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AN ANALYSIS OF EMERGING SPACE CAPABILITIES IN EURASIA AND RISING SECURITY TENSIONS

Facilitating the Process
for the Development of an
International Code of Conduct
for Outer Space Activities

UNITED NATIONS

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An Analysis of Emerging Space Capabilities in Eurasia and Rising Security Tensions

Introduction

Eurasia is an active region in terms of space activities.[1] States in the region use sophisticated space assets to provide critical telecommunications, resource management, and disaster mitigation tools on a daily basis, and they explore new ways to use space to benefit national development. Some states in the region are exporting their knowledge, technology, and expertise to other actors seeking to benefit likewise. This has contributed to the rapid growth in space activities and the emergence of numerous new space actors all over the world.

While outer space was once the domain of only two actors, there are now over 60 states engaged in space activities. The dramatic rise of activities has changed the space environment significantly, making it increasingly "congested and contested".[2] As a result, as more states seek to utilize the most useful—but limited—orbits, the likelihood of clashing interests is also rising. An increased number of satellites on orbit, for example, means a greater likelihood of accidental collision or harmful interference. But threats deriving from accident are only a portion of the dangers to space assets. Technology is being developed that could be used for intentional harm or interference. This is resulting in heightened security tension throughout Eurasia, as well as the rest of the world.

Space activities are not excluded from the wider picture of regional security in Eurasia. The growing dependence of states on space-based services, combined with the emergence and proliferation of space-enabled weapons, has created anxieties about the integrity and safety of space assets, particularly because of the strategic advantages that space capabilities can offer the "haves" over "have-nots".[3] Given the dual-use nature of space technology—meaning that similar capabilities can be used for both civil and military purposes—even seemingly peaceful space programmes have created disquiet. It is not infeasible that, when taken in the context of wider security concerns, legitimate space activities might lead to open hostility or give rise to the spread of armed conflict into outer space. Such a result would impact all space actors, including the numerous emerging actors in Eurasia.

Against this backdrop, policymakers are looking for solutions to ease tensions over the development of space capabilities in order to ensure the long-term sustainability of space activities. One option that has gained significant support is the development of norms of behaviour for space activities. Such norms are voluntary "rules of the road" that set parameters for what is considered by the international community to be responsible behaviour in outer space. In particular, discussions are underway for the development of transparency and confidence-building measures (TCBMs) that might mitigate the impact of space capabilities on existing security dilemmas. However, because these measures are voluntary and must be enacted at the national level, it will be important to convince states that compliance with these norms will not jeopardize their national security objectives. This will present a significant challenge in Eurasia, where security tensions are high. As a number of Eurasian states are poised to be major space players in the near future with significant military space capabilities, their support will be of particular importance to the implementation of norms of behaviour.

Eurasian space resources and security concerns

Following the breakup of the Soviet Union, several states in Eurasia inherited space expertise and capabilities. The direct beneficiaries were the Russian Federation and Ukraine, two of the leading states in terms of space activities.[4] Other states, such as Kazakhstan (home of the launch facility at Baikonur), have indirectly become active players

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1 Eurasia, as defined by the United Nations, consists of those countries located in Eastern Europe as well as Southern and Central Asia.

2 F. Rose, speaking at the UNIDIR Space Security Conference 2013: Enhancing Confidence, Securing Space Stability, Geneva, 2–3 April 2013.

3 S. Unnithan, "India has all the building blocks for an anti-satellite capability", *India Today*, 27 April 2012; "U.S. missile shield no threat to Russia–Deputy PM", *RIA Novosti*, 16 April 2013; "Pakistan considers India's ballistic missile system as destabilizing development: Foreign Office", *The Nation*, 9 May 2013.

4 The Russian Federation and Ukraine were counted among the top 15 global leaders by the Futron 2012 Space Competitiveness Index, a comparative analysis on how states invest in and benefit from the space sector.

in the space domain as a result of their proximity and economic/political ties to major space players.[5] These states have sought to strengthen economic and diplomatic ties with aspiring space actors not only in the region but all over the world by exporting their space capabilities. For example, in addition to its own domestic investments in space technology, the Russian Federation provides launch services (the majority of which are provided in Kazakhstan) for numerous clients.[6] Similarly, Ukraine is working closely with Brazil to establish a new launch facility in South America based on Ukrainian technology.[7] The major exception in the region to the development of space capabilities is India, which has emerged as a leading space actor without external technical assistance.[8] The sum of the rapid growth in space activities—which is not limited to Eurasia but is gaining notable momentum there—is changing the daily realities of these activities.

