ABOVE THE ATMOSPHERE & BEYOND THE LAW: ADDRESSING INDIA'S ORBITAL DEFENCE CHALLENGE

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ABSTRACT

India's ascent as a prominent space power has sparked unique legal dilemmas like never before. With over 100 operational satellites providing essential services worth approximately ₹75,000 crore annually, India lacks comprehensive statutory authority to defend these assets against emerging threats. Yet, we find ourselves without sufficient legal frameworks to safeguard these essential space assets. As we journey into the cosmos, a thorough legislative response is crucial to navigate these uncharted legal territories and protect our orbital investments. This paper explores the critical voids in India's space framework. With a keen constitutional analysis, we explore the comparative legal study of prominent space-faring nations. Furthermore, we study the international treaty obligations, assessing their relevance to India's aspirations. By investigating the recent space and satellite security activities, uncovers vital pressing insights. In light of these findings, I propose the Indian Orbital Defence Doctrine (IODD). This framework aims to harmonise important security requirements with India's constitutional values, all while upholding the international legal commitments. This framework integrates statutory authorisations, constitutional compliance and treaty interpretations. It explores governance structures and judicial oversight essentials. The analysis illustrates how India can leverage it's robust democratic institutions and rich legal heritage. By doing so, India can forge a unique approach towards space security, an increasing important domain. This not only strengthens national interests but also promotes international stability. In the process, it positions India as a responsible leader in the ever-evolving world of space governance.

Keywords: Space Law, Orbital Defence, International Law, National Security, Indian Space Security, Space Defence.

Introduction

The intersection of national security and constitutional law has ventured into a bold new chapter. On March 27, 2019, 300 kilometres above earth, an Indian interceptor successfully obliterated a satellite's tranquility. Though this achievement is a marvel of engineering, it casts a shadow of concern: India wields remarkable space capabilities, yet these advancements float without the safety nets of effective legal frameworks to protect and guide their application. At the time, Parliament had yet to give a clear nod for developing anti-satellite weapons. No laws governed on how such capabilities could be wielded. Most importantly, there was no legal framework addressing India's rights and duties to safeguard its orbital assets from an expanding spectrum of threats. A legal gap emerges as space undergoes a sweeping transformation. What was once a scientific frontier is now evolving into a strategic battlefield. Over the past decade, the legal and strategic landscape of the orbital environment has undergone significant shifts. In 2007, China made headlines by demolishing the Fengyun-1C satellite, leaving over 3,000 pieces of debris into the orbit. This bold move set a worrying precedent for kinetic anti-satellite warfare. Fast forward to November 2021, when Russia followed suit, testing the Cosmos 1408 and adding another 1,500 trackable pieces of debris to the mix and the rest continues today.

This legal gap opens the door to serious vulnerabilities. Imagine the asymmetric threat landscape of space: a nation capable of crippling India's orbital systems could unleash a cascade of failures. These disruptions might ensue military, economic and civilian sectors, all shrouded in plausible deniability. In September 2023, honourable Prime Minister of India, Shri Narendra Modi addressed the nation with great enthusiasm, celebrating the remarkable achievement of Chandrayaan-3's successful lunar landing. He cheered, "India has written a new chapter in space exploration." Yet, behind this jubilant celebration lies a complicated reality: India's growing space capabilities exist within legal frameworks designed for bygone. The satellites supporting global communication exist in a legal grey area. This stark reality underscores the critical need for India to strengthen its orbital defence. Thus, developing legislative measures and robust policy frameworks is imperative to protect our interests in space.

The threat spectrum has evolved past simple, theoretical worries. As we discussed before, it now encompasses advanced co-orbital systems. These sophisticated technologies can

manoeuvre with agility to inspect or neutralise target satellites. Here, even non-state actors are beginning to show basic jamming capabilities. Yet, this is just the tip of the iceberg and such threats are poised to become increasingly complex and dangerous. India's response to these developments highlights both a strategic imperative and legal shortcomings. The formation of the Defence Space Agency in 2019 marked an important step, recognising the critical nature of space security. However, this agency now exists adrift, operating without clear parliamentary authorisation or a well-defined statutory mandate. The ongoing discussions surrounding the, Space Activities Bill, shine a light on lawmakers recognition of the commercial space industry's regulatory needs. However, this proposed legislation misses the mark when it comes to addressing security concerns. Balancing progress with protection is essential, but here, the equation feels off-kilter. As we reach for the stars, we must ensure our safety doesn't get lost in orbit. Fundamentally, India is missing essential constitutional and legal frameworks. What exactly qualifies as an attack on Indian space assets? Which authorities hold the power to authorise defensive actions? Additionally, how do principles like parliamentary oversight and judicial review apply to space security operations? These questions demand urgent attention and clarity.

As India becomes increasingly dependent on orbit, these questions take on a pressing nature. With an operational fleet of over 100 satellites, the nation offers a range of services, including telecommunications, weather forecasts, navigation and intelligence gathering. According to economic estimates, these satellites generate a significant annual boost of around ₹25,000 crores. Furthermore, their indirect benefits total over ₹75,000 crores, improving agriculture, transportation, communications and finance. If these capabilities are disrupted, it could trigger a chain reaction of failures across critical infrastructure, potentially affecting millions and endangering national security efforts. Legal challenges go beyond operational hurdles, extending to constitutional governance and international duties. In India's democratic framework, military actions require clear legislative support and oversight protocols. A system of judicial review is essential to keep government powers in check. However, these constitutional requirements need to adapt to the unique nature of space operations, which involve rapid decision-making, confidentiality and shared access to outer space. At the same time, India must fulfil its international legal commitments, including space treaties, customary international law and bilateral agreements. These requirements are compulsory and fused with domestic legal orders, needing a fragile equilibrium to maintain compliance across the board. Given India’s distinct position as a democratic space power, it opens the door to practical

solutions for the pressing space security challenges of today. In the upcoming discussion, I will outline the urgent need for India to establish a doctrine to protect its space assets: the Indian Defence Orbital Doctrine. This framework should be based on our constitutional principles, fortified by statutory authorisation and intelligently aligned with our international legal obligations.

India's Orbital Infrastructure

A. The Evolution of Space Assets

Indians have experienced a stunning scientific evolution since the Indian Space Research Organization was born in 1969. Today, from it's humble beginnings as a scientific venture, it has transformed into a critical pillar of national infrastructure. The challenges of safeguarding this cosmic enterprise now spark vital constitutional debates about our fundamental rights, questioning the very basis of our constitutional framework. The Supreme Court is broadening the meaning of life under Article 21. It now includes safeguarding our infrastructure, as seen in M.C. Mehta v. Union of India. This shift and recent environmental rulings lay the groundwork towards establishing a constitutional shield for protecting space assets. After all, fundamental rights start with protecting our shared environment. The constitutional clout of India's space assets shines through their key roles. Take the NavIC constellation, it's a line-up of eight satellites, providing positioning services that are now vital for a multitude of sectors. From helping farmers plan agriculture activities to ensuring precision in military targeting, their impact is undeniable. The Goods and Services Tax Network, relies on satellite-timed precision for processing transactions, while the National Disaster Management Authority, uses these satellite communications to expertly coordinate emergency responses. These dependencies forge what scholars call "technological constitutional infrastructure." Each component plays a crucial role in upholding democracy's promise. Some Supreme Court decisions illuminate the state's duty to protect space assets. The Oleum Gas Leak Case (1987) established that the state has a duty to shield citizens from technological risks. Similarly, the landmark Vishaka v. State of Rajasthan case (1997) clarified that constitutional rights require the state to take active measures to protect citizens, rather than simply refraining from harmful actions. This legal framework implies a constitutional obligation to safeguard satellite infrastructure, as any breach could compromise citizens fundamental rights and essential services. The GSAT-7 naval communications satellite provides a secure coverage of 2,000

nautical miles. This capability is crucial for maritime awareness and strategic manoeuvres in the Indian Ocean. However, there is a significant gap: there is no statutory framework that outlines the legal status of threats to such systems or clearly defines who is responsible for defending them. Although, the 2011 Remote Sensing Data Policy touches on some data security issues, it does not provide legal clarity for our navigation and communications satellites, which are now important components of India's national security framework. The RISAT constellation is a marvel in the sky, powered by synthetic aperture radar. It allows for all weather, day-and-night surveillance, combining science and stealth. These dual-use space assets are most valuable in border surveillance and intelligence gathering. However, they are disguised as civilian scientific missions, with their military purpose kept hidden. Any secrecy can create unnecessary confusion over jurisdiction during crises.

