



Quo Vadis Regulation of Commercial Satellite Surveillance in Realizing National Digital Sovereignty

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Abstract

The widespread operation of Low Earth Orbit (LEO) satellites owned by foreign private entities, particularly SpaceX's Starlink in Indonesian territory raises fundamental questions about the adequacy of the existing national legal framework. This article analyzes the regulatory gap between Law Number 21 of 2013 on Space Activities and the operational reality of foreign commercial LEO satellites that route data across Indonesian jurisdiction without adequate oversight mechanisms. Using a normative legal research method through statutory and conceptual approaches, this study finds that the 2013 Space Activities Law does not explicitly regulate the authorization, supervision, and liability mechanisms applicable to foreign private LEO satellites serving customers within Indonesia. This gap is compounded by the absence of implementing government regulations mandated by the law and the misalignment between the international space law regime, rooted in the Outer Space Treaty 196 and national digital sovereignty imperatives. This article argues that Indonesia must urgently issue technical regulations integrating the principle of authorization and continuing supervision under Article VI of the OST into national law, while simultaneously strengthening data sovereignty clauses in the context of cross-border satellite services.

Keywords: LEO Satellites; Space Activities Law; Digital Sovereignty; Outer Space Treaty 1967.

INTRODUCTION

Since the mid-2020s, the constellation of *Low Earth Orbit* (LEO) satellites operated by foreign private entities has fundamentally changed the global telecommunications landscape. This phenomenon is most clearly represented by *SpaceX's Starlink* which by the end of 2024 has placed more than 5,700 satellites in low-Earth orbit with plans to expand to tens of thousands of units in the next few years.¹ Unlike previous generation satellites that use Geostationary orbit (GEO) at an altitude of about 35,000 km, LEO satellites operate at altitudes between 400 and 1,200 kilometers, offering much lower network latency and even global coverage. This characteristic makes LEO satellites a critical infrastructure that not only serves commercial needs, but also supports military communications, humanitarian operations, and replaces communication infrastructure decided by governments in various countries.

For Indonesia, the presence of foreign private LEO satellites carries complex legal consequences. On the one hand, this technology is very relevant to overcome connectivity gaps in remote, frontier, and outermost regions that have been difficult to reach by terrestrial infrastructure.² On the other hand, the technical architecture of LEO satellites that stream data directly to *international gateways*, going beyond domestic infrastructure supervised by the

¹Kemenko Polkam, *Siaran Pers No. 323/SP/HM.01.02/POLKAM/8/2025 tentang Satelit Orbit Rendah sebagai Solusi Infrastruktur Digital Nasional*, (Jakarta: Kemenko Polkam, 14 Agustus 2025).

² *Ibid.*

Indonesian government, opens up serious loopholes in the context of digital sovereignty, cybersecurity, and national law enforcement. This condition is even more critical considering that the United States CLOUD Act of 2018 requires US-based companies to disclose data to US legal authorities, but prohibits other countries from accessing such data. This puts Starlink at a wedge of tension between U.S. domestic law and Indonesian jurisdictional sovereignty.

The main legal instrument that regulates space in Indonesia is Law Number 21 of 2013 concerning Space. This law is a significant step forward because Indonesia is one of the few developing countries that has comprehensive space legislation. However, the law was formulated in an era when private space commercial activities were still embryonic. The massive commercialization of space in the past decade, marked by the emergence of thousands of privately owned LEO satellites, has exposed the structural weaknesses of the 2013 Space Law in regulating space activities carried out by foreign non-governmental entities operating over Indonesian territory.

A number of previous studies have examined certain aspects of this issue. Damaris Septyana et al. (2025) highlight global spatial governance but have not specifically linked it to the sovereignty of developing countries such as Indonesia.³ Jorry Soleman Koloay (2024) identifies legal gaps in the regulation of national airspace but does not discuss in depth the dimensions of *data sovereignty* in the context of LEO satellites.⁴ Dony Aditya Prasetyo (2023) discusses the urgency of new international law on space traffic management, but has not examined its implications for Indonesia's national legal system.⁵ *The research gap* that has not been filled is an integrated analysis that examines the adequacy of Law Number 21 of 2013 concerning Space in dealing with the presence of foreign LEO satellites from the perspective of digital sovereignty, namely connecting the international space law regime, national telecommunications regulations, and data protection principles. This paper is here to fill this gap.