While outer space provides benefits for people all over the world, the environment poses challenges. Outer space is inherently hostile to humans and their activities, with natural phenomena such as solar radiation and asteroids posing a constant threat to space assets. The rise of human space activities has introduced a new set of threats in addition to the natural ones. Most notable is space debris, which includes all non-functioning man-made objects and fragments in orbit or re-entering the atmosphere.[9] Debris travels at extremely high velocities and poses a significant threat to all space assets, regardless of origin or function. The immediate consequence of a collision is that each one creates even more debris, making this threat self-propagating. The fact that most space activities are carried out in a limited number of orbits, such as the low-Earth orbits (between approximately 160 and 2,000 kilometres above the Earth), means that the bulk of debris is concentrated there, increasing the likelihood of collision. The threat of debris is not theoretical, with several notable collisions having taken place in the last few years.[10]

While the threat of space debris exists outside of politics, space activities do not. Space technology has been widely embraced as a critical strategic domain by leading military powers, some of which have clashed in the last few decades.[11] Rising tension between India and China, both nuclear and space-faring states, could mean conflict between the two over the preservation of space capabilities.[12] India could face another rival in space if Pakistan, a nuclear neighbour, is successful in developing its own launch capabilities.[13] The tension between the United States and the Russian Federation over missile defence systems has also triggered renewed efforts by the Russian Federation to protect its interests from perceived Western threats.[14] Significant fears have also emerged that the United States and China could become adversaries in outer space.[15] It is feared that the tense relationships between the two could lead to space becoming a new theatre for armed conflict. An examination of space technology and its role in military activities reveals some of the sources of tension created by space capabilities and offers some insight as to how this tension might be mitigated.

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5 Z. Karipbayeva, "Development of space activities in the Republic of Kazakhstan", and N. Asselkan, "Regional prospects: the outlook for space activities across Eurasia from an independent media perspective", presented at the UNIDIR regional seminar Building Confidence for Eurasian Space Activities through Norms of Behaviour, Astana, 2–3 October 2013.

6 P.B. de Selding, "Russia boosting space budget to surpass China, equal Europe", *SpaceNews*, 5 June 2013; Committee on the Peaceful Uses of Outer Space, *National Activities and International Cooperation of the Russian Federation in the Exploration and Use of Outer Space for Peaceful Purposes in 2012 (as of 31 December 2012)*, UN document A/AC.105/C.1/2013/CRP.22, 18 February 2013.

7 A. Svitak, "Ukraine, Brazil prepare for 2015 Cyclone 4 launch", *Aviation Week*, 24 September 2013.

8 G. Madhavan Nair, "Achieving self-reliance in space programme", Indian Press Information Bureau, 2 August 2007.

9 Inter-Agency Space Debris Coordination Committee Space Debris Mitigation Guidelines, § 3.1; C. Mathieu, "Space debris: a challenge for all actors", presented at the UNIDIR seminar The Role of Norms of Behaviour in African Outer Space Activities, Addis Ababa, 7–8 March 2013.

10 "Ecuador Pegasus satellite fears over space debris crash", *BBC News*, 23 May 2013; B. Iannotta and T. Malik, "U.S. satellite destroyed in space collision", *Space.com*, 11 February 2009.

11 A. Lele, *Asian Space Race: Rhetoric or Reality*, Institute for Defence Studies and Analysis, 2013, p. 7.

12 R. Pillai Rajagopalan, *Clashing Titans: Military Strategy and Insecurity among Asian Great Powers*, Observer Research Foundation, 2012, pp. 33–35; C. Couvalt, "India races China in space for Asian prestige, military security", *Space Quarterly Magazine*, December 2012; A.K. John, *India and the ASAT Weapon*, Observer Research Foundation Issue Brief no. 41, 2012.

13 A. Lele, *Asian Space Race: Rhetoric or Reality*, Institute for Defence Studies and Analysis, 2013, p. 57; S. Khajuria, "Heavy Pakistani firing along international border, again", *Times of India*, 19 October 2013.

14 "Russia prepares a response to US missile defense plan", *RIA Novosti*, 11 October 2012; R. Pillai Rajagopalan, *Clashing Titans: Military Strategy and Insecurity among Asian Great Powers*, Observer Research Foundation, 2012, pp. 148–150.

