canadian dollars in full and final settlement.⁵⁶ Thereafter, in 2009, the collision between Cosmos 2251 and the privately owned Iridium 33 renewed the debate on private-party dispute resolution. Both satellites were destroyed. No claim was ever presented by or against either operator, and that silence is itself the measure of the gap, since no forum was available to a private operator against a launching State.⁵⁷

The Liability Convention recognises absolute and fault-based liability,⁵⁸ and permits the presentation of claims through diplomatic channels, but provides no institutional mechanism for their determination. Where a claimant State does not maintain diplomatic relations with the launching State, art. IX permits it to act through a third State or, if both are Members of the

⁵² Outer Space Treaty, *supra* note 39, art. VII.

⁵³ Liability Convention, *supra* note 36, art. I(c).

⁵⁴ Outer Space Treaty, *supra* note 39, art. IX; Andrea J. Harrington, *Due Regard as the Prime Directive for Responsible Behavior in Space*, 20 LOY. U. CHI. INT'L L. REV. 57 (2024); Elena Carpanelli, *Unweaving the Tangled Web: The Due Regard Obligation Under Article IX of the Outer Space Treaty*, 49 AIR & SPACE L. 35, 35-58 (2024).

⁵⁵ Sachdeva, *supra* note 35.

⁵⁶ Protocol Between the Government of Canada and the Government of the Union of Soviet Socialist Republics, Can.-U.S.S.R., Apr. 2, 1981, 20 I.L.M. 689 (1981).

⁵⁷ Fabio Tronchetti, *The PCA Rules for Dispute Settlement in Outer Space: A Significant Step Forward*, 29 SPACE POL'Y 181 (2013).

⁵⁸ Liability Convention, *supra* note 36, arts. II-III.

United Nations, through the Secretary-General.⁵⁹ The awards of the Claims Commission are, further, non-binding and merely recommendatory unless the parties have agreed that they shall be final and binding.⁶⁰ The Convention on Registration of Objects Launched into Outer Space, 1975 plays a significant role in establishing jurisdiction and control over outer space activities by mandating the registration of space objects. It requires each State to maintain a national register and to furnish corresponding information to the UN Secretary-General, thereby promoting transparency and accountability and strengthening global space situational awareness, while art. VIII of the OST presupposes such a registry and confers jurisdiction and control on the State of registry. Domestic legislation governs national registration, preserving jurisdiction and control even where the object is transferred. The Convention nevertheless lacks enforcement mechanisms, providing no procedure to compel compliance.⁶¹ Commercial outer space activities expose these legal limitations and accentuate the growing need for a clearly articulated dispute resolution framework and for dedicated institutional mechanisms capable of addressing complex, multi-actor disputes.⁶²

IV. ALTERNATIVE DISPUTE RESOLUTION AND ARBITRATION IN SPACE: GLOBAL PRACTICE

The third research question is examined in this part, in which the sufficiency of existing international ADR mechanisms, with particular attention to the PCA Optional Rules, 2011, is analysed.

A. Alternative dispute resolution in commercial space disputes

Dispute resolution is the lawful, equitable and conscientious resolution of conflicts through an independent third party. In commercial settings, effectiveness and efficiency are essential, because uncertainty undermines economic activity and contractual stability. Traditional courts, despite their authority, face judicial backlogs, procedural delays, high financial and emotional costs, a lack of privacy and inadequate technical expertise. ADR mechanisms such as negotiation, mediation, conciliation and arbitration emphasise party autonomy, flexibility, confidentiality and procedural efficiency, enabling timely and cost-effective resolution.

⁵⁹ Liability Convention, *supra* note 36, art. IX; Penny, *supra* note 41; John Adolph, *The Recent Boom in Private Space Development and the Necessity of an International Framework Embracing Private Property Rights to Encourage Investment*, 40 INT'L LAW. 961 (2006).

⁶⁰ Liability Convention, *supra* note 36, art. XIX(2); Atkins, *Dispute Resolution and Restructuring in Outer Space*, *supra* note 32.

⁶¹ Convention on Registration of Objects Launched into Outer Space arts. II, IV, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention]; Mahulena Hofmann, *Registration of Space Objects*, in INTERNATIONAL SPACE LAW IN THE NEW SPACE ERA: PRINCIPLES AND CHALLENGES 123, 123-24 (Sandeepa Bhat B. et al. eds., 2024).

⁶² Penny, *supra* note 41; Kilgore, *supra* note 46.

Arbitration is well suited to cross-border and technically complex disputes because it gives weight to party autonomy in determining the particulars of the proceedings, thereby minimising jurisdictional uncertainty, though it is private and non-precedential.⁶³ Its finality, impartiality, timeliness and formality favour it in commercial space disputes, with enforcement under the New York Convention, 1958.^{64,65,66} Third-party involvement and the limitations of existing state-centric mechanisms restrict direct access to remedies for non-State parties. Space disputes have in practice been referred to international arbitral institutions such as the International Chamber of Commerce, the London Court of International Arbitration and the Singapore International Arbitration Centre under their general commercial rules, the Devas arbitration before the International Chamber of Commerce being the leading example.⁶⁷ Growing foreign investment in the sector has also brought the investor-State dispute settlement mechanisms into play.⁶⁸

B. The PCA Optional Rules, 2011: strengths and limitations

The Permanent Court of Arbitration (PCA) is an intergovernmental organisation composed of member States, and provides a standing institutional framework for the resolution of international disputes through arbitration and other peaceful means. India has been a party to the PCA's founding convention since 1950.⁶⁹ Unlike traditional international adjudicatory bodies, the PCA is distinctive in its capacity to administer disputes involving State and non-State parties.

In 2009 an advisory group was constituted to examine the feasibility of a specialised, sector-specific dispute resolution framework for disputes arising from outer space activities,

⁶³ Penny, *supra* note 41; Mark J. Sundahl, *International Norms on the Settlement of Space Disputes*, in INTERNATIONAL SPACE LAW IN THE NEW SPACE ERA: PRINCIPLES AND CHALLENGES 275 (Sandeepa Bhat B. et al. eds., 2024); Clément Camion, *Access to Justice*, in E-ACCESS TO JUSTICE 335 (Karim Benyekhlef et al. eds., 2016); W.L. Ury, J.M. Brett & S.B. Goldberg, *Designing an Effective Dispute Resolution System*, 4 NEGOT. J. 413 (1988).

