

Can Japan Launch Itself into Becoming a Leader in Global Space Business with Its New Space Legislation?

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Abstract

On November 2016, the Japanese Diet passed the Space Activities Act (“SAA”) and the Satellite Remote Sensing Act in an effort to modernize its domestic space legislation and encourage its small but growing private sector to become global leaders in burgeoning new types of space business. This paper will examine whether it is feasible for these new laws to propel Japan enough to catch up with current market leaders such as SpaceX in the United States. The paper will have three parts. First, the paper will outline the legal regime that applies to the Japanese space industry. Second, the paper will analyze the impact of Japan’s new space legislation and provide a comparative analysis of how they measure up to other space-faring nations’ space laws. The paper will find that various aspects of Japan’s new space laws have great potential to attract significant foreign space business to be conducted in Japan. The third part of the paper examines whether the country’s economy can take advantage of these new legal developments and spur growth among startups. This article discusses how the Silicon Valley model may not be compatible with the financial culture in Japan. After examining how currently thriving startups are financed by corporate investments, the paper concludes that corporations need to finance space startups in more traditional forms of financing in Japan in order to infuse capital into the space industry. Drawing from legal and financial experts, this paper concludes that both legal and financial aspects are coming together for Japanese private space business. Depending on the industry’s momentum, the SAA may launch Japan to become globally competitive in the near future.

Keywords: Japan, Space Startups, Space Activities Act, New Space Business, Venture Capital

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I. Introduction

As private enterprises such as SpaceX are making remarkable advances in the space industry in the 21st century, ventures that seemed like science fiction such as space tourism and asteroid mining are beginning to seem like a real possibility. Over the last decade, numerous countries have enacted legislation to try and encourage local “new space” business by creating a legal framework where private enterprises can conduct business in the space industry while complying with international law. On November 16, 2016, the Japanese Diet took a big step forward by following suit and enacting two pieces of legislation that seek to advance the global positioning of Japan’s space industry: the Space Activities Act (“SAA”) and the Satellite Remote Data Sensing Act (“Two New Space Laws”). In particular, one of the express goals of the SAA is to better the everyday lives of Japanese citizens through the economic development of Japan’s space industry.¹ This paper will discuss the impact of the Two New Space Laws and provide an overview of the current status of Japan’s private space industry.

Section II of this paper will provide an overview of the legal framework of Japanese space law by discussing its international obligations, its unique historical development, and the significance of the Two New Space Laws. Section III will then briefly survey other countries’ national space legislation and how the Two New Space Laws position Japan in a position where it could have a competitive advantage from a legal perspective for cross-border space business. Finally, Section IV will address the financing issues that Japan faces by: providing a snapshot of how financing works for Japan’s space industry currently; describing why the Silicon Valley venture capital model is incompatible with Japan; and highlighting how Japan has begun to rely on its traditional forms of corporate financing to support ventures that have the potential to take Japan to a globally competitive level.

II. Legal Framework of Japanese Space Law

In order to understand the significance of the Two New Space Laws that were passed to bolster Japan’s Space Industry, it is important to understand the legal history (or lack thereof) of how space law in Japan developed. Furthermore, it also becomes necessary to understand the international obligations that Japan has assumed and how its national legislation needs to conform to their restrictions. This section will start with an overview of international space law applicable to Japan and then discuss the legal history of Japanese space law over the last half century. Upon establishing this

1 Jinkoeiseitou no Uchiage oyobi Jinkoeisei no Kanri ni Kansuru Houritsu [Act Regarding the Launching of Satellites, Etc. and Management of Satellites (commonly referred to as the “Space Activities Act”)], Law No. 76 of 2016, art. 1 (Japan) (hereinafter, “SAA”).

background, this section will then analyse the Two New Space Laws in detail from the perspective of how they have the potential to encourage the development of Japan's space industry.

A. International Space Law Applicable to Japan

As a threshold issue, it is worth looking at how Japanese law regards international obligations from treaties that it ratifies. Article 98 of the Japanese Constitution states that “[t]he treaties concluded by Japan and established laws of nations shall be faithfully observed.”² In an official report regarding how Japanese law considers treaties, the Japanese Diet has interpreted the clause, “laws of nations,” to mean customary international law.³ In defining customary international law, the Japanese Diet cites the International Court of Justice's definition from Article 37(1)(b) – “international custom, as evidence of a general practice accepted as law” as demonstrated by state practice and *opinion juris*.⁴ As opposed to a dualist system, the Japanese Diet states that Japanese domestic laws take a monist approach in incorporating treaties into its legal system.⁵ Pursuant to Article 98 of the constitution, the Japanese Diet opines that customary international law should be binding to the same extent as domestic law in Japan.⁶ Treaties require the additional step of obtaining the approval of the Diet. However, once the Diet approves the treaty, it automatically has the same effect as national legislation would and becomes binding.⁷ When there is a conflict between a treaty and Japanese domestic laws, the Japanese Diet states that it depends on the nature of the treaty.⁸ Generally, domestic legislation may supersede treaties when the nature of treaties are political and economic. However, if the treaty relates to the establishment of international standards or to international peace and security (like most space treaties), then the treaty would supersede domestic legislation.

Japan has ratified four space treaties. Japan acceded to the Outer Space Treaty (“OST”) in 1967. Then, in 1983, it ratified the Convention on International Liability for Damage Caused by Space Objects (“Liability Convention”), the Convention on Registration of Objects Launched into

2 Constitution of Japan, art 98(2) (3 November 1946).

3 Shugiin Kenpo Chosakai Jimukyoku [House of Representatives Constitutional Law Investigation Committee], Kenpo to Kokusaiho (toku ni jinken no kokusaiteki hosho) ni kansuru kisotekishiryō [Fundamental materials regarding Constitutional Law and International Law (especially, international protection of individual rights)] (22 Apr 2004), 5 <[http://www.shugiin.go.jp/internet/itdb_kenpou.nsf/html/kenpou/chosa/shukenshi050.pdf/\\$File/shukenshi050.pdf](http://www.shugiin.go.jp/internet/itdb_kenpou.nsf/html/kenpou/chosa/shukenshi050.pdf/$File/shukenshi050.pdf)> accessed 24 June 2018.

4 Ibid.

5 Ibid 7.

6 Ibid 9.

7 Ibid 10.

8 Ibid 17 – 18.

Outer Space (“Registration Convention”) and the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (“Rescue and Return Agreement”). Notably, Japan has not signed the Moon Agreement.

The OST and the Liability Convention are relevant to the issues discussed in this article. Primarily, under Article VI of the OST, Japan has a duty to supervise all non-governmental space activities that occur within its borders and by its citizens.⁹ Article VII of the OST and the Liability Convention provide teeth to this obligation by holding the launching state liable against other states for any damage it causes so long as such damage is not caused by gross negligence or intentional conduct by the claimant state¹⁰ Also, under Article VII of the Liability Convention, any liability that would otherwise have been incurred by private citizens shifts to the state. This provides significant impetus for states that are parties to these treaties to draft national legislation that provides a framework to regulate non-governmental actors to conduct space activities. On December 16, 2013, the UN General Assembly passed a resolution that are Recommendations for National Legislation (“UN Recommendations”) relating to space legislation. While these recommendations are non-binding,¹¹ they provide a general framework of what national space legislation should ideally include and address. The UN Recommendations suggest that the scope of national legislation should address subjects such as appropriate regulations of launching objects into and back from outer space, operation of a launch or re-entry, operation and control in orbit, design and manufacture of spacecraft, application of science and technology, exploration activities and research.¹²

B. Development of Japanese Space Legislation

Despite Japan’s space activities commencing in 1955 with the launch of the pencil rocket, Japan never had its own domestic space legislation until 2008. According to a study enacted by a special working group in 1976, there were three reasons why Japan did not enact domestic legislation at the time it acceded the international space treaties: (1) rockets that are launched in Japan are owned and operated by the government; (2) telecommunication activities are also conducted by the government; and (3) Japan does not have

9 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Res 2222 (XXI) (1966) (“OST”), Art. VI.

10 Ibid art VII; Convention on International Liability for Damage Caused by Space Objects, Res 2777 (XXVI) (1971) (“Liability Convention”).

11 Recommendations for National Legislation Relevant to the Peaceful Exploration and Use of Outer Space, A/C.4/68/L.2 (2012), preamble para 4 <http://www.unoosa.org/pdf/limited/c2/AC105_C2_2012_CRP19E.pdf> accessed 23 June 2018.

