

Norm Formation in Space Law (Executive Summary)

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----- Table of Contents -----

Introduction

Part I: Basic Structure of Space Law

Chapter 1: Components of Space Law

Chapter 2: History of the Formation of the Basic Structure of Space Law

Chapter 3: Contemporary Issues Concerning Space Activities

Part II: Norm Formation Concerning Contemporary Issues

Chapter 4 Ex Post Facto Remedies for Damage

Chapter 5: Space Debris Mitigation

Chapter 6: On-orbit Servicing and Active Debris Removal

Chapter 7: International Scheme of Active Debris Removal

Chapter 8: Comprehensive Package of Measures to Address Contemporary Issues - Space Traffic Management

Part III: Characteristics of Norm Formation in Space Law

Final Chapter

Introduction

The purpose of this book is to elucidate the characteristics of formation of space law norms, with conscious attention to the structure of interest adjustment behind the negotiations for its formation.

Space activities have developed for more than 65 years under the principle of freedom of space activities set by the Outer Space Treaty (1966), contributing to the promotion of human welfare. On the other hand, the number of remnants of satellites and rockets (hereafter referred to as "space debris" or "debris") in Earth orbit continues to increase, and the number of satellites has been dramatically increasing in recent years due to the mass launch of small satellites and the deployment of Large Constellations (LC), which pose the risk of collisions and radio frequency interference. However, since the adoption of space treaties, namely the Outer Space Treaty, the Rescue and Return Agreement (1967), the Liability Convention (1971), and the Registration Convention (1974), there has been no normative formation by universal treaties in space law. In the sense that the difficulty of creating such a treaty is always talked about, it appears that there are limitations in the method of norm formation. In order to solve the above-mentioned contemporary issues effectively and in a timely manner through norm formation, it is imperative to understand the characteristics of norm formation in space law.

Some of the studies of other scholars have attempted to understand the nature of space law from a macroscopic perspective, focusing on the structure of the adjustment of interests among actors: for example, the studies by B. Chen, S. Yamamoto, and R. G. Steinhardt. However, these and other previous studies cannot be said to have analyzed the characteristics of norm formation from the perspective of what specific implications such a structure of adjustment of interests may have for future norm formation regarding contemporary issues, and since Yamamoto's study was conducted in 1976, it naturally does not touch on the development of norms since then.

Therefore, the author attempts to achieve the above-mentioned objective by reviewing the history of the formation of the basic structure of space law, inspecting the trends and embryonic movements of normative formation regarding the contemporary issues, in the form of an attempt to further the efforts of the abovementioned scholars. He has chosen to deal with "space law" rather than focusing on "international space law," because it is

necessary to examine not only international norms, such as treaties and resolutions formed at the United Nations and other fora, but also domestic norms (laws, regulations, and guidelines of individual countries) that regulate the behavior of actors under the domestic legal order, while influencing the formation of international norms.

Since this book analyzes the characteristics of normative formation of space law, it is worth mentioning the international regime theory of international politics and international relations. It may be utilized as a method to analyze the factors that lead to the establishment of a set of norms related to contemporary issues, considering treaty systems such as the space treaties as international regimes. However, in this academic field, there is generally little awareness of the legal nature of norms, and since legal interpretation is outside the scope of this field, it does not have an eye for analyzing how far legal norms have developed in an international regime, what remaining legal issues there are, etc. Precisely because the author believes that cooperation between the two disciplines is important in the long run, in this book, the author will concentrate on what can be done within international law discipline.

Part I

Basic Structure of Space Law

In Part I, after understanding the components of space law, we will analyze the characteristics of the process of formation of its basic structure. He will also understand the status of contemporary issues, relying on the findings of the natural sciences. In Part II, he will examine in detail the trends and embryonic development of normative formation regarding the contemporary issues. In Part III, the characteristics of norm formation in space law, as analyzed in Parts I and II, are clarified from a macroscopic perspective, and implications for basic theories of international law and future research issues are presented.

Chapter 1: Components of Space Law

Chapter 1 examines the components of space law, dividing them into international and domestic norms.

Section 1 examines legal norms among international norms. Codified legal norms include treaties, which can be classified into the following categories: the space treaties and the Moon Agreement (1979), treaties in other fields that are relevant to space activities, treaties establishing relevant international organizations, and treaties for the joint implementation of

space activities, etc. (such as the International Space Station Agreement). Customary international law includes those that are existing and are relevant to space activities and those for which space law norms have been established as customary international law, and the multiple provisions of the Outer Space Treaty fall into the latter category.

