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Legal aspect of space activities in international context

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ABSTRACT

Land is considered as limited and consumable asset which should be managed with the sustainable development approach. Today, economic, social and cultural activities of humans on the land have obviously increased due to advances in technologies and globalization trends. These rapid developments have caused environmental, housing, food and energy resources management problems. The main requirement for efficient and effective land management is qualified, reliable, correct and up-to-date land information. Especially, space technologies that enable to obtain land related data have provided many opportunities to manage land resources and human activities in local, regional and global context. Communication, earth observation, navigation and meteorology services are among the main usage areas of space technologies for land management purposes. With the rapid advances in science and technology, space has begun to be seen as a new resources area. Space tourism and space mining are emerging as the new topics. All these developments have been transforming space into a commercial and industrial target as well. With the national space program in Turkey, our country has started new studies to develop space abilities. As known geomatics engineering has play key role in organizations that perform many different services by using the space technology products. In this context, local and global initiatives have an effect on our profession. Therefore, it is important to understand current legal regime in this area. In this study, main international agreements concerning space activities under the United Nations are summarized and the role of the International Telecommunication Union on allocation of satellite orbit is mentioned.

1. INTRODUCTION

Space law, which is considered as a sub-branch of international law, is the field of law that regulates studies and activities in outer space. Space law mainly consists of international agreements approved among states under the United Nations General Assembly (UNGA) and national laws.

Space law has emerged as a result of human efforts to launch artificial satellites into earth orbits. It can be stated that the launch of World's first artificial satellite Sputnik-1 into earth orbit in 1957 by Soviet Union is the starting point of legal studies aimed at regulating activities in outer space in the international context. In the following years, several international agreements concerning outer space activities were adopted by the UNGA (Can 2017). The Outer Space Treaty of 1967 which was signed under The UNGA can be stated as the

On the other hand, outer space has begun to seen as an alternative place for extracting mine and producing energy. Some countries have started to make own legal basis legal document which conducts activities of outer space (Can 2017).

In the early years, the scope of space law was formed as a result of the space activities carried out by the USA and the USSR. Depending on the advances in science and technology, the abilities for space activities have increased and new issues that should be regulated by the space law have been emerged.

Today, GNSS data has taken important role in our daily life via mobile phones and navigation devices etc. Many location-based applications receive the necessary data from GNSS satellites. In addition, environmental management, mapping, urban-rural planning, mining and other related activities have become increasingly dependent on data derived from space technology such as earth observation, communication, meteorological and navigation satellites.

On the other hand, outer space has begun to seen as an alternative place for extracting mine and producing energy. Some countries have started to make own legal

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regulations concerning the space mining. For instance; On 25 November 2015, U.S Government signed into law the U.S. Commercial Space Launch Competitiveness Act that has a title named as ""Space Resource Exploration and Utilization" which is about space mining (Can 2017). Considering current trends, it can be easily seen that space has an economic potential on space mining and production in space. All these developments have been transforming space into a commercial and industrial area that should be interested.

Today, countries have realized the economic and civil benefits of space and several countries are making great effort to increase their abilities for space activities. Our country has been working for a long time to take its place in space. The first step of space activities for Turkey was launching of communication satellites. Then, space developments of Turkey have continued with earth monitoring and remote sensing satellites. Our first reconnaissance satellite Göktürk 2 was launched in 2012. Also, several cubic satellite projects have been completed. With the achievement of these steps, Turkish Space Agency was established as an affiliated part of the Ministry of Industry and Technology by Presidential Decree No.23 dated 13.12.2018 (The National Space Program Document).

Recently National Space Program has been announced. Our country has started new studies in many areas including regional satellite navigation and remote sensing systems. Main objectives of National Space Program can be summarized as developing space technologies in Turkey, reducing dependency on foreign resources related to space technologies and increasing the awareness of public on space. By the help of missions that declared in National Space Program, economic and technological capacity can be increased extremely. Furthermore, outcomes of declared programs will contribute to public services and enhance the collaboration with other countries in scientific and commercial area.

