



SPACE INSURANCE FOR SMALL SATELLITE LAUNCH AND OPERATION IN THE SETTING OF INDONESIAN LAW

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ABSTRACT

The topic of liability under international law falls in the norms of the Outer Space Treaty 1967 and the Liability Convention 1972. The principled division of responsibility for harm incurred by a space object to the launching state(s) is the starting point in this regard. Since the conventions are legally binding for Indonesia, it become the outlining frame for regulating space insurance with national regulations. As small satellite industry and space insurance in Indonesia show a massive potential grow, this article focuses on the analytical explanation of Indonesian space insurance-related regulations covering small satellite operations. Even though international law does not require obligatory space insurance, Indonesian Space Act 2013 regulates mandatory requirement for all space activities conducted by private companies, including small satellites. One of the main issues discussed in this paper is whether the Indonesia regulation open opportunities to space insurance industry in Indonesia to grow. The study was conducted using descriptive-analytical approach, emphasizing on the normative juridical approach by literature studies.

Keywords: indonesian law; launch and operation; small satellite; space insurance.

I. INTRODUCTION

The American Communication Satellite Corporation (ACSC), which was established in 1962 and was involved in acquiring satellite insurance, was the first organization to dedicate itself to using modern satellite technologies for commercial purposes. ACSC received the first space insurance policy on April 6, 1965, to cover Early Bird, the first commercial geostationary communication satellite (an Intelsat I-F1 satellite).¹ Compared with such a head start engineered by technological advancement in that era, Indonesian space insurance business environment logically left behind. In this case Indonesia need a boost, not only by developing new technology, creates more space-oriented companies, but also support from government policy and law. The combination absolutely will be narrowing the gap with states that has a more established national space industry.

The space industry specialized in insurance involves several main actors divided to big categories, which are: (1) Insurers/Reinsurers and Brookers; (2) Insured (consist of manufacturers, launching agencies, operators, and users), and (3) Users: e.g. television stations, telecoms, banks, car manufacturers. For each actor, the insured will benefit most from a space insurance mechanism since satellite operation from launch to the operation itself is a space activity that full of risks and has very high costs.

Currently, scholarly article that focus on the space insurance for small satellite is lacking, so this article will contribute to give a point of view in that area. As time goes by, the demand for small satellites is increasing and the presence of small satellites has slightly shifted the existence of conventional state

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¹ Manikowski, Piotr and A. Weiss, Mary, "The Satellite Insurance Market and Underwriting Cycles", *The Geneva Risk and Insurance Review*, No. 38, 2013, p.149, <https://link.springer.com/content/pdf/10.1057/grir.2013.2.pdf>.

satellites. Due to their small size, small satellites do not cost as much as conventional satellites. Therefore, many small satellites are used to test new technologies.² Small satellite and conventional satellite have different characteristics. Small satellites have a greater risk than conventional satellites and the short lifespan can also be seen as a weakness.³ Due to the small satellite category, which is under 500kg, with a lighter weight and smaller size, the operation cost is relatively lower than conventional satellites, so that it can encourage more small companies and even the involvement of other private party like universities.

The differences between the small satellite and the conventional satellite certainly affect insurance considerations. The small satellite is not a new discovery, but compared to the conventional one, the experience or track record of success with small satellites is not convincing and many companies or private actors still have no experience of successful launches or in-orbit phase in small satellite cases. Insurance companies should look at the space company's track record, the parties involved, and the history of similar small satellite designs. Thus, these factors will determine the type or quality of insurance provided by the insurance company to the aerospace company.⁴ A particular concern emerges because of the multi-risks of space operations. Insurers cannot handle a risk that is limitless in both amount and time or, instead, need extraordinarily high premiums to create a broad margin of protection.

Satellite insurance was initially largely put in the international aviation industry, simply because this market was more familiar with space flight concerns than other insurance markets. Because of the difficult and technical nature of this line of insurance, as well as the risk of major losses, only a few insurers have chosen to offer it. Satellite insurers are a tiny but multinational group within the insurance industry at the moment, with satellite insurance centers in Europe (London, Paris, and Munich) and the United States (New York and Washington, DC).⁵

Through the collaboration of aerospace clients, brokers, and insurance underwriters, various types of satellite insurance policies have been created. With time and maturity, the insurance sector has continued to have a wider range of insurance coverage. Property insurance (including pre-launch, launch, and in-orbit insurance) and third-party liability insurance are the two most common forms of satellite insurance currently available:⁶

Insurance Type	Phases Coverage	Damage Coverage
Property insurance	<ol style="list-style-type: none"> 1. Manufacturing and pre-launch activities, 2. Launch into space, 3. In-orbit life 	<ol style="list-style-type: none"> 1. Payment for proportion of satellite capability lost as a result of failure, with provisions made for loss of payload function and loss of service life due to premature consumption of propellants or excessive degradation of the solar array power.
Pre-launch insurance	Physical loss or damage of the asset during the pre-launch period: <ol style="list-style-type: none"> 1. Transportation. 2. Temporary storage in the launch area. 3. Integration with the launcher. 	

² Lee, Sanghyun; Oh, Jaeyo, et. al., "Development Trends of Small Satellites and Military Applications", *Journal of Advanced Navigation Technology*, 21 (3), 2017, p. 214.