12 Ibid para. 1.

any plans for human space activity.¹³ Regardless of the foregoing, Japan still manufactured rockets and satellites for governmental missions. However, in 1990, Japan signed the US-Japan Satellite Procurement Agreement of 1990 (“1990 Procurement Agreement”) with the United States.¹⁴ This agreement required Japan to open any procurement bids for production of its domestic satellites to foreign satellite manufacturers.¹⁵ Until this agreement, Japan had largely protected its satellite business from foreign trade. After global pressure, this agreement opened up the satellite business with an extreme requirement that foreign producers must be allowed to bid on any satellites not used entirely for research and development.¹⁶ Given the competitive pricing that foreign bidders brought to the table, what was set to become a riveting market for Japan disappeared and became import-reliant. The consequences of entering into this agreement lingers even today given how the majority of Japanese satellites and satellite parts are U.S.-made. However, all was not lost. Given that the 1990 Procurement Agreement excluded R&D, Japanese businesses have invested significant time and effort into satellite technology. For example, companies such as MELCO, Mitsubishi Heavy Industries (“MHI”) and IHI Aerospace have obtained numerous global patents regarding satellite technology.¹⁷ Given the foregoing, Japan’s space efforts in the late twentieth century primarily focused on governmental missions that support foreign operations (such as the ISS) and R&D.¹⁸ However, the landscape began to change in July 1990 when a company called Rocket System Corporation (“RSC”) began to jointly manufacture rockets with NASDA (the former Japanese governmental space agency). NASDA supervised RSC as the company controlled the mechanics for various rocket launches. In 1996, RSC obtained commercial launch service contracts from two US satellite manufacturers. Given that it was a private actor that was awarded the contract, this posed some compliance issues under the OST and the Liability Convention.¹⁹ In order to satisfy these treaties, the following issues were discussed: (1) who should have to pay for damages caused by a space object to the Japanese government or to an individual citizen; (2) how should liability be allocated among governmental agencies and RSC; and (3)

13 Setsuko Aoki, “Uchohou no Doukou: Uchu Nihou wo Chushin ni” [Movement of Space Laws: Centered around the 2 Space Laws] Keio University Law School (25 Oct 2017), slide 12.

14 Aoki [4], 368.

15 Agreement on Satellite Procurement, Us-Japan (15 June, 1990) <http://stage.tksc.jaxa.jp/spacelaw/world/1_05/05.E-4.pdf> 24 June 2018.

16 Robert D. Hershey Jr. ‘A Basic Pact on Satellites with Japan’ *NYTimes* (4 Apr 1990) <<https://www.nytimes.com/1990/04/04/business/a-basic-pact-on-satellites-with-japan.html>> accessed 25 June 2018.

17 DBJ Report [13] 75.

18 Aoki [4] 366-68.

19 Ibid 398-99.

what should be the conditions for RSC to be able to obtain a launch license. In 1998, the NASDA law was amended to include third-party liability and insurance requirements to address some of these concerns. Launching parties were required to purchase insurance to assure that appropriate compensation would be provided to the victims without a trial and the victims would not have to prove that NASDA or the non-governmental entity was at fault.

Shortly thereafter, JAXA was formed on October 1, 2003. Keeping the RSC situation in mind, the Law Concerning the Japan Aerospace Exploration Agency (“JAXA Law”) contained various provisions that facilitate consignments of space activities to private actors. Drawing from the recent amendments to the NASDA Law, Article 21 of the JAXA Law requires third party liability insurance with certain mandatory caps – for example, \$200 million for H-II rocket launches. Article 21(3) further allows third party consignors (private actors) to enter into such insurance contracts in cases where launches were consigned to private parties. Importantly, Article 22 then further elaborates on how consignment contracts work. JAXA can enter into special arrangements with a private entity upon obtaining ministerial approval regarding the scope of liability for potential damages from the consigned launch. Article 22 also states that JAXA and the consignors will assume joint and several liability for the consigned launch.

Meanwhile, in 2001, the Council for Science and Technology Policy (CSTP), an advisory governmental entity, was established by the Prime Minister. In May 2002, the CSTP had recommended that the H-IIA rocket, Japan’s primary large-scale launch vehicle, be privatized.²⁰ After public bidding, MHI was selected to become the sole contractor for H-IIA launch services, including manufacturing and operating the H-IIA rocket. A consignment contract was signed between JAXA and MHI pursuant to Article 22 of the JAXA Law. MHI then signed launch services contracts with the end-user that wished to launch satellites via the H-IIA rocket. MHI further entered into manufacturing contracts with other aerospace component manufacturers and suppliers. While MHI seems to be conducting most of the business related to building the rocket, the prerequisite administrative approvals allowed for the consignment arrangements (along with JAXA’s supervision) to substantively comply with the OST Article 6 requirement. Through this scheme, Japan was initially able to consign space activities to private actors without passing domestic space legislation even with private actors entering the space industry. Starting around 2006, JAXA began shifting more responsibilities to private companies like MHI and IHI Aerospace for consigned launches.

As these consignments were occurring, since 2005, various organizations such as the Study Group to Design a National Space Strategy and the Liberal Democratic Party (“LDP”)’s Space Development Special Committee had been advocating that domestic space legislation be passed so private companies

20 Ibid 399.

could independently conduct launches. This spurred the country's ruling coalition parties to form a project team in November 2006, which resulted in a draft bill to be submitted to the House of Representatives on June 20, 2007.²¹ After some political debate, the June 2007 bill was withdrawn on May 9, 2008 and a stronger bipartisan bill was proposed. With these efforts, the Basic Space Act was promulgated on May 21, 2008 and became effective on August 27, 2008.

The purpose of the Basic Space Act was to “comprehensively and systematically promote Japan's space development and use in order to improve lives of its citizens and promote national economic development, international peace and welfare of humankind.”²² Notably, the Basic Space Act did not yet provide a framework for private, commercial launches of space objects. Rather, it created an obligation for the government to draft such legislation in the near future. The Basic Space Act further obligates the government to carry out space development and use in accordance with international space treaties as well as the constitutional requirement of pacifism.²³ The main substance of the Basic Space Act sets forth certain core basic principles that should be followed in implementing basic measures that maintain and improve space infrastructure including satellite networks as well as autonomous launching capabilities.²⁴ The law further created a Strategic Headquarters for Space Development, which enacted a Basic Plan for Space Policy on June 2, 2009. This served as a guidepost for the relevant actors to draft another piece of legislation that would provide a more detailed legal framework for private space companies to operate in the near future – the SAA. While the SAA was being drafted, JAXA continued to supervised consigned private parties pursuant to Article 22 of the JAXA Law, in order to comply with Article VI of the OST. During this period, any “joint launches” between JAXA and private companies were *de facto* Article 22 consignments.

21 Aoki [4] 383.

22 Uchu Kihon Ho [Basic Space Act], Law No. 43 of 2008 (Japan) (“Basic Space Act”), art 1 <<http://stage.tksc.jaxa.jp/spacelaw/country/japan/27A-1.E.pdf>>, accessed 24 June 2018.

23 Constitution of Japan, art 9 [“Aspiring sincerely to an international peace based on justice and order, the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international disputes. In order to accomplish the aim of the preceding paragraph, land, sea, and air forces, as well as other war potential, will never be maintained. The right of belligerency of the state will not be recognized.”]; Basic Space Act art 2.

24 Basic Space Act, arts 13, 15.

C. Space Activities Act

1. Basic Overview of the SAA

After much deliberation, the SAA was promulgated on November 16, 2016 and is to be implemented on November 15, 2018. The SAA has the following three goals: (1) clarify the rules for space activities and encourage new players from the private sector to enter the space industry; (2) create reasonable approval and monitoring procedures and secure global competitiveness for private actors; and (3) nullify liability risks for third parties involved in satellite launches so as to encourage foreign actors to engage in business with the Japanese space industry.²⁵ Article 4(1) of the SAA sets forth that private actors must obtain the approval of the Prime Minister in order to launch satellites as well as rockets that launch satellites into outer space, which creates a system of government supervision that satisfies Article VI of the OST. Article 4(2) and additional instructions from the Cabinet Ordinance for Enforcement of the Space Activities Act (“Enforcement Ordinance”) set forth the requirements of how companies can apply for launch approval.²⁶ Applications for launching space objects began to be accepted by the Cabinet Office on November 15, 2017.²⁷

The SAA sets forth licensing schemes for: the designs of the rocket types that can be launched within Japan²⁸; launching facilities²⁹; and satellite management.³⁰ While the technical requirements of each of these licenses are outside the scope of this paper, it can be said that each of these applications requires submission of detailed information that is to be reviewed scrupulously. Furthermore, even once the application is approved by the Cabinet Office, Chapter IV of the SAA imposes obligations for the Prime Minister to supervise the use of the license. The Prime Minister’s staff has the authority to conduct on-site inspections to enforce any aspect of the SAA under Article 31 and may provide guidance, advice and recommendations as

25 Naikakufu Uchusenryakushitsu [Prime Minister’s Office, Space Strategy Committee] ‘Uchu Katsudo Hosei no Kongo no Kento no Susumekata ni tsuite’ [Regarding how to Proceed with Strategizing Space Activities Policy] (22 May 2015) <<http://www8.cao.go.jp/space/committee/27-kiban/kiban-dai4/siryou2.pdf>> accessed 24 June 2018.

26 SAA art 4(2); Enforcement Ordinance of the SAA, Ordinance No. 50 of 2017 (15 Nov 2017), art 5 <http://www8.cao.go.jp/space/application/space_activity/documents/ordinance_for_enforcement.pdf> accessed 24 June 2008.