Based on the description above, this article formulates two research questions: first, to what extent is Law Number 21 of 2013 concerning Space normatively able to accommodate the operational arrangements of LEO satellites owned by foreign private entities in Indonesia? Second, what is the legal framework that should be developed to answer these regulatory gaps while ensuring national digital sovereignty? This article uses normative legal research methods with a statute *approach*, conceptual *approach*, and comparative *approach* to examine space regulations in several other jurisdictions as comparative materials.

METHODS OF THE RESEARCH

This paper uses the *normative legal research method*, which is research that focuses on written legal norms by researching literature materials or secondary data.⁶ The use of this method is based on the existence of vague *norms* and legal *vacuums* in Law Number 21 of 2013 concerning Space, especially with regard to the absence of an explicit authorization and supervision mechanism for the operation of LEO satellites owned by foreign private entities in Indonesia. This study uses three approaches: the statute *approach* to examine all relevant

³Damaris Septyana dkk., "Starlink and Space Governance," *Jurnal Keamanan Nasional* 11, no. 1 (2025): 67-82.

⁴Alfandy, Muhammad Daffa. "Urgensi Pembentukan Undang-Undang Pengelolaan Ruang Udara Nasional Sebagai Respons atas Kekosongan Hukum Strategis dalam Zona Nearspace Indonesia." *SAMI Law Review* 3, no. 1 (2025).

⁵Dony Aditya Prasetyo, "Urgensi Pembentukan Hukum Internasional Baru terkait Lalu Lintas Ruang Angkasa," *Journal of International Air and Space Law* 8, no. 1 (2023): 12-28.

⁶Peter Mahmud Marzuki, *Penelitian Hukum*, (Jakarta: Kencana Prenada Media Group, 2017), p. 55-56.

national and international legal instruments;⁷ conceptual approach to examine legal doctrines and concepts such as digital sovereignty and the principle of *res communis*;⁸ and a *comparative approach* to evaluate the space law system in other countries as a reference material for Indonesian law reform.⁹ Legal sources include primary legal materials in the form of laws and regulations and international legal instruments, secondary legal materials in the form of textbooks, scientific journal articles, and policy documents, and tertiary legal materials in the form of legal dictionaries and encyclopedias.¹⁰ The technique of collecting legal materials is carried out through a documentary *study* by systematically tracing relevant legal sources.¹¹ All collected legal materials are analyzed using qualitative analysis, namely by describing, interpreting, and evaluating the applicable legal norms to then draw prescriptive conclusions.¹²

RESULTS AND DISCUSSION

A. International Space Law

The foundation of international law governing space activities centers on five multilateral treaties ratified under the auspices of the United Nations between 1967 and 1979. The most fundamental treaty is the *1967 Outer Space Treaty* (OST), which stipulates that outer space is a free territory and cannot be owned by any state (*res communis*), and that the exploration and utilization of space must be carried out for the benefit of all humanity. Indonesia has ratified the OST through Law Number 16 of 2002, which makes the principles of the OST part of Indonesia's positive law.

Article VI of the OST is the most relevant provision for understanding state responsibility for private satellite activities. It states that States Parties are internationally responsible for space activities carried out by non-governmental entities of their countries, and that the activities of non-governmental entities in space require "*authorization and continuing supervision*" from the State Party concerned. Thus, when *SpaceX*, a company registered and domiciled in the United States, operates Starlink satellites that serve customers in Indonesia, in principle the responsibility under international law is the United States as *SpaceX*'s country of origin, not Indonesia. But this is precisely the crux of the problem: the country where the service is received (Indonesia) does not have adequate legal instruments to ensure effective supervision.

Liability Convention (1972) and Registration Convention (1975) complements the OST by regulating the absolute responsibility of the launching country for the losses caused by space objects on the earth's surface, as well as the obligation to register space objects in the register maintained by the United Nations. However, neither convention explicitly regulates situations where satellite-based commercial services are launched by private individuals from one country and consumed by users in another country, exactly as happened in the case of Starlink in Indonesia.

⁷ *Ibid*, h. 133.

⁸ *Ibid*, h. 135-136.

⁹ Johnny Ibrahim, *Teori dan Metodologi Penelitian Hukum Normatif*, (Malang: Bayumedia Publishing, 2011), p. 313.

¹⁰ Soerjono Soekanto, and Sri Mamudji, *Penelitian Hukum Normatif: Suatu Tinjauan Singkat*, (Jakarta: RajaGrafindo Persada, 2015), p. 13-14.

¹¹ Abdulkadir Muhammad, *Hukum dan Penelitian Hukum* (Bandung: Citra Aditya Bakti, 2004), p. 101.

