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Fight for the Final Frontier: Irregular Warfare in Space by John J. Klein. Naval Institute Press

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John J. Klein's Fight for the Final Frontier: Irregular Warfare in Space compellingly examines the application of irregular warfare principles in outer space. Drawing extensively on maritime warfare theory, the author provides a structured and historically grounded framework that enriches the strategic understanding of space as a contested domain. At a time when geopolitical competition between the United States and China increasingly transcends the Earth's surface, Klein's work stands out as a seminal and timely contribution to military and strategic thought.

As persuasively argued in Chapter 1, The Enduring Nature of Irregular Warfare, space should not be treated as an isolated domain but rather analyzed using the same strategic logic that governs land, sea, and air. The chapter's key premise is that asymmetry, non-conventional tactics, and long-term strategic maneuvering define irregular warfare: elements that are likely to play a central role in defining the features of space power competition. Accordingly, Klein provides a strong foundational perspective on the necessity of adopting irregular warfare principles for the space domain, specifically through a thoughtful exploration of the strategic relevance of history and analogy. His analysis of nontraditional approaches to warfare underscores the increasing complexity of space security.

In Chapter 2, Characteristics of Irregular Space Warfare, Klein offers a nuanced understanding of hybrid space warfare by addressing the strategic role of time as a weapon, the necessity of deception and surprise, and the operational use of dispersal and concentration. He highlights the asymmetric advantages that space actors can exploit, particularly through cyber and electronic warfare. His discussion on how irregular space warfare intersects with political and terrestrial considerations adds further complexity to space conflict. This perspective is particularly in the light of the rising tensions between the United States and China, which are rapidly expanding their space

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capabilities, developing counter-space systems, and increasingly integrating commercial space assets into national security strategies.

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One of the book's most valuable contributions is its comprehensive exploration of Small Space Wars in Chapter 3. Klein convincingly outlines the inevitability of space warfare, drawing insightful parallels to Fabian strategy and maneuver warfare as applied to contested space operations. The chapter's discussion of proxy warfare in space, cyberattacks against space architectures, and electromagnetic attacks such as jamming and lasing is particularly insightful. Encouraging the readers to think unconventionally, Klein references the concept of space prizes and the possibility of terrorism in space, further highlighting the unconventional nature of future orbital conflicts.

Chapter 4 expands the analysis with a focus on Gray-Zone Operations and Gunboat Diplomacy, assessing the use of coercion, proximity operations, and forward presence to ascertain dominance by space-faring nations. The comparison to maritime strategy is particularly pungent at this point in the book, as Klein demonstrates how nations may engage in acts of intimidation and technological demonstrations to project power and deter adversaries without crossing International Law thresholds.

The book's emphasis on Lawfare and Space in Chapter 5 is particularly thought-provoking. Klein explores how states may manipulate international legal frameworks to their advantage, creating strategic ambiguity and challenging adversaries' ability to respond effectively. His discussion of China's and Russia's use of lawfare is especially relevant, illustrating how legal instruments can be leveraged as part of a broader strategy of irregular warfare. The reader is also alerted by the potential for commercial actors to be drawn into geopolitical conflicts, further complicating the regulatory landscape.

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Klein's insights into commercial space and its role in irregular warfare, discussed in Chapter 6, are particularly timely given the increasing role of private industry in space security. The chapter explores the implications of commercial innovation, private military companies, and even the controversial idea of space privateering. In the current context of international relations, the realization that commercial space infrastructure is both a strategic asset and a vulnerability adds a critical dimension to contemporary space security discussions. The Chapter's overarching argument is that, in the current geopolitical climate, policymakers must be cautious about the implications of misinterpreting space as a global commons while they increasingly rely on hybrid space architectures.

Developing some ideas further, Chapter 7, Exploiting Space Technologies for Asymmetric Advantage, focuses on technological innovation as a doubleedged sword in space competition. Klein addresses the dual-use nature of emerging technologies, discussing how China's space industry leverages commercial innovations for strategic purposes. His analysis of operational concepts and international relations theory provides a broader perspective on how technological superiority can shape power dynamics in orbit.