15 M. Krepon and J. Thompson (eds.), *Anti-Satellite Weapons, Deterrence and Sino-American Space Relations*, 2013.

Growing mistrust through space capabilities

Several factors have given rise to new fears regarding the potential use of military space capabilities in an offensive role. One factor is that space assets have come to represent very real vulnerabilities, in that they provide critical services for numerous socioeconomic and defence sectors. This makes space assets attractive strategic targets and raises concerns, particularly among the established space actors, over the potential loss of space-based services. The failure of satellite systems, for example certain telecommunication satellites, could have significant repercussions for those relying on those services.[16] For states such as the Russian Federation and India, whose space programmes are major components of their critical infrastructure, space assets are a significant vulnerability.

Another contributing factor is that the technology to strike space assets is becoming more prevalent. Much of the current concern with counter-space technology can be traced to 2007 when China destroyed a failed satellite with a kinetic anti-satellite missile, followed in 2008 by the United States destroying a failed satellite as it re-entered orbit.[17] The former incident was seen as particularly dangerous for the overall stability of space because it created one of the largest man-made clouds of space debris in history, capable of causing catastrophic damage[18] Despite such negative consequences, India has taken steps to develop similar technology in order to protect its interests in space, and some have argued that India should take immediate steps to demonstrate such capabilities.[19] As a result, Pakistan might also follow suit.

Kinetic anti-satellite missiles are only one form of counter-space technology. Numerous other forms have emerged that are more cost-effective and logical in terms of asymmetric warfare. One form that has seen a rise in use is signal jamming, which does not physically affect a satellite but rather interferes with its functions. This technology has seen a significant increase in use since 2010.[20] Another form is based on cyberattack, wherein a hacker can take control of vulnerable space systems.[21] This form of attack is inexpensive but requires significant human resources to carry out.

Furthermore, the dual-use nature of space assets means that states with certain space capabilities, particularly space launch capabilities, will also possess certain attack technologies. A state that can launch a satellite into space could, with certain modifications, launch a warhead almost anywhere in the world. The launch of space assets by the Islamic Republic of Iran and the Democratic People's Republic of Korea, for example, were met with concern that the respective civilian space programmes are pretext for the development of ballistic missile technology.[22] At present, there are no means of verifying the intentions behind space activities, making space technology a source of suspicion between rival states. Given that there is still limited communication among states regarding strategic space policies, there is real concern that outer space activities could be a trigger for conflict through misperception or miscommunication.

These factors, coupled with pre-existing security tensions in Eurasia, have contributed to the growing fear that armed conflict will inevitably spread into outer space, just as it has through land, sea, and air. Having seen the value of space-based services for social, economic, and defence purposes, policymakers are seeking multilateral options

16 V. Anand, *China's Evolving ASAT Capabilities: Implications for India*, Vivekenanda International Foundation, 27 May 2013; Report of the Commission to Assess United States National Security Space Management and Organization, pursuant to Public Law 106-65, Washington, D.C., 11 January 2001, pp. viii–ix; P. Podvig, "Russia and military uses of space", *Russian Strategic Nuclear Forces*, 1 July 2004. The potential consequences of these dangers were seen in 1998 when the failure of a single satellite resulted in the loss of service to 80 per cent of the United States' 45 million pagers; F. Roylance, "Orbiting switchboard pulls plug on U.S. Millions experience failure to communicate", *Baltimore Sun*, 20 May 1998.

17 W.J. Broad and D.E. Sanger, "China tests anti-satellite weapon, unnerving U.S.", *New York Times*, 18 January 2007; T. Bowman, "China protests after U.S. shoots down satellite", *National Public Radio*, 21 February 2008.

18 C. Mathieu, "Space debris: a challenge for all actors", presented at the UNIDIR seminar The Role of Norms of Behaviour in African Outer Space Activities, Addis Ababa, 7–8 March 2013.

19 A.K. John, *India and the ASAT Weapon*, Observer Research Foundation Issue Brief no. 41, August 2012; T. Hitchens, "An ASAT arms race: the slippery slope to space weaponization", *Disarmament Times*, Summer 2007.

20 E. Lavan, "Satellite interference: an operator's perspective", presented at the International Telecommunication Union satellite communication workshop, Geneva, 10 June 2013; H. Foy, "Eutelsat adopts anti-jamming tech in upcoming satellite", *Space Safety Magazine*, 21 February 2013.