³ NASA, "Just 5 Questions: Small satellite Technology", 2013, <https://climate.nasa.gov/news/936/just-5-questions-small-satellite-technology/> downloaded on 21 August 2021.

⁴ Stark, Peter M., "Insurance Issues for Small Satellites and ELVs", <https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2415&context=small-satellite>, downloaded on 21 August 2021.

⁵ *Ibid.*

⁶ *Ibid.*

	4. The configuration of the satellite. 5. Other preparations for launch, including fuel loading.	2. Coverage for payload losses is usually for an agreed upon amount for each transponder. 3. Coverage for “satellite loss of lifetime” is based on estimates of the remaining life after the loss of fuel or power giving rise to the claim.
Launch insurance	1. Actual launch. 2. Considerable period of initial satellite operation (e.g. transfer into orbit and initial deployments)- Usually the minimum coverage period is at least 180 days, to ensure that the spacecraft has experienced a full season of solar eclipses in its orbit.	
In-orbit insurance/ “life” insurance	Proper functioning of the satellite during its operational lifetime, usually in yearly renewable phases.	
Third-party liability insurance	1. Preparations for launch, 2. The lift-off; 3. In-orbit operations of a satellite program 4. Re-entry.	The legal liability arising from damage (damages occurring when a satellite, a rocket or its components fall to the ground; damages from fire during ignition; damages from an explosion of a satellite in orbit; and damage from collision of the satellite with another spacecraft) to third parties. Compensation is provided in the event of personal injury and property damage to third parties, both on the ground and in space, caused by the launch vehicle or the satellite.

Table 1. 1 The Most Common Forms of Available Satellite Insurance

Studying small satellite and its insurance mechanism on national level inevitably consider the international law regime governing space activities. International space law is an ‘régime d’État’ making states as the main actor responsible for space activities conducted by its nationals. The exclusive public existence of responsibility for harm incurred by the space objects in such activities is the pre-condition set by international law for the operation consisting comprehensive participation by private parties in the launch or service of the space object. Consequently, national policy will still be tied to questions of public regulation over private participation. Municipal legislation must ensure that such connection occurs only with fair assurances of the agencies' ability to execute them safely, as well as liability sharing between the states and private entities involved.

Liability of the launching state on the international level is unlimited in two factors: (1) liability amount and (2) time limit as Liability Convention 1972 requires that the principles of justice and equity governs the sum amount of compensation to restore the individual, natural or legal, state, or international organization on whose behalf the claim is made to the situation that would have prevailed if the harm had not occurred. The mechanism most often chosen by states to deal with any international space law issues in the context of their domestic legal systems is to draft a framework law. This amounts to insertion in the national space law or act of a principled obligation to indemnify the state. Domestic implementation mechanisms generally require the private operator to have adequate cover or contractual guarantees, as states want their money back if they are held liable as a launching state for harm incurred by the operator's actions. Indonesia is one of the states imposing the mechanism.

Indonesian Space Act 2013 regulates mandatory requirement for all space activities conducted by private companies.

I. DISCUSSION AND RESULTS

A. Current International Space Law for Space Insurance and Small Satellite Operation

Satellite activities ranging from launching, operating satellites to picking up unused satellites is one of the space activity which is not carried out in the space of a single country but also in free space without jurisdiction and potential affect the region or country under the satellite activity. Therefore UN based on UNGA Resolution 1348 (XIII) in December 1958⁷ succeed to established UNCOPUOS to create international agreements in an effort to utilize space for peaceful purposes.⁸ UNCOPUOS has established 5 space law which are The Treaty on Principle Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies 1967 (Outer Space Treaty) that referred ad the “Magna Chart’ of outer space activity, The Agreement on the Rescue of Astronauts, The Return of Astronauts and the Return of objects Launched into Outer Space (Rescue Agreement 1968), Convention on International Liability for Damage Caused by Space objects (Liability Convention 1972), Convention on Registration of Objects Launched into Outer Space (Registration Convention 1975) and Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Agreement 1979).

As stated in Article I (2) of Outer Space Treaty, every country is given the freedom to explore and utilize outer space including the satellite activity. However, its use must comply with the applicable treaty. As mentioned before, space is an uninhabited place and not all countries have access to space. Space activities has no jurisdiction, which means a country is allowed to carry out satellite activities above the other country. This makes the greater risk of satellite activity because it has the potential to threaten the security of the countries below it.

Space activities are not only carried out by the state as governmental entities, but private parties or so-called non-governmental entities and international organizations can also be involved. This is recognized in Article VI Outer Space Treaty where the non-governmental entities shall require authorization and continuing supervision by the appropriate state party to the Outer Space Treaty. In fact, small satellite organizers that come from private entities is more than the governmental entities. As stated before that the small satellites are considered easier to produce for experiments so that they may encourage governmental and non-governmental entities more to build them. The increasing of actors in space activities are also in line with the increase in the number of space objects and their types. The United Nations Office for Outer Space Affairs (UNOOSA) said in its report that there have been 19,000 satellites orbiting the Earth since 2016.⁹ Certainly, these conditions make space denser and higher potential to risk collisions and other hazards.

