

Reshaping a Balanced Context of Space Arms Control: From Sustainability and Threat to Stability and Deterrence

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Journal of Autonomy and Security Studies

10(1) 2026, 73–86

DOI: <https://doi.org/10.61199/9k10-634p>

Abstract

In the discussions on space arms control, the terms of space sustainability and space threat are frequently mentioned. Space sustainability has been taken as the objective for space arms control negotiation, and the recognition of space threat is always deemed as the prerequisite for such rules-making processes. By contrast, space stability and space deterrence are seldom mentioned on purpose or as an omission. However, the recognition and determination of these two terms will be critical and even decisive for space security rules-making. When addressing all kinds of counter-space capabilities in the process of Prevention of an Arms Race in Outer Space (PAROS), it is always associated with the concept of space threat, in particular kinetic weapons, for instance Anti-Satellite (ASAT) tests. Subsequently, this brings about discussions on how to limit or ban such threats. It cannot be denied that these capabilities, when being defined as threats, are also the main sources of strategic or tactical deterrence. An arms control strategy involves interpreting an adversary's deterrence as a threat to the international community, thereby weakening or even prohibiting the adversary's deterrence through arms control initiatives. Space deterrence does not solely, or even necessarily, aim to deter space operations; rather, it may combine with nuclear, conventional, and informational deterrence capabilities to shape an adversary's overall perceptions and behavior. The complex interactions among space threats, deterrence, and threat perception shape international strategic dynamics, exerting significant influence on the international security landscape and policymaking. Therefore, it is imperative to foster a shared and balanced understanding of these interrelated concepts among states, so as to minimize the risk of misperception and miscalculation and thereby develop more balanced and practical rules for space arms control.

Keywords

Space sustainability, space stability, space threat, space deterrence, DA ASAT test, PAROS

1. Introduction

Security is the foundation of development, while international security reflects the collective capacity of nations to address shared risks through cooperation and governance. As a vital frontier of human activity, outer space plays an increasingly critical role for global strategic stability and technological advancement, warranting focused international attention. However, there are still obvious political contests and divisions in the field of arms control in outer space. Pursuing a balanced space security global governance (SSGG) through space diplomacy is the most urgent goal for all countries to address amid these challenges to pave the way towards space stability and sustainability.¹

Since the beginning of the 21st century, initiatives such as “Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects (PPWT)” put forward by China and Russia have gained widespread support from developing countries, while the United States firmly opposes them. Most of the European countries have tried to remain as neutral as possible. The situation was somehow changed at the seventy-fifth session of the UN General Assembly in 2020. The “New Initiative for Responsible Space Behaviours” put forward by the United Kingdom, the United States, and other states, has won the support of a certain number of developing countries.

In the future, the game of space security and arms control in outer space will become increasingly complex and fierce. From the perspective of space global governance, this is conducive to neither alleviating tensions in space or enhancing mutual trust among major powers, nor effectively responding the challenges to the long-term sustainability of outer space activities.² In December 2024, the Open-Ended Working Group on the Prevention of an Arms Race in Outer Space in all its aspects was established under UN General Assembly Resolution 79/512. Its first and second substantive sessions were intended to mark a turning point in space diplomacy, a chance for states to move beyond disagreements in approach between legal and nonlegal measures, and regarding behaviors and weapons capabilities. It was intended to be a chance to begin meaningful work on a comprehensive approach to space security, arms control, and conflict prevention.³

Distinct rationales of sustainability and stability determine different contexts and approaches for space arms control negotiations. In practice, concepts such as space

1 Wang Guoyu, “Space Sustainability: Balanced Space Security Global Governance,” in *The Oxford Handbook of Space Security*, ed. Saadia M. Pekkanen and P.J. Blount (Oxford: Oxford University Press, 2024), <https://doi.org/10.1093/oxfordhb/9780197582671.013.35>.

2 Guoyu Wang and Junzhe Chen, “On the New Initiative for Responsible Space Behaviors Proposed by United Kingdom, United States, and Other States,” *Space: Science & Technology* 3 (2023): 4, <https://doi.org/10.34133/space.0033>.