Section 2 examines another type of international norm: codified norms that are not legally binding ("non-legally binding norms"). Non-binding norms consist of UN resolutions, etc. (a generic term for UN resolutions and normative documents adopted by international conferences) and statements of intent prepared by two or more parties. UN resolutions, etc. are considered to be (i) legal principles that formed the basis of the space treaties, (ii) norms to deal with outstanding issues that arose during the negotiations of the space treaties, (iii) norms that supplement the space treaties mainly in procedural aspects, (iv) norms to deal with contemporary issues, and (v) framework for international cooperation to share the fruits of space activities. Against the background of the difficulty of preparing universal treaties, non-legally binding norms have become the main means of norm formation in pursuit of general applicability in today's space law. Note that while the "soft law" theory views normative documents in terms of gradations of legal binding force, this book does not use the term "soft law," because practitioners dichotomize documents according to whether or not they are legally binding. A number of statements of intent documents have been prepared for the implementation of international cooperation and other purposes. Non-legally binding norms have the advantages of speed of preparation, usefulness in dealing with new or unclear issues, and a format suitable for technical documents, etc.

Section 3 examines domestic norms. They are classified into (i) organizational laws and laws that establish basic principles of space policy, (ii) laws for self-regulation of space activities, (iii) laws for adoption of international norms, and (iv) laws clarifying home country interpretations of the space treaties. Domestic norms are an important component of space law together with international norms, both in terms of adoption of international norms and in promoting the formation of international norms.

Chapter 2: The Formation Process of the Basic Structure of Space Law

Chapter 2 analyzes the formation of the space treaties system that forms the basis of space law, i.e., the space treaties and the UN resolutions, etc. that dealt with the outstanding issues that arose during the negotiation of the space treaties, focusing on the structure of the adjustment of interests, and then clarifies the characteristics of the space treaties system.

In Section 1, the history of the development of the law of the sea and the law of aviation is reviewed in order to better understand the characteristics of the formation process of the space treaties system through comparison. In the case of maritime law, the composition of wide high seas and narrow territorial waters was established at the beginning of the 20th century through the adjustment of interests between coastal states and sea powers symbolized by the debate between Grotius' "*Mare Liberum*" and Selden's "*Mare Clausum*." In the case of air space law, the prevailing view at the beginning of the 20th century was that foreign flying objects could, in principle, fly freely over the territory of other countries, but the use of aircraft as a means of warfare in World War I established exclusive sovereignty over the territory, as seen in the 1919 Paris Convention. The adjustment of interests in this process was mainly between the territorial states and the aeronautical states.

Section 2 inspects the formation process of the space treaties system. In the Outer Space Treaty negotiations, the U.S. and the Soviet Union, which were the overwhelming space powers, aimed to maximize their first-mover advantage, as well as to avoid being exhausted by the Cold War struggle for supremacy, and tried to control the escalation of confrontation in a way that would not be detrimental to itself. Other countries, on the other hand, pursued interests different from those of advanced space-faring countries such as the United States and the Soviet Union. In this book, countries that have not started space activities at that time but intend to do so in the future and pursue the preservation of their own future interests are called "developing space-faring countries," while countries that pursue the minimization of adverse effects of other countries' space activities are called "impacted countries." Although some provisions, such as the wording on the avoidance of adverse changes in the Earth's environment (Article 9 of the Outer Space Treaty), have certainly been incorporated in response to the claims of the impacted countries, overall, the most dominant adjustment of interests has been between the advanced space-faring countries, especially the United States and the Soviet Union, followed by that between the advanced space-faring countries and the developing space-faring countries. Adjustment of interests between the space-faring countries and the impacted countries was not the major dynamic that formed the legal order. In other words, the negotiations for space treaties were basically an effort to establish a framework for the coexistence of the space-faring countries. Subsequently, the Direct Broadcasting Satellite Principles Resolution (1972), the Remote Sensing Principles Resolution (1986), the Nuclear Power Source Resolution (1992), and the Space Benefit Declaration Resolution (1996) were adopted to address issues left over from the space treaties

negotiations, and in the process, the impacted countries argued for the regulation of space activities. Though the resolutions adopted did clarify some of the wordings of the treaties, the space treaties were not renegotiated. Even after the adoption of these resolutions, the space treaties system remained essentially unchanged in that it was essentially a framework for the coexistence of space-faring countries, and was established as a result of the adjustment of interests among them.

Section 3 analyzes the factors that led to the structure of interest adjustment described in Section 2. The first reason why the pursuit of interests by the impacted countries has not brought about substantive changes in the space treaty system is that the adverse effects of space activities on the impacted countries have been minimal. In the past, direct broadcasting from satellites of developed Western countries to the earth's surface caused concern in countries such as the Islamic world, but this has been dispelled by jamming technology. In addition, although there have been many cases of airstrikes by aircraft, there have been no actual examples of the use of force from satellites. Second, there is a large gap between the maximum altitude that an aircraft can maintain (about 50 km) and the minimum operational altitude of a satellite (about 90 km), and space and airspace are separated from each other in terms of current operational reality. As a result, there are few cases of jurisdictional conflicts between the space-faring countries and others, and there have not been many requests from the impacted countries to expand their jurisdiction over the space activities. Thus, the reason why there was no need for full-scale adjustment of interests between the space-faring countries and the impacted countries was due to the differences in the physical characteristics of outer space and airspace. Note that the delimitation between outer space and airspace has been a point of contention since the 1950s, but there is no prospect of a resolution. In the case of the oceans, since ships can physically come and go between the near and far seas continuously, it has become necessary to establish a territorial sea within a certain distance from the shore as a result of the adjustment of interests between coastal states and sea powers. However, since outer space and airspace are separated in operational reality, there is no particular obstacle even if the boundary is not fixed. In other words, if a boundary demarcation were necessary, the interests of the impacted countries would have become clearer, and the fact that there is no prospect of demarcation itself indicates that there was little need to adjust the interests of the space-faring countries and the impacted countries.