⁶⁴ Convention on the Recognition and Enforcement of Foreign Arbitral Awards, June 10, 1958, 21 U.S.T. 2517, 330 U.N.T.S. 3; Alexandra Dolce, *Interstellar Arbitration: Employing Arbitration for Resolving Outer Space Disputes*, LEXISNEXIS (June 16, 2023), <https://www.lexisnexis.co.uk/blog/research-legal-analysis/interstellar-arbitration-employing-arbitration-for-resolving-outer-space-disputes>.

⁶⁵ Darcy Beamer-Downie & Leonor D'Albiousse, *Space Law and Arbitration: Dispute Resolution Mechanisms for Space-Related Disputes*, CLYDE & CO (Mar. 28, 2024), <https://www.clydeco.com/en/insights/2024/03/overview-of-dispute-resolution-mechanisms-for-spac>.

⁶⁶ Naomi Pryde & Jue Jun Lu, *Dispute Resolution in Extra-Terrestrial Realms (Part 2)*, L. SOC'Y SCOT. J. (July 8, 2024), <https://www.lawscot.org.uk/members/journal-hub/articles/dispute-resolution-in-extra-terrestrial-realms-part-2/>.

⁶⁷ Pryde & Lu, *supra* note 66.

⁶⁸ NISHITH DESAI ASSOCS., *International Investment Treaty Arbitration and India*, https://www.nishithdesai.com/Content/document/pdf/ResearchPapers/International_Investment_Treaty_Arbitration_and_India.pdf (last visited June 20, 2026); Luise Weber-Steinhaus, *Transatlantic Cooperation in Space: EU-Canada Free Trade Agreement*, OASIS, no. 20, 2014, at 81; EUR. PARL. RSCH. SERV., *European Space Policy: Historical Roots, Present Challenges*, PE 545.736 (2015).

⁶⁹ PERMANENT COURT OF ARBITRATION, *Contracting Parties*, <https://pca-cpa.org/en/about/introduction/contracting-parties/> (last visited June 20, 2026) (recording India's accession to the 1899 Convention for the Pacific Settlement of International Disputes on July 29, 1950).

particularly those involving private parties. Arbitration was identified as a suitable mechanism because of its advantages over traditional fora. These considerations informed the development of the PCA Optional Rules for Arbitration of Disputes Relating to Outer Space Activities, adopted on 6 December 2011.⁷⁰

The strengths of the Optional Rules include their adaptation of the UNCITRAL Arbitration Rules to the specifics of space activities, their confidentiality provisions, framed with the sensitivity of outer space activities and commercial interests in mind, and the enforceability of awards as between State and non-State parties. The Rules also provide for a waiver of immunity, ensuring that States and international organisations can be held to account in arbitration. It cannot be said, however, that the Rules constitute a major advance, since most of their features are common to international arbitration. Uncertainty over the enforcement of awards remains, as States may invoke immunity provisions, and this is compounded by the imbalance in bargaining power between States and private parties. The effectiveness of the PCA is further limited because it depends on the mutual consent of the parties, who can avoid its procedures simply by withholding consent. Since the Optional Rules have not yet been tested in practice, there is no body of experience to guide arbitrators and parties on the issues that space disputes raise and on how the PCA would address them.⁷¹

No State appears to have given the Optional Rules statutory recognition, and no arbitration appears to have been commenced under them. Their application therefore depends upon the mutual consent of the parties or upon their incorporation as a contractual choice. This also suggests that the Optional Rules may not be well suited to non-contractual disputes.

V. THE INDIAN FRAMEWORK: GAPS AND INSTITUTIONAL WEAKNESSES

The fourth question forms the core of this section, which examines the limitations of India's existing dispute resolution mechanisms, the institutional constraints of IN-SPACe, and the challenges of arbitration in India.

⁷⁰ Tronchetti, *supra* note 57; Penny, *supra* note 41; Kilgore, *supra* note 46; Jesse Baez, *The PCA's Optional Rules for Arbitration of Disputes Relating to Outer Space Activities: Bringing Arbitration to Infinity and Beyond*, 4 ARB. L. REV. 218 (2012); Mythili Srinivasamurthy, *International Arbitration of the Quixotic Outer-Space Disputes Under PCA Optional Rules*, 2 INT'L J. LEGAL RSCH. & ANALYSIS 1 (2021).

⁷¹ Stefan Pislevik, *Law Without Gravity: Arbitrating Space Disputes at the Permanent Court of Arbitration and the Relevance of Adverse Inferences*, 43 J. SPACE L. 280 (2019); Caroline Arbaugh, Note, *Gravitating Toward Sensible Resolutions: The PCA Optional Rules for the Arbitration of Disputes Relating to Outer Space Activity*, 42 GA. J. INT'L & COMP. L. 825 (2014).

A. Existing legal mechanisms and their limitations

Amicable dispute resolution is recognised in India through customary practice among Indian communities, and colonial administrative enactments institutionalised ADR through common law and statute.⁷² Art. 51 of the Constitution promotes international peace, just and honourable relations, respect for international law and treaty obligations, and the settlement of international disputes by arbitration, while art. 253 empowers Parliament to legislate to implement international treaties, agreements, conventions and decisions.⁷³ Section 28 of the Indian Contract Act preserves access to the courts while saving arbitration agreements.⁷⁴ Section 89 of the Code of Civil Procedure recognises court-assisted ADR under the Arbitration and Conciliation Act, 1996,⁷⁵ which is aligned with the UNCITRAL Model Law and governs domestic and international arbitration and conciliation, recognising party-autonomous agreements, the constitution of tribunals, the conduct of proceedings, enforceable domestic and foreign awards, and limited judicial intervention.⁷⁶

B. IN-SPACe: regulatory mandate and institutional limitations

The lack of a comprehensive national law led to the formulation of the Indian Space Policy in 2023 (ISP 2023). The policy aims at enhancing the participation of non-governmental entities in the Indian space industry and recognises IN-SPACe as a facilitating and supervisory body. Though the policy is ambitious, the role and scope of IN-SPACe as a regulatory authority are open to scrutiny. Since its enactment the ISP has been criticised as a weak attempt at national outer space regulation and governance. It has no real legal recognition, as it does not come within the ambit of the term “law” as interpreted under art. 13(3)(a) of the Constitution. The policy also does not define commercial space activities, and the definitions provided are ambiguous and ill-formed.⁷⁷ On dispute resolution the policy says almost nothing. Its single reference directs the Department of Space to create an appropriate mechanism to resolve any dispute arising out of space activity, as per the extant laws, and the policy never uses the word

⁷² Shivangi Sinha, *Constitutional Aspects of Alternative Dispute Resolution*, 6 INT’L J. RSCH. & ANALYTICAL REV. 537 (2019).

