

Current Status of Japan's Active Development of Space Laws and Systems for Legal Compliance in the Age of Celestial Exploration

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In December 2021, Japan became the fourth country to enact a domestic law on space resources. One year after the enactment (November 2022), the Government of Japan issued the first license for a private enterprise's space resources project under that law. Furthermore, in November 2021, Japan formulated the world's first guidelines for applying for a license under the Space Activities Act for on-orbit services. These legal instruments have given legal foresight to non-governmental enterprises that envision space resource activities on the Moon and space debris removal services in orbit, and have encouraged their commercialization. For a considerable period, Japan's domestic space legislation lagged behind that of other space-faring countries. However, since enacting the Basic Act on Space in 2008 as a bipartisan Diet member's bill, Japan has caught up with other countries by successively passing the Space Activities Act and the Remote Sensing Act, and has also achieved the above-mentioned advanced legislation. Similarly, in international law, Japan became an original signatory to the Artemis Accords in October 2020 and signed a Memorandum of Understanding concerning Cooperation on the Civil Lunar Gateway with NASA under the Intergovernmental Agreement on the International Space Station in December 2020. In addition, the Japan-US Framework Agreement for Cooperation in the Exploration and Use of Outer Space, a long-standing issue between the United States and Japan, was signed in January 2023, ratified and entered into force in June 2023. This Framework Agreement cites the Artemis Accords and is the first treaty partially to incorporate the Artemis Accords into a legally binding agreement. This paper presents the notable features of

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these legal developments, the domestic background and circumstances that led to them, and their implementation status. It also demonstrates that Japan has conducted recent domestic rule-making with due regard to ensuring compliance with international law and reverence to the latest relevant debate, and that therefore Japan is well positioned to lead bilateral or multilateral discussions on related international rule-making.

1. Introduction – Rise of the Private Space Industry and the Move towards Government-Sponsored Space Exploration

Human space activities began with the launch of the Earth's first artificial satellite, Sputnik, by the Soviet Union (1957), continued (in broad strokes) with the first Moon landing (1969) and Space Shuttle (1981) by the USA, and carries on with the International Space Station ('ISS'; 1998). In all such instances, states were the main actors. However, in the 1980s, the private sector entered the space business through public demand-led provision of services for state space activities (e.g. satellite launches and remote sensing activities). By the early 2000s, the private sector had become a significant player in the space business, mainly in rocket development, manufacture and launch. In the early 2000s, space activities by the private sector emerged in the form of 'space access', with venture companies (e.g. SpaceX, Virgin Galactic) enabling low-cost space transport.

Since the 2010s, there has been a structural shift in the space industry, referred to as 'new space', wherein concepts for space utilisation continue to develop based on technological innovations in other fields, such as Big Data, Artificial Intelligence and the Internet of Things. Furthermore, venture companies' new space-related businesses, which are not necessarily dependent on public demand, are booming. As a result, the scale of global space business grew from 261.6 billion USD in 2009 to about 386 billion USD in 2021,¹ a trend experts expect to continue. Indeed, this rapid expansion encompasses new Earth orbit concepts, such as sub-orbital services, and deep space concepts, such as transport and resource exploration on the Moon and asteroids, coinciding with the emergence of private companies in these fields. Of course, national space exploration activities are increasing in line with those of the private sector. Specifically, in 2019, the United States announced the Artemis Program, a grand plan to build a 'gateway' in lunar orbit and then a lunar base to serve as a relay point to Mars. China and India have also conducted lunar exploration in recent years and successfully landed spacecraft on the Moon's surface. The 'Age of Celestial Exploration' is truly arriving; however, accordingly, there is an increasing need for new rule-making to ensure that governments and private companies are conducting

1 2019 Global Space Economy at a Glance; 2021 Global Satellite Industry Revenues (<https://brycetech.com/reports>).

space activities properly and in accordance with relevant international obligations, such as the Outer Space Treaty ('OST').

Japan has long lagged behind other space-faring countries in developing domestic space legislation. However, after enacting the Basic Act on Space² via a 2008 parliamentary bill, Japan caught up with other countries by enacting the Space Activities Act³ and the Remote Sensing Act,⁴ which cover space activities by the private sector. Notably, there have been agile regulatory responses to these new developments in recent years, particularly the adoption of the following legal instruments.