3 Jessica West, “Open in Name Only: The OEWG on PAROS Stumbles Through Its First Session, Special Report” (Project Ploughshares, April 2025), https://cdn.prod.website-files.com/63e066081ef50cb16a3f4157/67feab07b5610b53378bcde0_OEWGFirstSessionRecap2025.pdf.

sustainability and space threats are frequently discussed and often adopted either as goals for space arms control negotiations or as prerequisites for rule-making, associated with the topics of space debris mitigation and space environmental protection. In contrast, notions like space stability and space deterrence receive considerably less attention, whether intentionally sidelined or inadvertently overlooked. Nevertheless, clearly recognizing and precisely defining these terms is crucial, and may even prove decisive, in establishing effective space security governance. It is therefore imperative to foster a balanced and shared understanding of these interrelated concepts among states, so as to minimize misperception and miscalculation risks, and support the development of more balanced, coherent, and practical rules for space arms control.

In the current Prevention of an Arms Race in Outer Space—hereinafter PAROS—discussions, the identification of space threats is often regarded as a prerequisite for the formulation of relevant arms control rules, but the threat itself should not simply and directly become the object of arms control rules, in the context of the current four classifications based on anti-space capabilities. The object of arms control rules should instead be specific space behaviors, and the three elements of subjective intention, the behavior itself, and the consequences of the behavior should be considered when formulating the corresponding prohibition or restriction rules. Space threat and deterrence are two sides of the same coin. However, regarding the relationship between space threats and space deterrence, the international community has not yet given a definitive conclusion. They are both a tool of a state to pursue the sense of strategic security or superiority and a tool of strategic interactions among states. This means that the various space threats, which are deemed as negative factors to the safety of space activities and environment, might be simultaneously taken as positive elements for national security and necessary measures to preserve balanced, stable space relations.

2. From Space Sustainability to Space Stability

The word sustainability is derived from the Latin verb *sustinere* and is usually used in the context of being able maintain an activity at a certain rate or level. Since the 1970s, the concept of sustainability has been applied to human habitation and the equitable utilization of planet Earth and its resources.⁴ According to the *Oxford English Dictionary*, the term “sustainable” refers to “the capacity to be upheld or defended”.⁵ From an ethical

4 P. Martinez et al., “The IADC Space Debris Mitigation Guidelines and Supporting Documents,” *Space Policy* 43 (2018): 5–8, <https://doi.org/10.1016/j.spacepol.2018.01.002>.

5 *Oxford English Dictionary*, 3rd ed., s.v. “sustainability (n.),” accessed November 30, 2025, https://www.oed.com/dictionary/sustainability_n?tl=true.

standpoint, a third dimension in defining “sustainability” is self-restraint. This can be viewed as a subsequent requirement of the first two elements, suggesting that one is not supposed to always exploit one’s space rights to the fullest extent. Even in the absence of explicit prohibitions or restrictions under international law, space activities ought to be justified on ethical grounds.⁶ Space sustainability is frequently underscored in various international platforms and discussions, with numerous concepts and initiatives, such as space environmental protection, space traffic coordination, the threat posed by space debris, and the ban on anti-satellite (ASAT) tests being rooted in or justified by this rationale.⁷

Taking the perspective of international security and strategy, it is “stability” rather than “sustainability” that should be the key rationale. From an objective perspective, space stability means the status deviating from space conflicts, particularly space armed conflicts and space warfare, under which any of the stakeholders in the space military/security game lack motivations to change the existing equilibrium through proposing new arms control initiatives. However, from a subjective perspective, the connotation of strategic stability may vary due to different stages and status with respect to the capability development of states. To an existing superpower, super priority might mean the most acceptable strategic stability. For emerging superpowers, the more urgent and practical objective is to pursue and maintain strategic equilibrium and at least keep a safe and secure distance from the leader.⁸

Space stability should be regarded as the ultimate objective of space security governance, serving as the primary standard for assessing the value of international initiatives on the PAROS—namely, whether they contribute to achieving or maintaining this stability. Furthermore, compared to the concept of sustainability, stability offers a distinct, subjective lens for re-examining perceived threats. It posits that genuine stability exists when no actor is truly willing to alter the *status quo* of space relations or seeks to aggressively pursue absolute superiority, thereby uncovering the real, often less visible threats, such as an arms race driven by ambitions like a “golden dome” strategy.

