SAASS 665 - Space Power

Syllabus

2021

.

Course Director: Dr. Wendy Whitman Cobb

Syllabus Approved: _____
Col Jeffrey Donnithorne, USAF
Commandant and Dean
School of Advanced Air and Space Studies

Date: 1 FEB 2021

SAASS 665 Space Power

Course Objectives: In this course we examine the history of the space domain and the use of space in the context of the national interest, national security, and the conduct of warfare. Integral to this process is the development of critical thinking on the utility of the space domain to further overall US strategic goals. By the end of this course, students should be able to effectively assess the opportunities and challenges for the US and international community presented by the overall growth in the space domain. Such opportunities and challenges include discussions regarding effective space strategies and policies (to include the standup of an independent Space Force), the development of theories of space power, the role of commercial interests, the importance of space situational awareness, and the securitization/weaponization of space assets to optimize states' power.

Overview: SAASS 665 is a graduate-level course on strategy, with space power as the context. Space is a quickly moving, quickly developing subject area. Not only is the US military seeking to solidify its advantage in space, but other players are also seeking a foothold: potential adversaries are expanding their space presence and civilian and commercial actors also play significant roles. The result is a domain that is contested, congested, and competitive. Further, the unique physical conditions of space challenge all those who wish to take advantage of it. This seminar, while focusing on issues inherent in the military use of space including weaponization, the security dilemma, and theory, also focuses on the difficult operating conditions space presents as we explore major strategic challenges and the rise of great power competition in space.

The course begins with a broad overview of space warfare and the issues inherent in it, followed by a broader discussion of historical trends and patterns in space security and strategy, beginning with the Cold War. We then discuss various theoretical approaches to space power, considering the implications of using analogies in discussions about space and fully securing the US's advantage. This is followed by a more focused discussion on the weaponization of space, ASATs, and the strategic consequences, including debris. Because of the unique nature of space, what would be rather "normal" concerns in terrestrial conflict take on new meanings and dimensions. Debris that would not otherwise pose a problem on earth, becomes significant in a low gravity environment, potentially threatening American space assets. The remoteness of the space domain, the challenges associated with attack attribution, and its heightened secrecy further complicate efforts to deter and coerce state behavior in space.

The final part of the class turns to US strategy and policy, including an examination of the US Space Force and the actions of potential adversaries in space. While US strategy over the past few years has been more aggressive in recognizing space as a warfighting domain, this rhetoric has consequences that can make space operations harder for the US and its allies. This is particularly important as the USSF continues to establish itself as an independent service. Part of the rationale for the USSF has been increasing competition and contestation of the space domain. As such, the class examines great power issues in space by examining China's space program, in particular, along with regional tensions between China, India, Pakistan, and Japan that appear to be contributing to a unique security dilemma in Asia. Lastly, we take up an increasingly important component of US strategy in space by considering the rise of commercial space companies and considering both the benefits of commercial space and the questions that it raises for defending US spacepower.

Grading: Your final grade will be based on seminar participation and one essay assignment. Seminar participation is weighted at 40% of your final grade while the essay accounts for 60% of your final grade.

Seminar Participation: Our assessment of your performance in seminar is rated heavily toward quality over quantity. In considering your participation in class, keep in mind that this is your opportunity to demonstrate to your professor that you have read the material, have given serious thought about it, and can apply it. If you are in doubt as to how you are performing in class, please speak with your professor.

Essay: You will be required to write one essay responding to the following question:

Should the United States engage with the international community on formal rules of the road and/or treaties regarding conduct in outer space? If so, what should its objectives be in engaging? If not, why is it not in the interests of the US to do so?

Essays should fully explain and support the answers to the question using course material and outside research if necessary. Essays should be 8-10 pages in length, written in Times New Roman, 12-point font, with one-inch margins. Either footnotes or endnotes are allowed and do not count against the page limit, but they should consist primarily of references and not include substantial explanatory text. The essay is due via email to your professor by 1600 on March 30.

Course Faculty: There are three instructors for this course. If you need anything or have any questions, please do not hesitate to reach out.