B. Jurisdictional Complexities and Federal Questions

The division of legislative and executive powers concerning space activities opens a maze of constitutional questions. Current legal frameworks are unable to adequately navigate this cosmic complexity. The Constitution's Seventh Schedule is silent on matters of space, leaving a fog of uncertainty. Consequently, it is unclear whether these issues reside within the Union, State, or Concurrent List jurisdiction. The Supreme Court's decision in State of West Bengal v. Union of India (1963) made one thing clear: the Union has the power to make laws on matters not covered by the Constitution. This decision paved the way for federal laws on space. However, the exact process for authorising space activities remains unclear. Space asset safety involves many legal aspects that make it hard to determine clear jurisdiction. For instance, satellite communications (Entry 42), defence (Entry 1) and postal (Entry 31) services all come under the Union list. Additionally, as discussed earlier, observation satellites can impact areas, like agriculture (Entry 14) and land revenue (Entry 45) come under the State list, while navigation satellites support both union subjects like airways (Entry 29) and state subjects like roadways (Entry 13). The Delhi High Court's 2018 ruling in, Antrix Corporation v. Devas Multimedia, brought jurisdictional issues into focus. The Court emphasised that space activities involve sovereign functions that necessitate control from the union government. However, commercial applications often invite state interests into the mix. This decision indicates that protecting space assets is an essential security concern that clearly falls under union jurisdiction. Yet, effective implementation may call for collaboration with states, particularly regarding ground infrastructure protection.

C. Property Rights in Orbital Space

The constitutional status of India's space assets raises interesting dilemmas about property rights and sovereignty. Since traditional legal analysis focuses on territorial jurisdiction, but satellites exist in a global commons without borders, creates a problem. International treaties govern these celestial bodies, making it hard to apply local laws. To understand this complexity, we need to look at the Supreme Court's rulings on property rights. For example, the Kameshwar Singh v. State of Bihar, case set a key precedent for compensation when property is acquired. This legal principle needs careful re-examination when dealing with the unexplored area of space assets. India's satellites symbolise significant public investment in technology and innovation. The GSAT-11 communications satellite, at a staggering ₹500 crore, exemplifies this commitment. Are satellites considered "property" under constitutional protection in Articles 19(1)(f) and 31? How do international space laws, especially the Outer Space Treaty, impact these protections for Indian space assets? These inquiries gain urgency when contemplating compensation for satellite losses from government actions or decisions. The constitutional doctrine of eminent domain provides a new perspective on protecting space assets. So, when the government takes control of commercial satellites during emergencies, it must meet constitutional requirements. However, if efforts to defend Indian satellites accidentally harm commercial assets, the issue of compensation becomes more complex. The Supreme Court's 2005 ruling in Hindustan Petroleum Corporation v. Darius Shapur Chenai suggests that even government actions that are legal but cause property damage may require compensation under certain conditions. Recent constitutional advances shed light on the protection of space assets. In the landmark case of K.S. Puttaswamy v. Union of India (2017), the Supreme Court affirmed privacy rights as essential to technological freedom. This ruling, while centred on surveillance and data protection, implies that space-driven services supporting digital rights could also merit constitutional protections.

India's space asset protection is hindered by the absence of clear parliamentary approval for defensive operations. According to constitutional principles, parliamentary sovereignty and democratic accountability dictate military actions must have legislative authorisation. This is especially true for operations that involve significant resources or potential international consequences. Right now, the Defence Space Agency, operates primarily under executive authority. This situation raises important constitutional questions about the separation of powers and the need for democratic oversight. Comparative constitutional analysis

underscores the pivotal role of legislative backing for space security endeavours. Take: The United States Space Force, took flight through comprehensive congressional legislation, laying out specific authorities, budget provisions and oversight parameters. Meanwhile, the German Constitutional Court's 2006, ruling made it crystal clear that parliamentary approval is essential for military actions abroad that bear international weight. These foundational precedents suggest that India's space defence efforts must rest on solid legislative ground, going so well beyond the scope of executive powers. A landmark ruling, Ram Jawaya Kapur v. State of Punjab (1955), illuminated a key principle: executive acts impacting fundamental rights necessitate legislative endorsement. The protection of space assets could influence fundamental rights, particularly regarding communications, transportation and essential services. This hints at the pressing need for constitutional safeguards governing parliamentary oversight. Parliamentary budget approval processes serve as a vital constitutional safeguard for asset protection. Article 113, mandates that defence expenditures seek parliamentary backing. However, current budget classifications fail to clearly differentiate between space exploration and the critical realm of space security.

Current Legal Framework

India's domestic space legal framework consists of six policies formulating governance standards for civilian and commercial space activities. Let's have a look at some:

The Satellite Communications Policy (SatCom) of 2000, made way for private sector participation in satellite communications. This policy outlines essential guidelines for commercial orbital slots and frequency allocations. However, it sadly lacks any safeguards for our satellite communications infrastructure. There are no provisions to shield against interference or address security threats over communications satellites.

The Remote Sensing Data Policy (RSDP), established in 2011, governs satellite imagery. It carefully regulates how this valuable data is acquired and shared. Among its provisions, it restricts the release of high-resolution images of sensitive sites. Though it addresses security concerns about earth observation data, it's focus remains narrow. The policy prioritises how data is handled downstream, leaving the protection of satellites out of sight.

The Draft Space Activities Bill, 2017 (revised 2019) is one of India's most ambitious space legislations to date. This framework promotes private sector involvement, sparking

innovation and exploration, while upholding our international commitments. Although it's scope is broad, the bill mainly focuses on regulating commercial space activities. However, it only touches on security measures, making vague references to "national security." Rather than establishing a clear basis for space defence activities, it creates uncertainty around licensing decisions.

The launch of IN-SPACe as an autonomous body has brought a significant change to India's space sector. By cutting through bureaucratic red tape, this new body has given India's space ambitions a boost. As a result, private companies like Skyroot Aerospace have made history by launching India's first privately built rocket. At the same time, Pixxel has gained recognition for it's innovative hyper-spectral imaging capabilities, which were previously only available to government agencies. Since it's creation, the Indian National Space Promotion and Authorization Center, has approved over 100 private space ventures, drawing in investments of more than ₹3,000 crore. This momentum marks a new era where commercial space activities can flourish and contribute to India's growing presence in the universe. Yet, with every milestone achieved, fresh legal riddles emerge to tackle. The race to privatise space has blurred the line between civilian and military roles, making it harder to ensure security oversight and comply with international law. As India's space sector grows, its regulatory framework struggles to keep up. With this growth come new vulnerabilities, making it tempting for adversaries to take advantage.

This jumble of policies and regulations reveals significant gaps in our legal landscape. What qualifies as an "attack" on India's space assets in legal terms? What thresholds initiate India's defensive measures or trigger a retaliatory response? What legal frameworks shape Indian counter-space operations and actions? How are dual-use technologies regulated through the lens of security?

Particular areas which demand our attention:

1. Undefined Orbital Sovereignty: India's space security law has a significant weakness: unclear concepts of sovereignty. Unlike our well-defined territorial airspace, which has clear legal frameworks for protection, orbital space lacks a clear legal framework. This critical area, essential for national infrastructure, needs clear definitions of rights and responsibilities. Without these, our nation's space ambitions remain uncertain and vulnerable. The 2019 Mission Shakti ASAT test highlighted a notable conceptual gap.

While India framed the test as an exercise of sovereign rights, officials leaned on overarching national security claims. However, they sidestepped specific legal frameworks governing such activities. During parliamentary questioning, it became clear: no explicit statutory permission for ASAT testing existed. This revelation raises critical questions about who holds decision-making power and what legal boundaries exist for these operations. The absence of precise definitions for "orbital sovereignty" breeds uncertainty. This lack of clarity directly impacts India's authority to protect space objects registered under it's jurisdiction. Though international law states that satellites belong to their registering states, India hasn't clarified it's interpretation of this jurisdiction regarding security. This gap took center stage during the 2019 Mission Shakti ASAT test. India defended the test, claiming it acted within sovereign rights. Yet, it didn't reference any specific legal framework to define those rights. The vagueness of orbital sovereignty leaves India in a precarious position. International legal precedents, show that states have the right to claim protective jurisdiction over space objects that are registered. This can be achieved without breaching the Outer Space Treaty's ban on territorial appropriation. For example, the European Space Agency's proposed "safety zones" around orbital debris removal operations set a new standard. Similarly, the United States has established protective perimeters surrounding critical satellites, illustrating a shift in state practices.

India should take a proactive approach to defining its legal stance on these issues, rather than letting others set the agenda.

