



INTERNATIONAL DOCKING SYSTEM STANDARD: BETWEEN COOPERATION AND HIERARCHY

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ABSTRACT	KEYWORDS
<p>The International Docking System Standard (IDSS) is a technical interface that enables different spacecraft to connect safely in orbit. Under the United States led Artemis Accords, 52 partner nations are required to adopt this standard to ensure mission safety and interoperability. However, scholars disagree about the political implications of this technical requirement. This study addresses the following research question: How does the IDSS standard redefine international power dynamics in the Artemis led lunar exploration? Drawing on the theoretical frameworks of Stewart and Dittmer (2023) and Morin and Tepper (2023), the research analyzes official documents, academic literature, and historical cases such as the Apollo Soyuz Test Project. The findings reveal a fundamental paradox: The IDSS simultaneously functions as a “material vernacular” that facilitates international cooperation and as a “chokepoint effect” that creates a United States led technological hierarchy. Shared docking standards enable states to collaborate, even during terrestrial political conflicts. At the same time, they bind partner nations to American engineering norms, restrict their strategic autonomy, and marginalize rival powers such as China. The paper concludes that technical standards are never neutral; they embed structural power and reshape international relations. These findings are particularly important for emerging space nations that must balance the benefits of interoperability against the risks of long term dependency. As the Moon becomes a new arena for great power competition, understanding who writes the technical rules is as critical as understanding who builds the rockets.</p>	<p>International Docking System Standard; Artemis Accords; space diplomacy; structural power; technical interoperability.</p>

Introduction

It is a widely held view that outer space is no longer solely a scientific frontier. Indeed, it has evolved into a complex diplomatic arena where nations employ technical tools to project their influence. As noted by some scholars, the contemporary space system is currently undergoing what some scholars describe as an “intersystem transition” – shifting from a period of absolute United States (U.S.)

dominance toward a more competitive and multipolar landscape. This transformation is supported by substantial financial investments. For example, in 2023, global government spending on space reached a record \$117 billion, with the United States alone accounting for nearly 60 percent of that total (Euroconsult, 2024). At the heart of this new environment lies the International Docking System Standard (IDSS), a specialized technical interface that enables different spacecraft to connect safely in orbit. The standard acquired significant political weight following the introduction of the U.S.-led Artemis Accords. As stated in Section 13 of those Accords, all 52 partner nations are effectively required to adopt the IDSS to ensure mission safety and to achieve what the Accords term “interoperability” (NASA, 2020).

The political implications of this technical requirement, however, remain contested. As noted by Stewart and Dittmer (2023), the IDSS can be conceptualized as a “material diplomatic agent.” In their view, shared technical standards create a common language that encourages international cooperation and helps maintain a “tenuous peace” – even when those same nations are engaged in political conflicts on Earth. By contrast, Morin and Tepper (2023) argue that the IDSS functions as a tool of “structural power.” According to their analysis, by setting the technical rules of the game, the United States creates a “chokepoint effect” that institutionalizes a U.S.-led technological hierarchy and limits the strategic autonomy of rival powers such as China (Morin & Tepper, 2023).

In light of these competing perspectives, this study addresses the following research question: How does the IDSS standard redefine international power dynamics in the Artemis-led lunar exploration? The paper contends that the IDSS performs two functions simultaneously. On one hand, it provides the essential technical foundation for international cooperation – that is, the cooperative side. On the other hand, it operates as a strategic instrument of American structural power. By establishing these technical parameters, the United States creates a hierarchy that can restrict the independent decision-making of its partner nations.

To develop this argument, the paper first examines how the IDSS acts as a shared language that facilitates cooperation among different nations in space. It then analyzes how the United States employs these engineering norms to maintain its dominant position. Subsequently, the article responds to the claim that such standards are purely neutral safety protocols. Finally, it concludes with the broader implications for the future governance of outer space.

Methods

This study employed a qualitative research design based on document analysis and theoretical synthesis. The primary sources analyzed included the Artemis Accords (NASA, 2020), peer-reviewed academic articles, official statements from space agencies (including NASA, ESA, and Roscosmos), and historical case documentation (specifically, the Apollo-Soyuz Test Project). The selection of sources was guided by their direct relevance to the International Docking System Standard (IDSS) and its political implications for international relations.

