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Study on Northeast Asia's Feasible Cooperative Solution for Space Security and Space Development

Introduction

Northeast Asia (NEA) is generally defined as China, Japan, South Korea and North Korea. The three Northeast Asian countries, excluding North Korea, are ranked among the top 10 in the world regarding economic and military power.[2] North Korea's economy and military power are not among the top 10 in the world, but it has nuclear weapons. It would not be an overstatement to say that NEA is one of the regions with the highest military tension in the world. NEA countries do not have organisations similar to NATO or OSCE, despite such political/geographical security instability. In other words, rather than multilateral cooperation such as collective defence or cooperative security, bilateral cooperation exists in the region (including between the U.S., Russia and NEA countries) and has continued since the Korean War. Currently, it is divided into two blocs: 1. U.S. – Japan – South Korea; and 2. China – Russia – North Korea. However, in space, even North Korea, which has threatened the regional/international community with its nuclear test, is actively abiding by international law to gain recognition from the international community for space development.

In addition, no multilateral cooperation organisation is run by NEA countries on the ground. However, in the space field, we can find the Asia-Pacific Regional Space Agency Forum (APRSAF), led by Japan, and the Asia-Pacific Space Cooperation Organization (APSCO), led by China. They promoted space cooperation and were established in 1993 and 2008, respectively. However, no meaningful discussion exists on a cooperative plan to solve conflicts among NEA

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[2] Statistics Times 2021; GFP 2022.

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countries using APRSAF and APSCO. This study aims to derive collaborative problem-solving in NEA using APRSAF and APSCO. To this end, the three possible approaches are: First, it analyses why cooperative measures were impossible in NEA by comparing them with Europe. Second, it examines the threats to space security in NEA. Third, it identifies a cooperative solution by comparing the European Space Agency, APRSAF and APSCO.

Northeast Asia in Space

In this section, the paper explores why cooperative measures have been more difficult to implement in NEA by comparing them with Europe. It will also examine what NEA could mean for European space security.

Space development capabilities of Northeast Asian countries

Table 1: 2021 GDP Ranking and 2022 Military Strength Ranking

Rank	GDP Ranking (Statistics Times 2021)	Military Strength Ranking (GFP 2022)
1	United States	United States
2	China	Russia
3	Japan	China
4	Germany	India
5	United Kingdom	Japan
6	India	South Korea
7	France	France
8	Italy	United Kingdom
9	Canada	Pakistan
10	South Korea	Brazil

Source: Compiled by the author.

Table 1 above shows that Northeast Asia Countries have significant economic and military power. North Korea is not in the top 10 strongest military or economic countries. However, it could be considered a nuclear-weapon state.[3] Also,

[3] Kim 2021: 20.

Kim pointed out: "It is logical for economically powerful countries to increase national defense expenditures, especially if there is no regional economic/security organization based on mutual trust in their region."[4] In this sense, it is reasonable that NEA countries with sufficient economic capabilities aspire to develop their space sectors to improve their national security.

Table 2: Timeline of first orbital launches by country

Rank	Country	Date	Rocket
1	Soviet Union	1957 Oct.	Modified R-7 ICBM
2	United States	1958 Feb.	Juno I
3	France	1965 Nov.	Modified Diamant A
4	Japan	1970 Feb.	Lambda 4S (L-4S)
5	China	1970 April	Long March 1 (CZ-1)
6	United Kingdom	1971 Oct.	Black Knight
7	India	1980 July	SLV
8	Israel	1988 Sept.	Shavit 2
9	Iran	2009 Feb.	Safir-1
10	North Korea	2012 Dec.	Unha-3
11	South Korea	2013 Jan.	Naro-1

Source: Compiled by the author.