⁷³ INDIA CONST. arts. 51, 253.

⁷⁴ The Indian Contract Act, No. 9 of 1872, INDIA CODE, s. 28.

⁷⁵ The Code of Civil Procedure, No. 5 of 1908, INDIA CODE, s. 89.

⁷⁶ The Arbitration and Conciliation Act, No. 26 of 1996, INDIA CODE; UNCITRAL Model Law on International Commercial Arbitration, G.A. Res. 40/72 (Dec. 11, 1985), as amended 2006.

⁷⁷ DEP’T OF SPACE, GOV’T OF INDIA, *Indian Space Policy - 2023* (2023), https://www.isro.gov.in/media_isro/pdf/IndianSpacePolicy2023.pdf [hereinafter Indian Space Policy 2023]; INDIA CONST. art. 13(3)(a); Sandeepa Bhat B., *Outlining Inconsistencies in the Indian Space Policy 2023* (SSRN Working Paper, July 9, 2024), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4886381; Sandeepa Bhat B., *Indian Space Policy 2023: An Evaluation*, 76 SPACE POL’Y 101743 (2026).

arbitration.⁷⁸ That mandate was discharged only later, and only at the level of a term in an authorisation certificate. The dispute resolution framework under the Norms, Guidelines and Procedures, 2024 (NGP 2024) adopts a structured, multi-tiered approach that treats space arbitration as a last resort. Clause 14 provides that disputes arising out of, or in connection with, the authorisation of space activities shall be addressed through amicable resolution by way of mediation and intervention by an independent committee constituted by the IN-SPACe Board.

Where such efforts fail, the clause provides for the initiation of arbitration proceedings under the Arbitration and Conciliation Act, 1996. The arbitral tribunal is to consist of three arbitrators, each party appointing one arbitrator with technical expertise in space science and technology, and the two party-appointed arbitrators jointly appointing a presiding arbitrator with experience in international law or arbitration. The arbitration is to be conducted by the Gujarat High Court Arbitration Centre, Ahmedabad, with Ahmedabad as the seat and the courts of Ahmedabad enjoying exclusive jurisdiction.⁷⁹ That mandatory designation may be resisted by foreign parties and international stakeholders who would prefer resolution before an international arbitral institution.

The NGP provides for the application, scope and procedure of authorisation of space activities.⁸⁰ The guidelines confine eligibility to Indian entities and admit foreign entities only through a subsidiary, joint venture, franchise, partnership or other recognised collaboration with an Indian entity. A list of activities is set out as separate verticals for which authorisation may be sought once the eligibility requirements are met.⁸¹ Of the many criticisms levelled at the NGP, the autonomy of IN-SPACe is perhaps the foremost. IN-SPACe regulates the space activities of ISRO as well as of non-governmental entities, including private players. Though constituted as an autonomous agency within the Department of Space, the extent of the regulatory control it actually exercises is a matter of concern, since the Secretary of the Department and the Chairperson of ISRO are the same officer, which leaves ISRO with a controlling influence over its own regulator. The NGP is, further, only an administrative instrument, and does not provide an adequate grievance redressal and appellate mechanism

⁷⁸ Indian Space Policy 2023, *supra* note 77, para. 8.10 (directing the Department of Space to “create appropriate mechanism to resolve any dispute arising out of space activity, as per the extant laws”). This is the only occurrence of the word “dispute” in the policy, which nowhere uses the word “arbitration”.

⁷⁹ IN-SPACe, NORMS, GUIDELINES AND PROCEDURES FOR IMPLEMENTATION OF INDIAN SPACE POLICY-2023 IN RESPECT OF AUTHORISATION OF SPACE ACTIVITIES, Doc. No. IN:ISP2023:NGP2024/V1.0, Terms and Conditions of Authorisation cl. 14, at 89-90 (2024), https://www.inspace.gov.in/inspace?id=inspace_ngp_update_page [hereinafter NGP 2024].

⁸⁰ NGP 2024, *supra* note 79.

⁸¹ Sakshi Singh, *IN-SPACe Releases Guidelines for Space Policy Implementation*, ASS’N OF GEOSPATIAL INDUS. (May 13, 2024), <https://agiindia.com/in-space-releases-guidelines-for-space-policy-implementation/>; NGP 2024, *supra* note 79, chs. II, V, XI.

consistent with the principles of natural justice. A further lacuna is the ambiguity about specific standards for space activities. Where a situation is not provided for in the NGP, applicants are to conform to globally recognised best practices, and what constitutes such practice is left to the interpretation of stakeholders.⁸²

C. Absence of space-specific adjudicatory expertise and enforcement challenges

As the late Fali S. Nariman observed, arbitration in India appears to be in a state of “animated suspension”.⁸³ India favours ad hoc over institutional arbitration, despite the global preference for institutions, and does so not only in low-value disputes but in high-stakes construction and infrastructure matters. Ad hoc arbitration brings delay, inconsistent professional standards, variable awards and extensive judicial intervention. Institutional arbitration offers structured procedures, oversight and case management, which matter particularly for complex, high-value outer space disputes. Despite a reasonably strong legal framework, arbitration in India remains protracted.⁸⁴ Concerns about cost and flexibility, inconsistent governmental support, and contracts favouring ad hoc arbitration hinder institutional growth.⁸⁵ Although the State is the largest litigant, the 2024 Office Memorandum on Guidelines for Arbitration and Mediation in Contracts of Domestic Public Procurement discourages the routine inclusion of arbitration in large contracts, provides that as a norm arbitration be restricted to disputes valued at less than ₹10 crore absent higher approval, and prefers institutional arbitration, mediation under the Mediation Act, 2023, and negotiated settlement.⁸⁶ Slow enforcement of foreign awards and misaligned legislative, judicial and executive approaches leave India’s ambition to be an arbitration hub unfulfilled. This state-centric system leaves private space actors without direct

