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Space Security Policy in Japan and Poland

Abstract

This article refers to the Space security legislation in Japan and Poland. Both states have already prepared some legislation on Security in Space- the question is the following- if there is still a need of progress and if those presented legislation are sufficient for the practical purposes of the peaceful uses of Outer Space. Japan is a much more experienced state in using space than Poland; the same seems with the legislation. Poland as less experienced state in this matter has lots of ambitions to create the efficient legislation on Space security, so it must follow the good examples of states and institution in this matter. One of them is Japan. On the other state, Poland as a Member of EU must implement the European law in space security (in particular SSA), which seems to be priceless and efficient for the international cooperation in Space.

Key words: space security, legislation, policy, Space Situational Awareness, strategy

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Introduction

Space security is a very important topic for every state which is engaged in space activities. That is the reason why states are engaged in preparing legal background referring to this important issue. This article presents space legislation from “space power state” as Japan is and Poland approaches to establish some rules referring to space security as well based on the EU framework.

The legislation history in Japan is quite long and impressive. Fifty years ago, in 1969, a plenary session of Japan’s House of Representatives enacted the Resolution on Principles of Japan’s Space Development and Utilization, which has shaped Japan’s space programs for “peaceful purposes”. A week later, the words “peaceful purposes” were interpreted to mean non-military and non-aggressive. This principle of “peaceful purposes” is slightly different from how the international community generally understands it. In general, most countries read “peaceful purposes” as non-aggressive, which allows them to acquire military capabilities and conduct military missions. However, the Japanese government decided to include the non-military principle on top of the non-aggressive principle because of Article 9 of the Constitution of Japan that prohibits the possession of war potential. Since the decisions made in 1969, Japan’s space programs were limited to scientific purposes. Space was considered neither an economic resource nor a military resource – the Self-Defense Forces (SDF), Japan’s military forces, had limited access to space systems. The government’s interpretations and perceptions of the space domain did not change until the Basic Space Law (Act No. 43, 2008) came into force.

Space Law in Japan

The Basic Space Law is the first domestic law that stipulates the government’s role in space development. The law established a Cabinet-level council that determines Japan’s national space policy. Relevant ministries and agencies are forming their own space objectives and programs to meet the goals addressed in the national space policy. The law also represents a clear transition from the previous science-focused space policy. Nowadays, priorities include the commercial sector and national security. Other states are leveraging commercial sector capabilities to meet government demands. Japan is also

accelerating its efforts to utilize more commercially available technologies and services to realize government objectives. With respect to national security, the government currently has a legal basis to develop and utilize space systems for national security reasons¹.

The important players in national space activities are a few incorporated administrative agencies and some governmental ministries (such as Ministry of Education, Culture, Sports, Science and Technology – MEXT). Thus, an explanation of the framework of authorization, supervision and control exercised towards such agencies which have special relationships with the government is important for purposes of understanding how to implement international space law in Japan². They are responsible for preparing space policy and law.

Space Law Act was divided into few chapters, such as general provisions (Art. 1–12), basic measures (Art. 13), the master plan of the space (Art. 24), Space Development Strategy Headquarters (Art. 25–34, establishment of legislation on space activities (Art. 35) and supplementary provisions. This law is applicable to the development and utilization of space in accordance with the progress of Science and technology and other changes in domestic and foreign circumstances. It aims to promote comprehensive and systematic measures related to space development and utilization through the establishment of a system to contribute to the improvement of people's lives and economic and social development, as well as to contribute to world peace and the improvement of the welfare of humankind. The act refers to the peaceful use of space in accordance with the convention on the use of space development and other international commitments, such as the convention on the principles governing national activities in the exploration and utilization of outer space including the moon and other celestial bodies. The use of space development must be carried out to contribute to the improvement of people's lives, the formation of a safe and secure society, the elimination of disasters, poverty, and various threats to the survival and livelihood of human beings, the securing of peace and security of the international community, and the security of Japan.

1 T. Wakimoto, *A guide to Japan's Space Policy Formulation: Structures, Roles and Strategies of Ministries and Agencies for Space*, „A Working Paper on Japan's Space Policy” 2019, vol. 19, p. 10.

2 S. Aoki, *Regulation of Space Activities in Japan* [in:] R. Jakhu, *National Regulation of Space Activities*, Springer 2010, p. 201.

According to article 4, the utilization of space development must be carried out to contribute to the promotion of Japan's space industry and other industries by strengthening the technical and international competitiveness of Japan's space industry through the active and systematic promotion of space development and utilization, the smooth commercialization of the results of R&D (research and development) related to space development and utilization, and so on. Based on the fact that the accumulation of knowledge related to the universe is an intellectual asset for mankind, the utilization of Advanced Space Development and the promotion of space science should contribute to the realization of the dream of mankind to the universe and the development of human society. Art. 6 of the Space law refer to the international cooperation.

The Japanese government is responsible to formulate and implement comprehensive measures related to space development and utilization in accordance with the laws and regulations of Japan. In accordance with the basic philosophy (the Art. 9), local public organizations should establish and implement independent measures based on the characteristics of local public entities based on the appropriate role allocation with the national government in space development and utilization. The government also shall take measures necessary for strengthening the cooperation between the national government, local public organizations, universities, private enterprises, etc., to promote the space development and utilization effectively by cooperating with each other (Art. 10).

The second chapter of the Space law is reflected to the basic policy. There are provisions referring to the use of artificial satellites to improve people's lives. The state shall take necessary measures to ensure peace and security of the international community and to promote space development and utilization that contribute to the security of Japan. In order to promote the utilization of space and to strengthen the technological capabilities and international competitiveness of Japan's space industry and other industries, the Ministry of Land, Infrastructure, Transport and tourism will use the capabilities of private-sector businesses to systematically procure goods and services, and will conduct launch facilities (lockets) to enhance the technology and competitiveness of Japan's space industry and other industries. Art. 19 promotes of international cooperation in the field of space development and utilization.

