BOOK REVIEW

The Battle Beyond: Fighting and Winning the Coming War in Space

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INTRODUCTION

The exploitation of space-based assets and applications for governance, development, commercial, and military purposes has increased manifold over the last few decades, making space capabilities a critical component of national power. Securing access to space and freedom to use space-based capabilities have become essential for national security. Space has consequently emerged as a domain of warfighting. *The Battle Beyond: Fighting and Winning the Coming War in Space* by Paul Szymanski and Jerry Drew addresses the critical issues concerning the conduct of warfare in space. The introductory

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chapter sets the tone for the book, highlighting the distinction between war and warfare, explaining that while war involves all elements of national power and requires a whole-of-nation approach, warfare is purely a military subject that necessitates the application of military resources and knowledge. With space emerging as a domain of war, a conflict in space necessitates the involvement of the government and even civilian agencies dealing with dual-use space technology. However, space warfare remains a purely military subject. As a new domain of warfare, time-tested military knowledge may or may not apply here, and new ideas, concepts, and theories are likely to emerge. Space warfare has several facets, including policy, technical, institutional, ethical, and combat considerations. This discourse primarily focusses on the military elements of space warfare. It aims to develop space tactics that integrate into an operational framework, which subsequently informs strategic thinking on the subject.

SUMMARY OF THE CONTENT

The first chapter, of the book, "The Language of the Strategic Level" is dedicated to strategy in space. It highlights that while grand strategy necessitates a whole-of-government approach, military strategy serves as the interface between military operations and grand strategy. Military history, exercises, national intelligence, political and legal considerations, treaties, perceptions, and cultural biases inform the military strategic environment. Given the fast pace of operations and the rapid, mobile, flat communication architecture, space warfare would function within a hybrid hierarchical-network structure, as bureaucratic hierarchical methods cannot keep up with the pace of operations and the flow of information. Furthermore, thresholds for proportionate response in space are not clearly defined, and the expected reaction to a hostile action in space may vary between countries. Because the impact of a space attack is not immediately visible to the public, governments may not feel compelled by public opinion to retaliate and may still negotiate with the attacker. Thus, nations may use space attacks as a negotiating tool or as a punitive

or deterrent measure, even in the pre-conflict stage. In this way, space operations create conditions for additional rungs on the conflict escalation ladder. Space domain awareness remains the biggest challenge in a space war. Space surveillance capabilities, therefore, inform grand strategy, which, in turn, is informed by it. Strategic-level preparations for a conflict in space may involve forming alliances, signing treaties and developing a techno-industrial base. Such preparations would invariably be undertaken in the pre-conflict phase. Developing and utilising space forces effectively requires a strong political commitment and a deep understanding of the strategic complexities of space power. Military strategy connects available means to desired goals in a conflict. Space strategy, training, and capability development depend on the military's vision of future warfare. Effective space capability requires addressing equipment, force level, and technology gaps, creating a clear space doctrine informed by theory, history, and validated warfighting concepts. The doctrine must also consider the adversary's strategies to anticipate outcomes.

A significant strength of the book is its integration of historical military concepts with contemporary space warfare considerations. The authors draw from the works of military theorists such as Sun Tzu and Napoleonic strategists, adapting their principles to the context of space. This approach provides a familiar framework for military professionals while addressing the novel challenges presented by the space domain. The second chapter of the book, titled "Space Warfare and the Principles of War", explores the relevance of the principles of war to space warfare. The concept of 'mass' or the concentration of combat power relates to space warfare, in terms of concentrating kinetic or non-kinetic orbital warfare assets in time and space against a single, high-value target. The principle of 'economy of force', which advises the judicious expenditure of essential combat power on secondary efforts, is equally relevant to space warfare. This relevance arises from the inherent limitations in the availability of space assets for specific operational tasks and the necessity to undertake multiple global missions with a relatively small force structure. The principle of 'security'

of space warfare assets is critical for both ground and space-based assets, which are always at a premium. Space assets need resilience against kinetic and non-kinetic attacks, active protection measures, and redundancy through alternative capabilities. 'Surprise' in the space domain is best achieved through attacking first. Since it is challenging to detect and evade incoming Anti-Satellites (ASATs) or protect satellites from hypervelocity anti-satellite systems, the side that attacks first might as well win the war in space. Responsibility for planning and conducting space operations is generally centralised under the space force commander. The theatre commanders also seek similar command authority for space operations within their theatres to ensure integration with other theatre operations. Achieving 'unity of command' ensures that all space operations are directed toward a common objective under a single, responsible authority. In space, clear command structures and delineated decision-making responsibilities are essential for effective coordination and mission success. 'Manoeuvre' or moving forces in relation to an enemy to gain an advantage, and employing enablers to improve the chances of success, are inherent to all segments of the space domain (satellites, terrestrial receivers, ground and space-based ASATs) and in the electromagnetic spectrum, including directed energy beams. Space also augments the manoeuvre of other domains through flexible communication and battlefield transparency. In orbit, satellites can make large or small manoeuvres to gain positions of advantage, confuse the enemy and complicate his targeting solutions. In the electromagnetic domain, manoeuvre is effected through polarisation modulation, altering the beam shape, etc, to enhance survivability. Through 'offensive' action, the attacker seeks to gain the initiative and disrupt the enemy's capability to resist in a cohesive manner. Initiating a well-timed series of offensive actions in space can throw the adversary off balance. 'Objectives' in space warfare at the strategic level determine operational objectives, which, in turn, dictate tactical objectives. These can either be connected to terrestrial objectives or independent space operations. The concept of 'simplicity' in planning space operations is essential for ensuring that our forces can integrate these plans