Table 3: Timeline of first Lunar Probes by country

Rank	Country	Date	Lunar Probe
1	Soviet Union	1959 Jan.	Luna 1
2	United States	1959 March	Pioneer 4
3	Japan	1990 Jan.	Hiten
4	China	2007 Oct.	Chang'e 1
5	India	2008 Oct.	Chandrayaan-1
6	South Korea	2022 Aug.	Danuri

Source: Compiled by the author.

Tables 2 and 3 above show how dedicated the four NEA countries are to space development and security matters. As of 28 December 2022, South Korea became the 6th country in the world to achieve a lunar exploration mission. NEA

4 Kim 2021: 21.

countries with economic, military and space power will be essential actors for the international community and European space security. In the following section, the research will compare Europe and Asia to determine what role Northeast Asia will play in Europe.

Northeast Asia to Europe: As a partner? As an alliance? As a threat?

The question arises if the cultural, linguistic, historical, geographical, etc. factors shaped the European cooperation and if they did to what degree? The idea that Europe has common cultural and ideological roots originating from Latin and Greek culture and language, or that Christianity also serves as a foundation is widespread. But it is yet unclear how much these factors influenced the process of European integration in the 20th and 21st century. A thorough multi-level analysis could be a subject to a future research project.

It is for certain, that Asian countries vary in size and population. The range moves from China, with a population of 1.4 billion, to Brunei, with a total population of 430,000. In addition, it is difficult to find homogeneity between various religions, such as Buddhism, Christianity, Confucianism, Hinduism, Islam, Taoism and various languages. Above all, many Asian countries experienced colonisation by ruling powers such as Portugal, Spain, the Netherlands, France, Britain, the U.S. and Japan. Even after the ruling powers left, it created a new culture with the ruling powers' social, political and economic legacy.[5] As a result, it is quite challenging to cooperate with shared values and ideologies.

In addition, the NEA region was divided into two parts after the Korean War: 1. the democratic bloc with the U.S., Japan and South Korea; and 2. the communist bloc with the Soviet Union, China and North Korea. In this situation, could Northeast Asian countries be partners, allies, or threats to European space security? All three options are possible. There are countries in the NEA region which share similar ideologies, as most European countries, and there are also countries with less convergent ideologies. National interests might also contribute to any outcome regardless of the ideological background. It is possible even for countries having seemingly opposing ideologies to form partnerships or even strong alliances if the conditions are right. Understanding NEA space security is likely to be essential for European space security in the future.

[5] Beeson–Stubbs 2011: 2.

The four major threats to NEA space security

Threat 1: Changes in Japanese legal interpretation

Phase I (1947–2007): Strict interpretation of peaceful purposes (non-military purposes)

After Japan's defeat in World War II, all armed forces in Japan were disbanded, and the newly enacted Japanese constitution of 1947, also known as the "Peace Constitution", clearly prohibited the establishment of an armed force in Japan. The particularly important part is Article 9 on the Renunciation of War below.

"… 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."

Article 9 is the part that most clearly shows how Japan would behave in the international community after its defeat. In other words, Japan promised the international community that it would not remilitarise by taking an 'anti-militaristic stance' as a peaceful country. Later, following the spirit of the Peace Constitution, in 1967, the principle of peaceful use of space was announced, and the militarisation of space was opposed. Additionally, according to the Peaceful Purposes Resolution (PPR) of 1969, Japan's space activities should be "limited to peaceful purposes", i.e. "non-aggressive" and "non-military".

However, after North Korea launched missiles over Japan in 1998, the strict Japanese interpretation of Peaceful Purposes Resolutions began to crack. In other words, Japan decided that the Japanese Self-Defence Forces (SDF) would "be allowed to use space-based communications, observation, and meteorological data that were already commercially available".[6]

Phase II (2008–2019): From non-military to non-aggressive

Japan has adhered to the strict interpretation of peaceful purposes, which states that space is used only for peaceful purposes. The peaceful purposes restricted

[6] Kallender 2016: 18.