The third chapter of the Space law is about the Basic Space Plan. The plan specifies the following items, such as: a basic policy on the promotion of space development and utilization, measures to be comprehensively and systematically implemented by the government concerning the

utilization of space development, matters necessary for the government to comprehensively and systematically promote measures related to space development and utilization. The plan is prepared by the Space Development Strategy Headquarters agreed by the Cabinet and the Prime Minister (who must make a public announcement of the basic plan without delay through the use of the internet and other appropriate means). In case to implement the plan, the right budget must be secured.

The fourth chapter of the Law refers to the Space Development Strategy Headquarters (with the Director General of the Space Development Strategy Division at the top), established by the Cabinet. They are responsible to promote the preparation and implementation of the draft of the basic space program. The government shall comprehensively, systematically and promptly implement the development of legislation on matters necessary to implement the convention on space activities and other international commitments concerning space development and utilization.

In supplementary provisions of the Space law there is also some provisions related to the Japan Aerospace Exploration Agency JAXA³. The government reviews the purpose, functions, scope of operations, the form of organization, and the administrative organs in charge of the agency, etc., with the aim of going forward one year after the enactment of this law⁴. Japan has managed to fundamentally reorient its space policy from fundamentally anti-military use to one that supports hard domestic national security and regional security goals. Japanese space policy is now specifically designed to support the US in the region. As late as 2012, JAXA, Japan's major space agency, was committed to expressly non-military space development. Yet, in 2016, it is actively developing space-based BMD early-warning technologies (Ballistic Missile Defense Systems), SSA architecture and tactical reconnaissance satellites. Even as a quick snapshot, these developments show how far the orientation of Japan's space program has changed in the last decade, a change that has been purposely accelerated over the last four years⁵.

3 More about JAXA's projects (such as the Kounotori – a cargo transporter to the International Space Station), organization, research on space science and cooperation and other activities, see "JAXA – explore to realize" – brochure presented at Colorado Springs Seminar in April 2019.

4 www8.cao.go.jp (22.08.2019).

5 P. Kallender, *Japan's New Dual-Use Space Policy The Long Road to the 21st Century*, Center for Asian Studies, IFRI (Institut Français des Relations Internationales), November 2016, *Asie. visions* 88.

The Basic Plan on Space Policy

The Basic Plan on Space Policy is formulated to propel policies regarding Japan's space development and use, comprehensively and systematically based on Article 24 of the Basic Space Law (enacted in 2008, Law No. 43), and is considered to be the most fundamental plan of space exploitation. National Space Policy Secretariat plans and designs policies to be incorporated in the Basic Plan, including those discussed in the Committee on National Space Policy⁶.

This plan is the first of its kind since the establishment of a system for prompting Japan's space policy in an integrated manner, including the establishments of the Office of National Space Policy and the Committee on National Space Policy in the Cabinet Office. Japan has been faced with increasing demands for safety and security in light of the international situation, as demands for security including recovery from the Great East Japan Earthquake, establishment of a social and economic structure that can deal with huge risks, and strengthening of disaster management and mitigation.

The previous version of the Basic Plan on National Space Policy was laid out on the assumption of a budget of up to 2.5 trillion yen in five years from both the government and the private sector. The private sector has been unable to find sufficient private or foreign demand. It was decided that the government should promote the space policy under which going forward it focuses on the areas with high priority, instead of deeming every project as essential, in order to achieve maximum effectiveness under limited resources. In chapter 1 (Status of the Basic Plan on Space Policy and the New Structure) there is stated that the Basic Plan on National Space Policy is established as the plan at the most fundamental level for Japan's development and utilization of space according to Article 24 of the Basic Space Law (Law No. 43, 2008) in order to promote integrated and systematic measures for Japan's development and utilization of space. The Basic Plan on National Space Policy covers a five-year period. However, it should be reviewed as needed.

The Cabinet Office (1.3) has been assigned a commanding role in Japan's space policy by an amendment of the act (Law for Partial Amendment of the Law for Establishment of Cabinet Office) in July 2012. This enables the government to promote Japan's space policy in a more integrated and systematic manner.

6 <https://www8.cao.go.jp/space/english/index-e.html>.

The Cabinet Office is now responsible for coordination between agencies concerned, e.g. promotion of the development and utilization of space, and estimation of expenditures for the development and utilization of space. It is also responsible for administrative work of the development, maintenance and operation of satellites for public or official utilization in a variety of sectors, such as Quasi-Zenith Satellite System (QZSS), whose objective is satellite positioning, navigation and timing (PNT). The Office of National Space Policy is responsible for the project. Satellite positioning, navigation and timing involves many government agencies, such as the Ministry of Land, Infrastructure, Transport and Tourism; the Ministry of Economy, Trade and Industry; the Ministry of Agriculture, Forestry and Fisheries; the Fire and Disaster Management Agency; and the National Police Agency. Also, the private sector has created a variety of service industries that use data from positioning, navigation and timing satellites. Using GPS, for example, there are monitoring services for children and elderly people, logistics monitoring systems for food and other things, and financial transaction processing systems that use highly accurate timing information. So today, services that use GPS cover all around our daily lives. The QZSS can contribute to stronger international competitiveness of Japan's industries; increased efficiency in both industrial and government activities, as well as daily life; and to the enhancement of Japan's international presence, such as in collaboration with not only the United States but also Asia-Pacific economies⁷.

Japan Aerospace Exploration Agency (JAXA)⁸ has been positioned as the core organization that provides technical support for the entire governmental development and utilization of space projects. It is stipulated in law that JAXA's Mid-Term Goal should be based on the Basic Plan on Space Policy. JAXA is therefore supposed to make necessary contributions to the governmental space policies specified in the Basic Plan. On this basis, the Prime Minister, as the head of the Cabinet Office which is responsible for the administrative work for the promotion of space utilization, has now become one of the competent ministers of JAXA. In addition, JAXA has begun to do support work, such as giving advice to private enterprises upon their requests. Now the Prime Minister and the Minister of Economy, Trade and Industry play a major role in promoting industry through JAXA in cooperation with the Minister

7 https://global.jaxa.jp/article/special/michibiki/kunitomo_e.html.