effectively and that adversaries can understand the effect of a space attack and respond in the desired manner.

Chapter Three, titled "The Language of the Tactical Level," emphasises the necessity of a shared tactical language to integrate space operations seamlessly with traditional military domains. It advocates a standardised lexicon and symbology for effective communication and coordination within the space forces. The authors argue that tactical terminology in the space warfare domain must be in a language familiar to military practitioners. The chapter introduces an extensive set of symbols and terminologies tailored for space operations, drawing parallels with established military doctrines. For instance, traditional concepts like 'jamming' are adapted with specific icons to represent their application in space, ensuring that terrestrial and space-based forces can operate in a cohesive manner. A significant portion of the chapter is dedicated to the development of a comprehensive symbology system for space assets and threats. This system is designed to be intuitive for military personnel, incorporating colour-coded icons and standardised shapes to represent various space entities and actions. The chapter also addresses the integration of space operations into joint and combined arms strategies. It emphasises the importance of aligning space tactics with terrestrial objectives, ensuring that space operational objectives align with broader military goals. By establishing a common language and framework, the authors aim to bridge the gap between space and traditional military operations, fostering a more unified and effective defence posture.

Discussing the operational concepts of space warfare in the fourth chapter, "The Language of the Operational Level", the authors state that the operational level links the strategic aims with the tactical actions. As in the other domains of war, space warfare at the operational level requires an understanding of the operating environment, which includes the strategic environment, space situational awareness, and knowledge of the physical environment. Thus, developing the operating picture in space, threat warning, and assessment involving ongoing enemy actions and anticipated enemy actions (predictive battlespace awareness) must be undertaken. This

would be followed by the development of space courses of action. Delving into the operational art of space warfare, the authors discuss how mission analysis and defining desired end states are essential for effective planning. They stress that understanding the interplay among time, space, means, and purpose is vital for achieving political goals through military power in the space domain. Szymanski and Drew also acknowledge the human elements inherent in warfare. They argue that despite technological advancements, factors such as knowledge, culture, traditions, and the psychological state of participants play a critical role in conflict outcomes. This perspective reinforces the idea that developing a shared operational language is not solely a technical endeavour but also a human-centric one, requiring collaboration and mutual understanding among diverse stakeholders.

In the concluding fifth chapter, "Revisiting the Military Strategic Domain", the authors bring us back to the military strategic domain, which lies between the operational level of warfare and the grand strategic realm. To make resource allocation decisions, senior government officials and military leaders assess the risks to current military operations, advocate for, and source, future requirements, and integrate military external resources across global complex problem sets. To develop an actionable strategy, the space forces could juxtapose themselves with existing plans, contributing through space-based resources.

CRITIQUE

In *The Battle Beyond: Fighting and Winning the Coming War in Space*, Paul Szymanski and Jerry Drew examine the tactical, operational and strategic aspects of the militarisation of outer space. The quality of the content is informed and enriched by the authors' extensive operational experience, which lends practical credibility to their analysis of space warfare. Their efforts at initiating a standardised operational language for the space domain and adapting terrestrial military principles to orbital mechanics are particularly insightful. The emphasis on strategic planning, risk assessment, and the integration of space power into joint warfare enhances the relevance

of the book to the doctrinal challenges in space warfare. However, certain critics have pointed out that the extensive use of specialised symbology and the dense technical content of the book may be incomprehensible to a broader audience. In the Indian context, with New Delhi focussing on developing its capability to secure and defend its space-based military capabilities and develop counter-space deterrence capabilities, the book provides a critical perspective on developing concepts of space operations.

CONCLUSION

The Battle Beyond: Fighting and Winning the Coming War in Space is a foundational work in the domain of space warfare, which analyses in great detail the strategic, operational, and tactical dimensions of conflict in space. The book has garnered attention from both military professionals and academic reviewers. General David Petraeus has commended the book's contribution towards understanding space warfare, emphasising its relevance for both casual readers and professional warfighters. The book provides invaluable insights for military professionals, policymakers, and scholars interested in the future of space warfare. As space emerges as a critical domain for national security, Szymanski and Drew's work serves as an essential guide for understanding and navigating the nuances of this complex landscape.