6 Wang Guoyu, “Space Sustainability: Balanced Space Security Global Governance,” in *The Oxford Handbook of Space Security*, ed. Saadia M. Pekkanen and P.J. Blount (Oxford: Oxford University Press, 2024), <https://doi.org/10.1093/oxfordhb/9780197582671.013.35>.

7 *Ibid.*

8 *Ibid.*

3. From Space Threat to Space Deterrence

When used in the context of space security, the term “threat” generally refers to the danger to the security of a space system or any of its components.⁹ More specifically, it denotes a status arising from intentional behaviors that may cause adverse impacts to the space assets, activities and/or security interests of another country. It comprises three essential elements: intention, behavior, and adverse impacts.¹⁰ To draw an analogy, if space threat is likened to an aircraft, behavior represents the core element, corresponding to the fuselage, whereas intention and adverse impacts serve as the two critical supporting factors, akin to the wings.



Intention. Threats in the space security domain are supposed to focus on intentional behaviors, which are distinct from risks that affect the safety of a space system or any of its components. Some definitions, as found in dictionaries and adopted by some countries, typically encompass both natural causes and man-made factors. However, it is neither appropriate nor necessary to include natural phenomena—as well as negligence, unintentional actions, or accidents—, within the scope of space threats. For instance, risks associated with space debris during normal operations, such as break-ups or uncontrolled re-entries, should not be classified as threats in the space security context. Instead, the intention in space threats encompasses unfriendly, provocative, or malicious behaviors. It may manifest in specific space operations, including electromagnetic interference, co-orbital attacks, and unauthorized use of cyber capabilities to seize satellite control. The intention can also extend to certain space security strategies or policies, such as public declarations identifying specific countries as primary threats or explicit designation of space as a warfighting domain, since they may increase the risk of misperception and miscalculation, thereby escalating tensions among states. Furthermore, the presence of hostile intention *per se* constitutes a potential threat to a certain extent.

Behavior. Space technologies and capabilities are inherently neutral and do not constitute threats *per se*, although they could be used to deny, disrupt, degrade, damage, destroy, or

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- 9 Almodena Azcárate Ortega and Victoria Samson, eds., *A Lexicon for Outer Space Security* (Geneva: United Nations Institute for Disarmament Research, 2023), <https://doi.org/10.37559/WMD/23/Space/05>.
- 10 Guoyu Wang, “The Recommended Definition of ‘Threat’ in the Context of OEWG” (working paper presented to the Open-ended Working Group on Reducing Space Threats, New York, September 12, 2022, <https://documents.unoda.org/wp-content/uploads/2022/09/20220912GW-The-Recommended-Definition-of-Threat-in-the-Context-of-OEWG.pdf>).

otherwise harm a system, infrastructure, or person. Under specific circumstances, certain space behaviors utilizing these technologies or capabilities may pose potential threats. These behaviors can generally be categorized into two main categories. The first refers to behavior resulting from actions, such as jamming, spoofing, and rendezvous and proximity operations, which can directly impair space assets or operations, albeit in a potentially reversible manner. The second refers to behavior resulting from omissions. For instance, a commercial satellite is operated under the jurisdiction of State A and its collision warning services are also provided by State A. However, upon identifying potential in-orbit collisions or hazardous conjunctions between this satellite and a satellite operated by State B, State A does not promptly provide the necessary space situational awareness information to the commercial operator responsible for the satellite. In addition to the aforementioned behaviors that directly target space systems, there are other existing behaviors pertaining to space security, such as national space strategies and policies, serving as underlying drives of space threats. These behaviors are often less conspicuous and tend to be overlooked in discussions on space threats; they are, however, closely associated with weaponization and the emergence of an arms race in space.