⁸² Revathy Muralidharan & Aryan Mohindroo, *Navigating the Legal Cosmos: A Deep Dive into the Norms and Guidelines Released by IN-SPACe*, ECON. TIMES (Aug. 31, 2024), <https://economictimes.indiatimes.com/small-biz/legal/navigating-the-legal-cosmos-a-deep-dive-into-the-norms-and-guidelines-released-by-inspace/articleshow/112940644.cms>; NGP 2024, *supra* note 79, General Guideline 9, at 12.

⁸³ *India’s Arbitration Law Is in a Chronic State of Animated Suspension: Sr Adv Fali S. Nariman at UNCITRAL South Asia Conference*, LIVE LAW (Aug. 24, 2023), <https://www.livelaw.in/top-stories/indias-arbitration-law-is-in-a-chronic-state-of-animated-suspension-sr-adv-fali-s-nariman-at-uncitral-south-asia-conference-238175>.

⁸⁴ *Institutional Arbitration: The Emerging Need for a Robust Dispute Resolution Mechanism in India*, CDR CENTRE (Oct. 25, 2023), <https://cdrcentre.com/institutional-arbitration-the-emerging-need-for-a-robust-dispute-resolution-mechanism-in-india/>.

⁸⁵ *Institutional Arbitration*, *supra* note 84.

⁸⁶ *Arbitral Procedure: The New Endemic*, BAR & BENCH (May 22, 2024), <https://www.barandbench.com/view-point/arbitral-procedure-the-new-endemic-2>; Guidelines for Arbitration and Mediation in Contracts of Domestic Public Procurement, Off. Mem. No. F.1/2/2024-PPD, DEP’T OF EXPENDITURE, MINISTRY OF FINANCE, GOV’T OF INDIA (June 3, 2024), https://doe.gov.in/files/circulars_document/Guidelines_for_Arbitration_and_Mediation_in_Contracts_of_Domestic_Public_Procurement.pdf; *India: An Arbitration Hub - An Achievable Dream or an Illusion*, BAR & BENCH (Nov. 17, 2023), <https://www.barandbench.com/columns/india-an-arbitration-hub-an-achievable-dream-or-an-illusion>.

access or binding outcomes. Institutional arbitration through bodies such as the PCA offers a more suitable path forward.^{87,88,89}

VI. THE CASE FOR A DEDICATED STATUTORY SPACE DISPUTE RESOLUTION REGIME

The final research question is addressed in this section, which proposes the statutory and institutional reforms necessary to establish a comprehensive, sector-specific dispute resolution framework in India.

A. The necessity of comprehensive national space legislation

The development of international outer space law occurred in three phases: treaty drafting and codification; the adoption of UN resolutions and soft-law instruments as the sector expanded; and the reinterpretation of existing concepts to broaden their relevance in the New Space Age.⁹⁰ National space law encompasses all legally operative domestic instruments significantly affecting, directly or indirectly, a space activity or a major space application.⁹¹ Prof. von der Dunk identifies three guiding questions. First, national space law is necessary because the New Space Age gives private actors a prominent role while international space law does not directly regulate or protect their interests, leaving the State responsible.⁹² Second, domestic laws must contain core elements that promote stability, legal certainty and uniformity despite differing State interests.⁹³ Third, international organisations have a role in shaping national space laws.⁹⁴

The need for national legislation rests on three grounds. First, art. VI of the OST requires State authorisation and continuing supervision of national activities carried on by NGEs. That demands a stringent licensing regime with substantive and procedural requirements, so

⁸⁷ *India: An Arbitration Hub*, *supra* note 86; *From Award to Execution: The Arduous Journey of Executing Foreign Arbitral Awards in India*, BAR & BENCH (Jan. 12, 2024), <https://www.barandbench.com/view-point/from-award-to-execution-the-arduous-journey-of-executing-foreign-arbitral-awards-in-india>; Vikash Kumar Singh, *Arbitration in India: Recent Developments and Key Challenges*, 11 INT'L J. CREATIVE RSCH. THOUGHTS 82 (2023).

⁸⁸ Kavita & Sukanya Singha, *Resolving Disputes Through Arbitration in India: Issues and Challenges in International Commercial Arbitration*, 44 LIBR. PROGRESS INT'L 10300 (2024).

⁸⁹ Tjaco T. van den Hout, *Resolving Outer Space Related Disputes*, in PROCEEDINGS: UNITED NATIONS/INTERNATIONAL INSTITUTE OF AIR AND SPACE LAW WORKSHOP ON CAPACITY BUILDING IN SPACE LAW 3, U.N. Doc. ST/SPACE/14 (2003) [hereinafter *Capacity Building Proceedings*].

⁹⁰ Stephan Hobe, *National Space Legislation: What International Law Demands and How It Is Implemented*, in COMMERCIALISATION AND PRIVATISATION OF OUTER SPACE: ISSUES FOR NATIONAL SPACE LEGISLATION 1 (R. Venkata Rao & Kumar Abhijeet eds., 2016).

⁹¹ Frans von der Dunk, *National Space Law*, in SPACE LAW: LEGAL FRAMEWORK FOR SPACE ACTIVITIES 27 (Thomas Leclerc ed., 2023).

⁹² Frans von der Dunk, *Fundamental Provisions for National Space Laws* (2006), <https://digitalcommons.unl.edu/spacelaw/11>.

⁹³ Hobe, *supra* note 90.