Chapter 3: Contemporary Issues concerning Space Activities

In Chapter 3, we will examine contemporary issues that have emerged following the

establishment of the space treaties system. The author examines the increase in debris in Section 1, the increase in artificial satellites in Section 2, and radio frequency interference in Section 3, relying on the findings of the natural sciences. The increase in debris is a hindrance to satellite operations. The most common type of space object in orbit is fragmented debris. The most common causes of fragmentation incidents are intentional destruction, propulsion system explosion, and collision or accident, in that order, and it is believed that they self-propagate due to mutual collisions (cascade effect). Second, the number of satellites has been increasing in recent years due to the deployment of LCs and the increase in the number of small satellites, adding to orbital congestion: while the number of satellites injected into orbit in the 60-plus years since 1957 is estimated at about 12,000, there are more than 20,000 planned for the next 10 years alone. In addition, LC is also aggravating the problem of radio frequency interference.

Part II

Norm Formation concerning Contemporary Issues

Chapter 4: Ex Post Facto Remedies for Damage

Contemporary issues center on congestion in Earth's orbit. The most serious violation of the legal interests of other countries due to congestion is damage to valuable space objects, and how to deal with such damage is an important issue in norm formation. Therefore, Chapter 4 analyzes the functions and limitations of the liability system under the space treaties as a system of ex post remedy for damages.

Section 1 examines the basic structure of the system. First, Article 6 of the OST provides for the concentration of responsibility on States. Under the said Article, the State is centrally responsible for any breach of its obligations under international law caused by the acts of private parties. In addition to the said Article, the State is also uniquely responsible internationally even in the case of damage caused as a consequence of a legal act, under the absolute liability system provided for in Article 2 of the Liability Convention. Article 7 of the Outer Space Treaty provides that its parties are internationally liable for damage caused by their own space objects (infringements of the legal interests of other states in other ways than damage are dealt with under Article 6), and the Liability Convention accordingly provides details regarding liability for damage. The concentration of responsibility on states, absolute liability for the damage on the surface of the Earth, and limitation of exoneration (Article 6 of the Liability Convention) provided for by both treaties reflect the principle of

liability based on risk. However, the Outer Space Treaty is based on the freedom of space activities, and like the tort law under the national laws of many countries, the principle of the space treaties system should be considered a fault-based liability system (Article 3 of the Liability Convention).

In Section 2, the author will analyze how this system works with regard to the debris issue, which is a representative example of contemporary issues. Articles 2 and 3 of the Liability Convention limit damages to those caused by "space objects." Although theories have not converged on the conceptual relationship between debris and space objects, there is no theory that states that there is no debris that falls under the category of space objects, and there are examples of states treating debris as space objects in their national practices, so this book will also examine debris that falls under the category of space objects.

When damage is caused to a space object, its launching state can file a claim for compensation to the launching state of the space object that caused the damage. However, it may not be easy to identify the debris that caused the damage or its launching state. Regarding the scope of damages, it is understood that nuclear damage and other environmental damage on the surface of the earth are included, but it is difficult to understand that orbital congestion caused by an increase in debris is included. Whether indirect or subsequent damages are included in the scope of damages must be determined in each case by comprehensively considering the causal relationship and other factors. As for absolute liability in the case of surface damage, as a result of negotiations between the two countries following the 1979 Soviet satellite crash into Canada, the Soviet Union paid approximately half of the amount claimed. Although neither the Outer Space Treaty nor the Liability Convention is cited as the basis for payment, it can be understood that both treaties were in effect utilized to settle the dispute. On the other hand, the fault-based liability system has some essential problems as a system for pursuing liability for damages in outer space, such as the difficulty of identifying the launching country, the fact that no standard of care effective in preventing collisions seems to have been established in practice, and the difficulty of creating a new effective standard of care when many space objects have difficulty changing orbit. This is an essential problem for a system to pursue liability for damages in space.