Adverse impacts. Pursuant to “Draft Articles on Responsibility of States for Internationally Wrongful Acts”¹¹, injury includes any damage, whether material or moral. The latter, also referred to as non-material damage, can broadly be defined as the opposite of financial or any other form of tangible damage.¹² The adverse impacts of space threats encompass both material and non-material dimensions. Material consequences are akin to the damage defined in the Liability Convention¹³, which means loss of life, personal injury or other impairment of health, or loss of or damage to property of States or of persons, natural or juridical, or to property of international intergovernmental organizations. These consequences include the impact in space, such as the degradation or loss of satellites and orbital resources, as well as impacts on Earth, such as the damage or destruction of critical infrastructure and services. Non-material consequences not only involve general interference during space operations, such as temporary sensor dazzling, but also pertain to perceptions of insecurity or misunderstanding, which may heighten tensions and potentially trigger or escalate arms races and conflicts in space. Additionally, both material and non-material consequences may be characterized as either reversible or irreversible from the perspective of technology.

Together with space threat, the concept of space deterrence must be examined simultaneously. Deterrence theory is deeply rooted in the nuclear domain but is not

11 Adopted by the UN International Law Commission in 2001.

12 Stephan Wittich, “Non-Material Damage and Monetary Reparation in International Law,” *Finnish Yearbook of International Law* 15 (2004): 321–68.

13 See the UN Convention on International Liability for Damage Caused by Space Objects, adopted 1971.

necessarily limited to this domain. This theory also applies to and is reflected in space practice.¹⁴ Deterrence is central to the national security policy throughout history, and is still achieved through, on most occasions, military measures¹⁵. As far as the author is concerned, from the perspective of game theory, deterrence is the tool of one party in the game to inflict the perceptible, foreseeable costs or negative consequences to the other party, in order to pursue maximum benefits through minimum cost.¹⁶ Deterrence can be either a threatening initiative or a responsive one. Then, based on the perceptions to the category and extent of the deterrence inflicted by the other, the parties in the game would lay down their respective follow-up measures and plans to gradually, pertinently, and systematically degrade and even eliminate the effects of the deterrence it suffered.

The complex interactions between space threats, deterrence, and threat perception shape international strategic dynamics, exerting significant influence on the international security landscape and policymaking. It is therefore crucial to consider the balance of interests and stability among states while defining space threats and deterrence. Many delegations have expressed the view that kinetic weapons and destructive and ascent anti-satellite tests are major space threats, prompting calls for restrictions or prohibition, without appropriately mentioning that these capabilities and associated activities also serve as essential tools for maintaining strategic deterrence.

An arms control strategy involves interpreting an adversary's deterrence as a threat to the international community, thereby weakening or even prohibiting the adversary's deterrence through arms control initiatives. This is the essence of the United States' commitment not to conduct destructive, direct-ascent anti-satellite (DA ASAT) missile testing. Although the U.S. has made this commitment, it will have little impact on its own deterrence system. The impact of such a commitment on a State depends on the composition of its overall deterrence system. Some states might also wave the flag of environmental protection to cover their real intention to mitigate or degrade the strategic deterrence they have suffered. It is difficult to distinguish between threat and deterrence, in particular after the historical development of the great power games. Assuming that the national security concerns and the relevant strategic needs are not duly considered and only exploring space threats from the perspective of space environment protection, it becomes very difficult to achieve practical and effective solutions to deal with threats to space systems and their consequences for both space and Earth.

14 Wang Guoyu, "Space Sustainability: Balanced Space Security Global Governance," in *The Oxford Handbook of Space Security*, ed. Saadia M. Pekkanen and P.J. Blount (Oxford: Oxford University Press, 2024), <https://doi.org/10.1093/oxfordhb/9780197582671.013.35>.

15 Michael Krepon and Julia Thompson, *Anti-satellite Weapons, Deterrence and Sino-American Space Relations* (Washington, DC: Stimson Center, 2013), <https://www.jstor.org/stable/resrep10894>.