Geomatics Engineering has play key role in organizations that perform many different services by using the space technology products such as earth observation and navigation satellites. Local and global developments on space activities have several effects on our profession continuously. Technical, legal and administrative developments will affect our professional directly. Therefore, in addition to technical details, it is also important to understand the legal status of relevant studies.

In this study, sources of international law concerning space activities are summarized in the context of only five main agreements adopted by the UNGA. And also, in order to highlight the status of geostationary orbit satellites, role of the International Telecommunication Union on space activities are mentioned.

2. MAIN SOURCES OF INTERNATIONAL LAW CONCERNING SPACE ACTIVITIES

Committee on the Peaceful Uses of Outer Space (COPUOS), which is considered the most important intergovernmental organization in the space field, became a permanent committee in accordance with the decision of the United Nations General Assembly in 1959 (Soysal et al.2018). Main contributions of the Committee are the creation of five international agreements concerning space activities and many decisions supporting the agreements as well as the creation of legally non-binding international documents (Soysal et al.2018).

Five international agreements were adopted by The UNGA between 1967 and 1979. These international agreements that aim to define general and objective rules in space law are still in force (Danışman 2019). These agreements can be listed as below;

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 27 January 1967, (Outer Space Treaty)
- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 22 April 1968, (Rescue Agreement)
- Convention on International Liability for Damage Caused by Space Objects, 29 March 1972, (Liability Convention)
- Convention on Registration of Object Launched into Outer Space, 14 January 1975, (Registration Convention)
- Agreement on Governing the Activities of States on the Moon and Other Celestial Bodies, 18 December 1979, (Moon Agreement)

Four Agreements that are expressed in the list with their short titles as Rescue Agreement, Liability Convention, Registration Convention and Moon Agreement elaborate and reaffirm the provisions of the Outer Space Treaty (Soysal et al.2018).

In addition to five agreements mentioned, the main international documents containing the principles on the subject of space by the United Nations General Assembly can be summarized as below (Danışman 2019);

- The Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space, UNGA Res. 1962 (XVIII), (13.12.1963)
- Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, UNGA Res. 37/92, (10.12.1982).
- The Principles Relating to Remote Sensing of the Earth from Outer Space UNGA Res. 41/65, (03.12.1986).
- The Principles Relevant to the Use of Nuclear Power Sources in Outer Space, UNGA Res. 47/68, (14.12.1992).
- The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, UNGA Res. 51/122, (13.12.1996).

3. LEGAL STATUS OF SPACE IN ACCORDANCE WITH THE FIVE INTERNATIONAL AGREEMENTS UNDER THE UNGA

First of all, it should be said that boundary of space is not described in international law. Whereas, many countries define the Karman Line which is 100 km above the sea level as the boundaries of outer space, NASA defines the space limit to be about 80,5 km above the sea level (Sarıkaya 2020). Our country states that definition and delimitation of space should be defined by joint work with International Civil Aviation Organization (ICAO).

Outer Space Treaty includes basic principles on international space law. The main purpose of the Treaty is to ensure the exploration and use of space for peaceful purposes (Soysal et al.2018). The most basic principles that stated in Outer Space treaty can be summarized as follows:

- *As stated in Article 1, "the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be province of all mankind."*
- *As stated in Article 2, "outer space, including Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any others means."*
- *As stated in Article 4, "The Moon and other celestial bodies shall be used by all States Parties to Treaty exclusively for peaceful purposes. "*
- Statement in Article 6 can be summarized as states are internationally liable for damage caused by their space activities.

Rescue Agreement elaborates the Article 5 and 8 of Outer Space Treaty. This law consists of 10 articles. The main purpose of this agreement is to guarantee all possible steps must be taken by the all parties to rescue and assist astronauts in cases of accidents, emergencies and compulsory landing that may occur during space mission.

Liability Convention which consist of 28 articles elaborates article 7 of Outer Space Treaty. According to Article 2 in Liability Convention, "*a launching State shall be absolutely liable to pay compensation for damaged caused by its space objects on the surface of the Earth or air craft in the flight*. "The term of "damage", "launching State" and "space objects" are expressed in the Article 1 of this convention. Article 3 and 4 express the types of liability for damages occurred. Also, the procedures for claim to compensation are stated in this convention.