Preventive and repressive actions related to accidents in satellite activities have been regulated in the five treaties that have been made by UNCOPUOS. Based on Article VI Outer Space Treaty governmental agencies and non-governmental entities shall bear international responsibility for its national activities in outer space. Furthermore in Article VII Outer Space Treaty stated that Launching State as a country whom facilitate or its territory is used to satellite launching activity is internationally

⁷ United Nations Office for Outer Space Affairs, GA Res. 1348 (XIII) (1958).

⁸ Supriadhie, Anjar, Supriadhie, Anjar, “Urgensi Keberadaan Hukum Antariksa dalam Sistem Hukum Indonesia dan Tantangan Pengembangannya”, *Jurnal Hukum dan Pembangunan*, No. 1, 2001, p. 49.

⁹ Permatasari, Yunita, “The Urgency of Guidelines for the Long-term Sustainability of Outer Space Activities for Indonesia”, *Global Strategies*, Vol. 13 No. 2, 2019, p. 64.

liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object of its component parts on the Earth, in air space or in outer space. Based on Article II Liability Convention 1972 the form of this responsibility is in the form of space insurance where launching state shall be absolutely to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight. Elaborating Article VII of Outer Space Treaty, Liability convention is a victim oriented. Launching State shall be liable to compensate for the “damage” caused by its space objects fully, promptly, and equitable.

It's important to take a note that there are two terms of “responsibility” contained in the Outer Space Treaty in Article VI which mentions the term ‘international responsibility’ and Article VII with the term ‘International liability’. The two terms have different meanings. International responsibility is defined as international responsibility for violations of binding obligations (Internationally wrongful act).¹⁰ Responsibility does not depend on fault and damage elements.¹¹ Meanwhile, the meaning of ‘liability’ in international law is a consequence of the fault and damage done by the state.¹² Article III of the Outer Space Treaty does not explain further regarding the definition of fault in question, thus giving rise to many interpretations regarding what actions are included in the definition of fault in the provision. Liability can be seen from two elements, namely intention or negligence. Intention is clearly that the actor had the intention to cause the harm, whereas Negligence can be explained as a blameworthy attitude because reasonable foreseeability or recklessness.¹³ To determine the possible fault of state, due diligence may be considered. In the context of liability, especially for damage in space, it is necessary to look at the actions of countries that have or have not fulfilled their due diligence obligations on their space objects.¹⁴ This concept applies to extra-terrestrial activities because damage that may occur in outer space needs to be reviewed from the point of view of the cause of the damage, if the state is negligent or does not carry out its due diligence obligations, the state can be held accountable in accordance with Article III Liability Convention 1972.

The term of ‘launching states’ in the Liability Convention 1972 emphasizes the clear responsibilities of the state hosting and facilitating the launch regardless of who is the owner, the Manufacturers, the launching agencies, operators, and users of the space objects.¹⁵ However, the definition of Launching States in Liability Convention 1972 must be interpreted broadly. It is also stated in the Outer Space Treaty that states also bear the international burden of private space entities. This then makes any form of action or damage done by non-governmental entities will automatically become the responsibility of the state regardless of whether the governmental made a mistake or not.¹⁶ Therefore, any mistakes made by non-governmental entities both on earth and in outer space will be the responsibility of the Launching States.

Referring to the definition of space object in the Liability Convention, space law does not differentiate the scope of space object based on the conventional on or the small one. International

¹⁰Ruhaeni, Neni, "Perkembangan Prinsip Tanggung Jawab (Bases of Liability) dalam Hukum Internasional dan Implikasinya terhadap Kegiatan Keruangkakasaan ", *Journal of Law Ius Quia Iustum* Vol. 21 No. 3, 2014, p. 339.

¹¹Von der Dunk, Frans G., “Liability Versus Responsibility in Space Law: Misconception or Misconstruction?”, *Space, Cyber, and Telecommunications Law Program Faculty Publications*, University of Nebraska, 1992, p. 363.

¹²*Ibid.*, p. 364.

¹³Maria Flemme, “Due Diligence in International Law”, *Public International Law of Lund University*, 2004, p.8.

¹⁴Joel A. Dennerley, “State Liability for Space Object Collisions: The Proper Interpretation of 'Fault' for the Purposes of International Space Law”, *The European Journal of International Law*, Vol. 29 No. 1, 2018, p. 290.

¹⁵Marco Pedrazzi, “Outer Space, Liability for Damage”, *Max Planck Encyclopaedias of International Law*, Oxford Public International Law, 2008, p. 7.

¹⁶Bhat B, Sandeepa, “Space Liability Insurance: Concerns and Way Forward”, *Athens Journal of Law*, Vol. 6(1), 2020, p. 39.

regulations do not look at the satellites' shape, size, or quality. Therefore, liability may be heard by the launching state for any types of satellites, including small satellites.

Commonly there are two main types of space insurances, the damage insurance for space assets or insurance phase and liability insurance. As previously mentioned, the Insurance Phase consists of Pre-Launch Insurance, Launch Insurance and In-Orbit Insurance.¹⁷ The potential risks of space activities may not only concern the parties involved in the launch and operation of satellites, but may also arise outside these parties (third parties). Third Parties can also be interpreted as parties who are not bound by an agreement or contract with the insured. This is regulated in Article VII of the Outer Space Treaty 1967 and the objectives of the Convention on International Liability for Damage Caused by Space Objects (Liability Convention 1972).