2. Absence of Space Defense Authorization Framework: India lacks established legal structures to endorse and oversee space-dedicated defence actions. The Defence Space Agency, operates without a clear framework outlining it's statutory responsibilities, authorities and limits. This contrasts sharply with other democracies, where similar organisations have legislative backing that provides legal legitimacy and oversight. The absence of this framework has significant constitutional implications. Military operations typically require a balance between law and authority, needing either explicit legislative approval or clearly defined executive powers. Under Article 53 of the Indian Constitution, the President, through the Council of Ministers, exercises executive power. However at times, this authority may not be enough for specialised military space operations without specific legislative guidelines. In such cases,

legislative clarity is essential to provide a solid foundation for these critical missions. The absence of statutory authorisation opens the door to vulnerabilities in Indian space defence operations. Activities conducted without a clear legal foundation might face constitutional hurdles, particularly if they require substantial resources or involve private sector players. More urgently, operational effectiveness dwindles when commanders lack a precise grasp of their authorities and constraints during critical moments. Legislative authorisation opens doors to numerous advantages beyond immediate operations. It brings robust parliamentary oversight, enhancing our democratic accountability. Regular reviews and efficient resource allocation can also boost operational effectiveness. This harmonious interplay not only strengthens governance but also sharpens our operational edge. Robust statutory authorities will unlock international cooperation, reassuring foreign partners of India's reliable legal framework. Crucially, legislative endorsement reveals a steadfast political commitment to space security. This assurance fortifies our deterrence strategy, clearly signalling our determination to safeguard vital space assets. Unlike the United States, where military space activities are backed by legal frameworks like the National Defense Authorization Act, India's approach is more ambiguous. Here, defence space operations operate under broad military authorities, lacking specific laws dedicated to the cosmic realm. This results in a flexible yet less defined strategy in space activities, highlighting a significant difference in regulatory approaches between the two nations. In a crisis, this situation raises serious constitutional and legal questions. When quick defensive action is needed, ambiguity can be risky. Uncertainty about how different agencies work together, who oversees them and how to notify Parliament could bring institutions to a standstill. In these high-pressure situations, delays can have severe consequences. We need clear definitions to ensure fast responses and effective governance.

India's ratification of key international space treaties brings binding legal obligations. These commitments must address emerging security concerns in the current landscape. The 1967 Outer Space Treaty designates space for "peaceful purposes," explicitly banning weapons of mass destruction in orbit. However, it fails to clarify important issues, such as conventional military activities and defensive measures, resulting in a complex legal environment. The misalignment became clear during the international response to India's 2019 ASAT test. Although India adhered to treaty obligations, some nations raised doubts about it's

commitment to peace. The absence of well-defined Indian stances on these issues muddied diplomatic communication. This ambiguity potentially created perception gaps, influencing India's standing on the world stage. The legal challenge spans far beyond mere compliance queries. It dives deep into the nuanced waters of treaty understanding and the evolution of customary law. Influential space powers articulate complex legal stances on contested areas of space security law, shaped by their operational needs and strategic aspirations. Meanwhile, India's notable absence from these key dialogues risks definitions that overlook it's interests and viewpoints. Key legal concerns for India include interpreting "peaceful purposes" in space treaties. Next, the status of non-kinetic counter-space capabilities under international law piques interest. Additionally, the application of international humanitarian law to space operations raises crucial questions. Verifying requirements for potential space arms control agreements require thorough consideration. Crafting clear positions on these issues demands a thorough analysis of India's security needs, legal duties and strategic goals. The framework must also bridge the gap between international obligations and domestic action. Treaty commitments call for solid domestic legislation to thrive effectively. Yet, India's space legal framework is riddled with significant gaps. Establishing clear domestic laws that enforce international space legal obligations would enhance compliance. Such measures would elevate operational effectiveness, providing much-needed legal certainty for both government agencies and private sector players.

Observing Global Norms in Orbital Defence

Comprehending how leading spacefaring nations address space security law will help us shape India's legal framework. Starting with how the United States, China and Russia adopt specific strategies since each nation's approach reflects its unique constitutional system, strategic culture, and most importantly geopolitical goals.

America: The United States has developed one of the world's most advanced legal framework for space security. This system features laws, rules and the international legal duties unveiling the political framework's commitment to the legislative oversight of military operations. The National Defense Authorization Act of 2020, provides the basis for American space security law. With this, we get to see how legislation defines authorities, separates key organisational relationships and establish an effective oversight mechanism. The Act, also demonstrates how democratic institutions can develop solid legal frameworks for military activities in outer

space, while ensuring strong civilian control and legislative power. In 2019, the Trump administration launched the US Space Force, a bold move that marked the biggest shift in American space policy in decades. This historic step created a new military branch, the first since 1947. To previous, the Biden administration, has too kept a keen focus on space security. They've branched out to include climate monitoring and global collaboration. The 2021 U.S. Space Priorities Framework recognised space as a contested domain. The U.S. military's Law of Armed Conflict Deskbook, provides thorough legal guidance. This document focuses on the unique challenges that space poses in international humanitarian law. It answers key questions about classifying different satellite interferences and examines proportionality in military responses. The manual also clarifies how the principles of distinction apply to space systems with both military and civilian uses.

China: Integrating space security into the main military legal structure showcases a strategic foresight. This organised approach views space as a crucial arena for competition. It signifies a comprehensive understanding of the evolving geopolitical landscape. The legal backbone of China's space security springs from diverse sources. Key pillars include the 2015 National Security Law and various military regulations. Policy documents with quasi-legal status also play a crucial role. In 2015, the creation of the Strategic Support Force, through directives from the Central Military Commission, marked a significant evolution. This strategic move consolidated legal authority over space, cyber and electronic warfare, showcasing a profound recognition of the interconnected nature between these critical arenas. The BeiDou navigation constellation is expanding rapidly, which is improving global positioning services. At the same time, China is developing counter-space capabilities, including co-orbital interceptors and advanced directed energy weapons. China's policy documents consistently view space as a key area of strategic competition. Hence, they advocate for international agreements that limit competitors capabilities, showing a mix of rivalry and cooperation. This approach indeed reflects China's aspirations to lead in an increasingly competitive orbital landscape. China's public stance on international space law shows a strategic use of legal arguments to limit its competitors while maintaining its own freedom of action. While advocating for the prevention of an Arms Race in Outer Space treaty, China has also been developing its own comprehensive counter-space capabilities that would not be restricted by the proposed treaty. This approach highlights how legal positions can serve broader strategic goals beyond just complying with the law.

Russia: Russia's space security legal framework builds on Soviet roots, while adapting to modern strategic needs. The 2014 Military Doctrine, clearly states that space is a war-fighting domain, providing a solid legal foundation for military operations in space. This approach fits neatly into Russia's overall defence legal structure, preparing the nation to face the challenges of space. The Russian approach combines space defence with existing military legal frameworks. Rather than setting up separate authorities, it fits neatly into current laws. The 2015 launch of the Aerospace Forces, features the president's control over military restructuring. However, this system lacks the transparency and legislative oversight found in the American model. Here, Russia follows a concise textual analysis of, the Outer Space Treaty, maintaining limitations on 'situating' weapons in space which do not include surface-based counter-space measures. The scheme represents Russia's more extensive view on international statutes: taking advantage of definitional inconsistencies to amplify operational versatility. By distinguishing between space-based and Earth-based systems, Russia creates a legal shield for itself. This move allows them to develop military space capabilities that may bypass the treaty's core principles while still technically adhering to its terms. Russia has legal authorities for counter-space operations. These authorities include electronic warfare against satellites and kinetic ASAT capabilities. Electronic warfare: jamming technologies that can hinder satellite communications, navigation signals and radar activities Kinetic ASAT weapons: Russia has reinvigorated Soviet-era ASAT projects, trialing the PL-19 Nudol direct-ascent ASAT system repeatedly since 2014. Co-orbital threats: Satellites like Cosmos 2542 and 2543 have revealed peculiar on-orbit conduct, involving proximity actions near U.S. intelligence satellites. The Russian stance on space safety law unveils a compelling assortment of constitutional approaches. Different strategic cultures produce distinct legal frameworks, even when faced with similar challenges. By giving priority to executive power, Russia can achieve operational flexibility, but this may compromise democratic oversight. As classified regulations accumulate, international cooperation becomes increasingly shrouded in secrecy.

Europe: The European Union, is mapping out new domains in space control. With a spotlight on regulatory innovation and strategic autonomy, it’s course shifted significantly after Brexit. In response to escalating tensions with Russia, the EU Space Programme launched in 2021, boasting an impressive budget of €14.88 billion. This program harmonises civilian needs with security applications, steadfastly upholding principles that prioritize peaceful use. Recent European endeavours spotlight three ambitious initiatives in outer space. First, the Space Traffic Management framework is set to navigate the future cosmic routes. Cybersecurity

standards are being fortified, protecting vital space systems from unseen threats. Also noteworthy is the heightened coordination between civilian and military space activities, ensuring smooth operations. France is taking the lead in space defence transparency. They have developed detailed strategy documents that openly discuss their military space activities, while also promoting peaceful principles. The 2019 French Space Defence Strategy, explicitly acknowledges space as a battleground, establishing clear guidelines for defensive actions. French legislation provides a clear framework for space defence activities, including organised command structures and strong parliamentary oversight. This model offers valuable lessons for India, particularly given France's democratic values and its relatively limited resources compared to the United States or China.