Japan's space activities. More exactly, the United States dismantled Japan's aviation and space industries' production machinery suitable for the war industry and banned all lectures under the name of aviation at universities after the end of the Pacific War.[7] For this reason, the Japanese Basic Space Law (2008) was enacted to give legitimacy to developing space in a non-aggressive way, which is the most significant event in the history of Japanese space and defence policy.

Table 4: New interpretation from the Basic Space Law

JAXA Law No. 161 (2002)	**Basic Space Law (2008)**
Article 4 (Objectives of the Agency) **Only** for peaceful purposes	Article 2 (Peaceful Use of Outer Space) **from "non-military" to "non-aggressive"**

Source: Compiled by the author.

After enacting the Basic Space Law, Japan's first national space law, Japan changed its interpretation of peaceful use from "non-military" to "non-aggressive". It implies that Japan opened the door to military application, increasing military tensions among NEA countries.

Phase III (2020–): Counterstrike capabilities

It is the first time in 2022 that a Japanese defence white paper states that the Japanese Self-Defence Forces can review its "counterattack capability" in a crisis, even though Japan is constitutionally unable to wage war. The white paper introduces Prime Minister Kishida's speech at the joint press conference following the Japan–U.S. Summit Meeting by mentioning, "all the options will be there, not to exclude any one of them including counterstrike capabilities".[8]

Daniel Snyder, a researcher at Stanford University who is an expert on U.S.–Japan relations, said the following about the Japanese Ministry of National Defence's mention of counterattack capability in the 2022 Defence White Paper. "If there is a missile warming up on the launch pad in North Korea, we have the

7 Jo 1995: 9.

8 Ministry of Defence 2022: 196.

right to strike it before it hits us. That would be a self-defense".[9] Furthermore, the Ministry of Defence launched a Space Operations Squadron with about 70 members in 2020. Later it was integrated into the Space Operation force in 2022. Therefore, the interpretation of the peaceful purpose changed over three phases, and this became a factor further accelerating the Northeast Asian space race.

Threat 2: Similarities between ballistic missiles and space launch rockets and North Korea's strategic ambiguity

North Korea has claimed that they launched several long-range rockets, including Baekdusan-1 (Taepo-dong-1) and Kwangmyeongseong, since 1998. However, South Korea defines it as a "missile launch" and responds with sanctions.[10] Furthermore, according to Song, the international community is suspicious of North Korea due to 'the launching window'.[11] North Korea launched the rockets or missiles mainly at 9:00 a.m. to evade the surveillance of South Korea and the U.S. and to promote its regime. The satellite enters the sun's shadow when it launches in the morning hours, making it challenging to charge the battery using solar energy, resulting in malfunction or inoperability of the satellite. Therefore North Korea's launch of a satellite in the daytime can be interpreted as focusing on tests such as rocket operation checks and missile stage separation of long-range missiles rather than the success of launching satellites and entering orbit.

The second reason is the similarities between ballistic missiles and space launch rockets and North Korea's strategic ambiguity. In other words, when North Korea launches a space launch vehicle for artificial satellites, the most controversial issue is the difference between a space launch vehicle and an intercontinental ballistic missile. The Basic Guide by United Nations Office for Disarmament Affairs supported the similarities between missiles and space vehicle launches by mentioning: "There is no technical distinction between rockets and missiles, and the terms are often used interchangeably."[12] The basic technology is the same, but the payload type and flight path will make the difference. For this reason,

9 Park 2022.
10 Jo 2016.
11 Song 2021: 126.
12 Gillis 2017: 63.

verifying whether North Korea launched a missile or a space launch vehicle when seen from the outside is not easy. Therefore, these similarities and ambiguities create mutual distrust and intensify NEA's space and arms race.