Section 3 presents the characteristics of norm formation in this area. First, there are efforts to supplement the current system. One of them is the use of remedy systems other than the Liability Convention (domestic remedies as referred to in Article 11 of the Liability

Convention, and the Optional Rules for Arbitration of Disputes relating to Outer Space Activities of the Permanent Court of Arbitration), and another is the proposed creation of a new convention to supplement the Liability Convention, but no concrete moves have been made. In a report by the Cabinet Office of Japan (2018), voices collected from private operators state that even if a collision were to occur in orbit, the risk of liability would be limited because it would be difficult to prove fault. This suggests that the current system may not function as a deterrent against the occurrence of damage. While the fault-based liability system for damage in the space treaties is not functioning well, launch operators today manage the risk to their own assets through insurance, a mechanism outside of the space treaty system. Thus, the current system, the only secondary rule for dealing with on-orbit damage, is ironically not perceived as the main prescription for the problem. However, there is no prospect of creating a new, more functional liability system, and there is currently no movement to be seen other than a response through insurance. Addressing contemporary issues through norms needs to be based on this.

Chapter 5: Space Debris Mitigation

Chapter 5 analyzes trends in norm formation regarding debris mitigation as a preventive measure against damage.

Section 1 reviews the history of debris problems and countermeasures. Debris countermeasures did not really take off until the 1980s. The main countermeasures are (1) to monitor space objects (including debris) and conduct maneuver to avoid them if possible and necessary, (2) to improve the specifications of rockets and satellites so that they generate less debris, and to conduct post mission disposal (PMD) on their own after operation is completed, and (3) finally, to create international guidelines for (2) above in order to raise the level of measures in each country. Typical examples of guidelines for (3) above are those prepared by the Inter-Agency Space Debris Coordination Committee (IADC) in 2002 and those prepared by the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) in 2007. The 2007 COPUOS guidelines have been accepted by many national laws and regulations and have had an equalizing effect in practice. In addition, there are also standards from the International Organization for Standardization (ISO), a corporate rating system for debris mitigation from the World Economic Forum, and debris mitigation best practices from non-governmental organizations, such as a collection of best practices for debris mitigation developed by industry associations.

Section 2 analyzes the conflicting theories on the position of debris mitigation in space treaties system and customary international law. Since the 1990s, some academic theories have adopted, on the one hand, the interpretation that debris generation is included in "harmful contamination" of outer space as defined in Article 9 of the Outer Space Treaty. Others interpret that the obligation to reduce debris generation is derived from the principle of prevention as defined in international customary law. There are also theories that adopt these two interpretations. (These theories are hereinafter referred to as the "environmental damage approach"). On the other hand, there is an interpretation that debris generation is not included in "harmful contamination" and that the principle of prevention is not applicable either.

Section 3 describes the characteristics of norm formation in this area. There has been little demand to address the debris problem from the standpoint of the impacted countries, and basically voluntary regulatory efforts have been made among space-faring countries, but advanced space-faring countries were concerned about the loss of their competitive advantage, and developing space-faring countries were concerned about the further deterioration of competitive conditions. Initially, COPUOS attempted to formulate a norm, but it failed to gain support for the creation of legal norms. Some actors advocating such norms used IADC, a group of scientists and engineers from the advanced space-faring countries, as the forum for the discussion, and successfully introduced a series of technical guidelines. On this basis, the same type of technical guidelines was developed in COPUOS (COPUOS guidelines). Both guidelines are not only non-legally binding norms in themselves, but also do not address the legal obligations from which they derive. This is because, as we saw in Section 2, the debate on the merits of making them legal norms is still in its infancy, and because of the above-mentioned structure of interest adjustment, and in particular, the reluctance of advanced space-faring countries, represented by the United States, to create legal norms. In other words, these guidelines were successfully formed because they are technical non-legally binding norms. In addition, the efforts of nongovernmental organizations such as ISO should also be noted, since they are a new way for private companies to exert pressure for compliance with norms in the market without having to go through norms formed among nations, as space activities by private companies are increasing.

Chapter 6: On-orbit Servicing and Active Debris Removal

Chapter 6 analyzes the trends and embryonic movements of norms for On-orbit Servicing

(OOS), which extend the operational life of satellites and de-orbit satellites for PMD, and Active Debris Removal (ADR), which removes debris that has occurred in the past. These are important new technologies to mitigate the risk of debris before it damages operational satellites.

Section 1 provides an overview of each service and the norms currently under consideration in the international arena (e.g., protocols for rendezvous and proximity operations to contact the space objects, measures to ensure transparency, and duty of care to ensure the function of fault-based liability system).

Section 2 inspects the legal issues related to the implementation of the service. Article 8 of the Outer Space Treaty stipulates that the State of registry of a space object retains jurisdiction and control over the object while it is in outer space or on a celestial body. Therefore, the treatment of the Article becomes a point of contention when it becomes necessary to de-orbit an object without the consent of the State of registration. There are several theories, such as establishing universal jurisdiction over debris to allow removal without the consent of the State of registry, but there is no consensus of opinion. In addition, when analyzing the case-specific modes of liability for damage when unintentionally causing damage to other objects while implementing OOS or ADR, there is a wide variety of such modes, and it is necessary to formulate arrangements in advance between the country that ordered the service and the country that provides it.