Two complementary theoretical frameworks informed the analysis. The first was assemblage theory, as articulated by Stewart and Dittmer (2023), which conceptualizes technical infrastructures as active diplomatic agents. The second was structural power theory, developed by Morin and Tepper (2023), which explains how setting technical standards allows dominant states to shape the “rules of the game” in international relations.

Data collection involved a systematic review of literature published between 2020 and 2026, focusing on space governance, docking technologies, and the Artemis Accords. The analytical process consisted of three stages: (1) identifying key concepts (e.g., “material vernacular”, “chokepoint effect”, “tenuous peace”) in the selected sources; (2) comparing and contrasting the cooperative and hierarchical interpretations of the IDSS; and (3) synthesizing these perspectives into a paradoxical framework that captures the dual nature of the standard.

The study relied exclusively on qualitative interpretive analysis, which is appropriate for examining the political meaning and diplomatic consequences of technical standards. All citations follow the APA 7th edition guidelines.

Results

The analysis yielded three principal categories of findings: (1) the cooperative function of the IDSS as a material and diplomatic tool; (2) its historical and symbolic role in space diplomacy; and (3) its function as a mechanism of U.S. structural power and technological hierarchy.

Cooperative Function: Material Vernacular and Tenuous Peace

The IDSS was found to operate as a “material vernacular” – a common technical language that facilitates international cooperation and interdependence. Stewart and Dittmer (2023) argued that this shared language allows different spacecraft to “talk to each other” through the IDSS interface, thereby maintaining consistency in state behavior in space and providing a basic foundation for mutual agreement. The authors further contended that technical infrastructures such as docking systems possess capabilities far beyond their basic function as simple pieces of hardware. Thus, viewing these technologies as “material diplomatic agents” offered a deeper understanding of their role in international relations.

When spacecraft physically link up, Stewart and Dittmer (2023) termed the resulting condition a “tenuous peace.” This concept proved significant because technical dependence – for example, one vehicle providing necessary equipment or orbital boosts for another – prevents nations from easily abandoning a project, even during terrestrial political conflicts. By adopting standards such as the IDSS, nations become “enmeshed.” This physical and diplomatic link served as the “glue” required to maintain and develop international cooperation. Moreover, technical interoperability ensured that practical collaboration between scientists and experts continued even when official political communication at the state level had ceased. Such a situation, according to the authors, may help soften future conflicts and restore international ties.

Historical and Symbolic Role

The historical and symbolic roles of the IDSS were found to be equally important as its technical function. Chiu and Kornprobst (2025) considered Rendezvous and Docking Technologies (RDT) as the most innovative field of “techno-diplomacy” in orbit. They did not treat this technology merely as an engineering achievement but rather as a central arena for diplomatic exchange. Stewart and Dittmer (2023) added that such material systems are capable of more than basic technical functions, serving as a material key for building solidarity even between competing states.

A clear historical example was the Apollo-Soyuz Test Project of 1975. That mission symbolically ended the Cold War space race and marked the beginning of international cooperation in space. Chiu

and Kornprobst (2025) presented this experience as the first successful case where docking technology functioned as a diplomatic tool. Under a 1972 agreement, the United States and the USSR cooperated on a common docking interface despite using fundamentally incompatible systems. That technical compatibility created the essential material foundation for the famous “handshake in space” between two political rivals.

Furthermore, the metaphor of “Opening the Hatches,” introduced by former ESA Director-General Jan Wörner, was viewed as a highly symbolic act of international collaboration. Chiu and Kornprobst (2025) stated that establishing standards such as the IDSS is necessary not only for mission safety but also to prevent the waste of resources and to expand global partnerships. During the Cold War, cooperation was largely determined by state leaders such as presidents. Today, those responsibilities are shifting to the heads of technical agencies and scientific departments. This evolution, in turn, encourages the study of space diplomacy at a more professional and technical level. Thus, the IDSS served as a diplomatic bridge that unites international interests and collective security.

Hierarchical Function: Structural Power and Technological Hierarchy

From another perspective, the main purpose of structures such as the IDSS was found to be not only to ensure stability in space but also to maintain U.S. power and influence there, in addition to supporting American hegemony on Earth. Morin and Tepper (2023) demonstrated that the United States employs two kinds of power: “relational power” – the capacity to compel other states to take specific actions – and “structural power” – the capacity to establish the general rules or “rules of the game” that all other participants must follow. Unlike relational power, structural power does not rely on direct pressure. Instead, it shapes the legal environment by setting technical standards, and in that environment all states must act.