- Guidelines on a License to Operate a Spacecraft Performing On-Orbit Servicing (10 November 2021, the 'OOS Guidelines')
- Act on the Promotion of Business Activities for the Exploration and Development of Space Resources (Act No. 83 of 23 December 2021, the 'Space Resources Act')

This paper introduces the rule-making that the Japanese Government has undertaken in recent years, both domestically and internationally, to promote space business by the private sector and to ensure that space activities, whether by the Government or the private sector, are conducted in compliance with the relevant rules of international law.

2. Guidelines on a License to Operate a Spacecraft Performing On-Orbit Servicing (OOS Guidelines)

2.1. Background

The increasing size and functionality of satellites have inevitably increased the impact of unexpected damage due to malfunctions, and there is now a growing need to repair and refuel orbiting satellites to prolong their lives. In addition, the miniaturisation of satellites and the emergence of constellations further congest space and increase the risk of interference and collisions between space objects, thus increasing the need for space debris mitigation.⁵

With this backdrop of demand, on-orbit services are attracting attention as they enable maximum utilisation of orbiting assets through inspection, repair and replenishment of satellites and active removal of space debris. Accordingly, on-orbit services will continue to commercialize and play an essential role in further promoting the development and use of space.⁶

2 Basic Act on Space (Act No. 43 of 28 May 2008).

3 Act on Launching of Spacecraft, etc. and Control of Spacecraft (Act No. 76 of 2016).

4 Act on Ensuring Appropriate Handling of Satellite Remote Sensing Data (Act No. 77 of 16 November 2016).

5 Cabinet Office of Japan, Sub-Working Group on On-Orbit Servicing, Study Report (in Japanese, 17 May 2021), p. 4.

6 *Id.*

For example, in February 2020, Space Logistics (USA) rendezvoused the MEV-1 satellite, which propels satellites that have exhausted their fuel, with the Intelsat 901 satellite, which was then moved to its designated orbital position and returned to service. In April 2021, a similar rendezvous of the MEV-2 satellite with the Intelsat 10-02 satellite was equally successful.⁷ In Japan, JAXA and Astroscale plan to conduct the Phase 1 mission of the Commercial Removal of Debris Demonstration (CRD2) project in JFY2023, aiming for the world's first large-scale debris removal demonstration.⁸

Such on-orbit services are anticipated to involve deliberate proximity to and even rendezvous with target space objects. This approach is particularly hazardous compared to normal orbital satellite operations, and the risk of causing accidents, such as interference or collision with target objects or third-party satellites, is relatively high. In addition, satellites capable of carrying out such operations are functionally capable of unilaterally approaching other satellites and, in some cases, causing harmful interference.⁹ However, despite on-orbit services being potentially high-risk, no international legal rules regulate such services. Similarly, in principle, the rules for space traffic management (STM) are only contained in treaties, and there are no effective operating rules internationally, as is the case for automobiles and aircraft.

2.2. Deliberation within the Government

In response to the above situation, the Inter-Agency Task Force on Space Debris, a meeting of ministers of relevant ministries and agencies, convened in March 2019 to promote effective efforts based on the trends in the international debate on space debris and the state of response in Japan.¹⁰ Moreover, the Sub-Working Group on On-orbit Services, organised by the National Space Policy Secretariat of the Cabinet Office, has conducted several study meetings since December 2020.¹¹ In May 2021, the Sub-Working Group compiled a report entitled 'Rules for Japan to be Commonly Applied to On-Orbit Services' (the 'Study Report').¹² The Study Report summarised the matters to be implemented by the State and private operators in granting licenses for the control of satellites for on-orbit services in accordance with the Space Activities Act. On this basis, the OOS Guidelines were drawn up on 10 November 2021, setting out the legal, technical and

⁷ *Id.*

⁸ *Id.*, see also, <https://www.kenkai.jaxa.jp/eng/crd2/project/>.

⁹ Sub-Working Group on on-Orbit Servicing, Study Report, p. 4.

¹⁰ https://www8.cao.go.jp/space/english/stm/set_stm_tf.pdf.

¹¹ Mihoko Shintani, "Recent developments in the space business and their impact from a practitioner's perspective.", NBL No. 1203 (October 2021, in Japanese), p. 87.