¹² Peter Mahmud Marzuki, *Op. Cit.*, p. 213.

B. Digital Sovereignty as a Legal Concept

Digital *sovereignty* is a concept that has developed to describe a country's ability to maintain control over digital infrastructure, data, and technology ecosystems within its territory. Mochtar Kusuma Atmadja and Etty R Agoes define state sovereignty in general as "the highest right possessed by a country to regulate everything within its territory."¹³ In the digital context, sovereignty includes three dimensions: control over infrastructure (*infrastructure sovereignty*), control over data (*data sovereignty*), and control over the platform ecosystem (*platform sovereignty*).

LEO satellites operating over Indonesian territory threaten all three dimensions of digital sovereignty simultaneously. In terms of infrastructure, satellite signals pass through space outside Indonesia's full jurisdiction and data is transmitted without passing through gateways controlled by the Indonesian government. In terms of data, *Starlink's Network Operations Center* (NOC) outside Indonesian territory makes it difficult for the Indonesian government to access data traffic related to national security. In terms of platforms, the dominance of foreign satellite operators without data localization obligations creates structural dependencies that have the potential to erode the country's regulatory capabilities.¹⁴

C. Law Number 21 of 2013 concerning Space Phenomena of Foreign LEO Satellites

Law Number 21 of 2013 concerning Space is a product of legislation that should be appreciated as Indonesia's effort to have a national legal instrument in the field of space. This law regulates the implementation of space starting from planning, development, operation, to funding and responsibility. Article 38 paragraph (2) of this law confirms that the administration of space is carried out by an institution that is under and responsible to the President, which is currently held by the National Research and Innovation Agency after the National Institute of Aeronautics and Space is integrated into it.

However, a textual analysis of Law Number 21 of 2013 concerning Space reveals a number of fundamental normative weaknesses in dealing with the phenomenon of foreign LEO satellites. First, there is not a single article in the law that explicitly regulates the licensing or supervision mechanism for satellites belonging to foreign private entities that provide services to Indonesian citizens or legal entities. This law regulates the "implementation of space" which is basically aimed at actors of space activities who are domiciled or subject to Indonesian law. When the perpetrator is a foreign corporation that does not fall under Indonesia's personal jurisdiction, the supervision mechanism of Law Number 21 of 2013 concerning Space becomes ineffective.

Second, the mandate to establish government regulations as a technical instrument for implementing Law Number 21 of 2013 concerning Space, including the Draft Government Regulation on Space Commercial Activities mandated by Article 37 paragraph (2) and Article 84 until more than a decade since the law was passed, has not been determined. The absence of this technical regulation creates a serious legal vacuum because without implementing regulations, many provisions of Law Number 21 of 2013 concerning Space that are *self-executing cannot* be implemented effectively in the context of the supervision of

¹³ Mochtar Kusuma Atmadja and Etty R. Agoes, *Pengantar Hukum Internasional*, (Bandung: Alumni, 2019), p. 194.

¹⁴ Communication and Information System Security Research Center (CISSRec), *Kajian Starlink dan Implikasi Kedaulatan Digital Indonesia* (Jakarta: CISSRec, 2024), p. 15.

private space commercial activities. This condition is in line with the findings of the Center for Aviation and Space Studies of the National Institute of Aeronautics and Space which in 2016 has identified the urgency of the preparation of nine Draft Government Regulations mandated by Law Number 21 of 2013 concerning Space, but the realization to date is still very minimal.¹⁵

Third, there is a discrepancy between Law Number 21 of 2013 concerning Space and Law Number 36 of 1999 concerning Telecommunications and Law Number 27 of 2022 concerning Personal Data Protection in terms of regulating cross-border satellite-based services. The Telecommunications Law requires the implementation of infrastructure-based telecommunications that are physically located in or passing through Indonesian territory. Furthermore, the Personal Data Protection Law requires the fulfillment of data protection principles for every data processing of Indonesian citizens. However, there is no clear regulatory coordination mechanism between the two with Law Number 21 of 2013 concerning Space to deal with the operational scenario of LEO satellites that inherently cross the boundaries of these regulations. This fragmentation of regulations is the root of the state's powerlessness in supervising and enforcing its jurisdictional rights.