16 *Ibid.*

The current discourse unilaterally emphasizes space threats while neglecting space deterrence. When discussing various counter-space capabilities, particularly kinetic weapons and ASATs, they are invariably framed as space threats, followed by proposals to restrict or prohibit them, ignoring how these capabilities simultaneously serve as strategic or tactical deterrents. Calls for “threat reduction” may simply mean constraining or weakening an adversary’s deterrence. The space threat debate focuses disproportionately on space sustainability while overlooking stability. In fact, misunderstandings, misperceptions, and tensions in outer space pose risks no smaller than those of space threats and their consequences, perhaps even greater. Lose sustainability, lose a lot; lose stability, lose everything. Deterrence cannot be eliminated; the optimal approach is to regulate it systematically. Clarifying the concept of space deterrence and its relationship with space threats is essential.

4. Case Study: The DA ASAT test from the perspective of space deterrence and space stability

As mentioned in the introduction, the initiative to partially ban anti-satellite (ASAT) testing is becoming the spotlight in the international discussions on space security and space arms control. It seems conducive to preserving the space environment, but it’s also a game among space powers.¹⁷

In April 2022, the United States committed not to conduct destructive, DA-ASAT (Direct-Ascent Anti-Satellite) missile testing, and sought to establish this as a new international norm for responsible behaviour in space.¹⁸ In September, the United States first proposed a draft resolution on “Destructive direct-ascent anti-satellite missile testing” at the UN Open-ended Working Group on Space Responsible Behaviour. In October, it submitted the draft resolution to the UN General Assembly (UNGA) First Committee together with 11 other countries, including Canada, the United Kingdom and Germany. The draft resolution was adopted by the First Committee on November 1 and was approved by the UNGA on December 7 with 155 votes in favour, 9 against and 9 abstentions. This resolution calls upon all states to commit not to conduct destructive direct-ascent anti-satellite missile tests and considers such a commitment to be an urgent, initial measure aimed at preventing damage to the outer space environment, while also contributing to the

¹⁷ *Ibid.*

¹⁸ The White House, “FACT SHEET: Vice President Harris Advances National Security Norms in Space” (news release, Washington, DC, April 18, 2022), <https://bidenwhitehouse.archives.gov/briefing-room/statements-releases/2022/04/18/fact-sheet-vice-president-harris-advances-national-security-norms-in-space/>.

development of further measures for the prevention of an arms race in outer space.¹⁹ As of March 2025, 38 countries (including all member states of the European Union) have made a commitment not to conduct destructive DA-ASAT missile tests.²⁰ Although it is widely known that ASAT capabilities and related tests pose great risks to space environment, unfortunately, they are simultaneously important means for a state to safeguard its own security and maintain external deterrence capability.

The forms of ASAT deterrence. ASAT deterrence can be further divided into different forms, for instance, deterrence with ASAT capabilities, deterrence through conducting ASAT testing, and deterrence through possible ASAT testing. The deterrence of ASAT capabilities generally needs to be perceived through conducting ASAT tests. In addition, ASAT deterrence can be divided into two categories: capability-deterrence and intention-deterrence. Deterrence through conducting ASAT tests belongs to the former, and deterrence through the possibility of conducting ASAT tests belongs to the latter. For States that have not yet conducted ASAT tests, once they make the same initiative as the United States, it is tantamount to giving up capability-deterrence and subsequent intention-deterrence. For States that have already conducted tests to verify and demonstrate ASAT capabilities, once they make the same initiative, it means they have given up intention-deterrence. These States may seek to retain the tactical option of conducting ASAT tests, in other words, reserving the space for intention deterrence to maximize the space-strategic value brought by ASAT capabilities.

The effectiveness of ASAT testing. Pursuant to the concept of traditional deterrence theory, effective deterrence requires three elements: certain strength, determination to use strength, and effective information transmission.²¹ Based on research on deterrence, Kissinger recognized the important role of psychological and cognitive factors in deterrence, and believed that deterrence requires a combination of strength, the willingness to use that strength, and potential attackers' assessment of the combination of these two factors. Meanwhile, deterrence is the product of all these factors, not the sum of them. If any one of these factors is zero, deterrence would fail.²² This theory has a prominent performance in the nuclear field. Yang stated that if the number of nuclear weapons does not reach the threshold of assured destruction, the effectiveness of deterrence cannot be recognized. However, some believe that this exaggerates the significance of assured destruction

19 United Nations General Assembly, Resolution 77/41, "Reducing space threats through norms, rules and principles of responsible behaviours," December 7, 2022, <https://undocs.org/A/RES/77/41>.