¹² https://www8.cao.go.jp/space/english/stm/outline_oos.pdf.

organisational requirements for on-orbit service missions to ensure safety and transparency.¹³

2.3. Overview of the OOS Guidelines

The OOS Guidelines provide supplementary requirements applicable to any related procedures, architecture and operation and management plan of servicer spacecraft capable and planned to provide on-orbit servicing in any of the phases below:

Rendezvous

Proximity operations

Final approach and capture

Servicing

Separation

The OOS Guidelines provide the following legal, technical, and organisational requirements.

Legal Requirements

- Prevention of infringement of rights related to the client object
 - Confirmation of title to the object
 - Respect for regulations of the state of registry/license
- Prevention of *ex post facto* interference caused by the client object
- Information disclosures for ensured transparency
 - Notification and reporting of the operation
 - Providing information in emergencies

Technical Requirements

- Study of the architecture of and other information on the client object for assurance
- Architecture of the servicer spacecraft
 - Recognizing the on-orbit state of the object
 - Space situational awareness of the area where rendezvous and other operations are executed
 - Basic principles for approaching trajectories
 - Conditions of not taking a passively safe trajectory
 - Ensuring stable operation during capture and docking
 - Employment of Go/No-go testing at appropriate timings in operations
- Identification of failure modes and risk mitigation
- Safety measures for specific missions (beaming and the release of objects)

¹³ English translation is available at https://www8.cao.go.jp/space/english/activity/documents/guideline_oosgl.pdf.

- Architecture and an operations and management plan for securing the servicer spacecraft control

Organisational Requirements

- Appropriate structure for the operation
- Point of contact for inquiries from related organisations

2.4. Relation to Japan's International Obligations

State's Obligations under the OST

Article VI of the Outer Space Treaty (the 'OST') provides that states party to the Treaty shall bear international responsibility for national activities in outer space, whether such activities are carried out by governmental agencies or by non-governmental entities, and for assuring that such activities conform with the Treaty's provisions.

Article VII of the OST also provides that a Party that launches or procures the launching of an object into outer space and each Party from whose territory or facility an object launches is internationally liable for damage caused by such object to another Party and its natural or juridical persons.

Article IX, the first sentence of the OST, provides for the Parties' obligation to conduct space activities with due regard to the corresponding interests of all other States. The third sentence of Article IX provides that if a Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space would cause potentially harmful interference with the activities of another Party, it shall undertake appropriate international consultations before proceeding with any such activity. The fourth sentence of Article IX provides that a Party with reason to believe that an outer space activity planned by another Party would cause potentially harmful interference with activities in the peaceful exploration and use of outer space may request consultation concerning the activity.

The OST is unclear whether a State's provision or publication of information regarding its space activities is a prerequisite for exercising the Article IX international consultation rights and obligations.

LTS Guidelines

In contrast to the OST, some non-binding international instruments, such as the LTS Guidelines,¹⁴ set forth standards for providing and publishing information regarding space activities. For example, the LTS Guidelines provide for the following standards.

14 United Nations Office for Outer Space Affairs, Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space, January 2021.

- States should ensure that the management of an entity that conducts outer space activities designates a contact point within the entity responsible for communication with relevant authorities to facilitate efficient and timely sharing of information and coordination of potentially urgent measures (A.3, paragraph 4(e))
- States or international intergovernmental organizations should respond to enquiries from other States or international intergovernmental organizations seeking clarification about the registration/non-registration of a space object that could presumably be under the former's jurisdiction or control (A.4, paragraph 4)

2.5. Compliance with International Law and Japan's Intention to Lead International Debate on Rules Applicable to On-Orbit Services

Among the requirements set out in the OOS Guidelines, in particular, the prevention of infringement of rights related to the client object and the technical requirements are considered to reduce the risk of damage associated with on-orbit services and thereby contribute to fulfilling Japan's supervisory responsibilities under Article VI of the OST. In addition, although the requirements of information disclosure and transparency and the requirement of point of contact do not derive directly from the obligations under the OST, they may help facilitate compliance with the consultation obligations under Article IX of the OST and prevent disputes, in line with typical transparency and information provision standards, such as those stipulated in the LTS Guidelines.

The Outline of the Study Report expresses the Government's intention to introduce the contents of the OOS Guidelines to the international community as 'good practice'.¹⁵ Japan expects to contribute to the international debate on international rules for on-orbit services by sharing the OOS Guidelines and its experience applying them.