⁹⁴ von der Dunk, *supra* note 92.

increasing privatisation requires stronger State regulation.⁹⁵ Second, the outer space sector has become a major economic sector whose development depends on international cooperation, State assistance and coordinated State and private action, and States must therefore create an environment that encourages industry stakeholders. Third, international space law remains inadequate for commercial activities, while limited State consensus requires national laws to fill the legal vacuum.⁹⁶

India's regulatory landscape consists largely of ISRO policies and guidelines. Although these guide certain activities, they have not developed into comprehensive legislation and they inadequately address commercial-sector issues, including licensing, safety and dispute resolution. Because States retain continuing responsibility for private activities under their jurisdiction, specialised national legislation is essential. Despite its technical capacity and its growing commercial sector, India lacks a consolidated statutory framework.^{97,98}

National space laws encompass certain core elements or "building blocks". While the most basic of these are an effort to fulfil treaty obligations,⁹⁹ a few other key elements may also be included.

i. Key elements of national space law

Defining key terms. A truly comprehensive national governance framework must not merely reflect treaty aspirations but should supplement them by addressing their inherent inadequacies. One such challenge is the definition of key terms such as "space" and "space activity". The proper definition, delimitation and demarcation of outer space helps establish an effective licensing regime.¹⁰⁰

Space worthiness. The capital-intensive and high-risk nature of outer space activities demands a high degree of financial, technical and operational soundness from stakeholders, as well as rigorous quality in execution.¹⁰¹

⁹⁵ Outer Space Treaty, *supra* note 39, art. VI.

⁹⁶ Setsuko Aoki, *Current Status and Recent Developments in Japan's National Space Law and Its Relevance to Pacific Rim Space Law and Activities*, 35 J. SPACE L. 363 (2009).

⁹⁷ Rupin Chopra & Shantam Sharma, *Navigating the Cosmos: Need for a Comprehensive Space Law in India*, S.S. RANA & CO. (Nov. 13, 2023), <https://ssrana.in/articles/need-comprehensive-space-law-india/>.

⁹⁸ Chopra & Sharma, *supra* note 97; Mehmood Pracha, *Indian Space Law and Policy: A Private Sector Perspective*, in Capacity Building Proceedings, *supra* note 89, at 410.

⁹⁹ Jacqueline Reichhold & Katja Grünfeld, *The Cologne Manual on the International Law of Space Traffic Management*, in PROC. 9TH EUR. CONF. ON SPACE DEBRIS, paper no. 130 (Bonn, Apr. 2025), <https://conference.sdo.esoc.esa.int/proceedings/sdc9/paper/130/SDC9-paper130.pdf>.

¹⁰⁰ Hobe, *supra* note 90.

¹⁰¹ Hobe, *supra* note 90.

Licensing mechanisms for authorisation and continuing supervision. Under art. VI of the OST, authorisation and continuing supervision are mandatory obligations of the State. Every national space law must therefore embody clear procedures and enforcement mechanisms for the application for, grant, authorisation, revocation and suspension of licences. It must further prescribe eligibility conditions, ensure safety in operations, provide redressal mechanisms and formulate clear regulations for the transfer of licences.¹⁰²

Liability for damage and space insurance. The privatisation of outer space activities has introduced significant uncertainty about liability for damage caused by private participants. Under the existing framework States bear international liability, which places them under considerable burden, and the absence of a dispute resolution mechanism leaves limited opportunity for recourse. Space insurance, discussed more fully in the succeeding section, is understood to be a promising solution and a mandatory element in the formulation of domestic outer space laws. Most existing national space laws, however, adopt either a limited-liability or a burden-shifting approach, which does not align with international obligations. The financial capacity of the State is also an important determinant.¹⁰³

Registration. The mandatory obligations of registration arise under arts. II and IV of the Registration Convention, while art. VIII of the OST presupposes a registry and confers jurisdiction and control on the State of registry.¹⁰⁴ Registration is a trust-building mechanism and ensures transparency and accountability in outer space activities, and it serves as the key to establishing liability and enabling continuing supervision. States must lay down clear procedures for the registration of space objects and must provide for a change in the State of registry. States must also define and enforce a temporal limit for registration and for furnishing information to the United Nations.¹⁰⁵

Safety and sustainability. Despite the infinite extent of outer space, the volume actually accessible for human activity at present is finite.¹⁰⁶ That reality underscores the importance of preserving outer space as an environment and as a resource through sustainable and responsible practice. Mandatory environmental impact assessment, debris mitigation measures and the recognition and incorporation of the principles of international environmental law are necessary

¹⁰² Hobe, *supra* note 90.

¹⁰³ Bhat, *supra* note 14.

¹⁰⁴ Registration Convention, *supra* note 61, arts. II, IV; Outer Space Treaty, *supra* note 39, art. VIII; Hofmann, *supra* note 61.

¹⁰⁵ Bhat, *supra* note 14.

¹⁰⁶ David G. Monk, *The Lessons of Airline Regulation and Deregulation: Will We Make the Same Mistakes in Space*, 57 J. AIR L. & COM. 715 (1992).

to secure the safety, security and sustainability of outer space activities.¹⁰⁷ All stakeholders must strive to ensure that their activities meet the highest standards of public and environmental safety,¹⁰⁸ guided by the principle of due regard¹⁰⁹ and by the peaceful exploration of outer space. Domestic legislation must also acknowledge the possibility of dual use of space objects and secure adherence to art. IV of the Outer Space Treaty, which prohibits the placing in orbit of nuclear weapons or other weapons of mass destruction and reserves the Moon and other celestial bodies for exclusively peaceful purposes.¹¹⁰

Dispute resolution. A governance framework is incomplete without a proper dispute resolution framework,¹¹¹ which is presently lacking in almost all domestic space legislation. While arbitration is generally the preferred approach, an overly narrow dispute resolution framework is undesirable. National legislation must therefore provide for a comprehensive mechanism that accommodates alternative processes while allowing recourse to conventional litigation where necessary.¹¹²

Additional regulations. Beyond these core elements, national space laws must recognise the interests and aspirations of the nation while balancing them against the principles of international cooperation, non-appropriation and equitable benefit sharing. Private parties must be firmly discouraged from asserting dominance or claims over outer space resources. A comprehensive national space law must also address intellectual property rights in outer space, cybercrime, and the recognition and protection of the rights of space tourists. It must be in harmony with the other laws of the land relating to labour rights, competition, contract and investment.¹¹³

B. Mandatory arbitration as the primary dispute resolution mechanism

The absence of territorial sovereignty in outer space has significant implications for conflict resolution. Since activities occur beyond national territory, traditional assumptions about the place of performance, the location of damage or the situs of assets become unclear,¹¹⁴ making it difficult for practitioners to ascertain jurisdiction and governing law when disputes arise between private parties *inter se*. National courts often lack the technical expertise and the authority to determine the transnational issues that complex outer space disputes involve.