In case there are more than one launching state, Liability Convention has regulated the first two launching states or several launching states shall jointly and severally liable for any damage caused to the third state. As regulated in Article V Liability Convention 1972, the participations in a joint launching may conclude agreements regarding the amount of compensation for each state.¹⁸ As for technical issues, including the amount of compensation due for damage to space objects to the injured state, this is still the subject of debate between countries. This is due to the differences in the national laws adopted by each country. The United States proposes in terms of compensation that the compensation paid by the launching state be determined in accordance with the applicable principles of international law, fairness and equality.¹⁹ In addition, the amount of compensation can be divided based on the portion of the error of each country but if the error of each cannot be measured and cannot be determined then the compensation can be divided equally among the Launching States.²⁰

A claim for compensation for damage may be presented to launching State within one year of the date of occurrence of the damage or the identification of the responsible launching State that is liable.²¹ If a third State have no information of the damage or unable to identify launching State who is liable, it may present a claim within one year of learning of the above facts; however, this term shall not extend one year from the date on which the State could fairly be assumed to have learned of the facts by due diligence.²²

A damage claims can also be addressed to private operators under national law. This means that State can be held liable under Liability convention in an international, diplomatic channel negotiation, Claim Commission under XIV–XX, Liability Convention 1972; and private party can also try in national courts using national laws.²³ A claim for compensation for damage shall be presented to a launching State through diplomatic channels. If a State does not maintain diplomatic relations with the launching State concerned, it may request another State to present its claim to that launching State or otherwise represent its interests under this Convention. It may also present its claim through the Secretary-General of the United Nations, provided the claimant State and the launching State are both Members of the United Nations. The claim to a launching State for compensation for damage does not require the prior exhaustion of any local remedies which may be available to a claimant State or to

¹⁷ Ardes, Runggu Prilia; Damayanti, Cholifah; Dikjiratmi; Marga Leta, Nessia; and Siregar, El Renova Ed., "Perbandingan Sistem Regulasi Asuransi Keantariksaan Beberapa Negara: Usulan Regulasi di Indonesia", *Journal Jurnal Kajian Kebijakan Penerbangan dan Antariksa*, Vol.1 (2), 2021, p. 92.

¹⁸ Article V (2) Convention on International Liability for Damage Caused by Space objects (Liability Convention 1972)

¹⁹ Cheng, Bing, *Op.Cit.*, p. 379.

²⁰ Cheng, Bing, *Op Cit.*, p.374.

²¹ Article X (1) liability Convention 1972.

²² Article X (2) liability Convention 1972.

²³ de Rozavel, A Kerrest and von der Dunk, Frans G., "Liability and Insurance in the Context of National Authorisation", *Space, Cyber and Telecommunications Law Program Faculty Publications*, Vol. 6, 2011.

natural or juridical persons it represents. A State shall not, however, be entitled to present a claim under this Convention in respect of the same damage for which a claim is being pursued in the courts or administrative tribunals or agencies of a launching State or under another international agreement which is binding on the States concerned.

In addition to the five international space law treaties, the International Law Association later published the Draft Model Law of the National Space Legislation, known as the ILA Model Law, which regulates insurance coverage for third parties. This has also been adopted by domestic laws in several countries, one of which is the regulation of licensing. The granting of permission to launch a space object is only granted by the State if the Launch entities can prove their financial strength and obtain a third-party liability insurance.²⁴

B. Space Insurance under The Indonesian Space Act of 2013

To enhance Indonesian space activity, Indonesia has enacted the Indonesian Space Act Number 21 of 2013 (Indonesian Space Act 2013) to adopt more specific provisions in international law into the form of national law. Enacted in 2013, it is a set of regulations which underline a national space policy. It is meant to guide future missions and undertakings to boost the nation's efforts in developing the space industry. Under the Indonesian Space Act 2013, Indonesian government aims to improve Indonesia's self-sufficiency and competitiveness in space activities and use its benefits for wider population while keeping such activities sustainable.

Indonesia's enactment of space law was in line with Indonesian attention to space law. The country has long standing history participating in space activities as it is the first developing country to procure and operate its own satellite when it obtained Palapa in the year 1976. To date, Indonesia has ratified four international space treaties, which are the Outer Space Treaty that has been ratified by Law No. 16 of 2002, The Rescue Agreement by Presidential Decree No. 4 of 1999, The Liability Convention by Presidential Decree No. 20 of 1996 and Registration Convention by Presidential Decree No. 5 of 1997.²⁵ Therefore, Indonesia in carrying out space activities must be internationally responsible and pay attention to the provisions of the treaties.

The law divides space practices into five categories, each with its own set of rules. There is a list of general prohibitions for all, like international law, including performing nuclear experiments in space, using celestial bodies for military purposes, and threatening or contaminating the earth and space by these activities: Space science; Remote sensing; Space technology capability; Launching and Commercialization. Satellites launch and operation is related to all those activities as Satellite can provide data for mapping the space weather, space environments and astrophysics. The government can also use satellite operation for remote sensing. This requires capability of manufacturing stellates using space technology. In the manufacturing, launching, and operating, the Indonesian companies are allowed to involve foreign parties as subcontractors.