Section 3 describes the characteristics of norm formation in this area. The sense of parties involved in norm formation basically exists only among space-faring countries. Since OOS and ADR technologies can theoretically be used for hostile applications against satellites of other countries, there are calls for ensuring transparency in COPUOS and other fora. In addition, the draft treaties that Russia and China have submitted to disarmament conferences since 2008 contain language that could be interpreted to mean that unauthorized de-orbit could be construed as a use of force. Although these technologies play an important role in solving the debris problem, the technological superiority of the country that has acquired the technology to move another country's satellite in orbit is significant, and the possibility cannot be denied that countries with inferior technologies may argue for caution due to a lack of transparency. Under these circumstances, industry associations are currently proposing related norms as self-regulations, which emphasizes transparency. Japan has established a licensing system for on-orbit operations including OOS and ADR under the Space Activities

Act, which also underscores the importance of transparency.

Chapter 7: International Scheme of Active Debris Removal

Chapter 7 examines the institutional design of international projects to ensure that ADR services, which are essential for reducing abandoned debris, are procured on an continuous basis.

In Section 1, the author examines the direction of the legal structure based on various academic theories. As for how the costs should be borne, the principle of common but differentiated responsibilities, the polluter-pays principle, and other ideas developed in environmental law have been advocated. However, as analyzed in Chapter 5, there is no convergence of views on the legal nature of measures even for debris mitigation, which is a preliminary step to ADR. Debris removal is costly, and in order to obtain the support of taxpayers, which is indispensable to secure the appropriation for its continuous implementation, it is necessary that the removal becomes a legal obligation or political duty, or that its benefit to the national interest of the country becomes clear. Therefore, the author will first examine the validity of the environmental damage approach introduced in Chapter 5 as a way to interpret debris removal as an obligation under international law.

The environmental damage approach interprets debris generation to be included in "harmful contamination" under Article 9 of the Outer Space Treaty and/or attempts to derive obligations such as that of debris mitigation from "damage to the environment" as referred to in the principle of prevention. Apart from this, the fault-based liability system under Article 3 of the Liability Convention exists for damage caused by debris, which means that the environmental damage approach recognizes the establishment of a wrongful act at a stage prior to the occurrence of "damage." However, the disadvantage at such a stage is basically the increased costs resulting from the increased risk of collision. The environmental damage approach assumes "environment" as the object of legal protection, but since debris is a physical obstacle and leaving them on orbit is not detrimental to human health or the landscape, nor is the damage a gradual process, it is unreasonable to use the term "environment" to describe the increased risk of physical damage. Nor does the drafting history of Article 9 of the Outer Space Treaty support this approach. If the act of contributing to orbit congestion is to be positioned as environmental damage, the relationship with the damage referred to in the Liability Convention must be rearranged, but such a rearrangement of the concept would be difficult to accomplish through interpretive theory alone.

Next, there is the question of how to set up the duty of care. Both the principle of prevention and Article 9 of the Outer Space Treaty are designed to question the violation of the duty of care. If a new duty of care is established for "harmful contamination" or "damage to the environment," it should be different from the duty of care for preventing "damage," but how can the two be differentiated?

Furthermore, if debris generation is regarded as an internationally illegal act and responsibility is pursued, this would be a pursuit of *erga omnes* responsibility, but there is also the question of whether this is really possible, because the ability to pursue such responsibility depends on the entirety of the primary and secondary rules.

Therefore, trying to view debris mitigation as a legal obligation through the environmental damage approach may not be more effective than a declaration of illegality for certain types of actions that exceed the limits of acceptability (such as the intentional destruction of satellites conducted in a very harmful manner) because liability laws are unlikely to work. Moreover, it is even more difficult to mandate the removal of existing debris because such debris was generated where there was no norm prohibiting debris generation.

Therefore, in Section 2, the author examines other configurations. The first is the precautionary principle. The United Nations Framework Convention on Climate Change (UNFCCC) and other treaties that embody the precautionary principle consider the legal interest in the preservation of the current state of the global environment itself, do not envision the occurrence of actual damage, and establish legal principles and procedures for recovery from the state of non-compliance, rather than state liability, in the event of a violation of such legal interest. For debris problems, this approach could be applied to consider legal interests such as orbital safety and maintaining access to outer space, rather than the preservation of environment under such terms as "harmful contamination" or "damage to the environment." Then, under the precautionary principle, each country would take the measures it deems necessary to pursue such legal interests, and if such measures are not taken, it would not pursue state responsibility, but rather have the state take corrective measures to restore the precautionary state. Such a legal structure would make it easier to overcome the limitations of the environmental damage approach. However, in order for such a mechanism to work in practice, a treaty that clearly defines such norms would be necessary.