3. Act on the Promotion of Business Activities for the Exploration and Development of Space Resources

3.1. Background

As noted, countries' lunar and celestial exploration activities have intensified recently, including the USA's Artemis Program (announced in March 2019), driven partly by the potential existence of *in situ* usable water. In addition to potability, the hydrogen and oxygen extracted from lunar water could fuel transport spacecraft and rovers travelling on or from the Moon, enabling rapid deployment of exploration activities. The potential of such lunar

15 On the Study Report by the Sub-WG on On-Orbit Servicing (Released on 17 May 2021), available at https://www8.cao.go.jp/space/english/stm/outline_oos.pdf.

resources has led to the emergence of iSpace (Japan) and other venture companies aiming to develop lunar resource businesses.

Outer space, including celestial bodies such as the Moon, is a public international area beyond the territorial sovereignty of any one country. Governance is, therefore, necessary to avoid overexploitation by the pioneer states, deterioration of the space environment and adverse effects on the exploration programmes of other countries. Furthermore, from the standpoint of private operators aiming to develop space resources, it is essential to establish basic and clear rules. Without such rules, what constitutes permissible business activities will not be clear, hampering the business environment's predictability and creating a serious barrier for private operators.

In 2015, the US enacted the Commercial Space Launch Competitiveness Act (in force November 2015), the first law to regulate private space resource exploitation. In 2017, Luxembourg also enacted a law on the exploration and exploitation of space resources, which covers private space resource exploitation.¹⁶

The US law grants US citizens the right to possess, own, transport, use and sell commercial asteroid and other space resources in accordance with the international obligations owed by the US.¹⁷ The Luxembourg law also allows for the acquisition (*appropriation*) of space resources by private persons for commercial purposes¹⁸ but further provides for a licensing procedure for the exploration or utilisation of space resources and specifies in detail the license requirements.

In addition, in December 2019, the United Arab Emirates enacted a law stating that space resource exploration, exploitation and utilisation are under government regulation and supervision.¹⁹

3.2. Legislative History of the Space Resources Act20

The movement towards enacting space resources legislation in Japan began on 12 December 2019, with the establishment of a working group on space legislation and treaties under the Liberal Democratic Party's Special

16 Loi due 20 Juillet 2017 sur l'exploration et l'utilisation des ressources de l'espace.

17 US Section 51303.

18 The explanatory document of the law clarifies that appropriation of space resources does not breach the OST. (See, *Projet de loi sur l'exploration et l'utilisation des ressources de l'espace*, (https://www.cc.lu/fileadmin/user_upload/tx_ccavis/4755_Exploration_et_utilisation_des_ressources_de_l_espace_PL_4755GKA_ZLY.pdf).

19 Space Sector Law (Federal Law No. 12 of 2019 on the Regulation of the Space Sector), Article 4(i)(j), Article 18.

20 See, Takayuki Kobayashi and Keitaro Ohno, "Enactment of Space Resources Act", NBL No. 1203 (October 2021, in Japanese), pp. 74-80; Mr. Kobayashi and Mr. Ohno were Japanese Diet members who led the drafting of the Act. See also, Saadia M. Pekkanen, Setsuko Aoki and Yumiko Takatori, "Japan in the New Lunar Space Race" Space Policy (available online 17 August 2023), p. 6.

Committee on Space and Ocean Development. One of the objectives of the working group was to 'develop legislation to recognise ownership rights with regard to the 'development and use' of space resources'.

Unlike the Space Activities Act, which was drafted and submitted to the Diet by the Cabinet, the Space Resources Act was a parliamentary act (i.e., drafted by Diet members and submitted to the Diet by the Diet members). In Japanese legislative practice, it is important to obtain the support of as many political parties as possible, regardless of whether they are ruling or opposition, before discussing parliamentary bills. To this end, discussions took place in the non-partisan Parliamentary Council for the follow-up to the Basic Act on Space (2008), and hearings were held with external experts and private-sector stakeholders, leading to agreement on the draft text of the legislation in September 2020. In June 2021, the bill passed the House of Representatives and the House of Councillors with a majority of votes in favour, passing into law and making Japan the fourth country with legislation on the exploration and exploitation of space resources.

3.3. Provisions of the Space Resources Act

The Space Resources Act aims to promote business activities related to exploring and exploiting space resources by private operators while ensuring the precise implementation of the international treaties on the use of space. Necessarily, it establishes special provisions for licensing the management of space objects for exploration and exploitation of space resources and the acquisition of ownership rights to space resources, per the basic principles of the Basic Act on Space²¹ (Article 1).