20 Guoyu Wang and Chengyun Zhang, "Analysis of the Proposed Initiative on the Partial Ban or Restriction of ASAT Tests," in *2025 International Arms Control and Disarmament* (Beijing: World Knowledge Press, 2025), 109–131.

21 Gao Yangyuxi, "The Historical Evolution of American Deterrence Strategy in Space", *International Studies Reference*, no. 6 (2017): 27–34.

22 Henry A. Kissinger, *Nuclear Weapons and Foreign Policy* (New York: Routledge, 1984), 12, <https://doi.org/10.4324/9780429046902>.

to deterrence since some other related factors are ignored, such as the credibility of commitment.

Similarly, the credibility of deterrence capability is proven by the successful test of ground-based kinetic ASAT testing. The credibility of the threat intention is the extent to which a State believes its adversary would use the ground-based ASAT capability under certain conditions. In theory, the deterrence of ASAT tests, particularly tests that can generate debris, has strong strategic deterrence effect, and its deterrence capability is directly proportional to the degree of damage generated by debris. Therefore, the deterrence of theoretical ASAT capability without any demonstration is not the same as that which has been perceived via demonstration. The latter may have a stronger and more direct deterrence effect due to the selection of different targets—for instance, those in low Earth orbit (LEO) or high LEO.

Meanwhile, the ASAT test itself is an effective means to seek and enhance the deterrence effect of ASAT capability, namely the credibility of ASAT capability. ASAT tests that destroy real targets (space objects) obviously generate stronger deterrence than tests that validate the capability through virtual targets. Once a state has successfully conducted a similar test, it has less incentive to continue to prove the credibility of its deterrence capability. Nevertheless, it cannot be ruled out that it would continue to conduct such tests, including the destruction of real targets. On the one hand, it may stem from the demand for its capacity system construction and/or for better capacity building. On the other hand, such tests are tactical or strategic options to send a strong signal, especially debris-generating tests, which have stronger deterrence effect due to the realistic threats they may pose.

Moreover, if a state already has the credibility of deterrence capability, the evaluation of its deterrence capability at this time mainly depends on the credibility of its deterrence intention, in other words, whether a state has the determination to conduct such tests again. It is undeniable that the cost of conducting such tests to achieve desired effects must be high, and this state would be liable under international law if the debris causes damage or loss to the space assets or to personnel of a third party. However, it is precisely the high costs and risks that may let states determine whether to conduct such tests or not, in order to be in a better position in the game. In other words, whichever side of the game is willing to take greater risks of losing control would be able to force the other side to concede.²³ It is possible that one party of the game may prefer to take the risk of losing control to prevent a war in space, that is, to deter adversaries' attempts to directly attack its space targets by conducting a debris-generating ASAT test, or to deter adversaries in other areas involving national security, so as to avoid the escalation of conflicts. Therefore, the credibility of the

23 Schelling, 1966, pp. 92–105.

deterrence intent of such ASAT tests depends, on the one hand, on the determination of the testing party, and on the other hand on whether the testing party has the technical ability to effectively avoid the in-orbit collision risks caused by its debris.

Such DA ASAT initiatives directly affect the effectiveness of deterrence. Obviously, U.S. commitment and related ASAT initiatives are not only aimed at capability-deterrence, but also intention-deterrence. For countries that have developed ASAT capabilities, they would lose the tactical option to implement intention-deterrence once they have made similar commitments or signed relevant international documents. For countries that have yet to develop ASAT capabilities, they would lose the option to implement intention-deterrence, and the space for them to demonstrate ASAT capabilities might be greatly compressed.