21 N. Blake Johnson, "Report: cyber attacks targeted U.S. satellites", *Defense News*, 28 October 2011.

22 A. Lele, *A Missile in the Monkey's Shadow?*, Institute for Defense Studies and Analyses, 31 January 2013; J. Johnson-Freese, "Is North Korea testing the Sino-US relationship with missiles?", *China-US Focus*, 17 December 2012.

that could meaningfully reduce the tensions created by space technology. These include a variety of diplomatic, legal, and political tools, particularly the development of norms of behaviour for outer space activities.

Why norms of behaviour?

Current international space law prohibits the placement of nuclear weapons or weapons of mass destruction in outer space or on the Moon or other celestial bodies, but it is silent on the placement of other types of weapons in outer space. Since the early 1980s, international policymakers and key stakeholders in the international community have recognized this gap and called on the Conference on Disarmament (CD), a multilateral disarmament negotiating forum of the international community, to take up discussions on a treaty for the prevention of the placement of weapons in outer space within an agenda item entitled the prevention of an arms race in outer space (PAROS).[23] However, due to a number of diplomatic hurdles—including a debate over whether an arms race even exists in space and whether it should be addressed at all—the CD has been unable to make progress. In 2008, the Russian Federation and China submitted a proposal to the CD on a draft Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT), but similar hurdles have led to a lack of progress on this proposal.[24] In this context, the development of legal solutions to mitigate the potential outbreak of armed conflict in outer space has proven particularly slow, while the development and proliferation of space arms and technology have continued.

Given the difficulties that have been faced in addressing the issue of an arms race in outer space, some policymakers have once again turned to the establishment of voluntary norms of behaviour in order to mitigate the possibility of armed conflict while more comprehensive solutions are found.[25] Rather than relying on legal agreements for parties to behave in a particular manner, these norms are dependent on political pressure for adherence. Such approaches have seen some success in the past with particularly dangerous forms of technology, including the International Code of Conduct against Ballistic Missile Proliferation, a voluntary political agreement under which states undertake to mitigate the effects of ballistic missile proliferation by providing pre-launch notifications of ballistic missiles and space launch vehicles.[26] This instrument received notable support from a number of Eurasian states, including Afghanistan, Kazakhstan, the Russian Federation, and Ukraine. However, the lack of engagement with the initiative on the part of key states—such as India and Pakistan—is a reminder that non-legally binding instruments must have broad support in order to be effective.

Recently, significant efforts have been proposed to establish norms that are designed to help ensure strategic stability in outer space by promoting transparency and confidence among states, namely TCBMs. The objectives behind these TCBMS include arms limitation/disarmament, reduction of international tensions, and the reduction in the possibility of misunderstanding and mistrust with regard to a state's space policies and intentions.[27] The usefulness of such types of measures was evident throughout the Cold War, when informal tools helped to reduce the risk of nuclear strikes between the Soviet Union and the United States.[28] While TCBMs could also come in the form of formal legal instruments, such as those contained in the draft PPWT, several initiatives have been put forward to use voluntary political measures to establish norms of behaviour as a means of promoting transparency and confidence.

One initiative comes in the form of the United Nations Group of Governmental Experts on TCBMs in Outer Space Activities (GGE), a group organized by the Secretary-General of the United Nations at the request of the First Committee of the General Assembly. The GGE prepared a report that contains recommendations on TCBMs for improving international cooperation and reducing the risk of miscalculation or miscommunication related to space

23 Federation of American Scientists, "Prevention of an arms race in outer space".

24 Reaching Critical Will, "Outer space: militarization, weaponization, and the prevention of an arms race".

25 Statement of the European Union on PAROS, Conference on Disarmament, Geneva, 19 March 2013.

26 A Brief Overview of Norms Development in Outer Space, UNIDIR, 2012, p. 6.

27 V. Vasiliev, "UN Group of Governmental Experts on TCBMs for Outer Space Activities", presented at the UNIDIR Space Security Conference 2013, Geneva, 2–3 April 2013.

28 Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, UN document A768/189, par. 22.

activities.[29] The GGE was formed on the basis of equitable geographical representation, with a number of Eurasian states represented, namely the Russian Federation (as Chair), Kazakhstan, Romania, Sri Lanka, and Ukraine.