¹⁰⁷ Hobe, *supra* note 90.

¹⁰⁸ Bhat, *supra* note 14.

¹⁰⁹ Bhat, *supra* note 51.

¹¹⁰ Outer Space Treaty, *supra* note 39, art. IV; Bhat, *supra* note 14.

¹¹¹ Hobe, *supra* note 90.

¹¹² Bhat, *supra* note 14; Abhijeet, *supra* note 14; von der Dunk, *supra* note 92.

¹¹³ Bhat, *supra* note 14, at 66-77; von der Dunk, *supra* note 92.

¹¹⁴ von der Dunk, *supra* note 33.

Concerns about the nature of space activities and objects, the identity and influence of the parties, and the conduct of activities in a state of regulatory uncertainty require parties to enter into space commercial contracts containing comprehensively drawn arbitration clauses.¹¹⁵ Such clauses ease the procedural challenges of outer space dispute resolution and secure structural certainty.

An example of the inclusion of dispute resolution clauses in commercial space contracts is the agreement entered into between NASA and SpaceX on 18 December 2014 for Collaborations for Commercial Space Capabilities. Article 20 of that agreement sets out a three-step dispute resolution mechanism, beginning with amicable resolution by the authorised points of contact of both parties. If the points of contact do not agree, the dispute is referred to the signatories of the agreement, or their designees, for joint resolution. If no resolution is reached then, and notwithstanding the right of either party to pursue any other remedy available at law, the NASA signatory or that person's designee issues a final written decision.¹¹⁶ The agreement illustrates the incorporation of tiered dispute resolution provisions in commercial space contracts.

One of the most important commercial space disputes is that between Devas Multimedia Private Limited (Devas), an Indian company, together with its majority shareholders Deutsche Telekom Asia Pte Ltd, Telecom Devas Mauritius Ltd and CC/Devas (Mauritius) Ltd, and Antrix Corporation Limited (Antrix), the commercial arm of ISRO, wholly owned by the Government of India.¹¹⁷ The case arose out of a 2005 contract under which Antrix agreed to build, launch and operate two satellites and to lease spectrum capacity on them to Devas, which planned to provide digital multimedia broadcasting services across India, in return for USD 20 million in fees per satellite and lease fees of up to USD 11.25 million a year for 12 years, with a right of renewal for a further 12 years. In February 2011, shortly before the scheduled launch, the Government determined that it needed greater satellite capacity and decided that it could no longer lease its limited S-band spectrum for commercial use. The contract was terminated on grounds of *force majeure*. Devas was notified, and the matter was referred to arbitration before the International Chamber of Commerce on the ground of wrongful termination. Antrix

¹¹⁵ *Commercial Space Industry Prepares for Increased Future Disputes Risk: Why Contracts Should Consider Including an International Commercial Arbitration Clause*, CROWELL & MORING (Apr. 24, 2024), <https://www.crowell.com/en/insights/client-alerts/commercial-space-industry-prepares-for-increased-future-disputes-risk-why-contracts-should-consider-including-an-international-commercial-arbitration-clause>; Sundahl, *supra* note 63.

¹¹⁶ Nonreimbursable Space Act Agreement Between the National Aeronautics and Space Administration and Space Exploration Technologies Corp. for Commercial Space Capabilities Collaboration art. 20, No. SAA-QA-14-18883, at 12 (Dec. 18, 2014), https://www.nasa.gov/wp-content/uploads/2015/06/saa-qa-14-18883-spacex-baseline-12-18-14-redacted_3.pdf.

¹¹⁷ *Devas Multimedia Pvt. Ltd. v. Antrix Corp. Ltd.*, ICC Case No. 18051/CYK, Final Award (Sept. 14, 2015).

contested the claim, relying on the decision of the Cabinet Committee on Security. In September 2015 the tribunal found the termination unlawful and awarded Devas approximately USD 562.5 million plus interest. The shareholders of Devas separately commenced two bilateral investment treaty arbitrations under the India-Mauritius and India-Germany treaties, both of which India lost. Attempts to enforce the award were unsuccessful, and Antrix successfully petitioned for the winding up of Devas before the National Company Law Tribunal on the ground of fraudulent incorporation. That decision was upheld by the Supreme Court of India in January 2022, the Delhi High Court set aside the award of the International Chamber of Commerce in August 2022 as being in conflict with the public policy of India, and the Supreme Court upheld that set-aside in October 2023. The dispute was ultimately brought before the Supreme Court of the United States, which held in June 2025 that the Foreign Sovereign Immunities Act requires no proof of minimum contacts beyond those already required by its exceptions. The Court vacated the judgment of the Ninth Circuit and remanded the matter for further proceedings, leaving the enforcement question unresolved.¹¹⁸ The case is a practical illustration of how the absence of a mandatory, treaty-backed arbitration framework leaves parties vulnerable and uncertain.

