

Space Warfare: a 21st Century Battleground

Written by Bleddyn E. Bowen

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Michael E. O'Hanlon, *Neither Star Wars nor Sanctuary: Constraining the Military Uses of Space* (Washington, DC: Brookings Institution Press, 2004)

John J. Klein, *Space Warfare: Strategy, Principles and Policy* (Abingdon: Routledge, 2006)

These two books differ widely in scope and original objectives, but both authors discuss the very pressing issue of the United States' position of superiority in space which is being challenged by the growth of the numbers of actors in outer space and the strength of their individual presence. Michael O'Hanlon's book is specifically about American weaponisation policy and what the United States should do to best serve its interests in space and international relations. China features as the main potential adversary throughout, and is posited as the enemy in Chapter 4, which is an elaboration of a future scenario: a conflict with the United States over Taiwan. John Klein's objective is to devise a maritime-based military space strategic theory to guide activities, policy and most of all, warfare, in outer space. Naturally, Klein draws heavily on Julian Corbett's concepts, but adapts them and coins new concepts for the unique space environment. The four themes that run across these books are: (a) maintaining the status quo and delayed weaponisation, (b) a security paradox, (c) indiscriminate space debris, and (d) multipolarity.

The two books are lacking in areas which one or the other discusses. O'Hanlon manages to elaborate more substantively on an area than Klein does: **alternatives to space assets** and making space systems redundant, so as to reduce satellites' value as a target. Klein, on the other hand, develops a **useful lexicon for strategic thinking in space** which O'Hanlon could exploit, particularly the term 'celestial lines of communication' (CLOC). Both books can mostly be merged together, after taking consideration of the two points of difference and adapting them to each other. Klein uses the most methodical structure on framing space strategy and problems, as he frequently draws inspiration from Sun Tzu, Carl von Clausewitz, Julian Corbett and Mao Zedong. Using Klein's framework, we can identify several of his concepts in action in O'Hanlon's work, but O'Hanlon pays attention to more subtle issues that also affect strategic thinking.

Maintaining the Status Quo and Delayed Weaponisation

The first theme that unites the two books is that the United States stands to lose a lot from the aggressive weaponisation of space, and for the moment, restraint is needed. Weapons should not be deployed now, but research should continue, as the weaponisation of space is believed to be inevitable. It could not be clearer that the two authors agree most on this issue. O'Hanlon narrows his discussion to US space capabilities and anti-satellite (ASAT) technologies that are in development, with only a brief acknowledgement of conceptual technologies. Like Klein, O'Hanlon states that space is already militarised, yet the threshold of weaponisation has not yet been crossed. The provisions of the 1967 UN Outer Space Treaty should be adhered to, although O'Hanlon states that it only prohibits a small amount of direct activities. As the power that has the greatest presence in space, no-one has more to lose than the USA from the loss of access to, and use of space. Klein rightly conceptualises this as the celestial lines of communication. Both authors deem the United States to be enjoying its preponderance in space and should aim to keep it that way by not upsetting other powers with aggressive moves at weaponisation, nor should it allow its defences to slip. O'Hanlon is very stern in his suggestion that the US should harden its satellites from attack and

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interference, as only perilously few have such passive defences at this moment. Given his empirical data on hardened and unhardened satellites, he argues a strong case. Klein, whilst briefly mentioning passive defences because he is not focusing on technological issues, furthers this to include manoeuvrability, which allows for the strategic principles of dispersal and concentration. Dispersal is the important aspect here to maintain the status quo. Passive defences and the ability to disperse assets away from an enemy attack would allow the US to defend its assets whilst not weaponising outer space.

Security Paradox

Closely related to maintaining the status quo is the matter of avoiding a security paradox from the American perspective. The term 'security paradox', is not used by either author, but here it is meant in Booth and Wheeler's definition. That definition is by **A** increasing armaments (placing weapons in orbit in this case), **B** (or more powers) reacts in kind or attempts to undermine the armaments placed (placing weapons in orbit or adapting already existing technologies with latent ASAT capabilities). This problem is briefly referred to in O'Hanlon's final chapter and in Klein's penultimate chapter. Both authors raise the possibility of building or continuing norms, establishing new customary laws or creating formal ones to try and alleviate these concerns, and muting the calls for an aggressive weaponisation to prevent a 'space Pearl Harbour', which both authors describe as an exaggerated fear. O'Hanlon greatly fears the consequences of an aggressive tone and weaponisation, as described in the *Space Commission Report*, a document which is studied by both authors. Klein slightly differs here, whereas he has an original concept in regards to space strategy – that of making space a barrier. With proper 'policing' systems (satellite monitoring, stalking and destruction) in space, and a hold on chokepoints, a power like the United States could maintain control and access of the CLOCs. Klein would rather that not be the case because it is an expensive strategy based on technologies that do not yet exist, or are not tested enough in practice. And the diplomatic and economic results cannot be assumed to be advantageous in the long term, as Klein believes that an aggressive weaponisation will only be beneficial to the United States in the short term, before the security paradox is realised. Such uncertainty in space over weaponisation needs to be avoided