By making the IDSS the technical foundation of the Artemis Accords, the United States created a powerful “chokepoint effect.” After partner nations constructed their equipment according to U.S. specifications, switching to an alternative system became extremely difficult and costly. Because American components and technologies are integrated into nearly every major space project, partner nations recognized no alternative but to accept U.S. standards if they wished to continue participating in high-level missions. This situation reflected not direct coercion but practical necessity. No state could construct a completely separate docking system while remaining within the Artemis coalition. Consequently, this dynamic bound international partners to the American technological ecosystem, generating long-term dependency and restricting their capacity for independent decision-making. Over time, this dependency evolved into a clear hierarchy in which the United States held primary power – not through explicit directives, but through the technical system itself.

Soucek and Tapio (2023) showed that such technical standards act as “gamechangers” because they grant a substantial advantage to the first mover. The state that first establishes a standard can define the rules before others have the opportunity to act. Specifically, the state that first develops and implements a standard secures its own technical preferences. Subsequent states must either adopt that standard or invest significant financial resources in constructing their own separate systems. This situation had a considerable impact, particularly on developing countries. Because they accept the conditions of U.S.-led technical standards, they become dependent even before their initial entry into space, which may undermine multipolar competitiveness.

This technical hierarchy created a “glass ceiling” for rival networks, especially those led by China (Morin & Tepper, 2023). Although China has its own lunar plans through the International Lunar Research Station (ILRS), its capacity to attract international partners was limited because most states already follow U.S.-led standards such as the IDSS. From the Chinese perspective, Nie (2025) criticized these U.S.-led frameworks as one-sided and exclusionary. She argued that the Artemis Accords – including the IDSS requirement – are not neutral technical agreements but strategic instruments designed to protect American interests rather than to uphold international law (Nie, 2025). She also stated that states joining the U.S.-led bloc may encounter difficulties in participating in other competing frameworks (for example, China’s ILRS) or may face political pressure (Nie, 2025). Morin and Tepper (2023) further argued that the interoperability requirement elevates U.S. engineering methods to the level of a “global default.” This creates a hierarchical system in which the standard-setter holds ultimate authority. This dominance is reinforced by what Bower and Lantis (2024) termed “antipreneurship” – a defensive strategy whereby the United States blocks new international treaties, such as Chinese and Russian proposals for space disarmament, in order to protect its own strategic advantages. This strategy of “antipreneurship” operates by actively blocking the creation of new binding international treaties while simultaneously promoting non-binding, flexible frameworks such as the Artemis Accords. The United States, by opposing legally enforceable disarmament agreements proposed by China and Russia, effectively preserves a legal vacuum in space governance. Within this vacuum, U.S.-led technical standards like IDSS become the de facto global norms without the need for formal multilateral consent. As Bower and Lantis (2024) argue, this approach allows Washington to maintain maximum freedom of action while constraining the ability of rivals to shape alternative legal orders. Consequently, the absence of a comprehensive space treaty regime is not a passive gap but an actively maintained condition that benefits the dominant power. Rather than negotiating within the framework of the United Nations, the United States prefers flexible, non-binding frameworks such as the Artemis Accords (Morin & Tepper, 2023; Bower & Lantis, 2024). Those frameworks allow the United States to promote its preferred norms while avoiding formal legal commitments. Thus, while the IDSS is presented as a tool for mission safety, it actually functions as a “gatekeeper” that binds partners to American technological systems and preserves U.S. control over the future lunar economy. Therefore, the same technical standard facilitates cooperation but simultaneously acts as an instrument of exclusion and control.

Discussion

The findings of this study reveal a fundamental paradox: the International Docking System Standard (IDSS) simultaneously functions as a mechanism for cooperation and as an instrument of U.S. structural power. This paradox does not represent a contradiction but rather a dual reality inherent in contemporary space diplomacy. The cooperative dimension, as articulated by Stewart and Dittmer (2023), emerges from the IDSS’s role as a “material vernacular” – a shared technical language that enables interoperability, fosters mutual dependence, and maintains a “tenuous peace” even during terrestrial political conflicts. The historical example of the Apollo-Soyuz Test Project (Chiu & Kornprobst, 2025) further demonstrates that docking technology has long served as a diplomatic bridge, transforming rival states into cooperative partners through technical compatibility. Simultaneously, the hierarchical dimension, as theorized by Morin and Tepper (2023), manifests through the “chokepoint effect” created by making the IDSS a mandatory condition for participation

in the Artemis Accords. Partner nations, including Japan and the United Arab Emirates (Del Canto Viterale, 2025; Deplano, 2021), voluntarily join the Accords to enhance their space capabilities but become “locked in” to the U.S. technological ecosystem. The high costs of switching systems restrict their strategic autonomy and transform them into components of a U.S.-led hierarchy. Soucek and Tapio (2023) confirmed that first-mover advantages in standard-setting create lasting structural inequalities, particularly affecting developing countries that become dependent even before their initial entry into space.