The Space Resources Act, like previous legislative examples of other countries, places the exploration and exploitation of space resources by private parties under a government licensing system via the Space Activities Act. It also considers the rules formed through international discussions up to its passing, such as the international disclosure of information on resource exploitation activities. Further, it specifies the responsibility of the State to carry out international coordination when necessary.

Special Rules for Licenses

Article 3 of the Space Resources Act stipulates that the operation of spacecraft for exploration and development of space resources must be authorised under Article 20(1) of the Space Activities Act and that a 'business activity plan' must be submitted in addition to the matters listed in Article 20(2) of the Space Activities Act. Specifically, the plan must include:

21 Such basic principles include: peaceful use of outer space; improvement of citizen's lives; advancement of industry; development of human society; international cooperation; and consideration for the environment (Articles 2-7 of the Basic Act on Space).

- (i) the purpose of the business activity;
- (ii) the duration of the business activity;
- (iii) the location where the exploration and development of space resources is to be conducted;
- (iv) the methods of exploration and development; and
- (v) other details of the business activity.

The Prime Minister is to grant a license after confirming:

- (i) the business activity plan is in line with the basic principles of the Basic Act on Space;
- (ii) there is no risk of interference with the proper implementation of the various international treaties and the maintenance of public safety; and
- (iii) the applicant has sufficient capacity to carry out the business activities.

For example, the licensing requirements are unfulfilled if the acquired space resources are for anything other than peaceful purposes (such as industrial promotion), the duration or scope is problematic from the perspective of international cooperation, space mining-like activity will spread debris in space, or there is insufficient technical or financial capacity.²²

Public Announcement

Article 4 of the Space Resources Act stipulates that when the Prime Minister grants a license for the exploration and development of space resources, he/she shall, in principle, make public through the internet or other means the mission or name of the person granted the license and the matters described in their business activity plan. This requirement is because the drafters consider disclosing such information contributes to international cooperation by preventing conflicts involving overlapping development locations.²³ However, a Cabinet Office Ordinance provides that in cases where the publication of an entire business activity plan, including things such as trade secrets, is likely to cause unjustified harm to a business operator's interests, all or part of the plan may be withheld from being publicly notified.

Space Resources Ownership Acquisition

Article 5 of the Space Resources Act stipulates that a private operator who mines space resources in accordance with the provisions of an approved business activity plan acquires ownership of such resources by taking

²² Kobayashi and Ohno, p. 78.

²³ *Id.*

possession of them with the intention of owning them. This clause intends that recognizing private rights to space resources increases predictability for operators and encourages more private operators to participate in space resource activities.²⁴

As discussed later, this point raises the issues of consistency with Article 2 of the OST and whether it is possible to recognise ownership rights under Japanese law over outer space resources (which currently lie outside the sovereignty of any State).

Japanese conflict of laws stipulates that the law of the place where an object is located shall apply to the acquisition of rights over the object.²⁵ However, no country can claim sovereignty over outer space or celestial bodies, so this stipulation is not helpful. In cases such as this one, the law to be applied is to be determined based on 'natural reason', but the drafters considered that for business activities authorised by the Space Resources Act and the Space Activities Act, the law of Japan, which authorises such activities, should be generally applied as the law of the place most closely connected to the activities.²⁶

Implementation of International Agreements

Article 6 of the Space Resources Act emphasises that the law's implementation should not hinder the faithful fulfilment of treaty obligations and other international commitments entered into by Japan nor unjustly harm the interests of other States.

This deliberate emphasis on compliance with international commitments harks from the perspective of preventing the interests of developing countries, which do not currently have space capabilities, from being undermined by the unregulated development of space resources in the absence of international rules for the development of space resources.²⁷

Establishment of International Systems and Securing Coordination

Article 7 of the Space Resources Act requires the government to:

- (i) endeavour to establish internationally harmonised systems for the exploration and development of space resources in collaboration with foreign governments by cooperating with international organisations and other international frameworks;
- (ii) take necessary measures to ensure the advancement of international information sharing, measures for international coordination and

²⁴ *Id.*

²⁵ Article 13 of Act on General Rules for Application of Laws (Act No. 78 of 21 June 2006).

²⁶ Kobayashi and Ohno, p. 78.

²⁷ *Id.*, p. 79.

other international alignment concerning business activities by private businesses related to the exploration and development of space resources.