Another initiative is the European Union's proposed International Code of Conduct for Outer Space Activities (ICoC). While not containing any direct references to arms control or the weaponization of outer space, the ICoC does include several measures on notification of space activities, data/information exchange, and consultation mechanisms[30] The first of the open-ended consultations on the ICoC was held in Kiev, Ukraine in May 2013 and a second meeting was held in Bangkok, Thailand in November 2013. Both of these initiatives have been well received, though some space actors still doubt whether voluntary measures will be sufficient to prevent an arms race in outer space without the implementation of a formal legal instrument.[31]

One other initiative that should be mentioned is a no-first-placement pledge. This is a unilateral effort by the Russian Federation, which in 2004 pledged not to be the first state to place weapons in outer space. This is an effort to set an example against the deployment of weapons in space, potentially establishing a norm of behaviour.[32]

Norms of behaviour and space security dilemmas

While it is not possible to determine the precise motivations behind many of the actions that are unfolding in Eurasia, there are several common interests that would indicate that none of the actors discussed are eager to engage in an arms race in outer space. The Russian Federation has already shown its desire to avoid conflict in space by committing not to be the first to place weapons in outer space, not least of all because, as a leader in space activities, it has much to lose if conflict erupts in outer space. India, likewise, is increasingly dependent on space activities and has been seeking space-related arms largely as a deterrent against perceived threats. States such as Pakistan have not developed dedicated military space programmes but have the resources to do so should it be deemed necessary.

In this context, norms of behaviour, and TCBMs in particular, could usefully serve to mitigate mistrust among states by offering small, measured steps towards openness and transparency. The political flexibility of voluntary norms means that states do not have to meet all standards and obligations at once, but can come into compliance at a measured pace. For states in tense security situations, such as India and the Russian Federation, this would offer a gradual scaling down of armaments and tension, as opposed to a sudden drop in defences. The adoption of voluntary norms also does not preclude the adoption of formal instruments, so TCBMs can be seen as an intermediate measure taken as more formal, legal solutions are negotiated, such as the PPWT.

The downside of adopting voluntary measures is that they must be enacted at the national level and will, therefore, require the support of states that presently feel threatened. Without the support of major players such as India and the Russian Federation, the effectiveness of norms will be limited. It is therefore up to those involved in the drafting of the proposed norms of behaviour to find TCBMs that will achieve the desired objective of reducing tensions and the risk of miscommunication in a manner consistent with the national security objectives of the major players.

Conclusions

As space activities increase, the need for a normative framework to mitigate the man-made threats to space security is becoming apparent. Rules that address potential collisions and accidental harmful interference are being explored at the multilateral level in order to ensure the long-term sustainability of space activities. However, rules will also be required to mitigate the impact of space technology on existing and future security tensions around the world. The need for such rules is particularly apparent in Eurasia, where the socioeconomic and geopolitical interests of a number of key space powers are colliding. Concerns over the integrity of critical space assets, combined with the proliferation of space-based weapons technology, have contributed to increased tensions among actors such

29 General Assembly, *Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space*, UN Document A/68/189, 29 July 2013.

30 Part III of the draft ICoC, presented at the multilateral meeting held in Vienna on 5 June 2012.

31 Statement by Indonesia on behalf of the Non-Aligned Movement at the thematic debate of the First Committee (22 October 2012); M.A. Jáquez, "La carrera armamentista en el espacio ultraterrestre y la Conferencia de Desarme de las Naciones Unidas", presented at the UNIDIR seminar Space Equities: The Role of the Americas in Building Norms of Behaviour, Mexico City, 2–3 July 2013.

32 A. Yakovenko, "Why Russia is against weapons in space", *RT*, 3 April 2013.

as China, India, the Russian Federation, and the United States. The actions of these four in outer space could have destabilizing effects on the space domain, particularly if this tension should evolve into hostilities either on Earth or in outer space. The latter possibility could make the most useful but limited orbits prohibitively hostile for space assets. For other space actors in Eurasia, such as Ukraine and Kazakhstan, the spread of armed conflict into space could deprive them of critical services as well as deny a useful resource for economic prosperity.

Several options have been put forward by international policymakers to mitigate the impacts of space technology on global and space security. While efforts to develop a legally binding instrument have been met with considerable hurdles, voluntary norms of behaviour have emerged as a non-legally binding alternative. In particular, TCBMs may be useful in promoting confidence among potential rivals and lowering tensions over the use and development of space capabilities. The success of norms in the past has encouraged policymakers to seek a number of parallel multilateral initiatives to develop TCBMs, including the GGE and the ICoC. However, in order to achieve the necessary support for these tools to have a meaningful impact on the state of space security, widespread support will be needed from current and future space actors. This could be particularly difficult to accomplish among Eurasian states, which might find that norms limit their strategic options. It will be up to the policymakers involved in these processes to ensure that the resulting norms are seen as being complementary to national security policies throughout the region. Widespread participation by the international community could play a critical role towards this end.

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