The book's final chapter, How to Counter Irregular Space Warfare, outlines a series of strategic countermeasures to tackle the growing complexity of space conflict. Klein contends that nations must invest in space education, resilience, and domain awareness to effectively counter adversarial tactics. His recommendations for improving space deterrence – through a combination of redundancy, maneuverability, and collaborations with commercial partners – are particularly relevant in the current geopolitical climate. The framework he proposes for space attribution, which comprises space domain awareness, intelligence, and commercial elements, offers a well-structured methodology for addressing the challenges of identifying and responding to hostile actions in space.

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Klein also highlights the critical importance of maintaining political support and forbearance in space security efforts. Irregular warfare is often protracted and requires long-term commitment. The book emphasises the importance of strategic messaging and public diplomacy in shaping perceptions and ensuring sustained political will. This approach is especially relevant given President Donald J. Trump announcement of his objective to build a new missile defence system, reminiscent of President Ronald Regan's Strategic Defence Initiative. Public opinion, as Klein points out, can significantly influence policy decisions and resource allocation for space security initiatives.

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Furthermore, Klein's arguments are consistent with the ongoing assessments conducted by key institutions monitoring counterspace threats. Among others, the Secure World Foundation's Global Counterspace Capabilities Report (2024), the CSIS Space Threat Assessment (2024), and the U.S. Defense Intelligence Agency's Challenges to Security in Space (2022) provide valuable open-source insights into adversarial advancements in anti-satellite systems, cyber operations, and hybrid threats. While Klein interprets these developments through a maritime strategic lens, these reports furnish empirical evidence of counter-space capabilities, reinforcing his assertion that future conflicts in space will heavily depend on asymmetric and hybrid tactics. The increasing militarisation of space, as emphasised in these reports, reinforces Klein's claim that hybrid warfare strategies (e.g. cyber-attacks and economic coercion) will play a crucial role in upcoming orbital conflicts.

John Klein's Fight for the Final Frontier presents a strategic framework for understanding space as a domain of irregular warfare, and the CSIS Space Threat Assessment 2024 and SWF Global Counterspace Capabilities 2024 provide extensive empirical validation of many of his arguments. Klein asserts that space conflict will be shaped by asymmetric tactics, lawfare, economic coercion, and hybrid warfare, principles that align closely with

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the counterspace developments outlined in both reports. The integration of cyber operations, electronic warfare, and commercial space assets into military strategies is not only discussed conceptually in Klein's work but also substantiated with real-world examples in these reports.

One of Klein's core arguments is that the future of space security will mirror the historical evolution of naval warfare, where irregular tactics (e.g., privateering and blockade strategies) played a significant role. The SWF Global Counterspace Capabilities 2024 report provides direct evidence of this trend, detailing how commercial space infrastructure is increasingly targeted in geopolitical conflicts. It highlights how commercial satellite networks, such as Starlink, were used in the Russo-Ukrainian war, demonstrating the dualuse nature of these assets and their vulnerability to state and non-state actors. This reinforces Klein's contention that commercial entities will be drawn into military confrontations in space, whether they intend to or not. Similarly, the CSIS Space Threat Assessment 2024 discusses the proliferation of electronic warfare (jamming and spoofing), particularly by China and Russia, to degrade satellite communications and reconnaissance capabilities, an aspect Klein identifies as a growing concern.

The reports cited above are further reminiscent of Klein's assertion that China and Russia are leveraging lawfare to challenge and reshape existing space governance frameworks. Klein dedicates considerable attention to China's legal maneuvers to shape international norms to its advantage, a claim that is further substantiated by CSIS 2024, which documents how China strategically employs diplomatic channels, such as the United Nations, to influence space policy discussions. Similarly, thee SWF 2024 report highlights how China and Russia use international legal ambiguities to justify activities that, under different interpretations, could be classified as hostile. This aligns with Klein's stark warning that adversarial states will continue

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to exploit regulatory loopholes and engage in strategic legal maneuvering to gain an advantage without crossing the threshold into overt military conflict.