Second, instead of establishing a legal system, one approach is to encourage countries to contribute proactively by setting common future-oriented goals at the United Nations or other organizations and applying peer pressure under these goals, as in the case of Official Development Assistance.

Section 3 summarizes the results of this chapter's discussion. The environmental damage approach has limitations in application due to the inherent limitations of liability law in space. If the precautionary principle is relied upon to build a system, it is highly likely that conflicts will arise between advanced space-faring countries and developing space-faring countries over how responsibility should be shared. Whether or not this can be overcome depends on the sense of urgency within the community of space-faring countries regarding the specific aspects of the contemporary issues inspected in Chapter 3. Which of these approaches, or the one that uses development assistance as an example, can be achieved more quickly and easily will also depend on the sense of urgency. In this regard, it will be politically important to raise public awareness so that pressure for norm formation will come from outside the said community, and it will also be effective if one of the advanced space-faring countries takes a leadership role on the moral high ground.

Chapter 8: Comprehensive Package of Measures to Address Contemporary Issues-Space Traffic Management

Chapter 8 analyzes the developmental history of the Space Traffic Management (STM) concept, the current status of each element, and future challenges, which is a concept that packages measures to address contemporary issues.

Section 1 reviews the history of the development of the STM concept since the 1980s. Starting from academia (e.g., the International Academy of Astronautics (IAA) reports), through the accumulation of relevant international norms (e.g., COPUOS guidelines), and against the background of awareness of problems such as orbital congestion caused by small satellites and LC deployments, a recognition has grown that various norms are being formed under some kind of higher-level concept of STM. The United States announced a comprehensive policy on STMs in 2018, and the EU is currently in the process of developing a comprehensive policy as well.

Section 2 provides an overview of the basic elements of STM. Inspection of prior academic accomplishments and policy documents allows us to extract three categories: 1) provision of

space situational awareness with improved accuracy, 2) traffic management norms for collision prevention, and 3) norms for the prevention of radio frequency interference. Then, comparing the IAA reports and the U.S. policy documents, we can find notable differences over the regulatory philosophy. The former recommends the creation of a multilateral treaty, such as the Comprehensive Outer Space Treaty, as the ideal approach. This recommendation was made based on the recognition that the freedom under the Outer Space Treaty is not absolute and can be constrained for the sake of freedom of exploration and utilization by all parties. The latter would indicate that it is preferable to solve problems through voluntary cooperation and collaboration rather than regulation. The former also includes specific coordination among space activities of multiple countries, while the latter does not have anything of the sort.

Section 3 summarizes the characteristics of norm formation in this area, keeping in mind these differences in attitude. First, the author points out the challenges for future norm formation: when aiming at norm formation for the three elements of STM, first, the characteristics of outer space and the availability of technology cannot be ignored. Most space objects do not have propulsion, and unlike aircraft and ships, they are not maneuverable. Even if they have propulsion, the amount of propellant is limited, and timely operation is not easy due to the speed of movement and positional relationship with bases on the earth's surface. Accurate determination of location is also not easy. In addition, accurate location determination requires very sophisticated SSA, but is restricted by national security and commercial secrecy. Furthermore, while non-legally binding norms may be used to uniformly regulate activities, coordination among multiple activities, such as the allocation of orbital slots or coordination among launches, requires coordination by some coordinating authority, and it is most natural to have an international organization perform such coordination. However, such a mechanism is non-existent in space law, with the exception of the International Telecommunications Union, and any attempt to introduce it would mean a disruptive reform of space law. In this regard, it is interesting to note that some industry associations have set goals for such coordination on a voluntary basis among companies. In other words, there is currently a conflict over whether to strengthen regulation or respect autonomy in the formation of norms regarding these issues, with the following three options on the table: a coordination mechanism as a legal system, a method in which each country aims to maintain order through licensing and supervision of private companies in its own country, and autonomy within industry associations. In addition, there is a regulatory argument for LC, not only because of the need for coordination among advanced space-faring

countries, but also because of concerns about the negative impact of LC on astronomy and starry sky tourism. This is a demand for stricter regulation from the standpoint of the impacted countries. Thus, discussions have begun on what norms should be formed between the conflict of freedom and regulation and in what forum, and the outcome of these discussions is a matter that will determine the fundamental character of space law in the future.

Part III

Characteristics of Norm Formation in Space Law

Final Chapter

In the final chapter, the author summarizes the characteristics of norm formation regarding contemporary issues analyzed in Chapters 5 through 8 from a macroscopic perspective, and concludes the book by presenting future research issues.

In the first section, the following three points are pointed out as trends and embryonic movements of normative formation regarding contemporary issues.