8 <https://global.jaxa.jp> (12.01.2019).

of Education, Culture, Sports, Science and Technology and the Minister of Internal Affairs and Communications. Japan Space Agency JAXA is very active on ensuring stable use of outer space. JAXA focuses on the following objectives during the new starting period, in order to support the government and achieve its goals in the space policy to: 1) strengthen the cooperation with National Bodies of the national security affairs; 2) extend Japanese space activities and related business by developing new partnerships with private companies; 3) promote international space exploration program with Japanese space science and technologies with cutting edges; 4) strengthen the international competitiveness in next-generation aircraft engine.

JAXA promotes projects in consideration of four policies below: Secure national security and realize safe and secure society, expand utilization of space and industrial promotion, creation of world class results in space science and exploration fields, keep and step up presence of JAXA in the world and promote the aeronautical industry and strengthen international competitiveness.

Chapter 2 of the Basic plan states about basic policy to promote the development and utilization of space. Space utilization enables us to provide services covering an area beyond national borders and detect phenomena in a global scale. Due to such characteristics, space utilization is actively prompted across the globe both in national security and civil activities, particularly in the fields such as satellite navigation, communications (broadcasting) and remote sensing. It has become widespread in the society to considerable extent as an important social infrastructure. Since the 1990s, the space industry has experienced reorganization and rapid commercialization as a result of the decrease in military demands after the end of the Cold War. The utilization of space has expanded in the private sector, and the private-sector services are increasingly adopted to fulfill the demands of national security and other government-driven sectors. For example, Europe pioneered in public-private partnerships in the commercialization of space technology, while the U.S. decommissioned its Space Shuttles and now purchases commercial services for the transportation of crews and materials to the International Space Station (ISS).

The governmental investment for space development has been more focused on research and development (R&D) since 1990. As a result, the industry became over-dependent on the governmental investment in R&D, and there is a concern that may undermine the industry base, as seen in the withdrawal of some enterprises. Space utilization should be promoted hereafter in fields of critical importance to the industry and human life such as

meteorological and communications/broadcasting satellites. For this purpose, government-supported research and development should be conducted in a manner that outcomes of such research and technology contribute to sophistication and improved efficiency of the industry, administration and people's lives.

The measures and policies listed in the plan will be promoted in order to promote the development and utilization of space comprehensively and systematically. It's about implementation of the measures based on the Basic Plan on Space Policy, follow-up of implementation status and public and linkage with policies in other areas⁹.

Japanese Space Security Policy

The basics of Japan's space policy are designed to achieve the following through the utilization of space in accordance with the idea of the Basic Space Law: (1) advancement and efficiency of the industry, human life and the administration, national security in a broad sense, and economic development (expanding the utilization of space); and (2) maintenance of Japan's capacity of autonomous space-related activities by preserving and strengthening the industrial base based on generated demands from the private sector (ensuring autonomy).

Utilization of space is one of the most important means to strengthen the capabilities of continuous surveillance of sea and air surrounding Japan, the detection of signs of events, and the prompt delivery (sharing) of obtained information. For Japanese sustainable space development, establishing the Space Situational Awareness (SSA) system for the purpose such as to protect satellites from possible collision with space debris (junk in outer space, called as debris) has been gaining importance as utilization of space is extended for both civil and military purposes.

Space security in Japan is crucial. The priorities are the following: to strengthen international cooperation between like-minded states for integrated SSA/SST (Space Surveillance and Tracking)/STM (Space Traffic Management), to foster commercial activities and deepen academia

9 <https://global.jaxa.jp> (12.01.2019).

collaboration for sustainable SSA/SST/STM and maximize the use of existing ground facilities of the like-minded countries for SSA/SST/STM network¹⁰.

Japan's Basic Plan sets Space Policy's objectives, such as ensuring National Security in Space and strengthening of national security ability. JAXA's activities contribute to Basic Plan are: 1) contribution for Space Situational Awareness (SSA); 2) R&D for Space debris threats and risks; 3) support government in making international standards and regulations on space utilization.

JAXA is a big contributor to Space Situational Awareness. Their tasks are: to develop and operate JAXA's SSA related facilities and conduct, R&D¹¹ activities to advance our SSA abilities, upgrade our SSA related facilities and contribute to the intergovernmental operational framework by 2023 and integrated with MOD (Ministry of Defense) and other Japanese governmental institutions. JAXA is obliged to support the government for making international rules on the space utilization. JAXA leads Japan delegation for Japan in Inter Agency Space Debris Coordination Committee (IADC¹²). Based on R&D and the international technical trend, JAXA contributes for IADC and other international committee, UN/COPUOS, ISO and others. In R&D (research and development) for Mitigating Space Debris threats and risks, JAXA continue researches for observation, collision avoidance, protection and ADR, make space debris removal service into a new market and demonstrate the world's first active debris removal at low cost. JAXA is a partner with private sectors; by joint programs including research, ground testing, and demonstration in orbit and so on¹³.

Due to the fact, that space debris is a major threat for operational satellites¹⁴, JAXA started some researches on atmosphere. One of JAXA

10 H. Yamakawa *Member of Committee on National Space Policy*, Cabinet Office, GOJ, Professor of Kyoto University, Symposium March 2018 Tokyo.

11 M. Matsuura, *JAXA's endeavor to SSA*, March 2nd 2017, Tokyo.

12 IADC- the Inter-Agency Space Debris Coordination Committee is an inter-governmental forum whose aim is to co-ordinate efforts to deal with debris in orbit around the Earth founded in 1993.