Dr. Wendy Whitman Cobb, course director

Dr. Derrick Frazier

Dr. Paige Cone

Readings

March 15: Why Space Matters

Linda Dawson, *War in Space: The Science and Technology Behind Our Next Theater of Conflict*, Cham, Switzerland: Springer (2018).

We begin an examination of space power by looking more broadly at the issues inherent in it. While playing a significant role in great power competition, the space domain plays a largely unseen role not just in military affairs and operations but in everyday life. There are myriad ways that everyday people utilize space assets just by going about their daily affairs; for all that we depend on them, they are incredibly vulnerable. This vulnerability comes not only from military threats but also from the harshness of space itself. Dawson's *War in Space* not only outlines some of these dependencies but gives a more general introduction to space as a theater of war. In what ways might military conflict in space interfere and interrupt non-military activities? How might this complicate the future battleground? How do space assets support more terrestrial military concerns? What are potential adversaries such as Russia and China thinking about space? To what extent does the space environment affect operations? To what extent should the military be cognizant of debris and consider its destabilizing consequences?

March 16: History

James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* 3rd edition, Stanford: Stanford UP (2019).

If Dawson's book offers a primer on space security issues, Moltz's *The Politics of Space Security* not only delves deeper but shows how these forces have interacted over time. As you are already well aware, our history greatly shapes today's environment—space is no different. Moltz argues that much of this history is a process of learning, unlearning, and relearning just how important and fragile the space environment is. In this sense, space security is a balancing act between the need to aggressively exploit the advantages of the space domain while protecting it from overuse and sheer destruction. As such, national interest has often recognized the need to adopt strategic restraints to avoid overly threatening this valuable domain, even during times of great power competition. Moltz also serves to introduce us to the various perspectives on space power and space theory that we will begin to encounter. What are these views? Is there any rhyme or reason as to when one becomes more dominant than the other? Where are we currently in this cyclical learning process? Is the national interest truly in strategic restraint or should we more pursue more aggressive, but potentially destabilizing, actions in space? How have the actions of other countries such as Russia and China influenced US views on space? Considering the history Moltz presents, what might we see in future great power competition?

March 18: Theory

Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age*, New York: Frank Cass Publishers (2002).

Much like the Cold War, space is increasingly becoming a focus in this new era of great power competition as China seeks to build up its presence and exploit its space-based capabilities. In

Astropolitik, Dolman seeks to build a theory of space power and its relationship to power politics on Earth. Purposefully provocative, Dolman lays out a theory of space power based on realism and classical geopolitics, concluding that the US should seek to be a "benevolent hegemon" in space. Given the rise of China and the rebuilding of Russia's capabilities, is this even an option for the US, assuming it was a desired one? What might be the consequences of taking such actions? Of *not* taking action? Is conflict in space as inevitable as Dolman argues? How does the international legal regime in outer space actually restrict space exploration? Might competition between the US and China ultimately lead to cooperation as Dolman seems to suggest the two are intrinsically related?

March 19: Theory

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

In *Space Warfare*, Klein draws from military theorists that you are already familiar with to build a theory of space power that is largely built on the foundations of maritime theory. Through this, he builds out more functional detail than Dolman in identifying concepts such as celestial lines of communication, strategic chokepoints in space, and dispersal and concentration maneuvers. How does this theory of space power compare with Dolman's? Are its recommendations similar, even if they take different routes to get there? How feasible might it be to put Klein's vision of space power into effect? More than some of the other readings we've encountered so far, Klein's work demonstrates the role and power of analogy as actors in space seek to better understand and operationalize the space domain. How do analogies help us understand the space domain? Is space sufficiently similar to the air, sea, or Antarctica for the analogies to hold?

March 22: Weaponization of Space

Laura Grego, "A History of Anti-Satellite Programs" (Union of Concerned Scientists, 2012)

Megan Ansdell, "Active Space Debris Removal: Needs, Implications, and Recommendations for Today's Geopolitical Environment," *Journal of Public and International Affairs*, vol. 21, spring (2010): 7-22.

Karl D. Hebert, "Regulation of Space Weapons: Ensuring Stability and Continued Use of Outer Space," *Astropolitics*, vol. 12, no. 1 (2014): 1-26.