If a state faces serious external challenges to its national security—for instance, in the event of a geo-political crisis—, a debris-generating ASAT test alongside missile tests, sea and air cruises and military exercises may not be ruled out to deter powerful adversaries and demonstrate its determination for war. Once a state is forced to abandon this strategically deterrent option due to pressures from the international community, it must actively seek alternatives to achieve equivalent capabilities, which would lead to another round of an arms race in space, exacerbating misunderstandings and tensions among spacefaring nations. The United States has made this commitment, possibly due to its reduced demand for conducting similar ASAT tests, considering the rapid development of its other counterspace capabilities, such as co-orbital technology, jamming technology, and the deployment of mega-constellations, etc.

In conclusion, from the perspective of space and its overall security situation, if states lack other appropriate means of space deterrence, they are still not precluded from conducting similar tests when under serious threat or in a geo-political crisis. The issue of space security has never been just about space but is rooted in geo-political tensions. Therefore, seeking a geo-political equilibrium among major powers and reaching an overall strategic understanding may eliminate the space risks caused by ASAT tests to the greatest extent possible. However, the project of “Golden Dome for America” announced in January 2025, which is described as an executive branch initiative to develop an integrated air and missile defense system for the United States’ homeland, brings more uncertainties and destabilizing effects to the existing fragile strategic stability. This historic investment builds on two of the three main objectives of the U.S. Department of Defense: rebuilding military capability and re-establishing deterrence. It aims to protect the United States from aerial attacks from any foe and use next-generation technology to defend against the evolving and complex threat landscape.²⁴ The project’s explicit focus on “defending

24 United States, Department of Defense, “Secretary of Defense Pete Hegseth Statement on Golden Dome for America” (news release, July 15, 2024), <https://www.war.gov/News/Releases/Release/Article/4193417/secretary-of-defense-pete-hegseth-statement-on-golden-dome-for-america/>.

against peer adversaries” and its intention to “develop and deploy proliferated space-based interceptors” represent its two most contentious aspects.²⁵ Some experts have pointed out that its unilateral conception and rollout, without prior consultation or engagement with allies or competitors, signals a breakdown in the cooperative ethos that traditionally underpins arms control.²⁶ This move can also be considered as severely undermining global strategic stability, trampling on the principle of peaceful use of outer space, and further destabilizing an already turbulent world.²⁷ Whether the DA ASAT tests and the deployment of space-based interceptors could be handled in a package solution in the forthcoming PAROS discussions is still to be observed.

5. Conclusion

Space is a shared and finite resource. The evolving landscape of space-related threats demands a multifaceted and adaptive governance framework in a more balanced and proportionate way. Effectively addressing these challenges requires a holistic approach that prioritizes both immediate risk mitigation and long-term stability and sustainability in space. The weaponization of, and an arms race in, outer space are the most severe threats to space security, capable of causing long-term damage to the space environment. This calls for a renewed multilateral commitment from the international community to safeguard the stability, security, and long-term sustainability of outer space as a guiding objective.

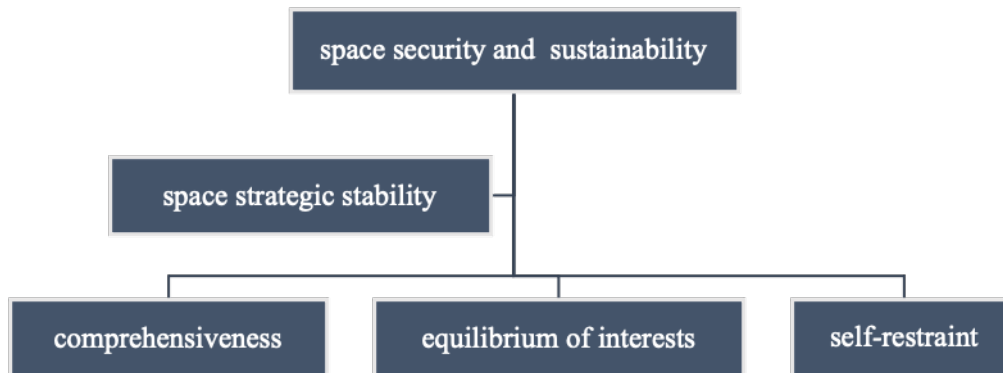
Space security governance would then have to aim at maintaining space strategic stability, following the principles of comprehensiveness, equilibrium of interests and self-restraint. (See Figure 1).