13 H. Yamakawa, *JAXA's Activities on Ensuring Stable Use of Outer Space*, Tokyo symposium, February–March 2019

14 M. Ohnishi, *JAXA's debris removal program*, JAXA has been promoting the comprehensive approach to space debris measures; Now JAXA focuses on the R&D for space debris removal in order to found the new enterprise. JAXA will proceed the R&D under the Industry-Academia-JAXA cooperation; Tokyo, International Symposium on Ensuring Stable Use of Outer Space, 28 February–1 March 2019; K. Yamanaka, *Space debris research in JAXA*, 1st of March 2019–JAXA continues researches on both technical and non-technical aspects. JAXA contributes continuously to the cooperation with international partners;

primary interests was how to increase the effectiveness of both of new SSA facilities. There are projects to be able to observe at least 10,000 objects, and obtain measurement data directly¹⁵. JAXA will also contribute to Japanese SSA activities by providing data with the future system as well as by supporting from a technical point of view. The development of the new SSA system is ongoing. Its operation is expected to start in 2023¹⁶. Implementation of basic plan on space policy and research and develop plan JAXA should change itself to an organization which leads society by science and technology and creates new values. JAXA promotes projects in consideration of 4 pillars below (secure national security and realize safe and secure society, expand utilization of space and industrial promotion, creation of world class results in space science and exploration fields, promote the aeronautical industry and strengthen international competitiveness). In 2017, MOD and JAXA concluded the partnership agreement which provides the framework of general cooperation concerning SSA. In the same year, ASO (Airforce Staff Office) and JAXA concluded another appendix to the agreement relating to design or construction of SSA system¹⁷.

Space industrial basis is at stake. Industrial basis is essential for conducting space activities autonomously. The lack of foreseeability of investments led to continuous business withdrawals and made new entries stagnated into space industry. In new policy, growing importance of outer space for national security policy can be noticed. There is necessity to utilize space for the security area proactively based on the National Security Strategy (Advent of a new era for US-Japan space cooperation). There is lack of organic cycles among science & technology, national security and industrial vitalization – Insufficient efforts of R&D in use of space for security purpose and of making the most of outcomes of R&D in civil space areas for individual vitalization. Growing risks against stable use of outer space – increased number of space debris and growing threats of ASAT attacks; so there is a necessity to cope with such risks

JAXA will partner with private sectors in joint programs including research, ground testing, and demonstration in orbit etc. utilizing JAXA's experience and lessons learned; see more at: <http://www.jaxa.jp/projects/ssa/>.

15 S. Nakamura, *Research and Activities on SSA at JAXA*, Tokyo symposium, 8 March 2018.

16 S. Ogawa, *SSA activities at JAXA*, 28 February 2019, Tokyo symposium.

17 S. Yoshitomi, *SSA Capabilities and Policies in Japan, Space Situational Awareness Workshop: Perspectives on the Future Directions for j*, January 24–25, 2019.

sustainably and ensure stable use of outer space¹⁸. In 2017 budget plan half of percentage was sent to Ministry of Education, Culture, Sports, Science and Technology (MEXT); the rest to Cabinet Satellite Intelligence Center (CSICE) and Ministry of Defense (MOD)¹⁹. Those ministries are developing SSA related facilities. New system is being developed. It constantly monitors satellites of each countries and space debris, supporting safe operation of satellites, which strengthen system for collecting information of satellites.

JAXA contributes to space security with limited budget. Instruction by Prime Minister Abe (Excerpt)-16th strategic headquarters for space policy (12 December 2017) in recent years, as threat against the national security environment surrounding Japan increases, space security is extremely important. MOD and JAXA are cooperating. JAXA (Telescope Bisei, Control System, Space Radar Kamisaibarais) is sending to MOD (Surveillance Sensor, Operating System) the data obtained by sensors and MOD data utilized for research purpose. MOD is sharing data with the US. The discussions with France are ongoing.

In Space Security Maritime Domain Awareness (MDA) related ministries (National Security Secretariat, Secretariat of the Headquarters' for Ocean Policy, and National Space Policy Secretariat) are deepening study for utilization of comprehensive information of ships, aircraft, satellites and other vehicles etc. In the Space Policy there is a target to strengthen the Space Security Domain Mission Assurance. It can be done by preparations for developing measures, information sharing among ministries (threat & risk information sharing, interagency cooperation in emergency), implementation of vulnerability assessment (establishing of method of vulnerability assessment, related ministries conducting vulnerability assessment). The

18 H. Uchikura, *MOD'S SSA Project - Initiatives Taken by Koku-Jieitai*, Tokyo symposium 2019; H. Takahashi, *Trend in Military Satellite Communications*, Tokyo symposium February 2018.

19 MOD (Koku-Jieitai-Japan Air Self Defense Force) cooperates with the US Forces in SSA domain; the more value of use of space, the heavier dependence on the domain- the greater reliance on space, the more serious consequences if the use is impeded. [National Defense Program Guideline]; Defense Capability is the ultimate guarantor of its security, Priorities in strengthening Defense Capability means acquiring and reinforcing space capability [Mid Term Defense Program]; Acquiring and reinforcing capability to ensure stable use of space; Acquiring and reinforcing capability to continuously use space; Koku-Jieitai will contribute to safety, stability, prosperity and development of the human society by collaborating and cooperating with national related ministries, the ally and partners; acquiring and reinforcing space capability; ensuring stable use of space. See more at H. Sugai, *Toward Acquiring and Enhancing Space Capability*, Tokyo seminar 2019.

measures for Strengthening Mission Assurance are: Construction of resilient system (Diversification, proliferation), Defensive operations (SSA etc.) and Reconstruction after incident. Strengthening Space Technologies & Industries can be achieved by promotion and enhancement of civil space industries, development and utilization of new space technologies (ex. responsive small satellite and launch system); Ensure supply chain of space system (i.e. components and parts); Government procurements in space industries, Supporting companies reaching out to overseas markets.

Space Domain Mission Assurance is the first priority in space policy. Space Domain Mission Assurance (assuring the ability to achieve the objective of continuous and stable use of relevant space systems by detecting and avoiding threats and risks, strengthening the resiliency of systems, and early recovery of functions in the event of a situation where threats and risks related to space systems have been actualized). Space Domain Mission Assurance is: Defensive Operations (Strengthening threat and risk detection, timely provision of warning, strengthening and operational ability), Resilience (Protective Measures, Distribution of Equipment and Redundancy of Means) and Reconstruction (System recovery, Substitute systems)²⁰. The future challenge is to strengthen collaboration towards integration of space, cyber, and intelligence.