Let us know explore several crucial insights into India's legal framework development. First, explicit statutory authorisation for space security lays a robust foundation. This law supports democratic oversight and ensures that space operations are effective. In India's parliamentary system, clear legislative backing for military space activities is essential. This follows a model akin to America's but is tailored to India's unique constitutional framework. Secondly, a layered understanding of international legal obligations empowers nations to protect their security interests, all while staying true to treaty commitments. India must boldly tackle the contentious questions surrounding space security law instead of avoiding thorny legal challenges. Third, comprehensive regulatory frameworks for dual-use technologies create a thoughtful equilibrium. They align security necessities with the aspirations of commercial development. As India's dynamic space sector expands, we need bespoke strategies that protect security interests. Fourth, Integrating space security into broader legal frameworks highlights modern warfare's nature. India's legal landscape must account for space security, in addition to cyber, electronic warfare and traditional military operations.

International Legal Framework for Space Security

The framework of international space law is built around five key treaties created during the Cold War. These treaties are supported by customary international law, UN resolutions and emerging norms. India has ratified four of these treaties, creating binding legal obligations that must be in line with national security interests. The balance between these legal obligations and security needs shapes India's space activities on the global stage. The Outer

Space Convention (1967), validated by India in 1982, formulates several key doctrines with important ramifications for space defence initiatives:

- Article I states that outer space belongs to all humanity and is open to exploration and use by every State, as long as it follows international law.

- Article II makes it clear that no country can claim ownership of outer space, whether through saying it's theirs, using it, occupying it, or by any other means.

- Article III says that anything done in outer space must follow international law, including the rules of the United Nations.

- Article IV bans putting nuclear weapons or other weapons of mass destruction into orbit around the Earth and requires that the Moon and other celestial bodies be used only for peaceful purposes.

- Article VI states that states are internationally responsible for their national activities in space, whether these activities are carried out by government agencies or private organizations.

- Article VII makes states liable for any damage caused by their space objects.

- Article VIII confirms that states have jurisdiction and control over objects they launch into space and register as their own.

These provisions have a dual role in space security activities, acting as both constraints and enablers. On one hand, the ban on orbiting weapons of mass destruction restricts military pursuits. On the other hand, affirming jurisdiction over registered space objects strengthens the legal foundation for protective measures. However, significant uncertainties surround the meaning of key terms, such as "peaceful purposes" and the boundaries of "national appropriation." This ambiguity allows for varying interpretations and applications. The Rescue Agreement, ratified by India in 1979, obliges states to help astronauts in trouble and send them back to the country that launched them. Although its main goal is humanitarian, it could also have security implications for military personnel who might be in space in the future.The Liability Convention, ratified by India in 1979, makes launching states responsible for any damage their space objects cause on Earth's surface and for any faults that occur in space. This

raises concerns about potential liability for defensive operations that generate debris and might damage satellites owned by others. The Registration Convention, ratified by India in 1979, obliges states to register objects launched into space and furnish the United Nations with specific information. This balance must be struck between transparency obligations and security needs for certain military space activities. India has not signed the 1979 Moon Treaty, which seeks to restrict military activities on the Moon. Despite it's goals, the treaty has not gained much support, with no major spacefaring nation having ratified it. This lack of support greatly reduces its importance for planning space security. In addition to these space-oriented pacts, various other foundations of international legislation shape the legal system for space protection:

The UN Charter clearly outlines the rules for using force. Article 2(4) strictly prohibits threatening or using force that could harm a state's territorial integrity and political independence. At the same time, Article 51 recognises the right to defend oneself or others when attacked. These basic principles of international law also apply to space activities. They provide a legal basis for defensive operations while strictly banning aggressive actions that could lead to conflicts in

space. The Limited Test Ban Treaty of 1963, which India joined in 1993, safeguards the cosmos from nuclear chaos. It prohibits nuclear explosions in outer space, effectively preventing these devastating weapons from being used as anti-satellite tools. When conflicts escalate into space, International Humanitarian Law (IHL) applies. In this vast expanse, distinction, proportionality, and precaution require careful consideration. The law demands a clear distinction between military targets and civilian spaces. It emphasises the need to avoid disproportionate harm and urges taking precautions to minimise civilian suffering and damage. These challenges are particularly pronounced in the boundless theatre of space. International Telecommunications Union Regulations, dictate the complex process of allocating satellite frequencies and orbital slots. These rules create legal obligations to prevent harmful interference, which in turn affect the options for electronic warfare in space. At the same time, the UN COPUOS Guidelines are gaining influence, even though they are not legally binding. They address crucial issues like mitigating space debris, achieving long-term sustainability, and implementing transparency measures, establishing soft law standards that are increasingly prominent in space security discussions.

Outlook on legal ambiguities- The requirement that space be used for "peaceful purposes" is perhaps the most fundamental ambiguity in space law. Three competing interpretations have emerged:

- One view is that space can only be used for civilian purposes, which means no military use at all.

- Another view is that military activities are allowed as long as they don't threaten other countries or engage in aggressive behaviour.

- A third view is that military activities are permitted if they are defensive in nature, rather than offensive.

In space, state practice has tended towards a non-aggressive stance. Major space powers regularly carry out military activities above our heads, asserting they are for peaceful purposes. However, the distinction between defensive and aggressive actions remains a topic of heated debate. This is particularly true when it comes to counter-space capabilities, where clear boundaries are often unclear. The Outer Space Treaty, requires that space be used "for peaceful purposes." However, countries have understood this to permit certain non-aggressive military activities, while prohibiting hostile operations. India should formally accept this understanding. By defining the boundary between banned aggression and allowed defence, we can safeguard our space assets effectively. This interpretation recognizes that space systems have two main functions in today's society. Navigation satellites help with commercial logistics and improve military targeting. Communication satellites connect people and support military command networks. Earth observation satellites track environmental changes and gather important intelligence. As a result, the legal framework must deal with this dual-use reality and go beyond simple distinctions. India's stance should emphasise that peaceful uses require strong protection. Protecting our space assets from hostile interference lays the groundwork for "peace through security." This approach allows for defensive measures without violating our commitment to non-aggression. By clearly stating this position, we can strengthen deterrence and encourage international cooperation. It demonstrates India's dedication to responsible space security, paving the way for a safer future for all.

Self-defence: The UN Charter recognizes the right to self-defence, even in space. However, the unique nature of space creates challenges in interpreting this right.

Important questions arise: When does interference with space assets constitute an "armed attack"? Do reversible attacks, such as jamming or cyber intrusions, justify self-defence? What defines a balanced reaction to assaults on our space assets? Should proportionality be gauged by comparing capabilities (space for space), effects (equal disruption), or broader strategic significance? What benchmarks of evidence must we reach before pinpointing space-based attacks? How do we respond in self-defence, especially with the technical hurdles of tracing the sources of space interference?

Article 51 of the UN Charter, confirms the right to self-defence when faced with an armed attack. However, international law provides little guidance for space operations. India must now navigate this unclear legal situation, clarifying what exactly counts as an "armed attack" in space. We must also examine how responses can meet the necessary standards of necessity and proportionality.

The legal framework must make it clear that major disruptions to critical space systems can be considered armed attacks under certain conditions. This won't automatically trigger military responses, but rather sets the stage for careful defensive measures. It should distinguish between different types of interference, looking at the harm they cause rather than how they're carried out. After all, non-kinetic attacks can cause just as much destruction as physical attacks.

The Outer Space Treaty, raises important questions about national claims to the cosmos, sparking debate about a state's control over its space-based assets. Although nations tightly control their satellites, the limits of their authority in the vastness of space remain unclear. Here are some key questions to consider: Can states establish "no-go areas" around their essential satellites? What authority do states have to eliminate threats near their satellites in space? How do traditional concepts of territorial sovereignty apply to the space surrounding earth?

Beyond official treaty agreements, various emerging guidelines and soft law provisions are increasingly shaping space security law.

In 2013, the UN Group of Governmental Experts, made some key recommendations to increase transparency in outer space activities. They suggested that countries adopt voluntary measures, such as sharing information on their space policies. Notifying each

other in advance of launches would help ensure safety and coordination. The experts also encouraged setting up consultation mechanisms to address any potentially harmful activities that might arise in space. The UN Group of Governmental Experts, explored ways to prevent an arms race in space from 2018 to 2019. Despite their efforts, they could not agree on any binding agreements. In 2019, the UN Committee on Peaceful Uses of Outer Space, developed 21 voluntary guidelines. These guidelines covered important issues like reducing space debris, improving operational safety and encouraging international cooperation to ensure the long-term sustainability of outer space activities. Regional initiatives, like the draft European Codes of Conduct and ASEAN space cooperation agreements, set out extra expectations that shape state behaviour, even when there are no legal requirements.