According to the drafters of the Space Resources Act, the purpose of Article 7 is to demonstrate to the international community that Japan is willing to take the initiative, including in the development of domestic laws, in order to respond to an urgent need to formulate fair and harmonious rules, from the perspective of deterring uncontrolled development by predecessors and preventing undue harm to the interests of other countries, in the absence of international consensus. They also explain that information sharing promotes the prevention of disputes and the expectation of peaceful consultation in dispute resolution.²⁸

Reviews (Supplementary Provisions)

Under Article 4 of the Space Resources Act Supplementary Provisions, the Government must conduct reviews, including fundamental reconsideration of the perspectives of the legal system, taking into account the state of this act's implementation, the state of progress in science and technology, and the state of efforts to establish an international system. It also requires the government to take necessary measures, including establishing legislation based on the results of such a review.

Article 4 of the Supplementary Provisions reflects the principles of 'adaptive governance', which envisions incremental regulation of space resource activities and appropriate timing.²⁹

3.4. Balance between International Coordination and Promotion of Private Space Resource Activities

As we have seen, the Space Resources Act aims, on the one hand, to increase predictability for operators and investors and promote the industry by recognising the acquisition of ownership rights over space resources acquired by operators, as in the laws of the USA and Luxembourg. On the other hand, the Space Resources Act differs from those laws in that it contains some provisions for international coordination with other countries' space activities or interests and compliance with international obligations. This unique feature of the Space Resources Act stems from the international discussion on rules and frameworks governing space resource development at the time of the drafting of the legislation.

²⁸ *Id.*, p. 79.

²⁹ Olavo de O. Bittencourt Neto, Mahulena Hofmann, Tanja Masson-Zwaan and Dimitra Stefoudi (Eds.), *Building Blocks for the Development of an International Framework for the Governance of Space Resource Activities: A Commentary* (Eleven International Publishing, 2020), p. 32.

State of Discussions Regarding the International Rules and Framework Governing Space Resource Activities

Article II of the OST prohibits national appropriation of outer space, stating: 'Outer space [...] is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.' However, there is no provision in the OST regarding acquiring resources on celestial bodies.

On the other hand, the Moon Agreement³⁰ stipulates that natural resources on all celestial bodies in the solar system other than the Earth fall under the common heritage of mankind (Article 11.1) and denies ownership rights over pre-mined natural resources (Article 11.3). It also states that the exploitation of natural resources is to be carried out through the establishment of an international regime (Article 11.5). Therefore, under the Moon Agreement, States or private persons are not free to develop and acquire space resources but must establish an international regime and then develop them under that international regime. However, as of 1 January 2023, only 18 countries were party to the Moon Agreement (Japan has not signed yet), and no such international regime exists.

Legislations in the US and Luxembourg have stimulated international debate on the development of space resources and their compatibility with international law, including the OST. The first discussion on space resource exploitation occurred at the 56th session of the UNCOPUOS Legal Sub-Committee in April 2017. However, a substantial number of members expressed concerns about the US and Luxembourg legislations, such that they allowed for a first-come-first-served situation, amounted to unilateral attempts to promote their own industries, or could amount to a claim of sovereignty or territoriality in outer space, actions prohibited under the OST.³¹

Although such criticisms abated in the 57th Session in April 2018, the international community was far from having developed a common understanding of what exploration, development and utilisation activities are permissible under existing international law, including the OST, and on what conditions. In June 2021, the UNCOPUOS Legal Sub-Committee decided to establish a working group on space resources,³² but the working group's discussion results will likely take a long time to materialize.

The Hague International Space Resources Governance Working Group

Apart from the above-mentioned discussions at the UN, in 2015, the Hague International Space Resources Governance Working Group (the 'Hague WG') organised to scrutinise the need for a regulatory framework applicable to the

30 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (1984).

31 A/AC.105/1122, paras. 34, 50, 250, 241.

32 A/AC.105/C.2/L.314/Add.8.

exploitation of non-living resources on celestial bodies and provide a basis for international discussion for the development of such an international framework. The Hague WG examined the legal framework for the proper development of space resources with the participation of voluntary multi-stakeholder groups, including government agencies, space agencies, international organisations, academics and businesses from various countries. As a result of its deliberations, the Hague WG adopted and published the Building Blocks for the Development of an International Framework for the Governance of Space Resource Activities (the 'Building Blocks').³³

The Hague WG's Building Blocks propose principles and elements of the international framework that will enable the realisation of space resource development. In relation to Japan's Space Resources Act, it is worth noting that they set out the following principles.