Through the Indonesian Space Act, Indonesia is internationally responsible for the implementation of outer space carried out in the jurisdiction or sovereignty of Indonesia. The Indonesian Space Act has regulated liability for losses resulting from space activities carried out by space operators. If space activities cause a damage, a claim for compensation can be made through the applicable international legal mechanism as mentioned before, there are through diplomatic channels,

²⁴Mingyan, Nie *Op. Cit.*, p. 404.

²⁵Supancana, IBR, "Interpretation and Implementation of International Space Treaties and Its Implications to the Formulation of National Space Legislation (An Indonesian Experience)", *Journal of Aerospace Analysis and Information*, Vol. 3 No. 1 2006, p. 51.

the Prosecution Commission, or national judicial bodies. The losses that can be asked for compensation are physical and direct losses including costs incurred for relief and cleaning activities.²⁶ The use of diplomatic channels as a claim for compensation made by Claimant States to the Launching State is also regulated and prioritized in Article IX Liability Convention. The use of the diplomatic route must first be used on the grounds that the diplomatic route itself is a dispute resolution by peaceful means, in this case it is used to avoid conflicts or expand disputes faced by both the Claimant state and the Launching state.

If there are Indonesian nationals who suffer losses, they can file a lawsuit to the space operator through the judiciary, arbitration institutions and/or alternative dispute resolution institutions. In addition, the filing of claims and settlement of compensation can be facilitated by the Government of Indonesia. Payment of compensation to entities and/or Indonesian citizens must be carried out promptly, effectively, and appropriately.²⁷

Article 80 Indonesian Space Act 2013 stipulates that in the case of claiming for compensation, the time is limited for one year after the day the loss occurs or if the claiming party does not know when the loss has occurred within one year, a claim can be filed for one year from the party claiming compensation. demand to know of a loss or will know of a loss.²⁸ The calculation of one year is the same as the calculation of the application for compensation which is also regulated in Article X Liability Convention.

The Indonesian Space Act 2013 stipulates that in launching the space object, the 'space operator' shall determine the potential of the accident and/or public health disturbance or material loss, the space operator must fulfil the financial requirements and shall have space activity insurance guarantee.²⁹ It is more clearly regulated in Article 84 (1) of the Indonesian Space Act 2013, that every 'space operator' shall insure Liability Insurance against third parties for the consequences of the space activity he/she performs. Space operator is expected to pay liability insurance with the maximum amount of premium in order to be able to cover losses incurred to third parties and environmental damage.³⁰ The obligation to insure liability for losses to third parties as a result of space activities by space operator does not apply if the activities are carried out by Government Agencies. However, with the release of the Government of Indonesia from the obligation to insure liability insurance to third parties, it does not mean that the government is hands off from losses suffered by third parties, the government is still obliged to provide compensation because basically the government is obliged to protect its citizens.³¹ Thus, regardless of whoever the organizer is, the Government will be involved if there is a third party in this case is a citizen who suffers losses. Meanwhile, the losses suffered by the first party or the second party or parties involved in the implementation of outer space are only the business of the parties involved in it.³²

Regulations related to liability, compensation and insurance as referred to in Articles 83 and 84 of the Indonesian Space Act 2013 are further regulated in Government Regulations. However, until now the Government Regulation in question has not been finalized. Meanwhile, the Indonesian Space Act

²⁶ Article 79 the Indonesian Space Act Number 21 of 2013 (Indonesian Space Act 2013)

²⁷ Article 82 Indonesian Space Act 2013.

²⁸ Article 80 Indonesian Space Act 2013.

²⁹ Article 35 (1) a,b Indonesian Space Act 2013.

³⁰ Ardes, Runggu Prilia, et. al., *Pertimbangan Yuridis dan Konsekuensi Pengelompokan RPP Sebagai Amanat Undang-Undang Nomor 21 Tahun 2013 tentang Keantariksaan, Kajian Kebijakan dan Hukum Penerbangan dan Antariksa*, In media, Jakarta, pp. 90-106.

³¹ Elucidation of Article 84 (2) Indonesian Space Act.

³² Ardes, Runggu Prilia, et. al., "Sistem Perbandingan..." p. 106.

mandates that all Government Regulations referred to in the Act must be enacted no later than two years after the promulgation of the Indonesian Space Act.³³ This means that at least until 2015 the Government Regulations referred to in the Indonesian Space Act including Government Regulations regarding insurance and compensation for losses due to space accidents by Government Agencies must have been enacted. However, the Government Regulation that has so far been enacted is Government Regulation No. 11 of 2018 concerning Procedures for the Implementation of Remote Sensing Activities. In fact, if referring to the Attachment of Presidential Regulation No. 40 of 2017 concerning the Master Plan for the Implementation of Space Operations for 2016-2040 which is a mandate from Article 40 of the Indonesian Space Act, in the medium term I (2021-2025), Indonesia targets the development, operation and utilization of satellites. The Head of the Center for the Study of Aviation and Space Policy at Lapan informed the current developments that Indonesia is working on three Government Regulations (known as Rancangan Peraturan Pemerintah/ RPP) as referred to in the Indonesian Space Act, namely the RPP for Control of Space Technology, RPP for Commercial Space Activities and RPP for Development and Operation of Space Airports which contain regulations regarding launch accountability. satellite in Indonesia.³⁴

Indonesian Space Act has also regulated the existence of cooperation or involving two or more parties in the implementation of outer space. In Article 81 of the Indonesian Space Act, the joint responsibility for losses suffered by the state or foreign parties can be determined by the space operator concerned. So based on these regulations, the amount of each party's dependents is determined based on the agreement of the parties involved.