27 Naikakufu Uchusenryakushitsu [Prime Minister’s Office, Space Strategy Committee], Uchukatsudouho ni kansuru shinseiuketsuke ni tsuite [Regarding applications for the SAA] <http://www8.cao.go.jp/space/application/space_activity/application.html> accessed 24 June 2008.

28 SAA art 13.

29 Ibid art 16.

30 Ibid art 20.

necessary under Article 32.³¹ If the government finds that certain aspects do not conform to the issued license or the SAA, it may issue orders to make certain changes so that the licensee's activities conform to the license grant.³² The scope of what the SAA covers is defined quite broadly. Despite the law being referred to as the "Space Activities Act," it does not define or even mention the concept of "space activities." Instead, it generally defines the following three types of activities as the scope of the legislation: (1) launching objects such as satellites into space; (2) managing satellite operations; and (3) managing satellite launch sites. With respect to the first activity, Article 4(1) states that "a person must obtain a license from the Prime Minister each time it desires to conduct a 'Satellite Launch, Etc.' within the country, or conduct a 'Satellite Launch, Etc.' using a vessel or aircraft with Japanese citizenship that has a Launching Facility installed."³³ "Satellite Launch, Etc." is defined as "managing or operating a Launching Facility by oneself or through others and, upon loading a Satellite onto a Satellite-launching rocket, blasting off and accelerating that rocket until it reaches a constant speed and altitude at which point such Satellite separates."³⁴ Notably, "Satellite" is somewhat of a misleading term as it is defined extremely broadly as "an artificial object which is used upon being launched into the Earth's orbit or beyond, or placed on a celestial body other than the Earth."³⁵ This definition of Satellite essentially narrows the scope of the SAA's coverage to objects that are either: (1) being launched into the Earth's orbit or beyond; or (2) placed on a celestial body other than the Earth. This definition would exclude suborbital flights. However, according to scholars, this was intentionally done given that the possibility of suborbital flights affecting traditional orbital paths are very low and should not require government supervision.³⁶ By keeping the scope of Article 4(1) as broad as possible, the SAA legislators essentially allowed for supervised governance (and OST Article VI compliance) over any activities related to launching any objects into space. Unlike other countries' space legislation that narrowly define what "space activities" means and limiting the reach of their space legislation to certain space operations as they are known as of the date of enactment, Japan's SAA cleverly leaves the door open for space activities that have not been contemplated at the time the law was drafted. In the future, if new types of space activities become possible (e.g. space tourism, space colonization) and such activities fall outside the scope of the SAA, in order to comply with

31 Ibid arts 31, 32.

32 Ibid art 33.

33 Ibid art 4(1).

34 Ibid art 2(5).

35 Ibid art 2(2).

36 Zadankai, Uchu business wo meguru genjo to kadai [Current Situations and Challenges on Space Business], *Jurist*, No. 1506, May 2017.

Article VI of the OST, the government would have to either amend the SAA or legislate new laws to ensure adequate supervision of new types of space activities that are not contemplated in the SAA. Generally, most private actors were completely on board with the SAA given that it did not grant preferential treatment to any type of business or sector. However, when attempting to govern specific space activities, there may be specific interest or industry groups that oppose the legality or certain regulatory frameworks of such activities. To avoid delaying business lines that comply with the basic requirements of Article VI and the SAA to go to market, the broad manner in which the SAA is drafted prevents any political debate and allows space business to be tested and, if necessary, further regulated as the world begins to explore and learn what works and what does not in this new chapter of commercial history.

To provide teeth to this license scheme, Chapter 8 of the SAA outlines the penalties for non-compliance with the act. The maximum penalties for non-compliance are up to 3 years imprisonment, a fine of up to 3 million yen or both.³⁷ The maximum penalties may be issued for: (1) a person who has launched a satellite or is managing satellites without obtaining a license from the Prime Minister's Office (violation of Article 4(1) or Article 20(1)) or engages in activities not authorized by such licenses; (2) a person who has obtained any license authorized in the SAA through deception or wrongful means; or (3) when a party that is licensed to manage satellites fails to comply with a corrective order issued by the Prime Minister's Office. This framework above for violations of licenses is reasonably straight-forward, similar to other types of Japanese legislation and does not come as any surprise.

2. SAA's Liability Framework

In addition to this broad scope described above, a critical aspect of the SAA is the scope of who it holds liable for damages caused by the launching of rockets and satellites. The SAA only holds parties or vessels that have Japanese citizenship strictly liable for any damages as narrowly defined in Article 35 and 36.³⁸ These articles limit liability for launching rockets and satellites to only those Japanese persons, entities or vessels/aircrafts that were directly involved with conducting the launch itself. In other words, any other Japanese or foreign party that is not directly involved with the launch operations (e.g. suppliers, transporters, construction contractors, etc) would not be held liable under the SAA's scheme.³⁹ Article 36 explicitly channels liability to the launching party and explicitly states that other parties that may normally be liable in business situations (such as under the Product

37 SAA art 60.

38 Ibid arts 35, 36.

39 Ibid art 35, 38(1).

Liability Act) are not liable for damages.⁴⁰ Notably, liability is not limited to natural persons and can reach third party manufacturers, suppliers and other non-launching parties.⁴¹ However, if a party involved only either made materials/parts or provided labour in relation to the launch that caused damages, such suppliers are only held liable when the damages arose from that party or its employees' intentional conduct.⁴² It is important to note that "gross negligence" or a similar concept is not included in addition to the intentional conduct carveout.

Furthermore, the act does not impose any rules regarding contributory negligence of victims given the significant unlikelihood that a victim would cause any events to aid in damages caused by rockets and satellites.⁴³ Both on land/air and the sea, the government has a duty to notify the regional authorities to alert the relevant actors to engage in safety protocol when there is a rocket launch.⁴⁴ However, accidents can always occur. Therefore, the SAA also has a force majeure clause, where the government will cover damages for any events outside the control of the parties such as natural disasters.⁴⁵

The SAA requires licensees to execute insurance agreements that covers any liability caused by the launching of rockets or satellites.⁴⁶ These insurance agreements must be approved by the government. If the launching party or insurance company cannot meet their obligations, under Article 40, the SAA requires the government to cover any expenses that a party or the insurance company fails to provide per the terms of the approved insurance agreement.⁴⁷ The government also has subrogation rights to third parties under Article 45. When third parties are indemnified, the government must fund the lesser of: (i) the funds the government supplied; or (ii) the amount of indemnification promised.

From a business perspective, this liability scheme under the SAA may seem unfair for the Japanese government in many ways. However, given that one of the primary incentives of the SAA is to stimulate the Japanese economy and the private space industry, the legislators seemed to have carefully drafted this liability scheme to try and attract foreign business into the country. Given this background, legal scholars have presented the following additional theories regarding how liability is so narrowly channelled to

40 Ibid art 36.

41 Ibid art 38.

42 Ibid.

43 Uga Katsuya, Uchukatsudouhou ni okeru Songaibaishouseido no Kento [Examining the SAA's Compensation of Damages Policy], *Jurist* No. 1506 (May 2017), 40.

44 See Article 99 of the Civil Aeronautics Act for land/air and Article 26, 31 of Maritime Traffic Safety Act.

45 SAA, art 39.

46 Ibid art 2(9).

47 Ibid arts 40, 42.

Japanese launching parties. First, because there are so many parties involved in the act of launching a rocket, pinpointing who should be held liable when an accident occurs can be very difficult. Situations may include a slightly defective part, transportation accidents, manufacturing defects, environmental factors, launch installation procedure errors, launch plan errors, launch protocol errors and many other factors. Considering how it is difficult (if not impossible) for victims to escape danger from space debris or launch failures, many would argue that strict liability makes sense in a case like this whether or not the defect or mistake was intentional or negligent. However, in order to determine who should be liable, rather than going through expensive and complicated dispute resolution procedures (be it arbitration or litigation) that may not produce the best result in terms of identifying the party at fault and/or remitting the compensation due to the victims of the accident, scholars argue that a simple liability scheme would be more effective. As Articles 39(1) and 40(3) state, victims of space debris accidents have a priority to be made whole in advance of any creditors. The SAA liability scheme keeps this principle in mind by simplifying potential dispute resolution conflicts and creating the mandatory insurance scheme as well as the governmental indemnification obligation to ensure that victims are compensated properly.⁴⁸

Second, the SAA liability scheme incentivizes manufacturers and suppliers to enter the market. Since 1994, Japanese law has imposed strict liability on manufacturers for any defects from products.⁴⁹ While there are no punitive damages provided for product liability cases in Japan, there is no limit to the amount of damages that can be ordered by a court. Given this legal landscape, prior to the SAA, the space industry posed extremely high risks for parts suppliers. As described above, a rocket launch can go wrong in many ways and the slightest manufacturing defect, lack of warning or failure to customize the part to the rocket or launch in question could result in strict liability. Therefore, by having liability for launches channelled only to launching parties buys suppliers a free pass from liability. The risk is shifted to the launching parties to conduct a thorough review of all aspects of the launch, including all parts and services. This may further stimulate other lines of business for quality control of the manufacturing process.⁵⁰

Third, it is critical to keep in mind that the scope of liability is only limited to Japanese parties. In other words, remarkably, no foreign party can be held liable under the SAA in conjunction with the act of launching rockets and satellites. As will be discussed below in Section III, most other national legal

48 Katsuya [91] 40.

49 See Product Liability Act, Act No. 85 of 1 July 1994 (Japan), art 3 <<http://www.japaneselawtranslation.go.jp/law/detail/?vm=04&re=02&id=86&lvm=02>> accessed 24 June 2018.