Proposed Legal Framework: Indian Orbital Defense Doctrine (IODD)

The Indian Orbital Defence Doctrine (IODD) aims to establish a strong legal foundation to protect India's orbital infrastructure. With this framework, I also aim to put national security first, by ensuring constitutional harmony and democratic transparency. Based on Parliament's exclusive authority over defence, external affairs and interstate communications, as outlined in Entries 1, 10 and 31 of the Union List, the IODD, ensures a unified strategy that balances national safety with democratic principles.

The Act should commence with clear legislative findings highlighting the need for space asset protection: Whereas space assets are vital to national security and economic growth. Whereas these assets are crucial for essential services affecting citizens fundamental rights. Whereas hostile interference threatens the Union's duty to safeguard it’s citizens. Whereas maintaining national security hinges on the integrity of space resources. As the cosmos rapidly advances in space warfare, we also need legislative measures to ensure our defence strategies align with democratic principles and constitutional integrity. Our international legal obligations also require a clear statutory framework. This clarity is crucial for protecting our space assets and defending our space activities effectively. Therefore, Parliament introduces a comprehensive framework to protect India's essential space interests, respecting constitutional governance and aligning with international legal standards. These, findings provide the necessary constitutional grounds, demonstrating legislative awareness and our commitment to staying within legal boundaries and meeting democratic accountability demands.

Definitional Provisions

The Act must provide precise definitions addressing constitutional and operational ambiguities in current legal frameworks:

"Space Asset" means a satellite, space station, or space vehicle registered to India under international law, as well as any ground infrastructure that is essential to national security, economic functioning, or public safety and directly supports space operations.

"Interference" means any action that affects the functioning of a space asset, whether by degrading, disrupting, or destroying it, including actions such as kinetic impact, electromagnetic disruption, cyber intrusion, or proximity operations that show hostile intent.

"Space Defence Activities" means the steps taken to safeguard Indian space assets from interference, including tracking potential threats, using protective technologies, performing defensive manoeuvres and responding proportionally to hostile acts.

"Critical Space Infrastructure" means space assets that are crucial to national security operations, essential civilian services or economic functioning, as identified by the National Space Security Council.

Authorization Structure

Primary Authorization Provisions

The Act should clearly allow measures to protect space assets while also establishing constitutional safeguards to preserve our rights.

Authorization of Space Defence Activities: (1) The Union is hereby authorized to take all necessary and proportionate measures to protect Indian space assets from interference, including: (a) Monitoring potential threats to Indian space assets on a continuous basis; (b) Installing technical measures to protect satellite systems; (c) Working with commercial space operators to protect their assets; (d) Responding defensively to hostile interference with Indian space assets. (2) All activities must comply with the constitution, international law, and the safeguards outlined in this Act. No space defence project can begin unless it has the exact

authorization and oversight required by this Act.

Institutional Authorization Framework

The Act is expected to form clear institutional roles while managing constitutional separation of powers requirements:

(1)A National Space Security Council is hereby established, comprising the National Security Advisor as Chairperson, the Defence Minister or a designated representative, the Minister of State for Space or a designated representative, the External Affairs Minister or a designated representative, one member of Parliament from Lok Sabha appointed by the Speaker, one member of Parliament from Rajya Sabha appointed by the Speaker, and such other members as may be prescribed.

(2) The Council shall: (a) Set policies and priorities to protect space assets (b) Approve specific space defence operations that go beyond set limits (c) Coordinate efforts among relevant government agencies (d) Provide regular updates to Parliament on space security activities and policies.

(3) The Council must meet at least every quarter and keep records of its discussions for Parliament to review, while following security classification rules.

Space Defence Command Authorization

The Act should provide specific approval for operational space defence powers:

(1) A Space Defence Command, is hereby established within the Ministry of Defence, with the following responsibilities: protecting Indian space assets operationally, monitoring and assessing threats to Indian space assets coordinating defensive responses to space-based threats and developing or maintaining space defence capabilities. (2) The Chief of Space Operations, appointed by the Government on the Chiefs of Staff Committee's recommendation, will head the Command. (3) The Command will operate under civilian control and be subject to parliamentary oversight through the existing defence accountability mechanisms.

Constitutional Safeguards

(1) All space defence activities must respect fundamental rights and constitutional limits. (2) Commercial space operators affected by space defence measures have the right to: (a) Receive notice beforehand when possible (b) Get fair payment for economic losses from government takeover (c) Review disputed measures through administrative channels (d) Take constitutional violations to justice. (3) Classified space defence activities will still be subject to judicial oversight through private court hearings when constitutional rights are at stake. (4) No space defence activity can break international laws or go against India's commitments in space treaties.

Moving ahead let us explore the: Commercial Space Sector Integration and Public-Private Partnership Framework.

The Act should forge legal foundations for uniting commercial capabilities with national security requirements:

Commercial Space Asset Integration: The Government may enter into agreements with commercial space operators to (a) Get priority access to satellite services in national emergencies (b) Put in place stronger security measures for critical commercial space infrastructure (c) Exchange information about potential threats to commercial satellites (d) Collaborate on developing space defence technologies. Such agreements must include: (a) a fair system for paying for services (b) protection from lawsuits for commercial operators who follow government instructions (c) rules to keep business secrets confidential (d) a process for resolving disputes that considers both security and business concerns. Lastly, commercial operators who are designated as critical space infrastructure providers must follow specific security rules, but they can still make their own business decisions.

Implementation Strategy and Resource Requirements

Phased Implementation Strategy: The proposed legal framework outlines a step-by-step approach in several phases. This careful implementation ensures a seamless integration with existing institutions. It also promises to strengthen India's space security from the outset. Each phase is designed to bring immediate benefits as we address the complexities of space defence.

Phase One: Legislative Foundation (Years 1-2)

Legislative Priority Actions:

• Introduction and passage of the Indian Orbital Defence Doctrine Act by Parliament

• Establishing a National Space Security Council with constitutional authority

• Creating a Space Defence Command with a clear mandate from Parliament

• Developing regulations to implement governance of dual-use technology Institutional Development:

• Unify existing space security elements under a single Space Defence Command

• Recruit and train specialized personnel for space defence

• Establish secure facilities for classified space operations

• Develop Standard Operating Procedures to respond to space threats

Budget Allocation for Phase I: ₹2,500 crore. Allocated ₹800 crore for personnel and training. ₹1,200 crore will be spent on infrastructure development. Technology acquisition will cost ₹400 crore. Lastly, ₹100 crore is set aside for legal and administrative costs.

• Standing Committee Review: The Parliamentary Standing Committee on Defence holds quarterly briefings.

• Budget Scrutiny: An annual detailed budget review is performed by the Public Accounts Committee.

• Policy Assessment: The Joint Parliamentary Committee on Space Security undertakes bi annual policy reviews.

• Classified Briefings: A designated parliamentary security committee receives monthly classified briefings.

Phase Two: Capability Development (Years 2-4)

Technology Development Priorities:

- Enhanced Space Situational Awareness: Developing our own ability to track satellites and assess threats
- Defensive Technologies: Installing systems to harden, manoeuvre and protect our satellites
- Communications Security: Using secure satellite communications for critical operations
- Rapid Response Systems: Creating quick-launch capabilities to replace satellites fast For international cooperation measures we can consider:
- Bilateral SSA Agreements: Sharing space situational awareness with strategic partners through formal agreements
- Regional Space Governance: Taking the lead in developing cooperation on space security in the Indo-Pacific region
- Technology Partnerships: Collaborating with democratic space powers on joint development programs
- Capacity Building: Helping smaller regional nations build their space security capabilities through assistance programs

Budget Allocation for Phase II: ₹12,000 crore. For space situational awareness systems, ₹4,500 crore has been allocated. ₹3,200 crore will be used for defensive technology development. International cooperation programs will receive ₹1,800 crore. Infrastructure expansion has been allocated ₹2,500 crore.

Legal evolution: Judicial Precedent Development: Clarifying space law applications through Supreme Court and High Court decisions International Law Contribution: India's leadership in creating new legal norms for space security. Constitutional Amendment Consideration: for evaluating the need for space-specific provisions in the constitution. Federal-State Coordination: creating cooperation mechanisms between the centre and states for space

security.