India's legislative vacuum makes a compelling argument for relying on the PCA Optional Rules. As already discussed, the ISP 2023, though a progressive initiative, remains an executive policy without statutory backing and is therefore critically ineffective in enforcement. The absence of a codified dispute resolution framework exposes Indian stakeholders to the complexities and challenges of the sector. It requires the inclusion of comprehensive arbitration clauses in commercial space contracts, and without a uniform baseline this leads to the fragmentation of dispute resolution practice. Adoption of the PCA Optional Rules would resolve this by providing procedural certainty and international enforceability, and by aligning practice with international obligations.¹¹⁹

C. Internalising private liability

The proliferation of commercial outer space activities exposes a significant structural deficiency in the treaty architecture on space liability, namely the absorption of third-party liability by the

¹¹⁸ *CC/Devas (Mauritius) Ltd. v. Antrix Corp.*, 605 U.S. 223 (2025) (No. 23-1201) (vacating and remanding the judgment of the Ninth Circuit); Gautam Bhattacharyya & Simon Greer, *Once Tainted by Fraud, Always Tainted by Fraud: The Supreme Court of India Upholds Set Aside of US\$1.3 Billion ICC Award on Grounds of Fraud*, REED SMITH (Oct. 26, 2023), <https://www.reedsmith.com/articles/once-always-the-supreme-court-of-india-upholds-set-aside-fraud/>; Ata Türkfiliz, *Devas-Antrix Saga: A New Hope - Amici Curiae Brief*, COLUM. ARB. & MEDIATION L. REV. (Feb. 3, 2025), <https://aria.law.columbia.edu/devas-antrix-saga-a-new-hope-amici-curiae-brief/>; *Antrix Corporation Ltd. v. Devas Multimedia Private Limited*, PSL CHAMBERS (June 10, 2024), <https://www.pslchambers.com/case-brief/antrix-corporation-ltd-v-devas-multimedia-private-limited/>.

¹¹⁹ Pislevik, *supra* note 71; Arbaugh, *supra* note 71.

State.¹²⁰ The state-centric character of international space law leaves the liability of the private actor out of account. While the State is undoubtedly accountable internationally for activities carried out from within its territory, the invisibility of private players places a heavy burden on the public exchequer, the recovery of which depends on the provisions of national space law, if any.¹²¹

This article has already addressed the key elements to be included in a domestic legal framework and has underscored the importance of stating liability caps and indemnity measures in legislation. Space insurance is also widely recognised as one of the most important clauses in a national space law. Insurance plays a central role in risk allocation. It helps protect the interests of all stakeholders in an outer space activity, thereby promoting development, stabilising and managing risk, and encouraging investment. Insuring outer space activities depends on the risk associated with the activity, determined after close scrutiny and risk evaluation, and on the capacity available in the space insurance market, which turns on incident rates, claim rates and other factors affecting industry confidence. The space insurance market is highly volatile and responds to the changing needs of the outer space sector. That volatility affects the terms of space commerce contracts, and in particular clauses on indemnification, liability caps, exclusions and waivers.¹²² Space contracts incorporate insurance-linked obligations, subrogation rights and cross-border enforcement mechanisms, which align private risk distribution with the national legal framework and with international space law.¹²³

Apart from compulsory insurance requirements, a comprehensive national outer space law must embody the duty to mitigate. It is the responsibility of the policyholder to exercise due diligence and to take all steps necessary and reasonably practicable to avoid or diminish loss, and the onus of proof lies on the insured. Insurance is primarily governed by the policy agreed between insurer and insured. The absence of a statutory baseline, however, leads to a lack of uniformity in the obligations covered by each insurance contract. That inconsistency can be remedied not merely by including space insurance as a mandatory clause in a domestic space law, but by going further and codifying the issues associated with space insurance, such as satellite recovery. Such an approach is a positive measure towards securing the safety of the outer space environment and also ensures active participation and accountability by private actors.

¹²⁰ Julian Hermida, *Space Insurance*, in *SPACE LAW IN THE ERA OF COMMERCIALISATION* 111 (Sandeepa Bhat B. ed., 2010).

¹²¹ Alexander P. Reinert, Note, *Updating the Liability Regime in Outer Space: Why Spacefaring Companies Should Be Internationally Liable for Their Space Objects*, 62 WM. & MARY L. REV. 325 (2020).

¹²² Hermida, *supra* note 120.

¹²³ Roberto Cassar, *Fundamentals of Space Insurance*, 50 AIR & SPACE L. 457 (2025); Ilias I. Kuskouvelis, *The Space Risk and Commercial Space Insurance*, 9 SPACE POL'Y 109 (1993); Sandeepa Bhat B., *Space Liability Insurance: Concerns and Way Forward*, 6 ATHENS J.L. 37, 37-50 (2020).

Insurance clauses are, in addition, integral to a proper dispute resolution regime, since identifying the insurer and determining liability allows conflicts to be resolved more easily, and the duty of mandatory material disclosure under the law of insurance facilitates the identification and resolution of claims.¹²⁴

D. A space dispute resolution tribunal

Turning to the other side of the argument, while the scope of this article extends only to contractual commercial space activities, outer space activities in the broad sense also give rise to criminal and tortious liability. ADR mechanisms, including arbitration, are best suited to contractual commercial activities involving private parties, since they allow freedom in the choice of law, and party autonomy is paramount in determining the substantive and procedural law most favourable to the business and economic interests of the parties. That freedom is unaccommodating of the larger goals of international space law. The cherry-picking of law by private parties allows them to sidestep the principle of the province of all humankind enshrined in the OST,¹²⁵ allowing commercial interests to dominate public policy. It also undermines the principle of international cooperation, as States are no longer part of the equation in dispute resolution. While ADR mechanisms afford more benefits than disadvantages, they cannot be treated as the sole mechanism by which outer space disputes are resolved.¹²⁶ This makes it necessary to draft a multilateral dispute resolution framework that accommodates the flexibility of ADR while preserving the right of the parties to recourse to traditional dispute resolution.

Several scholars have argued the need to establish a sector-specific dispute resolution tribunal, under both international and domestic law, for the swift redressal of conflicts arising from outer space activities.¹²⁷ In the absence of any international treaty on the resolution of outer space disputes, it would be desirable for States to enter into multilateral treaties encouraging resolution through defined alternative mechanisms before established international bodies such as the International Court of Justice or the Permanent Court of Arbitration. The established processes of those fora can also guide the streamlining of procedures in outer space dispute resolution and encourage diplomatic dialogue between the parties. This cannot, however, be a

¹²⁴ Hermida, *supra* note 120.

¹²⁵ Outer Space Treaty, *supra* note 39, art. I.

¹²⁶ Brian Abrams, Note, *First Contact: Establishing Jurisdiction over Activities in Outer Space*, 42 GA. J. INT'L & COMP. L. 797 (2014).