50 Katsuya [91] 40.

regimes hold the foreign party liable for damages they have caused given the high level of risk and damages that can result from space launch accidents. Scholars believe that Japanese legislators decided to shoulder this burden in order to promote foreign parties to conduct space business using Japanese launch sites. As discussed in Section I above, there are only eleven countries in the world that have the capability of launching objects into space. It will be interesting to see whether the SAA liability scheme increases the utilization of Japanese launch sites given this lenient legal framework.⁵¹

For the three reasons stated above, on its face the SAA seems overly inviting to foreign actors. However, when digging a little deeper, it becomes clear that there will still be other types of legal compliance considerations for foreign actors to take into account when engaging in space business under Japanese law. Under the SAA, general indemnification rights against third parties (including foreign parties) are available under Article 38(1). Importantly, Article 38(1) specifies that suppliers of components/parts/labour may only be held if such supplier intentionally acted to cause damages. However, Article 38(2) specifies “[t]he provision in the previous paragraph must not obstruct other special contracts related to indemnification.” Article 38(2) makes Article 38(1) a non-mandatory provision. Under Japanese Civil Law, if a statutory provision is not mandatory, it is possible for contractual provisions to supersede a statutory provision.⁵² Accordingly, although the default statutory rule seems to significantly restrict liability for foreign suppliers, it is possible for parties to contractually agree on additional liability provisions. So long as the contractual provisions are enforceable under Japanese Civil Law, parties will be able to agree on any liability scheme they find to be appropriate. Therefore, negotiation of representations and warranties, limitations of liability and indemnification provisions of contracts related to space operations will become a critical point for space law practitioners.

In addition to paying attention to the liability provisions in contracts, foreign actors will need to be aware of the unique Japanese laws that can affect conducting business under Japanese law. One example that foreign actors often overlook when conducting business under Japanese law is the Act against Delay in Payment of Subcontract Proceeds, Etc. to Subcontractors (“Subcontract Act”). This law, which many countries around the world have begun to enact just recently, was enacted in 1956 in Japan and seeks to protect small and medium enterprises from essentially being bullied by larger businesses that hold significant leverage in negotiations either by market share, reputation or capital prowess. The Subcontract Act prohibits certain

51 Ibid.

52 Hiroto Dogauchi, “Outline of Contract Law in Japan,” Group for the Law concerning International Sales of Goods and International Service Contracts, available at <<http://www.law.tohoku.ac.jp/kokusaiB2C/overview/contract.html#chapter4-1>> (accessed 16 July 2018).

types of transactions that are patently unfair.⁵³ Additionally, a closely related provision under Japanese antitrust law is the concept of “Abuse of Bargaining Position” under the Antimonopoly Act. This provision essentially prohibits a larger company from exercising their dominant position (not just market position but *bargaining* position) when negotiating with a relatively smaller company.⁵⁴

Given the current state of how foreign players in the space industry are much larger than many subcontractors in Japan that will start securing competitive business niches, when foreign actors elect Japanese law to take advantage of the advantageous SAA provisions, they need to ensure that they are complying with relevant antitrust and Subcontract Act provisions. As discussed above, the business of manufacturing and launching a rocket can involve hundreds of subcontractors in order to secure a myriad of products and services. Therefore, compliance with these types of laws will become increasingly important.

D. Remote Data Sensing Act

The Remote Data Sensing Act (“RDSA”), in tandem with the SAA, was promulgated on November 16, 2016. Unlike the SAA, it has already been put into effect as of November 15, 2017.⁵⁵ The purpose of the act is to ensure that satellites are not used for international terrorism or other evil purposes.⁵⁶ Unlike the SAA, the RSDA has a more limited scope - “Remote sensing data” is defined in Article 2(6) and any other data falls outside the scope of the RSDA. However, the licensing scheme of the RSDA functions similarly to the SAA and requires that users of these satellites obtain registration with the government.⁵⁷ The Prime Minister will ensure that any plans for satellites have sufficient preventative measures to ensure that parties other than the applicant cannot use the satellite for purposes of ensuring international peace.⁵⁸ Those who obtain approval under the RDSA cannot share information to non-approved entities and must take certain precautions when sending data.⁵⁹ Notably, the Prime Minister can terminate the approval at any time in order to ensure matters of international peace. The RSDA should provide more governance towards satellite data that will become increasingly important in the technological innovations that we see today.

53 Act against Delay in Payment of Subcontract Proceeds, Etc. to Subcontractors, as amended in 2005, Act No. 120 of 1956.

54 Act on Prohibition of Private Monopolization and Maintenance of Fair Trade (“Antimonopoly Act”), Act No. 54 of April 14, 1947, Article 2-9(v).

55 Act on Ensuring Appropriate Handling of Satellite Remote Sensing Data, Act No. 77 of 2016 (Japan) (“Remote Sensing Act”).

56 Ibid art 1.

57 Remote Sensing Act, arts 2(6), 4, 21.

58 Ibid, arts 6, 8-16.

59 Ibid, arts 18, 20.

III. SAA vs. Other Space Legislation

In order to fully appreciate the unique nature of the SAA (and RSDA), it is worth undergoing a brief overview of national space legislation enacted by other countries. This section will first provide a comparison of how national space legislation differs over certain key issues that will become important for the future private space industry at the global level. Second, we will analyse whether such divergences in national space legislation will encourage forum shopping under private international law and whether the SAA can truly have an effect in launching Japan's space industry to a globally competitive level. Currently, 22 countries⁶⁰ have passed national space legislation. While each set of laws may not seem to differ greatly on their face, there are major differences that set them apart for legal and business purposes. Rather than describing each country's laws, this section will discuss certain key issues where such divergences can be seen that may have an effect on global space business.

A. Models of National Space Legislation

1. Scope of Regulated "Space Activities"

National space legislation can be divided into two major camps – those that define "space activities" and those that do not.⁶¹ How "space activities" or the equivalent is defined can have an important impact as it determines the scope of what types of activities are subject to the law's restrictions. As will be further explored below, there may be new types of space activities (e.g. space mining) that we have not yet contemplated as of 2018 that could fall outside certain definitions of space activities that have been drafted in the last 10 or 20 years. Keeping these possibilities in mind, if the definition of space activities is drafted too narrowly, there is a risk that the legal enablement of future types of space activities may be delayed by political impediments when legislative amendments become necessary.

Within the first camp of countries that explicitly define what "space activities" are, there are three subgroups. First, the strictest countries (Austria, Netherlands and Sweden) essentially state that any space activity requires authorization from the government.⁶² The scope of each differs

60 United Nations Office for Outer Space Affairs, National Space Law Collection <<http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html>> accessed 24 June 2008.

61 Irmgard Marboe, Setsuko Aoki and Tare Brisibe, "The 2013 Resolution on Recommendations on National Legislation Relevant to the Peaceful Exploration and Use of Outer Space" in Stephan Hobe, Bernhard Schimdt-Tedd, Kai-Uwe Schrogl eds., *Cologne Commentary on Space Law* Volume III ("CoCoSL"), 483, 506 (2015).

62 *Ibid*, citing Federal Law on the Authorization of Space Activities and the Establishment of National Space Registry (28 December 2011) (Austria) ("Austrian Law"); Act on Space Activities, SFS 1982:963 (18 November 1982) (Sweden)

slightly. For example, Dutch law does not contain the operation of a launch site/facility in its “space activities” definition.⁶³ The way the Swedish law is drafted, it is unclear whether suborbital flights would be subject to the act, raising questions about whether separate legislation would be required for suborbital space tourism.⁶⁴ Second, some countries (Russia, Ukraine and Kazakhstan) define “space activities” broadly but do not cover certain activities whether intentionally or not.⁶⁵ For example, the Russian law broadly defines “space activities” as “any activity immediately connected with operations to explore and use outer space, including the Moon and other celestial bodies” and enumerates nine specific types of activities that must be licensed by the government.⁶⁶ Third, some countries (France, South Africa) require licensing of activities that go beyond the scope of how they define “space activities.”⁶⁷ For example, French legislation requires a license for transferring command of a space object to a third party and obtaining control over a space object that has not been authorized – these activities are not defined as space operations in the act.⁶⁸ Meanwhile, South African legislation brutally requires that “any participation in any space activities” requires a license.⁶⁹ This has been interpreted to sometimes mean that any participation by a South African company (e.g. a supplier of parts) with a launching operation will require a license by the government.