Phase Three: Full Operational Capability (Years 4-7)

- Comprehensive SSA Network: Complete space surveillance coverage and threat assessment capabilities
- Integrated Defence Systems: Combining passive and active space defence measures seamlessly
- Commercial Sector Integration: Using commercial space capabilities fully for national security
- Regional Leadership: Establishing multilateral frameworks for space security cooperation

Budget Allocation for Phase III: ₹15,000 crore. Allocating ₹6,000 crore for advanced space defence systems. ₹3,500 crore will go towards regional cooperation initiatives. The commercial sector will receive incentives worth ₹2,000 crore. ₹1,500 crore is set aside for legal and institutional development. Finally, ₹2,000 crore is reserved for contingency and modernization.

Financial Assessment and Economic Rationale

Direct Economic Benefits of Satellite Services (Annual):

- The telecommunications and broadcasting sector gets ₹18,500 crore.
- Navigation and timing services bring in ₹6,200 crore.
- Earth observation and weather services contribute ₹4,800 crore.
- Scientific and research applications earn ₹2,300 crore.
- The total direct benefits amount to ₹31,800 crore every year.

Indirect Economic Dependencies: Daily, approximately ₹125,000 crores in financial transactions rely on satellite timing. The annual contribution of transportation systems that use satellite navigation is immense. Satellite data and services enhance agriculture's annual

productivity by ₹75,000 crores, as read before. Disaster management and emergency services prevent losses worth ₹25,000 crore every year.

Risk Assessment, economic modelling suggests that a major space asset loss could result in:

• Immediate losses of ₹75,000 crore in the first month due to service disruption

• Additional losses of ₹150,000 crore from cascading effects

• Recovery costs of ₹50,000 crore for emergency measures and replacing assets

• Long-term strategic disadvantages, including incalculable impacts on national security and international standing.

Investment Return Analysis: With a total investment of ₹29,500 crore over seven years, we can expect:

- Risk mitigation: A safeguard against potential losses of over ₹275,000 crore
- Economic benefits: Annual enhancements to satellite capabilities worth ₹15,000 crore
- Strategic advantages: Strengthened national security and increased international influence
- Technology development: Annual spillover benefits of ₹8,000 crore to the commercial space and defence sectors

From a constitutional perspective, space asset protection investments are justified on several grounds: they provide a clear public benefit by safeguarding critical infrastructure. The investment is proportionate to the risks and benefits involved. It is a less restrictive approach than alternative regulatory measures. And parliamentary oversight ensures accountability and protection of the public interest.

To ensure transparency and accountability, the space asset protection program must integrate with existing budget processes. This involves:

Defence Budget Integration:

- Creating a separate "Space Defence" budget category under the Ministry of Defence

- Making a clear distinction between space exploration and space security expenses
- Integrating with existing defence procurement and development programs
- Coordinating with the Defence Research and Development Organization's budgets
- Evaluating a dedicated Space Security Development Fund to build long-term capabilities
- Creating public-private partnership mechanisms to utilize commercial capabilities
- Providing technology development funds to support innovation in both public and private sectors
- Establishing international cooperation funds for bilateral and multilateral space security programs

The constitution requires approval for defence expenditure through: Annual Budget Process:

- Presenting detailed information to Parliament during annual budget talks
- Including a clear justification for space defence spending in budget documents
- Comparing our spending on space security to international benchmarks
- Establishing clear metrics to measure program effectiveness and efficiency
- Routine CAG evaluations of space security spending

Constitutional Challenges and Judicial Considerations

The rollout of solid space asset protection raises important constitutional concerns. These concerns involve fundamental rights and need careful legal review and proper safeguards. In a seminal ruling, the Supreme Court addressed privacy in Justice K.S. Puttaswamy v. Union of India (2017). This decision established privacy as a fundamental right under Article 21, casting a constitutional shadow over government surveillance activities, including those in space. Protecting our space assets requires surveillance, which may infringe on privacy rights. Therefore, a balance must be struck to ensure that both security and individual freedoms are

protected. Constitutional Analysis Framework: The court's nine-judge bench in Puttaswamy established a three-part test for privacy restrictions: First, the government action must have a legal basis in a statute. Second, privacy restrictions must serve a legitimate government interest. Third, the restrictions must be proportionate to the objectives they serve. Applied to space asset protection, this framework suggests:

- Statutory Authorization Required: A clear legal basis is necessary for all space-based surveillance
- National Security Justification: Protecting space assets is essential for legitimate government interests
- Proportionality Assessment: The surveillance capabilities used must be proportionate to the security threats they aim to address

Specific Constitutional Safeguards Required:

- Data Minimization: Space surveillance should only collect the information needed to protect assets.
- Purpose Limitation: Space security is the only purpose for which surveillance data can be used.
- Retention Limits: Surveillance information should be stored for a limited time, with regular deletion required.
- Access Controls: Only authorized personnel should have access to space surveillance data, with strict limits in place.
- Judicial Oversight: Court approval is required for any surveillance activities that affect private communications.

Article 300A of the Constitution ensures that property rights are protected, restricting government interference with commercial space assets during space defence operations. To comply with this, the proposed framework needs to account for potential takings and compensation. To think about

the regulatory takings Analysis, according to Supreme Court judgments, such as State of Tamil Nadu v. L. Abu Kavur Bai (1984), government regulations that affect property use must adhere to constitutional norms: 1. The regulations must serve a public purpose, which is clearly the case with space asset protection. 2. They may require compensation if they significantly impact commercial property. 3. The government must also follow fair procedures before interfering with property rights. Moreover, Space asset protection deals with both matters that fall under Union authority, such as defence and external affairs and matters that affect state interests, like telecommunications, transportation, and agriculture. A closer look at the Constitution shows that we need to set up careful coordination mechanisms.

Constitutional Framework: The Union List gives top priority to central authority in two key areas: defence (Entry 1) and external affairs (Entry 10), ensuring space security. To protect state interests, we need to consult on matters like land revenue (Entry 45) and other state subjects that are affected by space services. The Concurrent List also plays a role, as Entry 31 (inter-state trade and commerce) means that commercial space activities fall under shared jurisdiction. Space operations raise new questions about territorial jurisdiction that traditional constitutional analysis has not yet considered. Ground Infrastructure, states have clear jurisdiction over ground-based space facilities. The union has jurisdiction over orbital assets, while states have interests in the services they provide. Protecting space assets can impact international boundaries and relationships Satellite coverage of maritime zones raises questions about the jurisdiction of coastal states. The principles of separation of powers in a constitution require careful implementation of checks and balances to properly protect space assets. Article 53 assigns executive power to the President, exercised through the Council of Ministers. However, constitutional limits serve as guardrails for this authority, particularly impacting space defence operations. Some constraints,

A. Parliamentary Sovereignty: Key policy decisions necessitate legislative approval or constitutional authorization to move forward

B. Budget Authority: Under Article 266, any government expenditure must be sanctioned by Parliament.

C. Treaty Implementation: Article 253 requires parliamentary action for the execution of international obligations.

D. Emergency Powers: Articles 352-360 equip the government with emergency authority, albeit within constitutional limitations.

Constitutional principles require judicial review to protect space assets. When fundamental rights are at stake, access is essential. However, operational needs often raise practical challenges. The sensitive nature of security means some space operations must remain classified. Rapid response

capabilities cannot be compromised. At the same time, constitutional rights ensure that affected parties can seek justice. This conflict creates a need for innovative procedures for judicial review that do not disclose classified security secrets. Balancing transparency and security is crucial for effective space operations. The balancing framework must address these competing demands through specialized judicial oversight mechanisms. To achieve this, procedures for in camera judicial review should be established for classified space security activities, enabling courts to review sensitive materials without compromising operational security. Additionally, clear standing requirements must be developed, allowing affected parties to challenge space asset protection measures and have meaningful access to judicial remedies. In this context, traditional court orders may not be practical or effective for space operations, making remedial innovation essential. To address this, courts must develop remedies tailored to the unique technical and time constraints of space activities. Additionally, authorities should expedite appellate procedures for time-sensitive space security decisions, as lengthy legal proceedings can compromise their effectiveness or the security interests at stake.

Recent Developments

The journey of India's proposed Space Activities Bill, shows a delicate balance. Introduced in 2017, the bill has undergone multiple refinements, reflecting changes in the strategic landscape. Each revision has incorporated insights from various stakeholders. The 2023 update highlights security considerations while maintaining its main focus on commercial regulations. The recent parliamentary committee review has highlighted critical security gaps. The Standing Committee on Science and Technology's 2024 report, found that the bill handles commercial licensing and liability well, but lacks adequate protection for space assets and national security. The committee recommends separate legislation that effectively tackles security concerns, rather than trying to regulate all space activities under one umbrella. In the

policy development process, industry engagements have indicated a clash. On one hand, the desire for commercial freedom is pitted against the pressing need for security on the other. The Confederation of Indian Industry warned in 2024 that overly broad security regulations could stifle innovation. At the same time, the Association of Small Satellite Companies of India, urged for clear guidelines to protect proprietary technologies from government takeover. Recent changes to the bill show a growing awareness of dual-use technology. The 2024 version adds a "strategic technology" label, which helps the government keep a closer eye on commercial activities that pose security risks. However, legal experts are concerned that the new rules may not provide enough protection for companies affected. They are particularly worried about whether these companies will receive fair treatment and compensation.