Satellite activities are also regulated in the Regulation of the Minister of Communication and Information of the Republic of Indonesia Number 21 of 2014 concerning the Use of Radio Frequency Spectrum for the Satellite Service and Satellite Orbit. In the regulation, it is stipulated that the Indonesian satellite operator shall be liable for losses incurred to third parties as a result of the failure to launch or operate the satellite. The responsibilities are then carried out in accordance with the provisions of the legislation.³⁵ It is further regulated that in satellite launches, Indonesian satellite operators are required to submit a satellite launch plan report to the Minister containing the name, time of the planned satellite launch, the name of the launching vehicle, the name and location of the launch facility, insurance details and the plan for satellite placement.³⁶ So that based on the Regulation of the Minister of Communication and Information of the Republic of Indonesia Number 21 of 2014, insurance is an obligation to provide a guarantee of liability by the satellite operator if one day the satellite causes a loss to a third party.

By requiring insurance guarantees to space operators, the relevant legislation here is Indonesian Insurance Act Number 40 of 2014 (Indonesian Insurance Act 2014). The insurance referred to Indonesian Insurance Act 2014 is an agreement between the insurance company as the insurer and the policy holder, which is the basis for receiving premiums by the insurance company in return for providing reimbursement to the insured or policy holder caused by loss, damage, costs incurred, loss

³³ Article 104 (1) Indonesian Space Act 2013.

³⁴ Herlinawati S, Marta, "Indonesia Sedang Membuat Tiga PP untuk mendukung Kemajuan Keantariksaan", 2020, <https://www.antaraneews.com/berita/1838504/indonesia-sedang-buat-tiga-pp-support-kemajuan-keantariksaan> accessed on 18 August 2021.

³⁵ Article 50 Regulation of the Minister of Communication and Information of the Republic of Indonesia Number 21 of 2014 concerning Use of Radio Frequency Spectrum for Satellite Service and Satellite Orbit.

³⁶ Article 45 Minister of Communication and Information of the Republic of Indonesia Number 21 of 2014.

profits, or legal liability to third parties that may be suffered by the insured or the policy holder due to the occurrence of an uncertain event.³⁷

Based on the Indonesian Space Act and Regulation of the Minister of Communication and Information of the Republic of Indonesia Number 21 of 2014, both regulations require insurance, but both regulations only regulate the obligation of space operators to have Liability Insurance against third parties. If the Indonesian Insurance Act 2014 is examined further, the definition of insurance includes the understanding of the insurance phase and liability insurance. Apart from that, the objects regulated in Law 40/2014 are in the form of body and soul, human health, legal responsibilities, goods and services, as well as all other interests that can be lost, damaged, lost, and/or reduced in value³⁸, however, Indonesian Insurance Act is only limited to general insurance, life insurance, sharia general insurance, sharia life insurance and reinsurance.

C. Municipal Law as a Tool for Opening Opportunities for Space Insurance Industry in Indonesia to grow

As a result of the regulations regarding space insurance above, the space insurance industry has been supported in Indonesia. This can be seen from the existence of insurance products offered by companies in Indonesia. 'Bank Rakyat Indonesia', an Indonesian state-owned banking company, through its subsidiary engaged in insurance, namely 'BRI Insurance' offers space insurance product for companies operating in satellite business.³⁹ It sees that large companies in Indonesia use satellite as a means of supporting their communication technology, and the loss arising from damage and loss of satellites in orbit is one of the important things that must be considered. For this reason, BRI Insurance has issued a Satellite Insurance product to help ease the burden caused by these losses. The insurance offered by BRI Insurance covers: pre-launch, launch, in orbit, and liability to third parties.

Pre-launch coverage provides protection against all risks of property damage to the satellite and its launch aircraft from the time the satellite is installed to the pre-launch stage (transportation from the factory to the launch site, when it is stored, assembled and prepared for launch). The protection will expire when the engine is started. At the time of launch, it provides coverage against physical damage or loss to the satellite that occurs during the launch phase (the engine is turned on, until the satellite reaches the specified orbit). While in orbit coverage, provides a guarantee against all risks of total loss and partial loss during the satellite operation stage. Then third parties' liability protection guarantee all claims for legal liability for bodily injury or property damage that may arise from satellite launch activities and parts thereof. With respect to this insurance, BRI provides exceptions to cover losses arising from: risk of war, nuclear risk, errors in the manufacture of satellites, wear and tear, engine damage, satellites made to be used for illegal purposes, and costs incurred due to risk of damage, or accidents that occurred before the coverage began.⁴⁰

In addition to BRI Insurance, another company named Sinarmas Insurance issued a product called 'SIMAS Satellite', to reach the market satellite telecommunication system which includes various forms and uses, e.g. navigation satellites, geodetic satellites, communication satellites, and research satellites. SIMAS Satellite bears the risk of technical problems to the satellite, including failure to launch the satellite into orbit, which can cause substantial losses to the company or business entity.