Indiscriminate Space Debris

Conflict in space raises a similar concern to both authors. Space debris is mentioned in every chapter, and is a defining feature in both books when explaining the fundamentals of orbital mechanics. O'Hanlon prefers passive defences and non-physical ASAT technologies because such technologies do not create debris (or so little as to be satisfactory to O'Hanlon). O'Hanlon also suggests that the US would do well to push for the ban on weapons that create debris in orbit, effectively making space a domain of electronic warfare. However, given developments since China's ASAT test in 2007, and the United States' retaliatory test soon after, we must reconsider the plausibility of such proposals. Klein rightly addresses debris constantly, particularly when considering physical attacks and technologies, such as missiles, mines and collisions. He often uses debris as a pinch of salt on every offensive strategic concept, as what **A** does to **B**'s CLOCs will probably affect **A**'s CLOC. This is due to the fact that in space, CLOCs are often shared by all users. Not only is physical debris a threat, but also radiation. After a nuclear blast, radiation will permeate regions of orbit and intensify the Van Allen radiation belts. Radiation in this context degrades communications and makes unshielded electronics defunct. However, it is not discussed whether the danger posed by rampant debris could restrain power projection capabilities in space. James Moltz has convincingly portrayed the concept of mutually assured destruction in space (and making space useless to all of mankind) as a restraining influence on the power projection capabilities of states in space. This is an aspect of the strategic calculations of space that could have been discussed in more detail by both authors.

Multipolarity

China is overtly the main concern (or competitor) to American preponderance in space in O'Hanlon's work, whereas in Klein's study, Chinese capabilities are often cited alongside those of the European Union or Russia when discussing the other significant space powers. O'Hanlon is quick to state that his scenario of a conflict over Taiwan is not likely, and it is not an approval of an offensive strategy towards China. It is merely used for illustrative purposes. Nevertheless, we must ask the question when reading these texts – who are we defending from? To whom

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are we going to deny the access of space? Klein can escape this question easily, as his work is the more strategic, and ideally, the more timeless. Klein's perspective can apply to any power in a dominant position. For O'Hanlon, who is dealing more with US policy, it cannot be ignored that such action will be to guard from the powers such as China and Iran, which may have conflicting interests that can escalate in future with the United States, and which also have long-range missile capability at least. Both authors recognise that the United States is not the only power with key interests in outer space, and will have to pander to other sensitivities in the future. Russia, the European Union and commercial actors are prevalent in their discussions. Klein uses the concept of 'presence' to explain how an entity such as the European Union is aiming to influence the United States and others through the Galileo programme, and bring them to the bargaining table to enforce beneficial norms and codes of behaviour. What follows is an explanation of the flaws in both books which are addressed by its counterpart in this review.

Making Space Systems Redundant

O'Hanlon deserves much credit on this issue. O'Hanlon, in his final chapter, states that the US and its allies should not count on space assets being available in future conflicts. He places greater emphasis in his work on existing technologies that have a latent ASAT capability. To him, the spreading of ASAT capabilities is so prevalent that crude ASAT weapons, such as nuclear tipped missiles that can knock out critical space infrastructure, can easily negate force enhancement. An enemy with nothing to lose in space, yet with a long enough reach, may decide to foul Earth orbit to give itself a more level playing field. O'Hanlon urges the US to develop land-based laser/fibre optic communications and to use naval assets as back-ups for destroyed satellites. This serves to make outer space less of a critical target, therefore less of a reason to send weapons up there. Both authors, however, urge the development of spare satellites to be ready to launch as soon as possible when the original is destroyed in orbit. Klein is lacking in this area due to the fact that plans should be made in case the utility of space is lost. This is linked to strategic thinking in space, because it changes the calculations of value over space assets depending whether space assets are redundant or not.

Celestial Lines of Communications

Already mentioned, Klein devises a term that is spawned from Corbett, and which all wartime strategy in space should revolve around – CLOCs. He has three concepts for maintaining CLOCs, which he states are not obvious in other literature. His concepts of policing systems, making space a barrier, and the practice of dispersal and concentration of force can be his 'unique selling points'. O'Hanlon's 'hedging strategy', as he calls it, could use these concepts. As O'Hanlon wishes to protect the USA's CLOCs, his ideas could use Klein's conceptual clarity. O'Hanlon states that communications and commerce travel in space, and physical objects travel there too which are of value. Klein's lexicon in space matters attaches a standard to the debate in a realm which is relatively new. However, Klein does not emphasise *enough* the dynamics of debris in space, as Moltz would. Imagine if all the shipwrecks and cannonballs fired since the Napoleonic wars were still hurtling around at unstoppable speeds in the busiest shipping lanes in the world today. Such potential disruptions to CLOCs demands more strategic thinking.

The two books are generally mutually complementary, although if one were to be recommended above the other, Klein's *Space Warfare* provides the wider appreciation of human activities and capabilities in outer space. Given a strategic understanding of diplomatic, economic, military and information dynamics, one can understand current issues and challenges, not just the United States' present position vis-à-vis China, Russia, the European Union, or other actors. Klein attempts to provide a timeless strategic framework for a state planning to undertake military action in space. And, like Clausewitz, he argues that military force should be but one aspect of the grand strategy undertaken by that state to further its objectives and deal with external powers. To be fair to O'Hanlon, his book proposes a very detailed description of actual satellite (and ASAT) capabilities and argues more overtly over US policy.

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