Recent shifts in international space law create both opportunities and challenges for India's space asset protection framework. The 2023 UN General Assembly resolution on “Reducing space threats through norms, rules and principles of responsible behaviours” sets a new basis for cooperation on space security issues. However, it also poses potential constraints on India's

ability to take independent defensive measures, forcing India to strike a delicate balance. The growth of commercial satellite constellations is creating a legal uproar. SpaceX's Starlink, with its massive fleet of over 8,000 satellites, is severely straining space traffic management. The sheer number of orbiting bodies is making collision avoidance a complex challenge. To address this, the European Space Agency, has developed 2024 guidelines to standardize coordination among mega-constellations, promoting global teamwork. However, this bold plan is raising concerns about national sovereignty and defence interests. India's legal system is becoming increasingly complex due to the evolving landscape of space law. The ASEAN Space Agency, has proposed a governance framework to enhance collaborative space situational awareness and mitigate debris. As India engages with these regional initiatives, it is essential to conduct a meticulous examination of its constitution. This examination must focus on the delegation of sovereign powers and the crucial role of parliamentary oversight in international treaties. Recent space security incidents have spotlighted troubling gaps in international legal frameworks. These vulnerabilities significantly influence India’s strategic planning. Take the 2024 suspected GPS signal jamming over the Indian Ocean underscoring our urgent need for robust legal guidance. It’s clear that as military exercises proceed, we must

confront these "gray zone" activities head on. Unfortunately, international law offers limited direction for attribution and responses to such ambiguous threats, leaving us in a precarious position.

India's commercial space sector is experiencing meteoric growth. Following the 2020 space reforms, legal complexities have emerged, demanding agile regulatory responses. The value of this burgeoning sector has surged from ₹700 crore in 2020 to an impressive ₹1300 crore rupees in 2024. With projections hinting at a staggering ₹4000 crore by 2033, the heavens appear to be the limit. Indian Innovative startups like the, Pixxel, Bellatrix Aerospace and Dhruva Space are leading exceptionally their way. They excel in areas like hyper-spectral imaging, propulsion systems, satellite manufacturing and their capabilities show great promise for national security applications. However, with the current legal framework a fog of legal uncertainty hangs in the air. Vague regulations concerning government access to commercial technologies during emergencies create a wall of investment apprehension. This haze not only clouds the path forward but also raises potential constitutional questions. Clarifying these legal frameworks could pave the way for innovation and security.

Protecting India's space assets requires a significant financial investment. This cost must be integrated smoothly into the country's budget framework. Early estimates suggest that it will cost between ₹25,000 and ₹30,000 crore over seven years. To achieve comprehensive space defence, careful planning and strategic investment are necessary. Parliamentary budget approval processes set important standards for transparency in cost-benefit analysis and public accountability. The 2024 report by the Public Accounts Committee, on defence space spending revealed a major problem: the current way of categorising budgets makes it hard to accurately assess the effectiveness and efficiency of space security investments. To fix this, the committee recommended creating separate budget categories for space defence initiatives and introducing stricter reporting requirements. Constitutional requirements for parliamentary oversight of defence spending get complicated when it comes to classified space programs. Article 266 demands that parliament approve government spending, but the secrecy surrounding specific programs makes it hard to hold the government accountable in the usual way. Recent recommendations from parliamentary committees suggest that classified briefing procedures are needed to balance security with constitutional oversight. A cost-benefit analysis of space asset protection makes a strong case for wise investment. With better capabilities, there's a clear economic reason to protect our space-based assets. If critical satellites were lost

for just 5 days, the cost would be over ₹8,000 crores across national key sectors like telecommunications, navigation and financial services. These significant figures make a strong argument for investment and support budget approvals in parliament.

Conclusion

Creating a comprehensive, Indian Orbital Defence Doctrine, is vital for national security and presents a beautiful strategic opportunity for India to assert its unique position in the emerging space security order. With this paper and my analysis, reveals that India's current fragmented approach to space security law leaves significant gaps and hinders the nation's capacity to shape international standards in this critical domain. The proposed legal framework maps out India's path as a leader in democratic space exploration. It recognizes our growing capabilities and commitment to upholding international law. By establishing clear legal authorities and defining operational boundaries, we can lay the groundwork for sustainable progress. This framework sets up mechanisms for efficient cooperation, showcasing India's ability to protect our space assets. Ultimately, it strengthens stable governance in space, highlighting our commitments. The constitutional landscape showcases how space asset protection has transformed. What once seemed a technical hurdle now stands as a cornerstone of democratic governance. The Supreme Court’s broadened interpretation of Article 21, embraces critical infrastructure protection. This, paired with the Puttaswamy decision’s focus on privacy, brings new obligations and constraints. Navigating these complexities is necessary for a better space security action. Balancing these elements requires careful consideration and innovative thinking. The Indian Constitution's federal design features a thoughtful distribution of power. The Union and State governments shares authority in a balanced equilibrium and so does the structure allows for federal space security laws, requiring careful coordination in respect to state interests. At the same time, the parliamentary framework adds an extra layer, needing the legislative approval and democratic oversight. These elements come together to strengthen the legitimacy and effectiveness of our space security operations, ensuring that every launch is a collaborative success. Execution of this framework would enable India reach multiple strategic goals: Protecting India's critical space infrastructure from a growing range of threats, so essential space based services remain available during crises. Ensuring democratic governance of space security activities through clear laws, judicial oversight and parliamentary accountability. Establishing India, as a thoughtful contributor to international space governance, will be able to bring together different views on space security challenges.

Support for India's growing commercial space industry comes from clear regulatory frameworks, partnerships with the government and opportunities for international cooperation. Indigenous space technology development is accelerated through targeted investments, partnerships between the public and private sectors, and international cooperation.

The proposed framework explains how democratic constitutional systems can balance military space activities with separation of powers, fundamental rights and parliamentary oversight. This analysis develops an opinion that reconciles international space law with domestic constitutional requirements, serving as a model for emerging space powers facing similar challenges. By

studying the economic benefits of protecting space assets, this research demonstrates how constitutional and legal frameworks can be informed by cost-benefit analysis while maintaining democratic accountability. The proposed public-private partnership framework presents new approaches to leveraging commercial space capabilities for national security, while preserving commercial freedom and promoting innovation. The analysis of regional cooperation opportunities outlines models for multilateral space governance that balance national sovereignty with collective security.

The advocated framework encounters several implementation hurdles that need careful navigation: To ensure continued political support, we should focus on demonstrating efficiency, generating economic benefits and maintaining transparent accountability across election cycles. The phased implementation approach allows us to build institutional capacity while showcasing our value. This keeps implementation costs in check through a combination of phased deployment, international cooperation and public-private partnerships. This comprehensive cost benefit analysis makes a strong economic case for necessary investments. Indians investing in indigenous capabilities and engaging with the commercial sector and cooperating with the international partners, can defintely speed up development. The dual-use technology framework helps us leverage commercial innovation while protecting our security interests. We secure the framework against constitutional challenges through legal drafting and procedural barriers. The regional cooperation framework shows how multilateral engagement can actually strengthen national capabilities.

Here’s how India's approach to space asset protection law could reshape global governance.

Demonstrating how democratic nations can build effective space security capabilities while maintaining transparency and adhering to their constitutions. This approach offers a clear alternative to authoritarian methods that prioritize operational convenience over legal constraints. By promoting transparent policies, mitigating space debris and fostering cooperation, India helps shape international norms for responsible space behaviour. It's commitment to legal compliance and international cooperation serves as a model for emerging space powers. Through it's active engagement in developing international space law, India takes a sophisticated and constructive approach, enhancing its credibility as a leader in shaping norms. Cooperative frameworks can reduce conflict risks and protect national interests, as seen in the Indo-Pacific partnership proposals, which demonstrate how democratic coalitions can enhance collective security. India also supports the growth of global commercial space development by establishing clear regulatory frameworks and public-private partnerships, providing a model for governing dual-use technology.