First, Building Blocks advocates the principle of 'adaptive governance'. In other words, to avoid stifling the development of space resource industries, excessive regulation prior to industry or technology establishment is undesirable, and consideration should be given to regulation content as technologies and business models evolve (Introduction, 4.2(a)).³⁴

Second, Building Blocks encourages States, international organisations and non-governmental entities to consider and use the Building Blocks, pending the adoption and operationalisation of an international framework (Introduction).

Building Blocks further provides specific elements of rules that the international framework should provide for, including the following.

- The international framework should ensure that resource rights over raw mineral and volatile materials extracted from space resources can lawfully be acquired through domestic legislation, bilateral agreements or multilateral agreements (8.1).
- The international framework should enable the attribution of priority rights to an operator to search for and recover space resources for a maximum period and a maximum area (7), and the international framework should provide that States shall register such priority rights and give advance notification of space resource activities (14 a, b).

Reference to the Building Blocks in the Drafting of the Space Resources Act

As noted above, during the drafting of the Space Resources Act, UN discussions on an international framework for space resource development had just begun. On the other hand, private companies in Japan, such as iSpace, planned to carry out space resource exploration and exploitation.

³³ <https://www.universiteitleiden.nl/binaries/content/assets/rechtsgeleerdheid/instituut-voor-publiekrecht/lucht-en-ruimterecht/space-resources/bb-thissrwwg-cover.pdf>.

³⁴ See also, Bittencourt Neto et al., p. 32.

From the perspective of ensuring predictability for such private operators, there was a growing need to develop domestic legislation. Under these circumstances, the Space Resources Act provided for business activity information sharing (Article 4) and consideration of the interests of other countries (Article 6) to facilitate coordination with other space activities. It is noteworthy that the Building Blocks were referred to when considering the content of the provisions of the Space Resources Act.³⁵ For example, the provision on announcement of business activity information refers to the provisions on information sharing in the Building Blocks, but given there is no international registration system, information sharing in the form of publication of information on business activities was provided to prevent disputes due to overlapping business activity locations. The drafters of the Space Resources Act referred to the Building Blocks, which were the only outcome of international discussions available at the time of drafting, to the extent possible to ensure that the content of the Space Resources Act would not be significantly at odds with the international framework that would be formed in the future, even though international discussions at the UN were still at a very early stage.

Way Forward

On 4 November 2022, after the entry into force of the Space Resources Act, iSpace was granted a licence for its business plan (including to collect regolith on the Moon).³⁶ Article 7 of the Space Activities Act stipulates that the Japanese Government shall make efforts to establish an international system, which expresses Japan's will to actively contribute to discussions on establishing such a system in the international arena based on its experience in operating the Space Resources Act.

4. Participation in International Instruments

4.1. Overview

In addition to domestic legislation, Japan has actively developed international instruments for exploring the Moon and other celestial bodies.

4.2. Memorandum of Understanding Concerning Cooperation on a Civil Lunar Gateway

In October 2019, the Strategic Headquarters for National Space Policy decided to join the Civil Lunar Gateway (the 'Gateway') in response to an invitation from the United States. This decision led to international

³⁵ See, Takayuki Kobayashi and Keitaro Ohno, *Commentary on Space Resources Act* (Daiichi-Hoki, 2022, in Japanese), p. 127-143.

³⁶ Licence number 22-019 (4 November 2022), available at <https://www8.cao.go.jp/space/application/resource/application.html>.

coordination to develop a legal framework for cooperation. The new MOU for cooperation based on the current ISS Intergovernmental Agreement (the 'IGA') relied on positioning the Gateway as a relay point to a permanent lunar base concept as an evolving form of ISS cooperation. Following diplomatic discussions, the European Space Agency, the Government of Canada and the Government of Japan³⁷ each signed an MOU with NASA or the Government of the United States starting from October 2020. The MOUs stipulate the necessary agreements to promote cooperation, including the division of responsibilities of each international partner and management mechanisms for development, operation and utilisation, while the provisions of the IGA will apply to key legal matters.³⁸