A noteworthy question arising from these findings is why 52 nations voluntarily subscribe to the Artemis Accords despite the evident hierarchical structure embedded in the IDSS requirement. One possible explanation is that the benefits of interoperability – access to U.S. technology, mission opportunities, and political legitimacy – outweigh the costs of reduced strategic autonomy for most partner states. As Del Canto Viterale (2025) suggests, smaller and middle powers often accept technical hierarchies in exchange for security guarantees and economic gains. This dynamic resembles a “hegemonic bargain” where subordinate states tolerate structural power in return for participation in high-prestige projects. However, as the case of China demonstrates, rival powers that reject this bargain are forced to develop parallel systems (e.g., ILRS), leading to the fragmentation of space governance. Thus, the IDSS not only reflects U.S. structural power but also actively reproduces it by creating a self-reinforcing cycle of dependency and exclusion.

This duality reflects a broader shift in space governance – from universal multilateralism within the United Nations system toward a fragmented “bloc-based governance” model (Del Canto Viterale, 2025). Technical standards now serve as “material glue” for alliances such as Artemis while simultaneously functioning as tools of geopolitical exclusion. The long-term implications of the U.S. “antipreneurship” strategy (Bower & Lantis, 2024) are profound. By consistently blocking new universal treaties, the United States not only preserves its freedom of action but also ensures that space governance remains fragmented and dependent on ad hoc, U.S.-led arrangements. Over time, this approach may normalize a “privatized” rule-making process, where technical standards set by a single dominant power effectively replace internationally negotiated legal frameworks. Consequently, even if geopolitical conditions change, the institutional path dependency created by such technical lock-ins (e.g., IDSS) could make it extremely difficult for alternative governance models to emerge. Thus, antipreneurship is not merely a defensive tactic; it is an active mechanism for perpetuating U.S. structural power across successive technological eras. Even rival blocs such as the China-Russia-led International Lunar Research Station (ILRS) are compelled either to develop their own separate standards or to seek theoretical compatibility with IDSS in order to overcome the “glass ceiling” (Morin & Tepper, 2023) and avoid isolation from the global space economy.

Counterargument and Rebuttal

A possible counterargument is that the IDSS is merely a technical safety mechanism with no political consequences. Critics may point to the voluntary nature of the Artemis Accords, the official safety objectives stated by NASA (2020), and the cost-reduction benefits highlighted by Chiu and Kornprobst (2025) as evidence of political neutrality. According to this view, states adopt the IDSS freely because interoperability provides equal benefits to all participants.

However, this interpretation overlooks the deeper political reality of technical standards. First, as Morin and Tepper (2023) argued, the very ability to set such standards constitutes “structural power,” enabling

the United States to define the “rules of the game” according to its own preferences. In this context, technical interoperability is not merely cooperative but functions as a strategic instrument that creates a “glass ceiling” for rival states. Second, Bower and Lantis (2024) referred to this U.S. strategy as “antipreneurship” – a defensive approach whereby Washington blocks new universal treaties to preserve its freedom of action and instead elevates its own norms, such as IDSS, to the level of a “global default.” This strategy operates by actively blocking the creation of new binding international treaties while simultaneously promoting non-binding, flexible frameworks such as the Artemis Accords. The United States, by opposing legally enforceable disarmament agreements proposed by China and Russia, effectively preserves a legal vacuum in space governance. Within this vacuum, U.S.-led technical standards like IDSS become the de facto global norms without the need for formal multilateral consent. As Bower and Lantis (2024) argue, this approach allows Washington to maintain maximum freedom of action while constraining the ability of rivals to shape alternative legal orders. Consequently, the absence of a comprehensive space treaty regime is not a passive gap but an actively maintained condition that benefits the dominant power. Third, Stewart and Dittmer (2023) demonstrated that material systems in space place states in an “enmeshed” condition, compelling continued cooperation even during conflicts and generating a “tenuous peace” that masks underlying power asymmetries.