Japanese Space industry

The development and utilization of space in Japan have already become common as an indispensable basis for everyday life. Examples include: weather forecast with meteorological satellites²¹; data communications

20 S. Takada, *Space Policy of Japan*, March 2017, Japan Forum February–March 2017.

21 M. Ishii, *Research and Operation of Space Weather forecast in Japan*, Tokyo symposium 2018; National Institute of Information and Communications Technology (NICT) is involved in Space Weather researches (SWE). It is eagerly required to estimate the quantitative social impact of SWx. Some national governments (e.g., US, UK, Korea), international organizations (e.g., ICAO), and private companies (e.g., Lloyd) reported documents related to SWx disaster and mitigation. NICT has been operating space weather forecast since 1988 and improving the precision of the forecast using cutting-edge technology. The framework of space weather services has been assigned in the thematic priorities of UNISPACE+50. This frame work should be required also in the operation of ICAO space weather centers. Many of Asian countries are aware of the importance to measure space weather and are interested in working for space weather service. A decade ago the ground based observatories had clustered on developed countries. Now we are on the phase to spread the points all around the world. We need to discuss the necessary tasks and strategy

and broadcasting via dedicated satellites; cartography, resource survey, agriculture, forestry, fisheries, and disaster monitoring in conjunction with land and ocean observation satellites; car navigation and geographical survey with GPS. However, applications other than those examples are still in the first stage. It is an urgent issue to exploit the maximum potential of the utilization of space in order to upgrade and streamline the industry, human life and the administration as well as to improve disaster management etc.

An important target is to develop the industry. Space industry is an important base for the national space activity. It is a promising source of innovation due to its aggregation of cutting-edge technologies and the wide range of supportive industries, which is expected to bring about far-reaching spin-off effects on the whole industry and significant economic effects. The space industry also has connections with the service industry through communications/broadcasting, map services using satellite imaging and positioning services, such as navigation. The current financial stringency limits the government to support the space industry with sufficient procurement orders. Some private surveys indicate that the sales and number of employees of the Japanese space industry is currently about 260 billion yen and 7,000 workers, respectively, down from over 350 billion and nearly 10,000 in the latter half of the 1990s.

A key factor for sustaining and strengthening the industry base of Japan is the growth of the Japanese space industry through satisfying the private and overseas demands in global competition. Promotion of international cooperation is crucial for the Japanese government. Japan has been active in addressing international issues through Group on Earth Observations (GEO), Asia-Pacific Regional Space Agency Forum (APRSAF), Sentinel Asia, and the Charter on Cooperation to Achieve the Coordinated Utilization of Space Facilities in the Event of Natural or Technological Disasters. For example, data from the Japanese satellites Himawari and DAICHI etc., have been provided for meteorology, disaster monitoring or climate change projection in Asia. Along with the participation in the ISS project and other space science and space exploration activities, Japan has built strong ties with other leading countries in space development and these performances have contributed to securing Japan's presence in the international scene.

how we drive the stream, for example, presentation to the decision-maker of the budget, education for glow up the next generation researchers/operators, framework of data sharing etc.

Development and utilization of space require a considerable amount of funds for developing and launching satellites. Since it is not realistic for Japan solely to cover the entire cost of such expensive programs, international cooperation and role sharing, as in the ISS project, are very important in order to cultivate a good international relationship that will realize effective utilization of space. For example, the Japanese remote-sensing satellite systems can be introduced to Asian and other emerging states where disaster management and monitoring are highly needed. A harmonious relationship beneficial to both Japan and a partner can be established through the joint operation of satellites and data sharing.

There is an increasing trend of taking into consideration the utilization of outer space for national security in foreign countries. In major countries of the world, information gathering based on remote sensing, satellite communications, satellite navigation and other practical applications of outer space for national security has been widely adopted and therefore, Japan considers also proper measures. In every country, there is an active effort toward establishment of cooperation with other countries despite severe finance constraints. Thus, the government takes part in the discussions about measures against debris, Space Situational Awareness (SSA) and other programs. There is an obligation to present a 5-year development and utilization plan for the national security of Japan, utilization of space serves as an effective means, and it is especially essential for the enhancement in interpretation of information, information sharing, and command and control means²².

International law and space diplomacy

Japan's contribution has been highly regarded by the international community, and it should utilize such recognition as a diplomatic asset in order to conduct "space diplomacy". Japan's international activities should not be limited to responding to requests from other countries but should involve efforts to build frameworks for mutually beneficial cooperation with partner countries, including support for overseas expansion of Japan's space-related businesses and industrial cooperation.

22 <https://www8.cao.go.jp/space/english/index-e.html> (11.11.2019).

An important issue on the global level is the establishment of international rules concerning utilization of space in order to ensure stable and sustainable space environment. In addition to the discussions at the Committee on the Peaceful Uses of Outer Space (COPUOS) and Conference on Disarmament (CD) in Geneva, Japan has to make a major contribution to the establishment of appropriate rules on utilization of space in both civil and national security sectors, such as an International Code of Conduct for Outer Space Activities proposed by EU.

Next target of the space diplomacy is the environment. From the viewpoint of friendliness to the global environment, space programs for effective and efficient solution of global environmental problems, such as climate change, are important. From the viewpoint of friendliness to space environment, prevention and reduction of space debris are important issues for space development and utilization. Some upper stages of launchers and fragments of decommissioned satellites remain on their orbits as space debris and may collide with satellites to cause heavy losses.

A large amount of debris was produced due to the experimental destruction of a man-made satellite with a ballistic missile by China in January 2007 and the collision between U.S. and Russian satellites in February 2009. It is expected that the number of debris particles will increase in a chain collision between the particles. Japan has proposed this concept to ASEAN states²³ in 2011 in order to enhance disaster response capabilities of the region through sharing disaster risk information obtained with satellites. Japan contributes to disaster monitoring and response in the whole ASEAN region via cooperative operation of satellites.