Registration Convention was adopted as a result of Rescue Convention and Liability Convention. This convention also elaborates article 8 of Outer Space Treaty. In accordance with Article 4 of Registration Convention; "*the name of launching State or States, an appropriate designator of the space object or its registration number, date and territory or location of the launch, basic orbital parameters including nodal period, inclination, apogee and perigee, and the general function of launching object*" should be registered in the secretary-General of The United Nations as soon as practicable.

Moon Agreement reaffirms and elaborates many regulations of the Outer Space Treaty. As stated in Article 1.1, "*the provisions of this Agreement relating to the moon shall also apply to other celestial bodies within the solar system other than the earth…*" Moon Agreement uses the expression of *"the common heritage of mankind*" for the Moon and its natural sources and reaffirms that the moon is not subject to national appropriation. Also, Article 11.5 of The Moon Agreement provides to establish an international regime which governs the exploitation of natural resources of the moon when exploitation activities are nearly become feasible. The main purposes of this international regime are listed in article 11.7 as well. Moon Agreement states that an equitable share by all States Parties should be made in benefits from space resources. Ince (2020) claims that several space-capable countries are not a party of this agreement because of article 11.

Status of International Agreements relating to activities in outer space as at 1 January 2020 which was shared by Office for Outer Space Affairs United Nations are on Table 1. In Table 1, TotalR refers to number of ratifications, acceptances, approval accessions or successions, TotalS refers to number of signatures only, TotalD refers to number of declarations of acceptance of rights and obligations.

Table 1. Status of international agreements relating to activities in outer space as at 1 January 2020

Items	1967 OST	1968 ARRA	1972 LIAB	1975 REG	1979 MOON
TotalR	110	98	98	69	18
TotalS	23	23	19	3	4
TotalD	0	3	4	4	0

Turkey ratified five basic international agreements regarding space activities which are mentioned in this paper.

4. THE ROLE OF THE INTERNATIONAL TELECOMMUNICATION UNION

At last, the role of the International Telecommunication Union (ITU) on coordination of the geostationary satellite orbit should be mentioned in briefly.

As stated by ITU webpage, ITU was established in 1865 in order to ensure coordination of international connectivity in communication networks. ITU takes a role on allocation frequencies and satellites orbits. In accordance with the International Telecommunication Convention 1973 and its additional protocols, ITU carries out satellite orbit and frequency allocation (Erdem 2012).

Geostationary orbit is about 36000 km from the Earth equator. Satellites in geostationary orbits travel around the world at about 24 hours. Therefore, satellites in geostationary orbit remain the same location relative to Earth surface. Especially, geostationary orbit is used by telecommunication satellites. Geostationary orbit provides a globally

coverage with minimum satellites. For the reason of physical environment restrictions, satellites that can be used in this orbit is limited. Also, satellites located close to each other may also interfere with each other (İnce, 2020). Therefore, coordination of the satellites to be located in this orbit is inevitable.

A state planning to launch satellite in this orbit should apply to the International Communication Union (ITU). The country should launch its satellite according to the location given by ITU (İnce, 2020).

5. CONCLUSION

Within the scope of this study, it is obviously seen that international law concerning space activities is formed as a result of the developments of space studies. Year by year, space studies have become a significant global topic for all mankind. Today, many researchers have an opinion that some issues in international law concerning space activities should be discussed because capabilities of space works have increased. For example, recently space tourism and space mining have emerged as a new issue that should be regulated in the international context. A few countries such as the U.S Government and Luxembourg made some legal regulations on space mining activities as well.

Turkey is part of five main international agreements that are mentioned in this study. Besides the technical efforts, national laws regarding these activities should be prepared as soon as possible.

Recently, our National Space Program has been declared. Our country aims to start new studies in order to develop our space abilities. As known, space activities are related to several disciplines. Coordination of relevant sub-branches of space activities is important to achieve successful results. With the technical issues, in order to contribute the development of space industry, one of the main requirements is national laws that regulates the priority issues related to space technologies.

Outcomes of space activities support public services and scientific collaboration with other countries as well. These technical and legal improvements will support many public and private sector such as the GIS (geographical information system) and remote sensing industry that are directly related to Geomatics Engineering discipline in Turkey.

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