Within the second camp of countries that do not define a “space activities” concept, there are two sub-groups.⁷⁰ First, some countries (Nigeria, UK, Belgium) enumerate a wide range of activities.⁷¹ For example, the Nigerian and the UK laws regulate the following three activities: (1) launching or procuring the launch of a space object; (2) operation of a space object; and

(“Swedish Law”), sec 1 para 2; and Space Activities Act (24 Jan 2007) (The Netherlands) (“Dutch Law”), art 2.

63 Dutch Law, art 2.

64 CoCoSL 507.

65 Ibid, citing; Law of the Russian Federation on Space Activities, No. 56630 (20 August 1993), as amended (Russia) (“Russian Law”), art 2, para 1; Law of the Ukraine on Space Activities No. 502/96-VR (15 Nov 1996) (Ukraine), art 1; and Law on Space Activities, No. 528-IV (6 Jan 2012) (Kazakhstan), art 1 no 7.

66 Russian Law, art 2 para 2.

67 CoCoSL 508, citing Act relating to Space Operations, French Law No. 2008-518 of 3 June 2008 (France) (“French Law”), art.1 no.3; Space Affairs Act, Act No. 84 of 1993 (6 Sept 1993) (S Africa) (“S Africa Law”) art 1.

68 French Law art 3.

69 S Africa Law art 11 para 1.

70 CoCoSL 509.

71 Ibid, citing National Space Research and Development Agency Act, Act No. 9A 1255 of 27 August 2010 (Nigeria) (“Nigerian Law”) sec 6, 9; Outer Space Act, 1986 Chapter 38 (18 July 1986), sec 3 para 1 (UK) (“UK Law”); and Act relating to Activities of Launching, Flight Operations or Guidance of Space Objects (17 Sept 2005) (Belgium) (“Belgian Law”) art 2, para 1.

(3) activities in outer space.⁷² The Nigerian law states the Nigerian National Space Council has the power to grant a license over these activities, whereas the UK law states that these activities may not be carried out with a license. It is worth noting that the scope of these laws are effectively the same as the laws of Austria, the Netherlands and Sweden described above. The scope of Belgium's law is similar to the Dutch definition of "space activities." However, Belgium notably excluded suborbital flight from its definition. Scholars discuss that this can be a problem.⁷³ It is entirely possible for objects to be launched to a high altitude but coming back to Earth without making a complete orbit. It begs the question whether aviation laws will apply, creating a grey area subject to interpretation, dispute and litigation. This highlights how the definition of "space activities" or the scope of national space legislation can be critical.

Finally, the laws of the rest of the second camp simply regulates the launch and return of space objects, including Australia, Brazil, S. Korea, Norway and the US.⁷⁴ Japan's SAA falls within the second camp that enumerates activities that require licensing without explicitly defining "space activities." As discussed above, terms such as "space activities," "space operations" or the equivalent are not used at all.

2. Liability and Indemnification

Under international law, the liability scheme of private actors launching space objects into space is ambiguous given that the Liability Convention only imposes strict liability on the "launching state." A "launching state" is defined as "a state that which launches or procures the launching of a space object or a state from whose territory or facility a space object is launched."⁷⁵ Objects that are launched by private space activities are not "launched" by a state. It is unclear whether they are "procured" by the state. Additionally, the words "territory" and "facility" are ambiguous. Accordingly, national legislation has the task of clarifying these concepts by imposing insurance requirements, limitations on liability and rights of recourse regarding third party liability.

72 Ibid.

73 Ibid.

74 CoCoSL 509, citing Space Activities Act, Act No. 123 of 1998 (21 Dec 1998) as amended, sec 3 ("Australian Law"); Administrative Edict No. 27 enclosing 'Regulation on Procedures and Definitions of Necessary Requirements for the Request, Evaluation, Issuance, Follow-up and Supervision of Licenses for Carrying out Launching Space Activities on Brazilian Territory of 20 June 2001' ("Brazilian Law"); Space Development Promotion Act, Law No. 7538 of 31 May 2005 as amended (S. Korea) ("S. Korean Law"); Norway, Act on launching objects from Norwegian territory into Outer Space, Act No. 38 of 13 June 1969 ("Norwegian Law"); and Commercial Space Launch Act, Public Law 98-575, 51 U.S.C. Ch. 509 (30 Oct 1984) ("US Law").

75 Liability Convention, art I(c).

As a threshold issue, most (if not all) national space legislation requires that launching parties obtain some sort of insurance for third party liability with various ranges of coverage, caps and deductibles.⁷⁶ Assuming that the launching parties enter into such insurance arrangements, the reach of liability and how the state government can seek recourse on behalf of its property and its citizens differs from country to country. Generally, most laws allow for state governments to seek recourse from the operators or owners of space objects.⁷⁷ Some laws state that if the government pays for damages, it can present a claim for indemnification against the operator that caused the damage.⁷⁸ Other countries such as Brazil, Russia, S. Africa and the US hold licensees liable for damages regardless of the right of recourse of a state government.⁷⁹ However, some laws also provide an indemnification regime where the government guarantees reimbursement of a certain amount under certain circumstances.⁸⁰ Most laws have some way of limiting the liability of the operators of space launches or other parties that the respective law holds accountable. There is also a range of what is excluded from such limitations of liability for cases such as failure to comply with the authorization conditions or willful misconduct or gross negligence on the part of the operator.⁸¹ Regarding the issue of third party liability, it is worth highlighting a few unique points from certain jurisdictions. First, the US and French laws require cross-waivers of liability among all concerned parties (e.g. operators, manufacturers, sub-contractors, etc).⁸² In other words, all professional parties must have some sort of contractual cross-waiver built into the various business relationships that make up a rocket launch operation. Second, South Korea has a unique regime by being the only country that has separate legislation regarding the issue of liability.⁸³ With respect to claims against third parties, its liability act states that, if the damage comes from a third party's willful misconduct or negligence, the launch provider may present an indemnification claim against the third party. However, the standards for bringing a claim against a supplier of components, materials or services is willful misconduct or *gross negligence*.⁸⁴

76 CoCoSL 531-32.

77 Ibid 530.

78 CoCoSL 530, citing Australian Law Sec 48, paras 1(d), 2; Austrian Law sec 11 para 1; Belgian Law art 15 para 1; French Law, art 14; Dutch Law, sec 12 para 1; S Korean Law, art 3 para 1; Swedish Law sec 6; UK Law sec 10, para 1.

79 Ibid, citing Brazilian Law, sec 7; Russian Law, art 25; S African Law, sec 14; and US Law, 51 U.S.C. § 50914.

80 CoCoSL 533.

81 Ibid 532.

82 Ibid art 20; US Law, 51 U.S.C. § 50914(b).

83 Space Liability Act, Law No. 8852 of 21 Dec 2007 ("S. Korean Liability Act") art 3 para 1.

84 Ibid, art 4, para 2.

Third, regarding the issue of what parties are directly liable for damages under their space legislation, it is only S. Korea, France, and now Japan that only holds the launch operators solely liable. In particular, it is worth examining the French national space law in some detail as its liability scheme is most similar to Japan.⁸⁵ In France, third party operators have “absolute liability” for damage on the ground and in space and liability on a “fault basis” for damage caused in outer space.⁸⁶ However, such liability ends on the year the obligations of the license are fulfilled. For any activities after this period, the law shifts liability to the government. Furthermore, the state guarantees damages caused to third parties by space activities (other than in cases of willful misconduct of the operator) on the ground and in airspace during the launch phase. This guarantee during the launch phase extends to third parties such as manufacturers and suppliers. While there is a cap of 60 million euros for this guarantee, this is also the ceiling for insurance that operators are required to obtain as part of the licensing process.⁸⁷ No other country had such a generous liability scheme until Japan passed the SAA, which more or less mirrors the French scheme with the exception that it does not have the requirement of cross-waivers with related third parties.

3. Jurisdiction

There are two groups of countries on the issue of jurisdiction – those who try and reach the regulations of space activities outside their territorial jurisdiction and those that do not. The countries (UK, US, Canada, Germany, S. Africa) that allow for extraterritorial application of national laws provide various restrictions.⁸⁸ For example, the US Law states that, barring any conflicting laws in other countries, any entity organized or existing under the laws of a foreign country is subject to the legislation if a controlling interest (defined as 51% or above) is held by a US citizen.⁸⁹ Of those countries that only regulate space activities in their territory, it is important to note which actors fall within the scope of who needs to obtain a license. Most laws consider nationals or vessels that are of that country’s nationality as subject to the “jurisdiction” of the home country’s laws. However, some countries exclusively limit the reach of its laws to activities that occur within the physical borders of its territory.