Japan prepared in G7²⁴ the statement on Non-Proliferation and Disarmament, (Hiroshima, in April 11, 2016). The statement is pointing out the need to evolve and implement principles of responsible behavior for all outer space activities in a prompt and pragmatic manner. It calls for taking appropriate measures to cooperate in good faith to avoid harmful interference with outer space activities. It suggests refraining from any action which brings

23 As of 2010, the Association of Southeast Asian Nations (ASEAN) has 10 member states, one candidate member state, and one observer state. ASEAN was founded on 8 August 1967 with five members: Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

24 G7-The Group of Seven (G7) is an international intergovernmental economic organization consisting of the seven largest IMF - advanced economies in the world: Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

about damage, or destruction, of space objects and implementing TCBMs, such as information exchange on space policies, information exchange and notifications related to outer space activities in a timely manner and an effective consultation mechanism.

Other Japanese initiatives The “Outline of Basic Objectives for Capacity-Building with regards to Developing Countries in the Space Field” has been announced in December 2016. Japan calls for continuing to support and utilize the Asia-Pacific Regional Space Agency Forum (APRSAF) and other dialogues to address Japan’s initiatives. There is a need to establish an integrated, harmonized, and comprehensive Space Traffic Management system is a very important challenge for future space activities. At present, developing rules regarding on-orbit space activities is a most urgent priority, in light of the clear threats of increasing space debris and orbital congestion. It is very important for policy makers to build consensus on some basic principles for outer space activities, which can form the basis for “technical and regulatory provisions”, meanwhile experts from related fields keep on analyzing these issues. Japanese policy makers must always take into consideration the possibilities of innovation caused by new technologies or business models, which can give birth to new types of space activities, as well as new tools for verification²⁵. STM issue can be connected with broaden issue, such as global space governance²⁶.

In addition to the countermeasures by the government, relevant agencies have to take appropriate measures from the standpoint of civil use, diplomacy and national security. The space development and utilization for national security are conducted in accordance with the Basic Space Law, international agreements concluded by Japan and principle of pacifism enshrined in the Constitution of Japan, in the light of the situation in Northeast Asia. Their main purpose is the enhancement of information gathering, surveillance and communications capabilities that will contribute to Japan’s national security. It is important for JAXA to make contributions to the utilization of space for national security, because its objectives were updated in the 2012 amendment of the act (Law of Partial Amendment of the Cabinet Office Establishment Law).

25 A. Saito, *Japan’s efforts for the rule of law in outer space – STM perspectives*, Tokyo, March 2nd 2017.

26 K. Suzuki, *How to Establish Space Governance?*, Tokyo symposium 2019.

Amendments of the Basic Plan for Space Policy

Japan changed its governmental structure in promoting space policy in 2012. But due to the shortage of materials translated into English, it seems not to be broadly known internationally about the Japanese government's space activities including governmental structure and behavior. The US system for developing space policy is more visible than Japan. This is beneficial for the space communities, including space industries, to anticipate what will happen in the near future. If the plan can't be implemented as initially planned, changes and actions tend to occur in space-related sectors. This seems to contribute to the active movement of US space communities.

On the other hand, Japan does not publish a new policy until the resources that are needed to execute the plan are prepared. It takes more time than the US government, but the Japanese government makes sure that the policy will be executed. This mechanism contributes to increased reliability of the Japanese government, and it is beneficial international cooperative projects like International Space Station and other space exploration efforts. Also, Japan started an effort to compile the roadmap of the Basic Plan on Space Policy in order to increase the visibility of governmental space activities for the space community, both domestically and internationally²⁷.

In January 2015, the new "Basic Plan for Space Policy" was determined. This policy sufficiently reflects the new national security policy. This policy is a long-term and concrete public activities plan for next 10 years and foreseeing coming 20 years. Comprehensive National Strategy is a first goal of Space Policy; the second is Space Policy Environmental Awareness surrounding Space Policy. There is a change in balance of power on space policy made by transformation from the US-Soviet bipolar structure to multi-polarized structure and by greater number of countries involved in space activities, and a corresponding growth in commercial space market.

In policy from 2015 the growing importance of the role of outer space to solve global challenges can be noticed. Global challenges such as energy, environment, food and natural disasters have come to the forefront and posing severe threats to the international community or necessity to contribute to solve global challenges using space systems are present. It can be also observed the growing importance of outer space for national security policy: necessity

to utilize space for the security area proactively based on the National Security Strategy and advent of a new era for US-Japan space cooperation.

This cooperation is crucial in SSA domain. SSA sharing agreements also allow the U.S. to share more information in a timely manner with the broadest range of partners. The U.S. aims to promote an interactive, exchange-based relationship with satellite owners and operators where all parties gain. This open exchange of information also supports efforts to detect, identify, and attribute actions in space that are contrary to responsible use and the long-term sustainability of the space environment. Sharing SSA information and collaborating with other nations and commercial firms promotes safe and responsible space operations. It reduces the potential for debris producing collisions and other harmful interference and builds international confidence in the responsible use of space systems²⁸.

The last Japanese Basic Plan, released on April 1, 2016, forges Japan's current national space policy. It is constituted by three goals: (1) ensure the security of outer space and national security through the use of space; (2) promote the utilization of space in the civil sector; (3) strengthen and maintain the competitiveness of the space industry as well as the science and technology foundation. A particular feature of the Basic Plan is that, since 2015, Japan's national space policy explicitly incorporates national security as well as industrial promotion. According to Defense Policies (as of January 2019) Japan's military space policy is formulated based on three national policies. The National Security Council (NSC) of Japan issues these policies. At the top of the hierarchy is the National Security Strategy (NSS) of 2013. The NSS aims to set comprehensive national security goals including energy, economic and military policies. Under this fundamental strategy, there is a long-term (about 10-year) defense strategy called the National Defense Program Guidelines for FY 2019 and beyond (2018 NDPG), which was amended in December 2018. The NDPG aims at defining the level of defense capability that Japan shall have to achieve the goals of NSS. More short-term goals (five