Michael P. Gleason and Peter L. Hays, "A Roadmap for Assessing Space Weapons" (Center for Space Policy and Strategy, 2020)

Dolman's *Astropolitik* presents a compelling argument that the United States, in particular, should be more aggressive in asserting control of the space domain. However, there are also good strategic reasons for refraining from such actions. Today's set of readings addresses some of these concerns by focusing on space weaponization, including anti-satellite weapons and the very real threat of space debris. The *Defense Space Strategy* released in June 2020 explicitly states, "China and Russia each have weaponized space as a means to reduce U.S. and allied military effectiveness and challenge our freedom of operation in space" (pg. 1). In this era of great power competition, how should the United States respond? Should the US respond in kind to Russia and China's move by deploying similar space-based weapons? Does doing so upset a strategic balance and threaten the use of space by all actors, including the United States? What other consequences come from open weaponization of space?

March 23: US Strategy in Space

Joan Johnson-Freese, *Space Warfare in the 21st Century: Arming the Heavens*, New York: Routledge (2017).

US *National Space Policy* (December 2020)

Without a doubt, and for good reason, the rhetoric over conflict in space has increased over the past two decades. As China has asserted itself on the world stage and greatly improved its strategic capabilities, especially in space, many leaders have expressed concern over the US potentially falling behind. At the same time, there are consequences to more aggressive rhetoric and actions in space. By asking whether our ends and means are sufficiently aligned, Johnson-Freese challenges us to ask whether the US is making an already unstable situation in space worse. This question is all the more timely given the release of the US's latest space policy. Considering Johnson-Freese's critiques of American space strategy, consider whether our current strategy is appropriate to the moment. Have US actions contributed to a potential misperception about intentions? What is it about space that contributes to the likelihood of misperceptions? Are there better strategic actions we could be taking to get us to where we want to be? What should those goals even be in the first place?

March 25: The Space Force and US Strategy

Space Force Capstone Doctrine

Robert Farley, "Space Force: Ahead of Its Time, or Dreadfully Premature?" *CATO Institute Policy Analysis*, 1 December 2020.

Wendy Whitman Cobb, "'It's a Trap!' The Pros and Mostly Khans of Science Fiction's Influence on the United States Space Force," *Space Force Journal*, vol. 1, no. 1 (2021), https://spaceforcejournal.org/its-a-trap-the-pros-and-mostly-khans-of-science-fictions-influence-on-the-united-states-space-force/.

Debate over the creation of a Space Force is not new. However, the most recent debate has contributed a new end to the debate by establishing the United States Space Force. Despite its establishment in law, the USSF still faces a precarious road ahead as it seeks to organize and create for itself an organizational culture and identity. Though the political debate over whether to establish a force is now ended, there is still a question of whether it was a necessary move. Farley's argument, that the Space Force is premature and risks upsetting a delicate balance in US space relationships, highlights the concern that Space Force only serves to make the strategic situation in space worse. However, Space Force proponents and its Guardians counter that the USSF is indeed necessary and rather overdue. Its first major doctrinal document is an important statement about what the USSF sees as its mission and purpose in space and how they seek to achieve that. How does "Spacepower" view the space domain? What are the major elements of it and how does it contribute to the foundations of a still emerging force? To that end, how has science fiction influenced the conception of the Space Force? Whitman Cobb highlights a major stream of influence for the USSF and argues that the overreliance on science fiction and pop culture may introduce an element of cognitive dissonance into the force that may hamper it in the short term. How might all of these dynamics influence the emerging identity and organizational culture of the Space Force? Does it help or harm its organizational, political, and tactical strength in the short-, mid-, and long-term?

March 26: Great Power Competition in Space—China

Stacey Solomone, *China's Strategy in Space*, New York: Springer (2013).