Japan’s SAA takes it one step further. Japan’s law is the only law that solely exercises jurisdiction over its citizens located within its territory.⁹⁰ In other words, the SAA does not govern foreign companies operating within the Japanese territory. This may seemingly create inconveniences as foreign

85 CoCoSL 533.

86 French Law, art 13.

87 Ibid, art 14.

88 CoCoSL 534.

89 US Law, 51 U.S.C. § 50901 *et seq.*

90 SAA art 35.

companies cannot obtain a license from the Japanese government to conduct launches in Japanese launch sites. However, given the liability scheme of the SAA, this turns out to not be the case. By conducting business by partnering with Japanese launch operators, foreign companies can shift all risk to the Japanese licensed operator who, under the SAA, will be solely responsible for any liability. Furthermore, under Article 38, foreign partners, manufacturers and subcontractors also enjoy any indemnification provided from the government. Therefore, the way the exclusive territorial jurisdiction curtailed to Japanese citizens only serves to be an attractive factor for foreign businesses to shed any business risk and, at the same time, an economic incentive for the Japanese private space industry.

4. Special Legislation for Space Mining: Luxembourg and the US

One recent development is that two countries (US and Luxembourg) have passed legislation that legitimizes the activity of space mining. In 2015, the US passed the Commercial Space Launch Competitiveness Act that explicitly states: “A U.S. citizen engaged in commercial recovery of an asteroid resource or a space resource shall be entitled to any asteroid resource or space resource obtained.”⁹¹ The following year, Luxembourg passed legislation that explicitly creates a formal licensing scheme for private actors to engage in space mineral extraction missions for commercial purposes under the purview of the Luxembourgian government.⁹²

To appreciate the significance of this legislation, it is worth mentioning that, at the time of this paper, the legality of space mining is a debated hot topic under international law. Article I of the OST states that “outer space is to be recognized as the province of mankind.”⁹³ Article II further provides that the national appropriation of celestial bodies, whether by sovereignty or other means, is prohibited.⁹⁴ There are two arguments that attempt to justify the legality of space mining despite these accepted principles. First, some argue that the phrase, “belongs to all mankind,” can be interpreted as allowing mankind to do what it wishes with its resources. This would require an international regime to determine procedures of allocating the resources of celestial bodies in the best interest of mankind.⁹⁵ Second, another approach argues that all states are entitled to use resources for their own benefit because outer space has been qualified as a “global commons” (similar to the

91 US Commercial Space Launch Competitiveness Act, Public Law No. 114-90 (25 Nov 2015) (USA), 51 U.S.C. § 51303.

92 Law on the Exploration and Use of Space Resources, Law No. 674, art 3 (28 July 2017) (Luxembourg) <<http://legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo>>, accessed 28 June 2018.

93 OST art I.

94 OST art II.

95 Frans G von der Dunk, ‘Asteroid Mining: International and National Legal Aspects,’ *Michigan State International Law Review*, 26 MSU 83, 91 (2017).

high seas). Regardless of which interpretation (if either) are deemed to be correct, it is unclear whether the US and Luxembourg laws are in compliance with the OST or not. There are some countries like Russia and Brazil that vehemently oppose their actions and insist that they are violating international law.⁹⁶ This debate is an ongoing one at the annual UNCOPUOUS meetings and it is not a question that will be resolved in the near future. However, given the polarized landscape on this issue, there is no definitive consensus that can guide the enforcement of any sort of guidance or regulation on this issue. Therefore, the US and Luxembourg laws will most likely continue to stand as they are for at least a number of years. Furthermore, it is highly likely that other countries will begin passing similar legislation whether for space mining or other business lines for controversial, new frontiers that space exploration will open up.

While Japan's SAA does not exclusively authorize space mining as a legitimate activity, the law could feasibly still cover the act so long as the Prime Minister's Office does not opine that it violates international law. Given the broad scope of what the SAA covers as "Satellite Launches, Etc.," licenses can be granted under the SAA scheme for rockets to be launched with the purpose of space mining. Notably, iSpace, a Japanese space venture that has the mission of being one of the first to accomplish space mining, believes that this is still a grey area for the Japanese government and established an entity in Luxembourg to take advantage of its explicit legal authorization of the activity. Regardless, should Japan's opinion on the matter become clearer, iSpace seems to be happy to get the appropriate licenses and launch from Japan.

B. How Japan's SAA Measures Up under Private International Law

While national space laws exist to comply with Article VI of the OST and to provide a regulatory framework for private actors so they can launch objects into space, they serve another important function – creating the foundations of evaluating business risks under private international law. Susumu Masuda, a legal expert in Japanese aircraft financing, discusses how disputes arising from Japanese space business have previously been dealt with under the supervision of JAXA and the government.⁹⁷ However, with the enactment of the SAA, Masuda argues that private international law will become a critical factor for this industry and outlines the following 3-step process: (1) selection of the venue of dispute resolution; (2) selection of the governing law; and (3) evaluating the applicable laws under the selected governing law. Another way

⁹⁶ Ibid 97-99.

⁹⁷ Susumu Masuda, 'International Private Law Analysis on Outer Space Activities,' *Keio Law Journal*, No. 15/16 (Mar 2010), 41 <http://koara.lib.keio.ac.jp/xoonips/modules/xoonips/download.php/AA1203413X-20100325-0041.pdf?file_id=32860> accessed 24 June 2018.

to put this process is “forum shopping” – shopping around different fora of jurisdiction and selecting one that is most beneficial for the party and/or transaction. For the purposes of space business, Japan’s SAA has many alluring factors that would want foreign companies to do business with Japanese launches as described above. First, the SAA has a broad scope of coverage so that it may cover certain state activities that other countries’ space legislation may intentionally or non-intentionally exclude. Second, the SAA has an incredibly lenient liability scheme that shifts all liability to the launch operator with indemnification provisions from the government when necessary. Furthermore, third, the SAA does not allow foreign operators to obtain a license to launch space objects, which exclusively shifts all risk to Japanese operators. If a foreign supplier seeks to enter global space business and is forum shopping, Japan would clearly be an attractive option for these reasons.

However, if foreign actors decide to choose Japanese law as the governing law of their space business transactions, they need to learn the quirks of Japanese business law. As discussed above in Section II, particularly given how foreign actors that will be engaging in space business will likely hold a larger market share or be in a superior bargaining position over Japanese space startups, compliance with Japanese antitrust law and the Subcontract Act will become an important consideration in structuring supply chains and business relationships.

IV. Japan’s Start-up Space Ventures and the Challenges of Obtaining Financing

Another major challenge the Japanese space industry has faced has been a lack of funds to support new start-up ventures in Japan. Until recently, there has been very little private or venture capital financing for Japanese space start-ups. While this may be attributed to the small demand from the private space industry, the reality is that there was no feasible financing model that could fund something as expensive as rocket manufacturing. In the US, venture capital served this purpose. This section will first discuss why venture capital (at least, the Silicon Valley model) does not work in Japan. Then, this section will survey the current state of Japanese space start-ups and examine what financing initiatives have actually worked in lieu of venture capital.

A. Japan’s Incompatibility with the Silicon Valley Venture Capital Model

While it is still in its early development, Japan’s venture capital industry has been slowly expanding. In 2014, a total of 139 billion yen was raised through VC funding, which grew to 209 billion yen (approximately \$2 billion) in

2016.⁹⁸ However, these numbers pale in comparison to the growth of Silicon Valley which went from raising \$35.2 billion in 2015 to approximately \$42 billion in 2016.⁹⁹ This section will explore the various facets of why this gap exists.

Japan's venture capital industry was non-existent until 1996 when the Japanese government deregulated its financial and capital markets. This spurred a flurry of activity beginning with the creation of stock markets where private companies can initiate public offerings. Then, Japan's Companies Act was amended in 1997, and then even further in 2001. This amendment lifted various rigid rules that regulated the issuance of new stock and companies began to be able to issue new types of stock more freely.¹⁰⁰ Most major firms including Toyota, Mazda, Hitachi, Matsushita, Fujitsu and Mitsubishi Trading began issuing stock options to employees and investors for the first time¹⁰¹ Preferred stock was also issued for the first time to create classes of stock that grant preferential rights to certain groups of shareholders¹⁰² Furthermore, these amendments allowed companies to put an upper limit on damages for negligent directors.¹⁰³ This shift in the legal climate spurred venture capital activity in Japan for the first time with the establishment of the Nippon Angels Forum, the Venture Law Form and the Japan Venture Capital Association in 2000 – 2002.¹⁰⁴

While these beginnings created some excitement, Japan's venture capital markets are still nowhere near as effective as they are in Silicon Valley. As of the date of this paper, while the option is never fully ignored, Japanese entrepreneurs do not look at venture capital to be their primary source of financing in growing their startups.¹⁰⁵ In order to understand why, we need to examine how the origins of the Silicon Valley model fundamentally differ from the Japanese one. The Silicon Valley model originally developed to accommodate specific demands by investors to receive preferential rights in connection with their shares in return for investing larger amounts than a

98 Yukihito Machida, 'Shinkabu Yoyakukentsuki Shasai no Katsuyo ni Tsuite no Ikkosatsu [Analysis regarding the Use of Convertible Debt] *Shoji Homu*, No. 2139, 20 (July 15, 2017).

99 KPMG, "Venture Pulse: Q4'16 Global Analysis of Venture Funding," (Oct 2015) <<https://home.kpmg.com/xx/en/home/insights/2015/10/venture-pulse.html>> accessed 24 June 2018.