D. Tensions between the 1967 OST Principles and the Interests of Indonesia's Digital Sovereignty

Article VI of the 1967 OST has been widely recognized as a norm of international law that obliges states to authorize and supervise non-governmental space activities of their countries. However, the implementation of this norm in the context of foreign commercial LEO satellites operating in the recipient country raises questions about who should actually bear the regulatory burden.¹⁶ The doctrine of international law stipulates that international responsibility falls on the launching country or the country of origin of the entity which in this case is the United States for Starlink, not Indonesia as the recipient country. But from the perspective of national sovereignty, this doctrine creates a paradoxical situation in which Indonesia cannot fully control the communications infrastructure used by millions of its citizens.

The general principle of the OST 1967 which states space as *res communis omnium* or the common property of humanity¹⁷ directly confront the principle of state sovereignty over its territory and internal affairs. This tension is not purely a theoretical issue but it manifests itself in a concrete situation when *Starlink* signals penetrate Indonesian airspace and stream the data of Indonesian citizens without being fully monitored or intervened by national authorities. As happened in the case of *Iran* where Starlink remained active when the government shut down the internet, the same potential could occur in Indonesia if there is no strict control mechanism.¹⁸

This issue is further complicated by the provisions of the US CLOUD Act 2018 which gives the authority for US legal authorities to access data stored or controlled by US companies

¹⁵ Pusat Kajian Penerbangan dan Antariksa LAPAN, *Pertimbangan Yuridis Pengelompokan RPP Amanat UU Keantariksaan* (Jakarta: LAPAN, 2016), p. 7.

¹⁶ Ruhaeni, Neni. "Direct International Responsibility of Non-Governmental Entities in The Utilization of Outer Space." *Padjadjaran Jurnal Ilmu Hukum (Journal of Law)* 7, no. 2 (2020): 230–250.

¹⁷ Atip Latipulhayat, *Hukum Antariksa* (Jakarta Timur: Sinar Grafika, 2024), p. 45.

¹⁸ Subiako, Henri. "Isu Starlink dan Kedaulatan Digital." *Kompas*, 8 Juni 2024. <https://www.kompas.id/baca/english/2024/06/07/en-isu-starlink-dan-kedaulatan-digital>

wherever they are, including Starlink user data in Indonesia.¹⁹ Indirectly, this provision has the potential to create extraterritorial U.S. jurisdiction over the data of Indonesian citizens, a condition that not only threatens digital sovereignty, but also violates the right to privacy protected by Indonesia's Personal Data Protection Law. This situation demands a regulatory response that not only relies on the existing international space law regime, but also proactively asserts Indonesia's jurisdictional claims through comprehensive national legal instruments.

E. Regulatory Comparison: Lessons from Other Countries

To understand how other countries respond to similar regulatory challenges, it is necessary to conduct a comparative analysis. The United States has a relatively comprehensive regulatory framework through the *US Commercial Space Launch Competitiveness Act* of 2015 which provides legal certainty for private commercial space activities, including licensing mechanisms and oversight by the *Federal Aviation Administration* (FAA). Luxembourg as a small European country that is a hub for the commercial space industry passed the *Space Law* in 2017 which explicitly regulates the ownership rights of space resources by private entities. The UK has the *Outer Space Act* 1986 which has been amended several times to accommodate the development of the commercial space industry.²⁰

Relevant to Indonesia is how these countries implement the principles of *authorization and continuing supervision* of the OST 1967 into their national laws. The United States, for example, requires every satellite operator to obtain a license from the FCC and FAA that includes provisions on frequency coordination, debris mitigation, and periodic reporting. This system ensures that even if the private company operates the satellite, the state can still carry out its surveillance obligations under international law. In contrast to Indonesia, where the licensing mechanism for the operation of foreign satellites serving domestic users still relies on telecommunications regulations that are not designed for the LEO satellite scenario.²¹

Regulation of the Minister of Communication and Information Number 3 of 2025 concerning Telecommunications Implementation is a positive step that requires foreign satellite operators, including *Starlink*, to meet a number of physical infrastructure requirements in Indonesia and provide surveillance access to the government. However, this regulation is limited to the telecommunications aspect and does not cover the broader dimension of space. In addition, this regulation has not been integrated with Law Number 21 of 2013 concerning Space in one coherent regulatory framework. The absence of this regulatory integration is one of the most obvious manifestations of the legal fragmentation mentioned earlier.

F. Recommendations for an Integrative Legal Framework

Based on the above analysis, this article formulates three main recommendations to build a legal framework that is more responsive to the phenomenon of foreign LEO satellites in Indonesia. First, it is necessary to amend or add provisions in Law Number 21 of 2013

¹⁹ United States, *Clarifying Lawful Overseas Use of Data Act (CLOUD Act)*, 18 U.S.C. § 2713 (2018); DPR RI, *Info Singkat: Kehadiran Starlink di Indonesia – Manfaat dan Dampak*, Vol. XVI No. 11/1/Pusaka/Juni/2024 (Jakarta: Pusat Penelitian DPR RI, 2024), p. 3-4.