Like the ISS in Earth orbit, the Gateway in lunar orbit is not subject to the territorial sovereignty of any State. With the ISS, the State that registers a space object launched into outer space under the OST retains jurisdiction over the object and its crew. Based on that jurisdiction, the authority to extend de facto control over the associated space objects and persons is internationally guaranteed. For the Gateway, each party also registers the elements it provides and retains jurisdiction over them (Article 5.2). On the other hand, for personnel on the Gateway, as with the ISS, the OST principles were modified to state that each State would retain jurisdiction over its nationals. The IGA also provides for the exercise of jurisdiction. In particular, concerning criminal matters, the IGA stipulates the order in which countries may exercise jurisdiction, considering the nature of the manned base and the crimes that may be committed. Specifically, it stipulates that the country of nationality of the suspect may give priority to other countries in criminal prosecutions. In addition, given the current increase in space traveller visits to the ISS, the MOU provides that each party is required to consult the Gateway Multilateral Coordination Board regarding criminal jurisdiction when allowing nationals other than their own to board the Gateway (Article 13.2), in order to provide clarity on the exercise of criminal jurisdiction.³⁹

4.3. Artemis Accords

On 14 October 2020, eight countries,⁴⁰ including Japan and the United States, signed the Artemis Accords. Although not legally binding, the agreement establishes principles and guidelines to strengthen the discipline of exploration and use of space in support of the Artemis program.

37 Memorandum of Understanding between the Government of Japan and the National Aeronautics and Space Administration of the United States of America concerning Cooperation on the Civil Lunar Gateway (signed on 28 December 2020).

38 Masahiko Sato and Daisuke Saisho, "Laws on Space Exploration and Space Resources Development" (Hogaku-Kyoshitsu, February 2022, in Japanese), pp. 55-56.

39 *Id.*

40 Japan, United States, United Kingdom, Canada, Italy, Australia, Luxembourg and United Arab Emirates.

The Artemis Accords reaffirm the basic principles of the OST and establish new principles focused on activities on the Moon and other celestial bodies. First, with regard to space resources, it confirms that the extraction of space resources does not inherently constitute national appropriation under Article 2 of the OST (Article 10.2). Second, conflicts of interest between states over the limited space of usable land on the Moon must be considered. As a countermeasure, it establishes a safety zone, further strengthening the duty of due regard and the obligation to consult in the event of potentially harmful interference, as provided for in OST Article 9, and avoiding harmful interference.

In addition, the Artemis Accords include shared values that are important for the conduct of activities, such as peaceful purposes and transparency (Sections 3 & 4), as well as the maintenance of interoperability (Section 5), which is essential for the safe and reliable conduct of exploration, emergency assistance to astronauts (Section 6), registration of space objects (Section 7), preservation of heritage of historical significance (Section 9), and the prevention of harmful debris in orbit around the Moon and other bodies (Section 12).

As of September 2023, there are 25 parties to the Artemis Accords.⁴¹ Although the Artemis Accords are not legally binding, they likely will see incorporation into national legal licensing criteria and cooperation framework agreements between the parties or be referenced in drafting a universal treaty to be adopted by the United Nations.

4.4. Japan-US Framework Agreement for Cooperation in the Exploration and Use of Outer Space⁴²

On 13 January 2023, the United States and Japan resolved a long-standing issue by signing the Framework Agreement for Cooperation in the Exploration and Use of Outer Space (the 'Framework Agreement'). It entered into force in June 2023 after domestic procedures in both countries. This Framework Agreement sets forth the basic terms and conditions for Japan-U.S. space cooperation for peaceful purposes.

The preamble of the Framework Agreement cites both the Artemis Accords and the Gateway MOU. The Framework Agreement also includes some elements of the provisions in the Artemis Accords, such as the mitigation of orbital debris (Article 15) and the preservation of historical sites (Article 16). The Framework Agreement is the first treaty that incorporated part of the Artemis Accords into a legally binding instrument in the Japan-US bilateral context.

⁴¹ <https://www.nasa.gov/specials/artemis-accords/index.html>.

⁴² Framework Agreement between Government of Japan and the Government of the United States of America for Cooperation in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, for Peaceful Purposes.

5. Conclusion

As explicated above, at the domestic level, Japan has recently responded to industry needs by introducing timely regulations covering new areas of the space industry (i.e., on-orbit services and space resource development). At the international level, Japan has actively participated in international instruments that form the basis for lunar exploration projects. The Government has expressed in legislation and in the rule-making process its policy to participate actively in the international debate on rule-making. In order to achieve a sustainable environment for lunar exploration in the future, Japan will actively participate in bilateral and multilateral rule-making based on the experience gained from the operation of its domestic rules.

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