28 Space should be used for peaceful purposes so all can take advantage of the benefits that it brings to our planet. While we all continue to face new challenges in outer space, the space community must continue to work towards meeting these challenges through multinational collaboration. Speech presented at the Tokyo symposium by Col. Scott Trinrud, Tokyo, 2nd of March 2017. Despite governmental organization frameworks that appear almost same, the internal scheme of the development and implementation of space policy are different in the two countries. It is important for those studying national strategy to analyze each country's policy with this point of view.

years) are included in the Medium-Term Defense Program FY2019-FY2023 (2018 MTDP), which was also enacted in December 2018 to address major government acquisition plans and amount of equipment as well as estimated acquisition cost for the next five years. The 2018 NDGP objectives in space are built on previous NDGPs. The 2010 NDGP focused on establishing missile defense capacities and effective utilization of space-based ISR systems. The 2013 NDGP emphasized securing and protecting space assets by monitoring the space environment. Today, actual installation of SSA systems under the JASDF has been decided²⁹.

Poland in space security

Poland is not as experienced in space security as Japan. Poland is more active in space and legislation since the Polish Space Agency was created (POLSA). This Agency is a governmental executive body, subject to the Prime Minister. It consists of civilian and military personnel. It was established by the Act of 26 September 2014 and became fully operational at the end of 2015. The agency participates in fulfilling the strategic goals of the Republic of Poland by supporting the utilization of satellite systems and the development of space technologies. The main tasks of POLSA cover the following 5 areas: coordinating the activity of the Polish space sector on the national and international level, representing Poland in relations with international space sector organizations, supporting national science and business projects associated with space technologies, popularizing the use of satellite data by public administration and increasing the defensive capabilities of the country. The agency is executive in nature in accordance with the Act from 27 August 2009 in public financing (art. – Act of 26 September 2014) and it can create local branches of the agency. The headquarters of the Agency is located in Gdansk (Art. 3). The activities of the Agency are under the auspice of the President of the Council of Ministers (Art. 2). The duties of the agency are written in Article 3 of the Act. The President of the POLSA Council is composed of representatives of the government - one from each administration and four representatives of scientists and the industry with recognized achievements in research or business

29 T. Wakimoto, *A Guide to Japan's Space...*, p. 23–33.

and chosen based on their knowledge competence in areas concerning POLSA activities (Art. 14).

Polish Space law is still waiting for the Parliamentary approval. Several versions of the draft have been developed; at present, the Government Legislation Centre website has published a draft law on space activities and the National Register of Space Objects. The Act regulates: the rules of performing space activities and the rules of maintaining the National Register of Space Objects. Earlier, however, the amendment of the Act on POLSA will be processed. The changes proposed in the draft act are aimed at: to streamline and clarify the scope of tasks of the Polish Space Agency, as an executive agency to provide the necessary expert support and technological knowledge to other public administration bodies involved in space activities, and responsible for the preparation and coordination of the implementation of the National Space Programme; and to adapt the supervision of POLSA to the solutions in force in other European countries, especially in the Member States of the European Space Agency (ESA), as well as to introduce improvements in the organisation of POLSA.

Polish Space Strategy was published by the Polish Ministry of Economic Development in February 2017. The objectives are: increasing competitiveness of the Polish space sector and its share in turnover (increasing participation in the EU space programmes: SST Support Framework), Development of satellite applications, strengthening capacities in the area of security and defense using space (establishment of Space Situational Awareness System), creating favorable conditions for the development of space sector in Poland, building human resources for the Polish space sector. The Strategic issue is to obtain 3% of the EU market in 2030. National Space Plan (2019–2021) from 2018 states about the establishment, development and operation of a National Space Situational Awareness System (SSA) in cooperation with the EU SST consortium. The objective of the project is to enhance the security of citizens and infrastructure (Earth and space) in the context of space threats, to build national Space Situational Awareness (SSA) capabilities and to prepare for commercial exploitation of services provided in the area of SSA. The first stage of the activity is to launch basic functionalities of the national SST system (Space Surveillance and Tracking), inter alia, through the development of infrastructure and capabilities enabling the implementation of tasks envisaged within the framework of Poland's future membership in the European SST consortium. 19th of December 2018– Poland joined the

European SST Consortium related to the tracking of space debris threatening infrastructure in space and on Earth.

Poland has become a full member of the European Space Surveillance and Tracking Consortium. The accession agreement was signed on 19 December 2018 at the seat of the Polish Space Agency in Warsaw. Joining the consortium will enable national entities to participate in projects financed by the EU, whose budget in the current and future financial perspective may amount to more than EUR 350 million. Membership in the consortium will allow for faster development of the Polish SST system, which will provide our country with data necessary to protect the planned missions of Polish satellites and will support national security and defense in monitoring threats from artificial space objects. Participation in the European programme also brings great scientific and business potential. Ensuring the operability of the observation sensors forming the Polish SST infrastructure, the possibility of their modernization and the demand for new ones – all this will facilitate a faster growth of competence in the area of SST and optical and radar observations for Polish entities, which already today gain experience by implementing projects under the optional SSA programme in ESA.

In view of the progressing commercialization of products related to situational awareness in space, domestic entities providing solutions and services in this area will be able to direct their offer also to the global market, which will grow as a result of the New Space trend, the increasing number of micro and smaller satellites, the planned development of mega-constellations and new areas such as satellite in-orbit servicing or, in the longer term, the sourcing of raw materials from celestial bodies. The Polish National Space Programme comes from December 2018 and still is in public consultations. Polish Space Agency (POLSA) will be responsible for the implementation of the programme. POLSA has considered a few areas of public support within the programme, such as, “Development of satellite systems” – with one of the priority projects: “Space Situational Awareness System”. The vital goal of the project is to provide a long-term access to the European and national space infrastructure and the services crucial for securing its operations. As a consequence, a network of sensors (telescopes, lasers, radars) responsible for space object observation and tracking is to function on the territory of Poland and staff is to be trained in order to perform tasks in the frame of SST.