²⁰ Zwaan dkk., *Introduction to Space Law*, 4th ed. (Alphen aan den Rijn: Wolters Kluwer, 2019), p. 102.

²¹ Agus Pramono, "Urgensi Penataan Hukum Keruangangkasaan dalam Kerangka Kepentingan Nasional Negara Berkembang," *Masalah-Masalah Hukum* 48, no. 1 (2019): 35-50.

concerning Space that explicitly regulate the obligations for foreign satellite operators serving customers in Indonesia to obtain operational permits from Indonesian space authorities, comply with provisions on data access by national law enforcement, and be responsible for losses caused to Indonesian users. This obligation can be modeled from the provisions of Article VI of the OST which requires *authorization and continuing supervision*, but is adapted to apply to the recipient country, not just the operator's home country.²²

Second, Indonesia needs to accelerate the issuance of government regulations implementing Law Number 21 of 2013 concerning Space, especially the Government Regulation on Space Commercial Activities which has been delayed for a long time. This Government Regulation should explicitly regulate the scenario of cross-border satellite services by including provisions on the obligation to localize some data (*data localization*) for data related to national strategic interests, the obligation of operators to provide domestic interconnection points that can be monitored, and a proportionate sanction mechanism for violations of these provisions. The 2016-2040 Space Implementation Master Plan stipulated through Presidential Regulation Number 45 of 2017 can be used as a policy reference, but this document needs to be updated to reflect the new reality of the commercial space industry that is developing very quickly.

Third, Indonesia needs to develop a cross-sectoral regulatory coordination framework that formally integrates Law No. 21 of 2013 concerning Space, the Telecommunications Law, and the Personal Data Protection Law in one coherent regulatory mechanism for satellite-based services. Currently, the three laws are under the authority of different institutions, namely National Research and Innovation Agency for space, the Ministry of Communications and Digital for telecommunications, and the Information Commission for data protection without a permanent regulatory coordination forum. The establishment of an *inter-agency coordination body* involving these three institutions, plus the Ministry of Foreign Affairs for the dimension of international agreements, will be a much stronger foundation in responding to the changing dynamics of the commercial space industry.²³

CONCLUSION

Law Number 21 of 2013 faces serious normative limitations in accommodating the operational arrangements of LEO satellites owned by foreign private entities serving users in Indonesia. These limitations stem from three things: first, the absence of explicit provisions on authorization and supervision mechanisms for foreign satellite operators; second, the absence of implementing government regulations that have been mandated more than a decade ago; and third, regulatory fragmentation between the legal regimes of space, telecommunications, and data protection that do not have adequate integration mechanisms. These limitations are not merely technical weaknesses that can be solved by partial revision. They are a reflection of the structural gap between the speed of commercial space technology innovation and the adaptability of the national legal system which tends to be reactive. LEO satellites are not just ordinary telecommunication instruments, they are strategic infrastructure that simultaneously touches the dimensions of airspace sovereignty, data sovereignty, national security, and digital access justice. Therefore, the necessary regulatory

²² Outer Space Treaty 1967, Pasal VI; Nurfaika Ishak, "Tanggung Jawab Negara atas Aktivitas Swasta di Ruang Angkasa," *Jurnal Hukum Internasional* 17, no. 2 (2020): 214.

²³ Dwiyanto, Erwin, Ramlani Lina Sinaulan, and Hedwig Adiinto Mau. "Penegakan Hukum Pidana Terhadap Pelanggaran Pesawat Sipil Asing di Wilayah Udara Negara Kesatuan Republik Indonesia." *Jurnal Multidisiplin Indonesia* 2, no. 9 (2023).

response must be holistic, not sectoral. The recommendations offered in this article, the amendment of Law Number 21 of 2013 concerning Space, the acceleration of the issuance of implementing Government Regulations, and the establishment of a cross-sectoral regulatory coordination mechanism are intended as *a road map* that can be adapted by policymakers in accordance with national priorities. The most important thing is that Indonesia can no longer delay the consolidation of regulations in this area, given that the penetration of foreign LEO satellites continues to increase exponentially and every day that passes without adequate regulation is every day in which Indonesia's digital sovereignty is in a vulnerable position.

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