Threat 3: Abolition of South Korea – U.S. Ballistic Missile Range Guidelines (1979–2021) and security dilemma in space

Table 5: South Korea Ballistic Missile Range Limits 1979–2021

Year	Range	Warhead weight	Use of solid fuel
1979–2001	180 km	500 kg	All
2001–2012	300 km	500 kg	All
2012–2017	800 km	500 kg	All
2017–2020	800 km	Unlimited	All
2020–2021.5	800 km	Unlimited	Military
2021.5–present	Abolished		

Source: Wikipedia 2022

South Korea had a limitation in developing space launch vehicles and missiles due to the South Korea – U.S. missile guideline. It has been revised four times since 1979 to gradually ease restrictions on the range, warhead weight and fuel. Guidelines that had restricted space development for 43 years were finally abolished in May 2021. It means a country has recovered its missile sovereignty, and restrictions and obstacles to Korea's space development have disappeared.

South Korea accelerated its space development after lifting the guidelines in 2021. The following year, Korea successfully launched the Korean Space Launch Vehicle-II (KSLV-II),[13] making Korea the world's 11th self-propelled space rocket launcher. Moreover, South Korea ranked the 7th country that can put satellites of 1 ton or more into orbit. Additionally, in August 2022, Korea successfully

[13] Also called Nuri (누리).

launched its first lunar orbital probe, Korea Pathfinder Lunar Orbiter (KPLO),[14] and entered lunar orbit on 28 December 2022.[15] Therefore, South Korea's KPLO became the world's 6th lunar explorer, excluding the ESA. The Republic of Korea (ROK) achieved space technology less than a year after the guidelines were abolished. This rapid change could create a security dilemma in space, likely destabilising regional security.

China's independent space system against the United States

China was the third country behind the U.S. and Russia to have its human-crewed spaceflight technology. China has also acquired in-space rendezvous, docking and spacewalking technology. Based on these technologies, it aimed to complete the Tiangong space station. Finally, China successfully launched the Shenzhou-15 to finish the construction of its space station, Tiangong. On 29 November 2022, Shenzhou-15, with three astronauts on board, arrived in 6 hours and 30 minutes and succeeded in docking with the Tianhe core module.[16]

Instead of belonging to the U.S.-led system, China has established an independent space system, such as the Tiangong space station, BeiDou Navigation Satellite System (BDS) and the establishment of APSCO. It is expected to accelerate the U.S.–China competition further and threaten the security of the NEA region, which is split by the U.S. and China. In order to solve those threats in the NEA cooperative way, it is necessary to figure out how to perceive space and neighbouring space activities. Accordingly, it is vital to compare and analyse four NEA countries' space policies, ESA, APRSAF and APSCO.

[14] Also called Danuri (다누리).
[15] Ministry of Science and ICT 2022.
[16] Xinhuanet 2022.

Four NEA cooperative solutions and conclusion

Solution 1: An agreed definition of peaceful use by APRSAF and APSCO

Table 6: Comparison of ESA, APRSAF and APSCO's structures

	ESA	APRSAF	APSCO
Led by	European Countries	Japan	China
Characteristics	Europe's comprehensive space agency	Open and flexible regional cooperative framework	Intergovernmental, independent non-profit body with full international status
	Member States work together, sharing financial and scientific resources to achieve the best results.	Voluntary and cooperative activities	The cooperative mechanism in the Asia-Pacific region for peaceful uses of space
Establishment	1975	1993	2008
Member states	22	52	8
NEA members	X	China, Japan, South Korea	China
Convention (Regulations)	Yes	No	Yes
Fund	It is mandatory, funded by a financial contribution from all the Agency's Member States, calculated per each country's gross national product. Member States also add voluntary funds to the budget	X	The Council, through consensus, shall decide the scale of the financial contribution of each Member State's average GDP per capita

Source: Compiled by the author.