First, the structure of interest adjustment is changing with regard to the formation of norms on contemporary issues. At present, as at the time of the establishment of the space treaties system, international norms are basically formed through the adjustment of interests among space-faring countries, and although there are some movements to pursue interests from the standpoint of the impacted countries under the STM, it is not yet a major movement. In other words, the formation of norms among nations must basically be done at the initiative of the space-faring countries themselves, without strong assertion of vital national interests from actors other than the space-faring countries, such as the voices raised by coastal states in the Law of the Sea and territorial states in the Law of the Air. However, within the community of space-faring countries, as commercial space activities have become more active, there have been calls for norm formation from private operators and their organizations, and they have begun to form their own norms as well. This may increase their influence as pressure on governments to form national and international norms.

Second, space law, as a whole, is slowly maturing into international administrative law in the medium to long term, while continuing to seek a balance between freedom and regulation. International space law is a legal order that aims to realize the principles stipulated in the

Outer Space Treaty by regarding them as public interests of the international community. As we have seen throughout this book, the norm formation in this context is influenced by the characteristics of the activities subject to discipline and the structure of interest adjustment in the community in which the norms are formed, and various innovations are made to achieve the objectives. These include the creation of treaties on a project-by-project basis among like-minded countries, the extensive use of non-legally binding norms for norms that seek general applicability, the utilization of the function of domestic norms to promote international norm formation, and the formation of norms by non-governmental organizations that utilize market functions to directly regulate the behavior of operators of spacecrafts and launching vehicles. This is an example of the institutionalization of the international community that is taking place in various fields to protect and promote the public interests of the international community. And since, according to the findings of the natural sciences reviewed in Chapter 3, contemporary issues are likely to continue to worsen if nothing is done to address them through norms, it could be expected to see an increasing degree of institutionalization in the medium to long term, even as we continue to search for ways to deal with them through freedom and regulation. Such a movement has already begun, albeit gradually, as we have seen throughout this book. No matter what method is used for the continuous implementation of ADR, there is a high probability that “international public affairs” will be required to be carried out by the International Administrative Organization as described by Souji Yamamoto for coordination among removal projects in each country. In addition, it is also highly probable that “international public affairs” will be required in a similar way when a mechanism for inter-activity coordination is introduced for STM.

The third point is the trend from responsibility to prevention. As we have seen in Chapters 4 through 7, there are not abundant possibilities in the legal structure to expand the scope of liability law with respect to damages in outer space. As we saw in Chapter 7 on possible international scheme for ADR, space law as a whole is moving, or even must move, away from a system based on the pursuit of liability toward a response centered on preventive measures. This is largely influenced by the physical characteristics of outer space, as pointed out in Chapter 2 and 4.

Section 2 discusses the results of the analysis of the characteristics of norm formation in space law, its implications for the basic theory of international law, and future research issues.

Since the establishment of the space treaties system, project-specific treaties by like-minded

countries have been formed from time to time as needed, as seen in the case of the International Space Station Agreement and frameworks regarding the Artemis Program. On the other hand, norms of general applicability continue to be formed exclusively through non-legally binding norms.

The reasons for this are as follows. (a) First, there has been little need for a universal treaty for the following reasons. (i) There have been few conflicts of jurisdiction over space activities with the countries underneath outer space and there are few legal disputes due to the coexistence of *in personam* jurisdiction in the vastness of space. (ii) In the space treaties, there is only one actor, the state, in the plane of liability law, and the states' behavior can basically be regulated by non-legally binding norms as long as the major advanced space-faring countries agree to it, so there was little momentum to create a multilateral treaty as a basis for introducing regulations on the activities of private operators.

(b) Second, in this sector, technology is constantly evolving, and it is generally time-consuming and often unreasonable to adopt a heavy written format with state responsibility for violations as a norm to uniformly regulate actors in a situation that changes day by day.

(c) Third, in the community of space-faring countries, the scale of activity and the influence of a few actors on norm formation overwhelm others, and agreement without them is not effective. And their desire for a treaty tends to be weak, with the possibility of constraining the freedom of vital activities including military activities. Besides, they are not, as a whole, like-minded countries, and reaching an agreement will not be easy. Pressure from outside the community to push for an agreement is also scarce due to the structure of the interest adjustment. Some researchers argue that the COPUOS consensus principle makes it difficult to formulate legal norms. Though it is true that it becomes even more difficult to reach consensus as the organization grows, this is not the cause of the inability to form a treaty. Forcing a treaty to be adopted by majority vote will not make it work. Therefore, the consensus principle is rather the result of the characteristics of the community of space-faring countries and the structure of the adjustment of interests in the said community.

Cheng's discussion (1965) on "instant" customary international law has had an influence on the traditional view that customary international law originates from unconscious facts, whereas the debate on the requirements for its establishment has been active and even the possibility of proactive formation has also been discussed. In this sense, the extent to which

customary international law can be used to address contemporary issues is also a point of consideration. However, there is a practice of preferring non-legally binding norms for norm formation in pursuit of general applicability, which are sometimes intentionally created without clarifying their legal source, and as such, it is not easy to obtain *opinio juris sive necessitatis*. It cannot be said that customary international law has been used as a tool for proactive norm formation in this field.