³⁷ Article 1 (1) Indonesian Insurance Act Number 40 of 2014 (Indonesian Insurance Act 2014).

³⁸ Article 1 (25) Indonesian Insurance Act 2014

³⁹ BRI Insurance official website, "Asuransi Satelit", <https://www.brins.co.id/produk/asuransi-satelit/>, accessed on 22 August 2021.

⁴⁰ *Ibid.*

Companies that will launch or operate satellites, including small satellites, can take advantage of this insurance. Sinarmas publishes the steps for closing Satellite Insurance:⁴¹

- i. Insured candidate visit the nearest Sinarmas Insurance broker/office and the insure will be directed to marketing division. Then the marketing will submit to Underwriting for further analysis.
- ii. Insured candidate fills out the Proposal Form ('Letter of Insurance Policy Closing' / SPPA Satellite Insurance). Understand the contents and ask for an explanation from the insurance officer regarding the consequences arising from closing your policy if the SPPA is not properly informed.
- iii. Information Required for Implementation of the closing of Simas Satellite Insurance, among others: name and address of the satellite project member; name and address who made the satellite/ satellite manufacturer and their reputation in detail, such as claim experience; satellite specifications in detail; policy coverage period and limit; the maintenance period includes the length of time in orbit; the amount of detailed coverage; project implementation schedule; project launch location; and operator qualification.
- iv. The Insurer takes care of the administration of satellite insurance, for example, the reinsurance back-up for this risk, whomever the reinsurance has the best standard and in accordance with the existing capacity, then the premiums and guarantees that will be given.
- v. The Insurer provides a policy offer to the insured in accordance with the backup that has been obtained. Then ask the Insured to sign an agreement on the terms and conditions offered.

Another insurance company with experience in not only providing insurance, but also providing substantial compensation for satellite operations is 'Asuransi Jasa Indonesia (Persero)' with its product called 'Jasindo Aviation and Satellite'. Jasindo offers aircraft insurance products to provide guaranteed protection for all air flight activities for the risks that are guaranteed under the policy conditions, such as legal liability to third parties, personal accident, loss of license, and ground handling liability. In addition to aviation insurance products, Jasindo also offers insurance products against satellite risks during pre-launch, launch and when the satellite is in orbit.⁴²

Jasindo has just completed the claim for the Satellite Palapa N1 (Nusantara Dua) loss in the launch phase.⁴³ Palapa N1 Satellite is a satellite owned by PT Palapa Satelit Nusa Sejahtera which is a joint venture between Indosat Ooredoo, PT Pasifik Satelit Nusantara and PT Pintar Nusantara Sejahtera. This satellite is intended to replace the Palapa D Satellite which has expired where this satellite will occupy an orbital slot of 113 degrees East Longitude. This satellite is produced by China Great Wall Industry Corporation (with a satellite value of US\$ 220 million. The satellite was launched on April 9, 2020 using a Long March-3B rocket from the Satellite Launch Center (XLCS) in Xichang, the People's Republic of China at 19:46 local time, but the rocket failed to reach orbit after an anomaly occurred when it entered the third phase of the rocket release stage.

Jasindo immediately coordinated both internally and externally (clients, reinsurance brokers and reinsurers) for the handling of claims whose value was confirmed to be quite material. The settlement of this claim proves that the Indonesian insurance industry has experience in handling specialty risk

⁴¹ Sinarmas Insurance official website, <https://www.sinarmas.co.id/produk/satelit>, accessed on 22 August 2021.

⁴² Jasindo Insurance official website, "Jasindo Aviation and Satelit", <https://jasindo.co.id/product/korporasi/aviation-satelit>, accessed on 22 August 2021.

⁴³ Liputan 6 News, "Jasindo Cairkan Klaim Asuransi Satelit Palapa N1 Rp 495,7 Miliar", 8 December 2020, accessed on 17 August 2021.

insurance. Since 1976 Jasindo has handled 22 satellite launch insurances and has settled insurance claims of satellite approximately US\$ 567 million. Among them are Telkom 1 in 1999, Telkom 5 in 2005 and Telkom 3S (T3S) in 2017. In 2012, T3S failed to orbit. Jasindo as the Insurer provides risk coverage with a value of US\$ 185.139 million or equivalent to Rp. 1.7 billion (2012 exchange rate) in that year. In addition, Jasindo also provides risk coverage with a large amount of US\$ 75 million for Apogee Kick Motor Palapa C2 claims, Band block Downconverter (BDC) failure Palapa C2 worth US\$ 31.2 million, Loss of DB Garuda Satellite worth US\$ \$101.5 million.⁴⁴ Due to its exceptional track record, Jasindo won the tender for two satellites owned by Telkomsat in Indonesia, namely Telkom T3-S and Telkom Merah Putih, which are now covered by insurance until 2022. The form of insurance protection for the two satellites is included in the Aviation and Satellite Insurance line of business. Winning the tender, Jasindo also shared knowledge related to 'Claim Handling' to Telkomsat which was held together with a broker named 'Reas Marsh International'.