Table 6 compares ESA to complement cooperative solutions through APRSAF and APSCO. APRSAF, established by Japan, has no convention or regulation. This makes the starkest difference from the other two organisations. APRSAF is an open and flexible regional cooperative framework, but it is challenging to operate projects for cooperative solutions because there is no financial contribution

obligation among member countries. Namely, it is easy to join due to this openness, and thus it is the reason APRSAF has 52 member countries. APSCO, founded in China, is similar to the ESA model. It is an intergovernmental, independent non-profit body with full international status where convention or regulation exists. Furthermore, its convention was registered in the United Nations as a Multilateral International Organisation. Also, there are financial contribution obligations among member countries, like ESA. Therefore, APSCO's cooperative solutions are feasible, but the cooperation is limited between 8 countries.

Therefore, APRSAF and APSCO must build the universally (at least regionally) agreed definition of peaceful use in Space on the convention or regulations of APRSAF and APSCO. Moreover, APRSAF and APSCO must make financial contributions mandatory to make cooperation solutions feasible.

Solution 2: Mutual agreements on the validation method

NEA intergovernmental organisations or APRSAF and APSCO should build a mutually agreed validation method to identify missiles and space launch rockets and clarify similarities and ambiguities. These agreements should be incorporated into national laws as well. In this case, NEA can prevent mutual distrust arising from being unable to distinguish between missiles and rockets, especially in the case of North Korea.

Solution 3: International customary law

If Solution 2 is no longer available for two reasons: 1. there is no legally binding agreement at the international or regional level; and 2. there is a great burden on the legal binding force among NEA countries, customary law could be an alternative and the most feasible solution. As pointed out earlier, North Korea showed a willingness to actively abide by the norms of the international community in order to participate in space development. In this aspect, the North Korean National Space Agency joined the International Astronautical Federation (IAF) and was approved on 15 October 2015, but on 16 October, the IAF decided to revoke the approval at the final deliberation stage. IAF explained that more

investigations were needed to determine whether the North Korean agency met the IAF's goal of pursuing only peaceful activities.[17]

Accordingly, North Korea's space development has been restricted, and Northeast Asia countries are not able to identify North Korea's intentions regarding space launch vehicles and missiles, which will increase distrust and anxiety. In this respect, customary law could be the most viable solution since it does not carry a legal binding force like international or regional law, but it could obtain the status of international or regional law when it becomes standard and globally accepted over time. Namely, if APRSA, APSCO, or a regional intergovernmental body conducts the validation method to identify space launch rockets 'repeatedly' and 'continuously', similar effects to international law can be expected.

Solution 4: Create more practical joint programs

NEA intergovernmental organisations or APRSAF and APSCO should create more practical joint programs in space, such as International Space Station (ISS). Multilateral cooperation in space among NEA countries would be possible if more significant common interests and coexistence were guaranteed and when the benefits of participating in the program are far greater than not participating. The case of North Korea is a suitable example of the above. As mentioned earlier, North Korea has been continuously conducting missile launches and nuclear tests without paying attention to the eyes of neighbouring countries and the international community. However, they have shown efforts and will to actively comply with international norms concerning space launch vehicles. In other words, North Korea considered that they could obtain more advantages from following international norms and taking a cooperative stance about space development. From this point of view, if NEA countries promote a joint program that guarantees more significant benefits, it is possible to maintain peace while enabling each country to develop in space. Hopefully it can also help to prevent tensions of the arms race and security dilemma in space from the Chinese independent space system against the United States. But development could also trigger this arms race; therefore, decision-makers and stakeholders should be careful about this.

[17] Choi 2017: 112.

Conclusion

Proceeding from what has been said above, it should be concluded that in Northeast Asia, divided into two camps, seems to be a limit to the direct application of international law led by the United States. In particular, it is hardly an exaggeration to say that there will be strong opposition from North Korea and China against the international law led by the U.S. Therefore, feasible solutions should establish 1. the regionally agreed concept of peaceful use in space through regional or intergovernmental space organisations; 2. mutual agreements on the validation method through regional or intergovernmental space organisations; 3. mutual agreements on the validation method through customary law; and 4. practical joint programs.

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