25 Zhang Ming, “U.S. Plan to Deploy Weapons in Outer Space Draws Criticism,” *China Daily*, June 10, 2025, <https://www.chinadaily.com.cn/a/202506/10/WS68479fdda310a04af22c42b8.html>.

26 Xu Ying, “U.S. Golden Dome: A Glimmering Shield or a Blow to Global Stability?” *China Global Television Network (CGTN)*, May 23, 2025, <https://news.cgtn.com/news/2025-05-23/U-S-Golden-Dome-A-glimmering-shield-or-a-blow-to-global-stability--1DAmfYsWNxe/p.html>.

27 Guo Xiaobing, “U.S. Accused of Planning to Deploy Offensive Weapons in Outer Space,” *People’s Daily Online*, June 10, 2025, <https://en.people.cn/n3/2025/0610/c98649-20325832.html>.

Figure 1: The principles to be established for strategic space stability



The *comprehensiveness* principle means that the international community needs a comprehensive solution rather than a proposal about a single issue, like placing weapons in space, testing certain ASAT weapons, or other military space behavior. All these concerns should be taken care of in a comprehensive solution because they interact with each other in the game of space security. Considering that the precariousness of space security is the result of various reasons, such as the lack of strategic understandings, necessary mechanisms, and common recognition of *lex lata*, etc., an international initiative cannot be effective if it only reflects one of the above elements. States should positively work together on all of these matters in parallel. One small step in any of these fields might promote the process of the others. For instance, establishing a bilateral space traffic coordination mechanism might pave the way for achieving strategic understanding between countries. This is another requirement of the comprehensiveness principle.

The *equilibrium of interests* principle requires that any international solution for space governance reflect the appeals and interests of the relevant parties in a balanced way. International initiative in space security should not be taken as a tool to seek the superiority of one State which suppresses its adversaries. Such an initiative would sooner or later be trapped in political debates, and such negotiations are liable to cause nothing but high costs to the whole international community. The more comprehensive and compromised the positions one initiative holds, the less costly the negotiation, and the more practical and effective the final solution would turn out.

The *self-restraint* principle is the subsequent requirement of the above two principles. But it applies to the formulation of international rules or solutions and to every stage of security practices. Self-restraint requires all stakeholders to be appropriately and fairly engaged in space competition and contests in space security. A state should refrain from excessively provoking or threatening its adversaries, or taking other extreme actions, even if these behaviors are not expressly prohibited by international law. In any case, the actors

in a space contest should do everything possible and practicable to avoid space (armed) conflict. When a conflict is inevitable or already occurring, each party in the conflict must prevent its escalation and try to contain the conflict on a small scale and at a low intensity. If it fails again, then the actors have to put the deteriorated conflict in a legal order and try to ensure a controlled result; otherwise, it would be a disaster for the space environment, and it would be the last picture we'd like to see.²⁸

Finally, a commonly recognized rationale should be jointly explored by the international community to maintain space stability. To achieve this goal, it is recommended that existing space law is strictly interpreted while new normative frameworks to improve the current situation are proactively developed. Specifically, this includes two key points: (a) reinforcing the existing legal regime through refined interpretation of the Outer Space Treaty (OST) and related legal instruments, to clarify acceptable peacetime conduct and define unacceptable activities; and (b) developing new norms of behavior in order to address regulatory gaps and breaking the current diplomatic stagnation caused by uncertainties in the applicability of existing law (*lex lata*). These efforts must be guided by a shared vision and understanding, enshrining core principles such as comprehensiveness, equilibrium of interests, and self-restraint. The resulting framework should be substantiated by specific norms, verification mechanisms, and technical standards to ensure its effectiveness. States should work together, compromise and be pragmatic to work on a resolution to not only reflect the demands of all parties in a balanced manner, but also effectively prevent an arms race and conflicts in space.

28 Wang Guoyu, "Space Sustainability: Balanced Space Security Global Governance," in *The Oxford Handbook of Space Security*, ed. Saadia M. Pekkanen and P.J. Blount (Oxford: Oxford University Press, 2024), <https://doi.org/10.1093/oxfordhb/9780197582671.013.35>.