¹²⁷ I.H.Ph. Diederiks-Verschoor, *The Settlements of Disputes in Space: New Developments*, 26 J. SPACE L. 41 (1998); Ben Casey, *Justice for the New Frontier: Why the United Nations Should Create a Space Court Through a Convention Process*, 54 GEO. J. INT'L L. 115 (2022); Philip D. Bostwick, *Going Private with the Judicial System: Making Use of ADR Procedures to Resolve Commercial Space Disputes*, 23 J. SPACE L. 19 (1995); Jayson Haile, *The New Age of Conquest and Colonialism: How Admiralty Will Be Used on the Final Frontier*, 29 TUL. MAR. L.J. 353 (2005).

permanent solution, because the growing and diverse character of commercial and contractual outer space activities and the role of plural stakeholders in the industry require a specialised forum.¹²⁸

The diversity of activities and actors in the outer space sector continues to expand its scope. Though UNCOPUOS acts as the principal body in outer space governance, the roles of other institutional mechanisms would overlap given the legal complexities of outer space activities and actors. This too makes a specialised forum for the resolution of outer space disputes necessary.¹²⁹ The International Tribunal for the Law of the Sea provides an example of a specialised institutional mechanism and can be taken as the mould for a similar forum in the outer space sector. The idea may be incorporated into existing outer space law by way of UN resolutions establishing such a forum, either independently or under the OST, or by a mandate from UNCOPUOS.¹³⁰

The ILA Draft Convention on the Settlement of Disputes Related to Space Activities, adopted in 1984, was a prominent attempt under international law to set uniform standards of dispute resolution. It was revised in 1998 to reflect developments in the sector, particularly the inclusion of private parties. It establishes a tiered mechanism encompassing ADR and finally offering the parties a choice between the International Court of Justice, an International Tribunal for Space Law and arbitration. The instrument remains a draft, however, which limits its practical authority.¹³¹ On the domestic front, the Courts of Space launched by the DIFC Courts in Dubai in 2021 are a pioneering measure that shows the significant role of national initiatives in reshaping international outer space law and in helping to overcome its limitations.¹³²

¹²⁸ Stephen Cutie et al., *One Small Step: Anticipatory Diplomacy in Outer Space*, FED’N OF AM. SCIENTISTS (June 8, 2023).

¹²⁹ Gennady M. Danilenko, *Outer Space and the Multilateral Treaty-Making Process*, 4 HIGH TECH. L.J. 217 (1989).

¹³⁰ Casey, *supra* note 127; Cutie et al., *supra* note 128; Fiona Naysmith, *The Quiet Privatisation of the Moon*, 99 SOCIALIST LAW. 22 (2025) (a magazine of the Haldane Society of Socialist Lawyers, not a peer-reviewed journal); Sarah Coffey, *Establishing a Legal Framework for Property Rights to Natural Resources in Outer Space*, 41 CASE W. RES. J. INT’L L. 119 (2009).

¹³¹ U.N. COMM. ON THE PEACEFUL USES OF OUTER SPACE, LEGAL SUBCOMM., *Information on the Activities of International Organizations Relating to Space Law*, U.N. Doc. A/AC.105/C.2/L.231 (2002); Final Draft of the Revised Convention on the Settlement of Disputes Related to Space Activities arts. 1, 3-6, adopted by the Space Law Comm. of the Int’l Law Ass’n, Oct. 1, 1984, revised May 30, 1998, https://ops-alaska.com/IOSL/V7P3/1984_DisputeSettlementConvention_EN.pdf; Lotta Viikari, *The Dispute Settlement Convention*, in THE FUTURE OF INTERNATIONAL SPACE LAW 3 (2004), https://lacris.ulapland.fi/ws/portalfiles/portal/16721572/Viikari_Lotta.pdf.

¹³² Aslan Abashidze et al., *The United Arab Emirates Approach Towards International Space Law: Divergence or Convergence?*, 213 ACTA ASTRONAUTICA 81, 81-89 (2023).

VII. CONCLUSION

A. Synthesis and discussion

This article, developed across five interconnected research questions, analyses the institutional and legislative inadequacy in India's governance mechanism that undermines its capacity to govern contractual commercial outer space disputes. International space law offers no significant recourse for private commercial actors, and its state-centric character makes it unsuited to govern contractual relationships between private parties operating across the space value chain. While the PCA Optional Rules offer a structurally appropriate mechanism, they are yet to be tested in practice and their adoption remains voluntary and unenforceable.

In the Indian outer space governance mechanism, the limited functional autonomy of IN-SPACE and the structural conflict of interest within it, the absence of comprehensive national legislation incorporating a space-specific adjudicatory mechanism, and the limitations of India's arbitration practice together create an environment that is not conducive to the continued development of a diverse commercial outer space sector. The *Devas v. Antrix* litigation is a pragmatic illustration of the difficulties of outer space dispute resolution. As India opens its outer space sector to private and international players, the lack of an unambiguous governance framework becomes difficult to overlook. Space projects are complex, risky and technologically and economically intensive, which makes disputes unavoidable. While private actors have found temporary recourse in arbitration clauses drafted into space contracts, a well-designed dispute resolution system embodying elements of both traditional litigation and ADR is crucial to sustained certainty and stability in the sector and among its stakeholders.

B. Recommendations and conclusion

At present India's space governance relies largely on executive policies and guidelines that do little to address the challenges of dispute resolution. In the absence of consensus between nations on binding international rules, the responsibility of providing practicable solutions to the challenges of international space law falls upon individual spacefaring nations through their domestic legal systems, which fuels the need for national space legislation. Notwithstanding the right of parties to seek recourse under traditional dispute resolution mechanisms, India can encourage the development of specialised space arbitration panels or expert tribunals within existing institutions, so that disputes are decided by people who understand both the law and the science behind space activities. Rather than being rigid or compulsory, such a framework could act as a common reference point, offering consistency and reassurance to domestic and foreign stakeholders alike. Combined with sustained efforts to train judges, arbitrators,

regulators and technical experts, and with continued international engagement, this approach can gradually bring coherence to space dispute resolution. Handled thoughtfully, dispute resolution can become a strength rather than a weakness of India's space ecosystem. By offering clarity, expertise and fairness, India can not only support the growth of its commercial space sector but also contribute meaningfully to the evolving norms of global space governance.