In the future, as the space utilization is hindered by orbital congestion, there may be calls for regulation by legal norms within the community of space-faring countries. In addition, some activities, such as inter-activity coordination, may be difficult to accomplish without a legal norm. At present, however, non-legally binding norms cannot be said to be a substitute for treaties or customary international law. Each normative form has been given a deliberate role.

Non-legally binding norms are accepted by the laws and regulations of the space-faring countries and become binding in the national legal order, thereby obtaining actual legal regulatory force. For example, one of the licensing requirements for satellite launches in Japan's Space Activities Law requires that the structure of the satellite conform to the standards established by Cabinet Office Ordinance as not likely to cause "harmful contamination" or "potentially harmful interference" as referred to in Article 9 of the Outer Space Treaty, and the said Ordinance's standards are consistent with the debris mitigation guidelines of IADC and COPUOS. In addition, some UN resolutions, such as the Remote Sensing Principles Resolution, have been accepted by national laws and regulations. COPUOS compiles and publishes the status of implementation of these UN resolutions by each country and places them on the agenda of its annual meetings, explicitly recognizing that such compilations will promote further progress in implementation by each country. In other words, there is a collective will in the UN to ensure actual regulatory power through the acceptance of non-legally binding norms by national laws and regulations.

As the number of outer space activities by private operators increases, it will become more important to order their actions, but as noted above, drafting a treaty with general application will not be easy. In space treaties system, however, the similar result have been achieved without the use of treaties, by encouraging acceptance by domestic law in the UN arena. In other words, while enjoying the convenience of non-legally binding norms on the plane of international norm formation, the actual regulatory force is secured through acceptance by domestic law. This combination of non-legally binding norms and domestic laws and

regulations that accept them is a creative way for the community of space-faring countries to adapt to the nature of space activities and the structure of interest adjustment over norm formation.

In future research, it is an important question as to what conditions should be met for the furtherance of acceptance of such norms by each country. In the process of enacting Japan's Space Activities Act, the following motivations were recorded: (i) the idea that Japan should promote its national interests in the international community by promoting efforts related to debris mitigation from the perspective of actively fulfilling its role in the international community, taking into account organized efforts in the international community related to debris mitigation, and (ii) the need to strengthen its international competitiveness. In other words, the legislative motivation is twofold: to promote the national interest through proactive efforts to address international issues and to strengthen international competitiveness. The U.S. government, for its part, stated in COPUOS in 2016 that the reason for accepting the contents of the Remote Sensing Principles Resolution into the statute was a kind of voluntary investment by the U.S. government to establish the contents of the Resolution as a regime. Whether it is the Debris Reduction Guidelines or the Remote Sensing Principles Resolution, attempts are being made to ensure the legitimacy of the formation process, including a review process covering all major stakeholders, adoption by consensus, and adoption/reporting at the UN General Assembly, which will be one of the forces encouraging acceptance by the countries. In addition, with regard to international competitiveness, in response to the growing social interest in debris issues, there is pressure in the market, under such non-governmental normative schemes as the ISO guidelines, the World Economic Forum rating system, and industry association best practice collections, to use the launch service providers that have taken appropriate debris mitigation measures. Therefore, in order to increase the demand for launch services provided by a country, it is meaningful to implement debris mitigation measures that conform to international norms. Thus, it can be said that the composition of the norm-forming arena, the characteristics of the mandate and procedures, and market pressures can promote domestic acceptance of non-legally binding norms. This issue has not been sufficiently examined in legal theory regarding compliance with non-legally binding norms, and this is an issue for future research.

The method of ordering the behavior of actors using the market function, as described above, with regard to the formation of norms regarding contemporary issues is itself another legal phenomenon that deserves attention. This method attempts to directly order the behavior of

private actors under the legal order established by the space treaties, which are structured in such a way that all actions of private actors are absorbed into the actions of the states on the plane of liability law, without the use of treaties. Several studies already exist on ISO standards and Basel regulations for financial institutions. In space law, however, this method is still in its early stages of development. The degree to which they have regulatory power and under what conditions they increase that power are also issues worth exploring in terms of their applicability in other areas.

Thus, space law intentionally utilizes a number of norms that are atypical from the perspective of dominant international law theories to develop a legal order, which is a remarkable feature of norm formation in space law. The reality of such norm formation is difficult to capture in a static legal source theory of judicial standards under Art. 38 of the ICJ Statute or "soft law. It is necessary to look squarely at the wide variety of norms that exist in reality and consider what needs to be done to develop the legal order in a manner consistent with the higher principles of the space treaties system and other universal treaties, and thereby achieve harmonious and sustainable development of space activities as a whole. Otherwise, international law discipline may be left behind in this field. In this sense, the norm formation in space law suggests that a more dynamic and comprehensive perspective should be added to the legal source theory of international law.