The small satellite industry in Indonesia has been slightly moving over the last few years. With new trend being shown by governmental institution, universities, and companies in Indonesia – the industry is still in developing stage waiting for a growth explosion. Governments are recognizing the benefits of small satellites for their flexibility, rapid development, resiliency, relatively cheap cost, and risk tolerance in cutting-edge technology.⁴⁵ In the world, manufacturers provide innovations making small satellites break throughs with the capabilities of providing wider connectivity as well as precision information support. This is needed by Indonesia. The geographical condition of Indonesia as an archipelagic state makes the need for satellites to meet the capacity of the telecommunications network is still quite high.

University awareness to develop the small satellite technology has also begun to form, for example, Universitas Gadjah Mada with the establishment of the Indonesian Nano-Satellite Platform Initiative for Research & Education (INSPIRE). It is established in 2011 as a non-profit project initiative that aims to build and develop a technology platform satellite (nanosatellite, in particular) among universities in Indonesia, namely by placing students as the main motor/driver.⁴⁶

Another example, Telkom University to provide accurate information about Aerospace and Remote Sensing System technology, together with Telkomsat and IEEE AES/GRSS held a Workshop entitled "(Nano) Satellite Design" which was held online on 19 - March 20, 2021. Workshop on (Nano) Satellite Design is a training that learns how to design small satellites that can perform various special services, such as constellation communication, earth observation, localization missions, or other constellation missions. Satellite is believed to be a bright future for the development of telecommunications and information in the future. This workshop also discusses the introduction of mission design, satellite orbits, and the physical environment in space. The speaker also explained about the small-bus design, electrical power, and structure in a spacecraft. It is hoped that it can provide insight into satellite technology to the wider community and encourage the younger generation to master the latest technology that can benefit wider community.

In addition to universities, Lapan, as Indonesian governmental agency for space activities, has long been programming the development of micro satellites. This program was started officially in the

⁴⁴Rr. Ariyani Yakti Widyastuti, "Jasindo Jamin Asuransi Satelit Merah Putih Rp 2,19 Triliun, <https://bisnis.tempo.co/read/1116461/jasindo-jamin-asuransi-satelit-merah-putih-rp-219-triliun/full&view=ok> accessed on 5 March 2022

⁴⁵R.Kopaczka, Joseph; Herschitzb, Roman; Roney, Jason, "Small satellites an Overview and Assessment", *Acta Astronautica*, Vol.170, 2020, Pp. 93-105.

⁴⁶UGM, "From Campus, Promoting Satellite Technology" <https://www.ugm.ac.id/en/news/6883-from-campus-promoting-satellite-technology>, accessed on 17 August 2021.

year of 1998, although Lapan has been researching the development of satellite components since 1989 with the development of rocket's mission payload program. Now Lapan plans to launch a small satellite or Nano Satellite in April 2022 in Japan. The satellite is currently in the final stages of development. Indonesia is currently developing a Nano Satellite. The satellite is a cube with a size of 10x10x10cm and weighs about 1 kilogram. If there are no obstacles, this satellite will be delivered to Japan in December 2021.

From the above explained facts, it can be inferred that the small satellite 'ecosystem' not yet a fully-fledged area in Indonesia. Nonetheless, given that Indonesia has a rather experienced space insurance industry in conventional satellite, it is logic that the industry and regulation will still relevantly covering insurance for small satellite once national industry of small satellite in Indonesia developed.

II. CONCLUSION

The Indonesia regulation open opportunities to space insurance industry in Indonesia to grow. This can be seen from the existence of insurance products offered by companies in Indonesia: 'BRI Insurance' for space insurance product, Sinarmas with 'SIMAS Satellite', and Asuransi Jasa Indonesia (Persero) with Jasindo Aviation and Satellite. The ability of closing a deal and handling a claim has shown by Jasindo which has just completed the claim for the Satellite Palapa N1 (Nusantara Dua) loss in launch phase. Due to its exceptional track record, Asuransi Jasindo won the tender for two satellites owned by TelkomSAT in Indonesia, namely Telkom T3-S and Telkom Merah Putih, which are now covered by insurance until 2022. The industry for conventional satellite is relatively on the right track, however the small satellite industry in Indonesia has been slightly moving over the last few years. The small satellite 'ecosystem' not yet a fully-fledged area in Indonesia. Nonetheless, given that Indonesia has a rather experienced space insurance industry in conventional satellite, the industry should not find any difficulties in covering insurance for small satellite which is less expensive and complex. By ratifying the international space treaties, Indonesia is committed to continuing to support the development of space activities. Therefore, Indonesia has enacted the Indonesian Space Act of 2013 to adopt more specific provisions in international law into the form of national law. It is meant to guide future missions and undertakings to boost the nation's efforts in developing the space industry. Under the Space Act 2013, Indonesian government aims to improve Indonesia's self-sufficiency and competitiveness in space activities and use its benefits for wider population while keeping such activities sustainable. It is more clearly regulated in Article 84 (1) of the Indonesian Space Act, that every. Space operator shall insure Liability Insurance against third parties for the consequences of the space activity he/she performs. Regulations related to liability, compensation and insurance as referred to in Articles 83 and 84 of the Indonesian Space Act must be further regulated in the form of Government Regulations in order to push further the development of space insurance for satellite activities, including small satellite.

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