Polish and European SSA

The European Space Situational Awareness System (SSA) consists of three separate segments: Space Surveillance and Tracking, especially in the context of Space Debris (Space Weather) and Near Earth Orbit (NEO) observation. The European SSA system has dual-use civilian and military applications. Additional components to the SSA system may be added in the near future. They are built on the basis of military requirements and compiled by the European Defence Agency (EDA). The conference also devoted a lot of space to the development of the STM (Space Traffic Management) system, which does not yet exist in Europe, unlike the USA. The goals for Space Situational Awareness are the following: society heavily dependent on critical space and ground assets, critical assets need to be protected against adverse effects from space, SSA Programme Declaration calls for independent European access to SSA data and services. There are three main areas: Space Weather, Near Earth Objects, Space Debris clean space. The participants in ESA SSA programs are 19 participating states. The good progress in the development of a SSA system in Europe has been observed and many actors involved: Member States, ESA, and EU. Distribution of roles needs to be finalized: development vs exploitation. There is still a performance gap in surveillance radars that is why there is a need to agree on a suitable governance scheme for the exploitation of future high performance European surveillance radar. There is a development of a high performance radar can be achieved within 3 years SWE and NEO systems will reach pre-operational status by 2020.

Thus, Europe has started its own preparatory programme of the SSA. International negotiations on permanent exchange of information and coordination, mainly with the USA, are also foreseen. Poland should also participate in these studies, which this year is to eventually become a member of the European SSA Consortium, where they play the biggest role: France, Germany, Great Britain and Italy. Much of the data to be dealt with by the established Consortium can be found in public satellite catalogues created by the USA and other countries, which are available on the Internet and can be freely used. That is why transatlantic cooperation is so crucial. Orbital paths are constantly changing or are disturbed by a number of factors, such as inconsistent degrees of attraction, solar activity or the effects of gravity of other orbital objects. International cooperation on SSA data sharing is weakened by issues such as liability and property concerns, data formatting standards and compliance with catalogued tools, and finally security (some satellites

do not provide data to the public). These issues are still being discussed in various international fora, including UN COPUOS (United Nations Committee on the Peaceful Uses of Space). The author follows these discussions on an ongoing basis and makes use of them in her scientific work. Space security has a multidimensional concept. It can be understood as Security in Outer Space, Outer Space for Security or Security for Space. The first means the protection of the space infrastructure against natural and man-made threats or risks, ensuring the safety and sustainability of space activities. The second means the use of space systems for security and defence purposes. Security for Space means the protection of human life and the Earth environment against natural threats and risks coming from space.

There are also several meanings of such definitions as: Space Situational Awareness (SSA) which can be understood as current and predictive knowledge and understanding of the outer space environment including space weather and location of natural and manmade objects in orbit around the Earth; SEPP (Space Environment Protection and Preservation, which is preventive and curative mitigation of negative effects of human activity in outer space on the safety and sustainability of the outer space environment and Space Infrastructure Security (SIS) as assurance of the infrastructure ability to deliver a service that can justifiably be trusted despite a hazardous environment.

There are some challenges to space infrastructure security, such as unintentional hazards (space debris, accidental interferences), Intentional threats (ASAT, malicious interferences, and cyberattacks), Space weather hazards (geomagnetic storms, solar storms).

There are rising challenges to space infrastructure security. Space is an increasingly congested and contested resource. Space is multiple and diverse, there are different mitigation and protection measures. There are many actors playing in the Space, so interdependence between them has been noticed. There are various trends in Space, such as increasing space activity, new concepts, connected space, strategic target, "space control" capabilities, etc. The most important is growing dependence on space for society and economy at large.

Growing security threats to civilian space programmes (access to space, cybersecurity in space, safe operations in space). Space is a critical infrastructure: satellites (jamming, spoofing, blinding), ground stations (hacking). Threats (military, non-military, natural) are understood and accepted and now are more properly and precisely assessed. Readiness to face

and respond to threats is growing in governments and private sector. It seems that there is a possibility to invest in handling a threat is developing and to find political solutions in managing threats³⁰.

Conclusions

In this article the attention was paid to the legislation issue on space security. It seems that both states: Japan and Poland (as an EU state) find this topic important and regulate this issue in the internal and regional (EU) law. Policy, strategy or plans on Space security are sensitive for both states, even though Poland has not achieved yet such a progress in this matter as Japan. The reason is probably very simple- Japan is much more experienced state as a regulator because of the longer history of using Outer Space on daily basis (institutions, regulators and space activities). Japan though is a good example to follow in the legislation on space security- SSA for Poland. The proper and practical legislation should be updated in case to serve to the public and not making not necessary barriers to the space market, having still the priority of security for all entities engaged in Space. This stabilized legislation is a great tool for international collaboration and cooperation in Space.

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Polityka bezpieczeństwa w Japonii i w Polsce

Streszczenie

Niniejszy artykuł odnosi się do przepisów dotyczących bezpieczeństwa kosmicznego w Japonii i w Polsce. Oba państwa przygotowały już pewne akty prawne dotyczące bezpieczeństwa w przestrzeni kosmicznej – pytanie jest następujące – czy nadal istnieje potrzeba zmian i czy te przedstawione akty prawne są wystarczające do realizacji praktycznych celów pokojowego użytkowania przestrzeni kosmicznej. Japonia jest znacznie bardziej doświadczonym państwem w korzystaniu z przestrzeni kosmicznej niż Polska; to samo wydaje się w przypadku ustawodawstwa. Polska jako mniej doświadczone państwo w tej dziedzinie ma wiele ambicji co do stworzenia skutecznego ustawodawstwa dotyczącego bezpieczeństwa kosmicznego, dlatego musi podążać za dobrymi przykładami państw i instytucji. Jednym z nich jest Japonia. Z drugiej strony Polska jako członek UE musi wdrożyć europejskie prawo w zakresie bezpieczeństwa kosmicznego (w szczególności SSA), które wydaje się bezcenne i skuteczne dla międzynarodowej współpracy państw w Kosmosie.

Słowa kluczowe: bezpieczeństwo kosmiczne, prawo, polityka, świadomość sytuacyjna w kosmosie, strategia