The argument concerning “voluntary acceptance” also requires closer scrutiny. Because American technology is embedded in nearly all major space projects, other states feel “obligated to choose” these norms; otherwise, they risk exclusion from international missions (Morin & Tepper, 2023). Consequently, cooperation that begins as voluntary evolves into systemic dependency over time. As Del Canto Viterale (2024) observed, the governance of the space system has become more fragmented, decentralized, and distributed across multiple levels. Thus, although the IDSS appears apolitical on the surface, its actual effect is to concentrate power in the hands of the standard-setter and to transform international space governance into a unilateral hierarchy. The result is an international system divided into competing blocs, reinforcing exclusion rather than cooperation.

Coexistence of Cooperation and Hierarchy

The two perspectives did not contradict each other. On the contrary, they revealed a fundamental paradox in contemporary space diplomacy: cooperation and hierarchy can coexist within a single technical interface. The IDSS standard simultaneously serves as a diplomatic “bridge” for mission safety and as a strategic “gatekeeper” that reinforces U.S. structural power. As Stewart and Dittmer (2023) noted, technical systems in space possess a unique “material agency” that compels states to cooperate even during terrestrial political conflicts and maintains a “tenuous peace.”

For example, partner nations such as Japan and the United Arab Emirates voluntarily join the Artemis Accords to enhance their national space capabilities and participate in lunar exploration (Del Canto Viterale, 2025; Deplano, 2021). However, because the IDSS standard is set as a prerequisite for participation, they become logically “locked in” to the U.S. technological ecosystem (Morin & Tepper, 2023). The high costs of switching systems restrict their strategic autonomy and transform them into components of a U.S.-led hierarchy. Nevertheless, it must be acknowledged that in this process, the partners’ need for safety and the U.S. interest in leadership intersect at a certain point.

At the same time, this paradox reflected a shift in space governance – from universal multilateralism within the UN system toward a fragmented “bloc-based governance” model. Del Canto Viterale (2025)

argued that this transitional period has led to a “complex hegemony” in which technical standards serve as “material glue” for alliances such as Artemis but also function as instruments of geopolitical exclusion. Bower and Lantis (2024) termed this U.S. strategy “antipreneurship.” Even rival blocs such as the China-Russia-led International Lunar Research Station (ILRS) are forced either to develop their own separate standards or to seek theoretical compatibility with the IDSS in order to overcome the “glass ceiling” (Morin & Tepper, 2023) and avoid being cut off from the global space economy. On the positive side, the existence of the IDSS may encourage rival states to further develop their own technologies and capabilities, thereby discovering new breakthroughs. Thus, the IDSS standard embodies the ongoing tension between shared exploration and strategic control.

Conclusion

This study has demonstrated that the International Docking System Standard (IDSS) is not merely a technical interface for connecting spacecraft; it is a strategic mechanism that reinforces U.S. structural power in modern space diplomacy (Morin & Tepper, 2023). On one hand, as a “material vernacular,” the IDSS directs states toward cooperation through physical interdependence and maintains a “tenuous peace” even during geopolitical conflicts (Stewart & Dittmer, 2023). On the other hand, by being set as a mandatory condition for participating in the Artemis program, the IDSS creates a “glass ceiling” for rival states and generates a “chokepoint effect” that locks partners into American engineering norms.

Thus, the IDSS redefines international power dynamics through a dual system: technical interoperability enables cooperation, but at the same time, systemic dependency and exclusion reinforce U.S. structural dominance. This paradox reflects a broader shift in space governance – from universal multilateralism toward a fragmented “bloc-based governance” model. The Artemis Accords (NASA, 2020) and their IDSS requirement exemplify this transition.

For emerging space nations, this situation presents a difficult choice: balancing the safety and mission participation that technical interoperability offers against preserving national strategic autonomy. Future research should focus on whether partner states perceive the IDSS as a pure safety standard or as a forced political concession to the United States. Ultimately, the future of lunar exploration depends not simply on the power of rockets, but on who writes the technical “rules of the game” (Morin & Tepper, 2023). In this sense, the IDSS standard is not only a key element of today’s space competition but has also become a symbol of how power is exercised in 21st-century international relations.

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