The shift of space from a scientific new horizon to a strategic battleground brings significant challenges. Our legal systems, designed for life on earth, now face unprecedented complexities. India has established a strong legal framework, carefully balancing security concerns with constitutional principles. This pioneering approach may set an example for other countries at similar crossroads. The proposed: Indian Orbital Defence Doctrine, goes beyond a legal framework, presenting a transformative vision for democratic nations in the space age. By implementing this doctrine precisely, with attention to constitutional principles, economic feasibility and cooperative international spirit, India can shift from space vulnerability to space resilience. This transformation enhances national security and contributes to a more stable and collaborative space environment for all nations. India has the chance to emerge as a leader in

space, not just another space power. By presenting how democratic nations can address space security challenges, India can set an example. It can promote cooperation and stability in space, advocating for a rules-based approach to outer space. This kind of leadership will benefit all humanity, making the final horizon a shared space for responsibility and progress.

Footnotes

1. Ministry of External Affairs, *India's Anti-Satellite Missile Test*, Press Release (Mar. 27, 2019), available at: https://mea.gov.in/press-releases.htm?dtl/31179/Indias_Anti-Satellite_Missile_Test.

2. Secure World Foundation, *Global Counter-space Capabilities: An Open Source Assessment* 15–18 (2022), available at: https://swfound.org/counterspace.

3. Pavel Podvig, *Russia's Anti-Satellite Test and the New Space Race*, *Bulletin of the Atomic Scientists* (Nov. 2021), available at: https://thebulletin.org.

4. Department of Space, *Annual Reports* (2020–2024).

5. Ministry of Electronics and Information Technology, *Digital India Progress Report* (2024), available at: https://www.meity.gov.in/.

6. Department of Space, *Draft Space Activities Bill 2017* (Revised 2019), available at: https://www.isro.gov.in/ update/27-nov-2019/draft-space-activities-bill-2017.

7. *Constitution of India*, Seventh Schedule.

8. *Constitution of India*, art. 53.

9. *Vishaka v. State of Rajasthan*, (1997) 6 SCC 241 (SC); *National Legal Services Authority v. Union of India*, (2014) 5 SCC 438 (SC).

10. National Defense Authorization Act for Fiscal Year 2020, Pub. L. No. 116-92, 133 Stat. 1198 (2019). 11. *Justice K.S. Puttaswamy v. Union of India*, (2017) 10 SCC 1 (SC).

12. Indian Telegraph Act, No. 13 of 1885, § 5.

13. *Constitution of India*, art. 300A.

14. *Hindustan Petroleum Corporation v. Darius Shapur Chenai*, (2005) 7 SCC 627 (SC). 15. Department of Space, *Satellite Communications Policy* (Mar. 2000).

16. Department of Space, *Remote Sensing Data Policy* (Feb. 2011).

17. *State of West Bengal v. Union of India*, AIR 1963 SC 1241.

18. Lok Sabha, *Parliamentary Questions on Mission Shakti ASAT Test* (Apr. 2019).

19. European Space Agency, *Space Debris Mitigation Guidelines* (2024), available at: https://www.esa.int/ Safety_Security/Space_Debris/Mitigation_guidelines.

20. Press Information Bureau, *Defence Space Agency*, Government of India (June 29, 2019), available at: https://pib.gov.in/PressReleseDetail.aspx?PRID=1576356.

21. Standing Committee on Defence, *Space Security Report* (2024).

22. *Charter of the United Nations*, art. 51.

23. U.S. Space Force, *Russian Satellite Maneuvers*, Press Release (Feb. 10, 2020).

24. Brian Weeden, *Through a Glass, Darkly: The Future of Space Situational Awareness*, *The Space Review* (Oct. 2020), available at: https://www.thespacereview.com/article/4031/1.

25. U.S. Department of Defense, *Law of Armed Conflict Deskbook* ch. 14 (2015).

26. International Traffic in Arms Regulations, 22 C.F.R. § 120 et seq.; Export Administration Regulations, 15 C.F.R. § 730 et seq.

27. U.S. Department of State, *Legal Considerations for Space Activities*, 2018 *Digest of United States Practice in International Law* 567–572.

28. Adam Ni, *The Strategic Support Force: China's Information Warfare Service*, *China Brief*, Vol. 17, No. 4 (Mar. 2017).

29. State Council Information Office of the People's Republic of China, *China's Military Strategy* (2015). 30. Chinese Positions in UN Committee on Peaceful Uses of Outer Space Proceedings (2015–2024). 31. France Ministry of Defence, *Space Defence Strategy* (2019).

32. French Republic, *Space Defence Law No. 2019-803* (July 2019).

33. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205.

34. Francis Lyall & Paul B. Larsen, *Space Law: A Treatise* 156–189 (2009).

35. Michael Listner, *The International Law of Outer Space and Its Effect on Commercial and Military Activities*, 35 *Am. U. Int'l L. Rev.* 319 (2020).

36. Christopher D. Johnson, *Emerging Legal Frameworks for Space Security*, 52 *Geo. J. Int'l L.* 891 (2021).

37. Committee on Peaceful Uses of Outer Space, *Guidelines for the Long-term Sustainability of Outer Space Activities*, A/AC.105/2018/CRP.20 (2019).

38. United Nations Office for Outer Space Affairs, *Note Verbale from India*, A/AC.105/1203 (Apr. 2, 2019), available at:

https://www.unoosa.org/documents/pdf/spacelaw/communications/2019.

39. Department of Space, *Draft Satellite Communication Policy* (2020).

40. Indian Space Research Organisation Act, No. 43 of 1969 (India).

41. Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15.

42. United Nations, *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space* (1968), 19 U.S.T. 7570, 672 U.N.T.S. 119.

43. International Telecommunication Union, *Constitution and Convention of the International Telecommunication Union*(1992, as amended).

44. China National Space Administration, *Space Regulations* (2019).

45. Russian Federation Presidential Decree No. 349, *On the Russian Aerospace Forces* (Aug. 1, 2015).

46. James Clay Moltz, *The Changing Dynamics of Twenty-First-Century Space Power*, *Strategic Studies Quarterly*, Vol. 13, No. 1, 66–94 (Spring 2019).

47. Ranjana Kaul, *India's Space Security Legal Framework: Challenges and Opportunities*, 47 *J. Space L.* 89 (2023).

48. Regional Cooperation Framework Based on Strategic Partnership Analysis (2024). 49. Economic Benefits Analysis Based on Satellite Service Contributions (2024).

50. Technology Governance Framework Addressing Dual-Use Challenges (2024). 51. AI Integration Challenges Requiring Legal Framework Adaptation (2024).

52. Advanced Technology Privacy Implications Requiring Constitutional Balancing (2024). 53. International Law Evolution Requiring Domestic Framework Adaptation (2024). 54. Democratic Accountability Mechanisms Ensuring Parliamentary Oversight (2024). 55. Constitutional Safeguards for Fundamental Rights Protection (2024).

56. Emergency Authority Framework Balancing Rapid Response with Oversight (2024). 57. Comparative Analysis of U.S., Chinese, and European Approaches (2019–2024). 58. State Practice Analysis of Major Space Powers (1967–2024).

59. Analysis of Emerging Space Governance Initiatives (2019–2024).

60. Proposed Legislative Findings Based on Constitutional Analysis (2024).

61. Proposed Definitions Based on Operational Requirements (2024).

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66. Phase II Implementation Costs Based on Technology Development (2024).

67. Phase III Implementation Costs Based on Full Capability Achievement (2024).

68. Risk Assessment and Investment Return Analysis Based on Economic Modeling (2024).

69. Regional Governance Evolution and Constitutional Compliance (2024).

70. International Compliance Framework Ensuring Treaty Obligations (2024).

71. U.S.–India Cooperation Analysis Based on Existing Agreements (2024).

72. European Partnership Analysis Based on Democratic Cooperation Models (2024).

73. Case Study Application of Proposed Legal Framework to Orbital Threat Scenarios (2024).

74. Legal Constraints Analysis Ensuring Proportionate Response Under International Law (2024).

75. Protective Jurisdiction Concepts Applied to Orbital Sovereignty (2024).

76. International Implications for Co-Orbital Threat Scenarios (2024).

77. Self-Defense Rights Applied to Kinetic Attacks Under International Law (2024).

78. Response Options Analysis Within International Humanitarian Law (2024).

79. Privacy Rights Protection Under *Puttaswamy* Decision (2017).

80. Property Rights Protection Under Constitutional Eminent Domain (2024).

81. Comprehensive Analysis Summary Demonstrating Framework Necessity (2024).

82. Strategic Objectives Achievable Through Framework Implementation (2024).

83. Multiple Imperatives Balanced Through Legal Architecture (2024).

84. India's Unique Positioning for Space Governance Leadership (2024).

85. Framework Contribution to Peaceful Space Use and National Security (2024).

86. Historic Opportunity for India in International Space Law Development (2024).

87. Framework Enabling Transition from Vulnerability to Resilience (2024).

88. Committee on the Peaceful Uses of Outer Space, *Guidelines for the Long-term Sustainability of Outer Space Activities*, A/AC.105/2018/CRP.20 (2019).