100 Sadao Nagaoka, 'Determinants of the Introduction of Stock Options by Japanese Firms: Analysis from the Incentive and Selection Perspectives' 78 *Journal of Business* 6, 2289 (2005).

101 Ibid at 2290.

102 Zenichi Shishido, 'Does Law Matter to Financial Capitalism? The Case of Japanese Entrepreneurs,' 37 *Ford. Intl. L. J.* 1087, 1095 (2014).

103 Ibid.

104 Ibid.

105 Ibid.

traditional market risk analysis would warrant for early stage companies.¹⁰⁶ In contrast, the Japanese model developed organically without any specific requirements mandated by investors. This difference proves significant when looking at least three key issues relating to the issuance of preferred shares that are commonly associated with the venture capital financing model.

First, an important part of the Silicon Valley venture capital process is the valuation process of preferred shares that are granted to investors. In the US, this is governed by Section 409A of the US tax code – a company is required to undergo an appraisal process of their share prices to ensure that shareholders are getting fair market value for their investment (“Section 409A”). Section 409A requires that the fair market value be determined by a “reasonable application of a reasonable valuation method” by someone who is qualified and must be updated every 12 months. While this requirement can be tedious and expensive for start-ups, the rule provides for wide discretion to choose the share valuation method. So long as a 409A valuation has been done properly, the share prices do not get questioned without significant causes of concern. On the other hand, there is no 409A requirement in Japan.¹⁰⁷ While US financial firms have become accustomed to valuating preferred shares to comply with section 409A, there has been no requirement for financial firms or the tax authorities to come up with customary standards in Japan. Accordingly, tax treatment of this type of equity in Japan is unpredictable.¹⁰⁸ Additionally, tax authorities may interpret such grants of shares as a “gift.”¹⁰⁹ Under the Japanese tax code, when a gift from a corporation to an individual is issued, the recipient of the “gift” will be required to pay gift tax – something that investors do not want to have to do.¹¹⁰ This type of unpredictability and risk dissuades entrepreneurs and venture capitals from entering into these types of financings.

A second issue has to do with the liquidation rights associated with preferred shares in each model. In the US, venture capitalists will make sure that their shareholder agreements and share certificates guarantee priority liquidation

106 John Y. Sasaki, ‘How the Silicon Valley Financing Model Works in Japan – Limitations and Alternatives,’ American Chamber of Commerce Alternative Investment Subcommittee (December 15, 2016) <http://www.accj.or.jp/uploads/4/9/3/4/49349571/accj_-_how_the_silicon_valley_financing_model_works_in_japan_public_.pdf> accessed 24 June 2018.

107 Ibid 40.

108 Zenichi Shihido, ‘Sweat Equity as a Gift: Venture Capital Investments and Tax Law in Japan,’ UC Berkeley Proceedings from the 2009 Sho Sato Conference on Tax Law (9-10 Mar 2009), <[https://www.law.berkeley.edu/files/sho_sato_tax_conf_web_paper--shishido\(2\).pdf](https://www.law.berkeley.edu/files/sho_sato_tax_conf_web_paper--shishido(2).pdf)> accessed 24 June 2018.

109 Shishido [138].

110 Corporation Tax Act, Act No. 34 of Mar 31, 1965, as amended in 2017, art 37 <http://www.sozeishiryokan.or.jp/corporation_tax/corporation_tax2017e.html> accessed 24 June 2018.

rights triggered by various key events. Such provisions are always found enforceable by courts. However, in Japan it may be possible that common shares are worth more than preferred shares in some circumstances. For example, sometimes a liquidation-based valuation is used – stocks are valued on the basis on proceeds that hypothetically would be received in an immediate liquidation.¹¹¹ For early stage companies, such a liquidation would significantly harm investors who expected a profit on their investment after 5 or so years. Similarly, a third issue is the nature of how preferred shares or warrants/options for preferred shares vest over time. In the Silicon Valley model, a common approach is to have a vesting period of 2- 5 years in order to ensure that the investor or employee stays loyal to the company for a certain period of time either by retaining their shares or continue working as an employee. On the other hand, while companies are increasingly issuing their employees stock options, most Japanese investors still prefer cash over equity and, when equity is acceptable, prefer straight common stock over uncertain stock options or warrants.¹¹²

A final factor is the differences in exit strategy that Silicon Valley and Japanese entrepreneurs have. In the US, the process of undergoing an initial public offering to become a publicly listed company is quite arduous and requires significant expense and planning. In addition to the regulatory disclosures and valuation processes, a part of this process is to determine and execute the various rights of preferred shareholders at the time an IPO occurs. In contrast, it is relatively easy to go public in Japan in terms of financial and administrative strains since the Tokyo Stock Exchange implemented reforms starting around 2000. This has led many Japanese companies to go public far too early, which would harm certain early stage investors that were hoping for a significant liquidation when the initial public shares would be worth significantly more than their initial investment.¹¹³ In contrast, Silicon Valley, values M&A as an attractive exit strategy given the high bar for going public. Approximately 80% of startups exit by selling their business to a larger company in the US. In contrast, only 20% do so in Japan.¹¹⁴ There are a number of legal, cultural and tax reasons for this trend, which are beyond the scope of this paper to go into detail. However, to name some of the major reasons, first, Japanese companies prefer to develop

111 Shishido [138], 7.

112 Ibid.

113 In 2000, the Tokyo Stock Exchange introduced programs that made it easier for small companies to go public. See Japan Exchange Group, 'Improvements to TSE Listing System' (Updated 20 Mar 2015) <<http://www.jpx.co.jp/english/equities/improvements/general/>> accessed 24 June 2018; Takashi Amano and Yuji Nakamura, 'Silicon Valley to Japan's piecemeal startups: first global growth, then IPO' *Japan Times* (30 Sept 2016) <<https://www.japantimes.co.jp/news/2016/09/30/business/silicon-valley-japans-piecemeal-startups-first-global-growth-ipo/#.Wy8A4BIzaCQ>> accessed 24 June 2018.

114 Sasaki [142].

technologies in-house with research facilities and seek to retain their employees until they retire. These cultural aspects make it difficult for founders to be willing to sell their business. Second, the tax regime does not favor shareholders when they cash out from a M&A. Third, the requirements of going public are significantly lower in Japan than they are in the US. Accordingly, entrepreneurs often tend to aim for the easier IPO. Given these reasons, the average Japanese entrepreneur is not incentivized to exit via M&A.¹¹⁵

Taking these differences into account, it is not surprising that venture capital is not as popular in Japan as it is in Silicon Valley. According to a survey conducted in 2015, it seems that Japanese entrepreneurs and investors prefer the issuance of simple, common stock rather than trying to understand and negotiate the special rights of preferred stock or deciphering foreign equity or debt instruments (e.g. SAFE, KISS, J-KISS).¹¹⁶

Given the challenges of venture capital taking effect in Japan, until the enactment of the Basic Space Act in 2008, Japan's space industry has been largely financed by public-private partnerships and government/bank loans. Public-private partnerships refer to what we have described in Section I where JAXA contracts out to private firms such as MHI to complete and manage public projects. This has been done not only with the MHI and the H-II/H3 rockets but also with the Himawari, QZSS Michibiki and X-Band communication satellite Kirameki.¹¹⁷ As part of these projects, loans were also available from export credit agencies such as JBIC and NEXI for exporting satellites and providing trade insurance.¹¹⁸ However, these loans do not assist the Japanese space industry to a level anywhere close to what Silicon Valley venture capital has done in the US market.

B. Current Status of Japanese Space Ventures

Regardless of the challenges of securing venture capital financing, Japanese space start-ups have started to get funded in alternative ways in the past few years. The key enabling factor lies in how large Japanese companies are extremely cash rich – three of the top 25 cash rich companies of the world are Japanese, which is second only to the US.¹¹⁹ Space ventures have been able to secure funding by approaching these cash-rich companies to become investors.

115 Ibid.

116 Shinki Takeuchi and Shuji Ogawa, 'Vencha Fainansu no Shikiryu'Shinchoryu' *Shoji Houmu* No. 2087, 43 (2015).

117 DBJ Report [11] 128.

118 Ibid.

119 Maria Obiols, '2017 Global Cash 25,' *Global Finance Magazine* (24 June 2018) <https://www.gfmag.com/magazine/september-2017/cash-piles-keep-growing> accessed 8 Sept 2017.