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Another area of convergence between Klein's analysis and the abovementioned reports is the role of space deterrence and resilience. Klein emphasises the need for redundancy, maneuverability, and robust space domain awareness (SDA) to counter irregular threats. The CSIS Space Threat Assessment 2024 reinforces this by documenting how the United States is expanding its SDA capabilities, including the deployment of advanced tracking systems and AI-driven analytics to identify hostile activities in orbit. The report also discusses the strategic significance of resilient satellite architectures, such as proliferated low-Earth orbit (LEO) constellations, which Klein argues are essential for maintaining operational capability during a crisis. The SWF 2024 report further elaborates on these deterrence strategies, detailing the international collaborations forming to strengthen space resilience, including NATO's increased focus on space security and joint military exercises integrating space-based assets.

Additionally, both reports validate Klein's predictions about the increasing role of cyber warfare in space. Klein argues that cyberattacks will become a primary tool for disrupting space operations due to their cost-effectiveness and plausible deniability. The CSIS 2024 report provides real-world examples of cyber intrusions targeting satellite networks, including Russia's 2022 attack on the Viasat KA-SAT network, which disrupted Ukrainian military communications at the war's outset. Similarly, SWF 2024 documents China's efforts to develop advanced cyber capabilities to infiltrate and turn off adversary space assets, further reinforcing Klein's concerns about the expanding cyber threat landscape.

Another critical overlap is the strategic use of counterspace weapons to create ambiguity and deter adversaries without escalating to open conflict.

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Klein discusses how limited space warfare and gray-zone tactics will be used to test responses and shape geopolitical behavior. The CSIS 2024 report provides an empirical basis for this claim, detailing how Russia's ongoing development of counterspace capabilities, including the Nudol directascent anti-satellite (DA-ASAT) missile and co-orbital ASAT platforms, aligns with its broader military doctrine of asymmetric escalation. SWF 2024 further supports Klein's thesis by analysing China's rapid expansion of its counterspace arsenal, including electronic warfare systems capable of knocking out satellites without physical destruction, thereby reducing attribution risks and strategic fallout.

The growing role of non-state actors and private military companies in space conflicts, a theme explored in Klein's book, is also reflected in the reports. The CSIS 2024 analysis notes that as commercial space capabilities expand, they become both a strategic asset and a liability, susceptible to coercion, hacking, and even physical attack. This aligns with Klein's warning that space-based economic assets will become integral to national security strategies, potentially leading to the emergence of space militias or privateers operating under state sponsorship. Similarly, SWF 2024 outlines how various nations are integrating commercial satellite data into military planning, further blurring the lines between civilian and military applications, a key point of concern in Klein's work.

Finally, Klein's call for stronger alliances, enhanced intelligencesharing, and clear red lines to deter hostile activities is echoed in the policy recommendations found in both reports. The CSIS 2024 report underscores the importance of coalition-building, highlighting developments such as the Artemis Accords and NATO's increasing focus on space security as vital to maintaining strategic stability. Similarly, the SWF 2024 report emphasizes the growing international consensus on the need for improved space situational awareness and cooperative security frameworks to manage emerging threats.

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In essence, in what constitutes his third in-depth exploration of the intersection between strategy and space, Klein provides a conceptual foundation for understanding the emerging dynamics of irregular warfare in space, and the CSIS Space Threat Assessment 2024 and SWF Global Counterspace Capabilities 2024 provide concrete, up-to-date evidence supporting his claims. The reports validate his warnings about the rise of hybrid warfare, the growing role of commercial space assets in military operations, and the increasing reliance on cyber and electronic warfare to gain strategic advantages. Moreover, they confirm his concerns about lawfare, deterrence, and the necessity of international cooperation to maintain stability in the increasingly contested space domain. Taken together, Klein's work and these reports paint a comprehensive picture of the challenges ahead, reinforcing the urgent need for policy adaptation, technological resilience, and robust international governance to navigate the complexities of space security in the 21st century.

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Fight for the Final Frontier is a pivotal contribution for academics and practitioners engaging in space security, military strategy, and international relations. Klein compellingly demonstrates the added value of premising contemporary space security analysis in historical strategic thought, offering a framework that will be invaluable for those shaping discussions on space security. By drawing on maritime strategy, he presents a coherent and accessible methodology for understanding space conflict, making this book a significant contribution to the growing literature on space security. Future works in this field would benefit from expanding on irregular space warfare's operational and tactical aspects, offering more profound insights into real-world applications and emerging trends in the rapidly evolving space environment.