Though the United States has historically focused on Russia as the main adversary in space, China's space capabilities are on the rise. Not only have they advanced their human spaceflight program over the last two decades, but their military capabilities have also improved and proliferated. Underlying all of this is a continuing and increasing reliance of all globalized states on the global economy on space assets. To better understand the nature of the threat China and great power competition poses in space, Solomone's book provides an introduction to Chinese space activities and their thinking about the space domain. How does China's thinking about space differ from the United States? How can we assess the state of Chinese space capabilities? How does the cultural heritage and history of China influence their views on space? How can we better understand the Chinese approach to avoid misperceptions in the space domain?

March 29: Great Power Competition in Space—Regional Players

Zulfqar Khan and Ahmed Khan, "Space Security Trilemma in South Asia," *Astropolitics*, vol. 17, no. 1 (2019): 4-22.

Mian Zahid Hussain and Raja Qaiser Ahmed, "Space Programs of India and Pakistan: Military and Strategic Installations in Outer Space and Precarious Regional Strategic Stability," *Space Policy*, vol. 47 (2019): 63-75.

Saadia M. Pekkanen, "Thank You for Your Service: The Security Implications of Japan's Counterspace Capabilities," *Texas National Security Review* (October 2020), https://tnsr.org/roundtable/policy-roundtable-the-future-of-japanese-security-and-defense/#essay5.

China is not alone in the Indo-Pacific region in terms of their space ambitions. Regional powers such as Japan, India, and Pakistan also affect China's posture and therefore the political and military conditions the United States must face. This set of readings explores the notion of a security trilemma which exacerbates relations between China, India, and Pakistan. Though the terrestrial implications of this relationship have been made clear by increasing military conflict, the space domain is often ignored. China's ambitions, as Khan and Khan discuss, have caused India to increase its military posture in space. The result is that, in 2019, India because the fourth state to demonstrate an ASAT capability. Concomitantly, as India has ramped up its space presence, Pakistan has felt a need to do the same. Hussain and Ahmed explore the strategic implications and instability that may result from such a situation. Finally, though it does not have an independent human spaceflight capability, Japan does have a very advanced space program with respect to technological capabilities, including launch technology. Pekkanen argues that despite the constitutional restrictions on Japan's military, these space capabilities make Japan underestimated in the space domain. Not only is Japan well placed to cooperate further with the US, but its counterspace capabilities may be contributing to a "counterspace race" in space. In sum, regional security dynamics and historic rivalries are being brought into the space domain and greatly affect great power competition.

March 30: Commercial Space

Christian Davenport, *The Space Barons: Elon Musk, Jeff Bezos, and the Quest to Colonize the Cosmos*, New York: Public Affairs, 2019.

The biggest shift in the space industry has occurred just recently with the rise of commercial launch companies. Prior to 2000, the average cost to launch a kilogram to space was $18,500. Given such high costs (in addition to the cost of the payload), few states could afford to access space. The entry of SpaceX with its reusable Falcon 9, and average cost of $2,720 to launch a kilogram into space, brought about a revolution for commercial launch. This revolution and the story behind it represents a seismic shift in accessibility and has contributed to the democratization of space. Davenport's book tells the story of the space barons and details the different approaches that Elon Musk and Jeff Bezos have taken in this revolution. How does commercial spaceflight change the space environment and calculations about conflict in space? How important is the commercial spaceflight industry to the strength of the US in space? How has the military taken advantage of these disrupters and how might they continue to do so in the future?

OPTIONAL Readings

The following readings are intended to be **entirely optional**. They present either conflicting arguments to or supplement the main readings of the listed day.

March 18: Theory

Matthew Burris, "Astroimpolitic: Organizing Outer Space by the Sword," *Strategic Studies Quarterly*, vol. 7, no. 3 (2013): 108-129.

March 19: Theory

Elizabeth Mendenhall, "Treating Outer Space Like a Place: A Case for Rejecting Other Domain Analogies," *Astropolitics*, vol. 16, no. 2 (2018): 97-118.

March 26: Great Power Competition in Space—China

Pollpeter et al, "China's Space Narrative" from CASI conference

Rajagopalan, "China's Growing Military Space Prowess" from CASI conference

March 30: Commercial Space

Moon J. Kim, "The Potential Speculative Bubble in the US Commercial Space Launch Industry and the Implications to the United States," *New Space*, vol. 6, no. 2 (2018): 156-183.