The startup that is currently receiving the most attention in the Japanese private space industry is most likely a company called iSpace, which was formed in 2010. iSpace has an ambitious mission of being Japan's first company to mine asteroids. iSpace has approximately 10 billion yen of capital, has won the Google X prize, and has partnered with Japan Airlines to form a capital and business alliance. Just last year, iSpace raised \$90 million in a Series A Financing comprised of 12 investors¹²⁰ to launch two private moon missions by 2020 and has the attention of not only Japan but the whole world.¹²¹ Eleven of the twelve investors were other large companies such as KDDI, Japan Airlines and Dentsu with the remaining investor being the Development Bank of Japan.¹²² Another rocket startup called PD Aerospace was formed in 2007 with dreams to create a market for space tourism. PD Aerospace completed their Series A financing for 520 million yen just 2 months ago with their investors also being large companies such as All Nippon Airlines, HIS and others.¹²³

While iSpace leads the rocket launch industry, a company named AxelSpace leads the satellite industry. AxelSpace obtained their Series A financing in September 16, 2015 with 8 corporate investors pooling \$16.1 million¹²⁴ for the company's mission to launch remote sensing microsatellites into orbit and form a constellation of satellites to provide live satellite imagery of various aspects of the Earth at a much higher level than what currently exists. Investors include some venture capital funds as well as large companies, including Mitsui and Weathernews. AxelSpace works with JAXA as well as other private companies and has already successfully launched a satellite to prove their worth.¹²⁵ Another emerging player in the industry is Astro Live Experiences ("ALE"), a company that strives to create a space entertainment sector by creating artificial shooting stars using microsatellites. ALE has

120 'Investors' for ispace Series A round, *Crunchbase* ("Crunchbase Ispace Search") <https://www.crunchbase.com/search/principal.investors/field/funding_round.has_funding_round.forward/num_investors/ispacetechnologies-inc--series-a--803df4ef> accessed 24 June 2018.

121 Darrell Etherington 'ispace just raised \$90 million to launch two private moon missions by 2020' 14 Dec 2017 <<https://techcrunch.com/2017/12/13/ispacetechnologies-inc-just-raised-90-million-to-launch-two-private-moon-missions-by-2020/>> accessed 24 June 2018.

122 Crunchbase Ispace Search [158].

123 PD Aerospace 'A Total of 520 million yen for Series A Fundraising Conducted' (31 May 2018) <http://pdas.co.jp/documents/Press_180531_En.pdf> accessed 24 June 2008.

124 'Investors' for AxelSpace Series A round, *Crunchbase* <https://www.crunchbase.com/organization/axelspace#section-funding-rounds>.

125 Axelspace, 'Press Releases' <https://www.axelspace.com/en/info/_news/> accessed 24 June 2018.

raised 700 million yen in seed round financing¹²⁶ and has the industry's attention given its plans for unveiling their services during the 2020 Tokyo Olympics. Another powerhouse startup that has perhaps advanced the furthest in its financing rounds by successfully closing a Series C round last year is Astro Scale, the "Space Sweepers," who are striving to secure a niche in space debris collection. Astro Scale has raised \$53 million and, while still in its planning phase, has the attention of the Japanese government.¹²⁷

Given how many of these startups are mostly at a Series A financing stage, it will be exciting to see how these companies will grow with this capital infusion and utilize the legal framework of the SAA effectively in order to legitimately provide private Japanese space services for the first time. The Japanese government is supporting these efforts by attempting to match investors with these companies. The government recently launched a platform called "S-Matching" where it seeks to match corporate investors with select space ventures. Additionally, on March 20, 2018, Prime Minister Abe announced the creation of a \$940 million allotment to fund space startups over the next 5 years.¹²⁸ Under this program, start-ups will be eligible to each receive about \$100,000 to present concepts to investors. To facilitate networking for these opportunities, conferences such as SPACETIDE have emerged where startups can pitch their ideas to potential investors.¹²⁹

In tandem with the development of these startups, aside from manufacturers and suppliers, general Japanese trade companies and other non-space players of the Japanese economy have started to slowly turn their heads in the direction of creating a business line for the space industry. At SPACETIDE 2018, two large companies presented innovative business ideas. All Nippon Airlines presented a new mode of instantaneous transportation called "Avatar" that allows humans to use avatars remotely to provide professional expertise (such as medical care and education) or experiences for pleasure (such as remote space travel).¹³⁰ Softbank, one of Japan's telecommunication giants, invested \$1.5 billion to Oneweb, a US startup satellite manufacturer. While this is a foreign investment, this shows the type of capital that Japanese companies can provide to local startup ventures once they come to existence.

126 'Funding Rounds' for Astro Live Experiences, *Crunchbase* <https://www.crunchbase.com/search/funding_rounds/field/organizations/funding_total/ale> accessed 24 June 2018.

127 Astro Scale, 'AstroScale Raises a Totally of \$25 Million in Series C Led by Private Companies' (14 July 2017).

128 Michael Sheetz, 'Japanese government launches \$940 million fund for space start-ups' *CNBC News* (20 Mar 2018) <<https://www.cnn.com/2018/03/20/japan-offers-940-million-to-boost-nations-space-startups.html>> accessed 24 June 2018.

129 Spacetide 2018 <<http://spacetide.jp/2018/>> accessed 24 June 2018.

130 All Nippon Airlines, 'ANA Avatar' <<https://ana-avatar.com/english.html>> accessed 24 June 2018.

Unseemly players have also been researching potential in the space industry. For example, Shimizu Kensetsu, one of Japan's top architectural/construction firms, presented at SPACETIDE 2018 that they have been researching market entries into private space business for 30 years from the construction perspective. The company constantly researches how it can have a hand in the creation of spaceports, robotics, on-orbit structures, space tourism and other types of celestial construction projects. Another Japanese startup, called Euglena, is currently cultivating bacteria called Euglena in the International Space Station for commercial uses on Earth such as food, face cream and jet fuel.¹³¹

Considering all of these developments, it looks as if the pieces are finally starting to come together for Japan's space industry to take off. While it may not be as easy as a billionaire founder and large venture capital funds funding SpaceX, the capital available from large Japanese corporations and the government's active support to foster the industry is an excellent starting point for Japanese space startups to take off along with the implementation of the SAA.

V. Conclusion: Blasting Off to 2030

The Japanese government's Committee on National Space Policy argues that this could be Japan's "Fourth Industrial Revolution" in a report called "Space Industry Vision 2030" ("2030 Goals").¹³² The 2030 Goals set forth a metric of increasing the space industry by 5 trillion yen over the next 10 years.¹³³ Given the developments discussed in this paper, this actually seems feasible. However, in order to reach these goals a few factors become critical. First, in order to substantially expand domestic demand for space utilization, private space companies need to actually begin delivering services in the near future. The forthcoming Tokyo 2020 Olympics is providing some incentive – for example, ALE is scheduled to unveil their artificial shooting star services then. Second, in order to make Japan more internationally competitive through development of technologies, more funds need to be channelled into R&D both of large companies and small startups that are striving to revolutionize business and markets with the use of outer space. Finally and perhaps most importantly, venture companies and new entrants to the market that have potential need to be nurtured and supported with financing,

131 Euglena, 'Food, face cream and jet fuel: Japanese firm finds many uses for algae,' CNN Tech (24 Mar 2017) < <http://money.cnn.com/2017/03/24/technology/japan-algae-euglena/index.html> > accessed 24 June 2018.

132 Committee on National Space Policy, 'Space Industry Vision 2030' (29 May 2017) ("Space Vision 2030").

133 Director-General Yoshinori Komiya, 'New Basic Plan on Space Policy,' Office of National Space Policy, Cabinet Office (26 Feb 2015).

partnerships and any other resources that will enable them to succeed and liven the Japanese Space Industry.

All of these factors are now possible thanks to the SAA, the launching site of Japan's space industry. By finally providing a legal framework that private actors can utilize to explore their own ideas, space initiatives from private actors such as the use of remote sensing satellite data can liven the economy to start shifting the market demand of the Space Industry away from the government to other private actors. By further providing a liability framework that makes it extremely attractive for foreign actors to utilize Japan as the governing law of international space transactions, market demand from private actors hopefully will become a global one. Articles 35, 36 and 38(1) channel liability only to Japanese citizens and companies that are located in Japan that are directly involved with the launching of space objects. Additionally, the SAA has set its scope quite broadly without defining what "space activities" consists of so that future types of space activities can fall within the ambits of its licensing scheme. This allows for business lines of "new space business" such as space mining, space tourism and concepts that we have not contemplated as of the date of this paper to fall within government supervision and comply with Article VI of the OST. While activities spurred by the SAA to realize the 2030 Goals will not immediately skyrocket Japan to the level of the US and SpaceX within a decade, they certainly have the potential to enable Japan to develop a solid foundation for private space business to eventually become globally competitive.

However, time is of the essence. On January 21, 2018, New Zealand's brand new "spaceport," the world's first private orbital launch complex, launched its first rocket.¹³⁴ Meanwhile, the Japanese launch sites are barely being used despite having existed for many decades. Therefore, the most important factor for the Japanese space industry to reach orbit after its launch provided by the SAA and realize its 2030 Goals is industry momentum. More non-space industry corporations need to get involved either directly as actors or as investors of promising start-up ventures. While government subsidies and support will also increasingly become available under Prime Minister Abe, the infusion and of corporate capital into the private space industry as a main source of financing of new, revolutionary ideas seems to be the key to launching Japan into competition. The legal and financial paths have been unveiled. Japan now just needs to blast off.

134 Holly Ryan, 'Blast Off! Rocket Lab successfully reaches orbit on second attempt' (21 Jan 2018)
<https://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11979201>
accessed 25 June 2018.