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## SOME LESSONS ON SPACEPOWER FROM COLIN GRAY

*John J. Klein*

*Where is the theory of space power? Where is the Mahan for the final frontier?*

COLIN S. GRAY

Colin Gray passed away in February 2020. He was a prolific author, and many within academia and at the service war colleges appreciated him as a great strategic theorist. Yet what is lesser known is the profound impact he made on the development of spacepower strategic thought.<sup>1</sup> Absent robust historical experience of conflict in space on which to draw, Gray's writings led to a better understanding of space strategy. Crucially, Gray explained how spacepower theory should fit within the context of the enduring nature of war, the better to inform the future development of space-warfare strategy.

Gray published over thirty books on military history and strategic studies, along with innumerable articles and monographs. His ideas and concepts are lasting in their ability to illuminate the intricacies of politics, war, and strategy. While Gray provided an abundance of strategic thought on which national-security and military practitioners could draw when considering the application of spacepower, this essay will discuss three key subjects: Gray's development of spacepower theory, his influence as a teacher and mentor, and insights for today's space professionals and members of the new U.S. Space Force that can be drawn from Gray's writings.

### SPACEPOWER THEORY

Early in his career, Gray showed an interest in space and its relation to the theory of war. In 1982, when he was beginning a stint supporting the Reagan administration's General Advisory Committee on Arms Control and Disarmament, he published *American Military Space Policy: Information Systems, Weapon Systems*

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*and Arms Control.* It is noteworthy that the following year the Reagan administration would consider the potential deployment of the Strategic Defense Initiative (SDI), also known as "Star Wars." For Gray, the publication was intended "to encourage informed debate of U.S. space policy, particularly military space policy."<sup>2</sup> In this relatively short study, he detailed many of his earliest

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ideas on spacepower and the character of space warfare, and he addressed U.S. and Soviet technical space capabilities, offensive and defensive actions in space, and the policy implications of the stationing of weapons in orbit. Gray would continue to develop further space-strategy concepts and encourage the development of spacepower theory through his numerous works. Alongside land, sea, air, and cyber power, Gray ensured that the strategic implications of spacepower were considered.

Moreover, Gray frequently wrote on nuclear weapons and the imperative to defend against their use. In noting the intersection of nuclear weapons and spacepower, he considered nuclear intercontinental ballistic missiles to be space vehicles for most of their flight regime. Even though during the Cold War nuclear weapons benefited mutual deterrence between the Soviet Union and the United States, these “absolute weapons” were strategically unhelpful in use. Consequently, nuclear weapons are inherently and fatally limited as a practical war-fighting tool.<sup>3</sup> Also, Gray believed that eschewing strategic defenses against nuclear weapons was both imprudent and immoral. Gray argued for defenses against nuclear weapons and ballistic missiles as the basis for deterrence-by-denial strategy and a hedge against deterrence failure. In particular, he viewed SDI as a credible defensive approach, potentially rendering Soviet nuclear-armed ballistic missiles impotent and obsolete as reliable military instruments.<sup>4</sup> Taken as a whole, Gray’s views over the decades directly influenced both U.S. declaratory and action policies regarding missile defense and the eventual Anti-Ballistic Missile Treaty withdrawal.

One of Gray’s best-known pieces on space strategy is his 1996 article “The Influence of Space Power upon History,” written while he was professor of politics and director of the Centre for Security Studies at the University of Hull. In this article he defines *spacepower* as “the ability to use space while denying reliable use to any foe.”<sup>5</sup> He also laments that, despite spacepower’s growing importance as a domain of warfare, no comprehensive theory of it had been formulated and spacepower theorists remained scarce.<sup>6</sup> He explores the potential reasons for the scarcity of notable spacepower theorists, and the epigraph that begins this essay comes from that article. Unbeknownst to Gray at the time, the quotation inspired many writers of spacepower theory and strategy who followed, including this author. Elaborating on the problem, he explained that “[t]oday, space power suffers from an unusual malady—an acute shortage of space focused strategic theory and the lack of a binding concept to aid understanding of what it is all about. People today, including many military professionals, remain less than enlightened on what space power is and does, how it works, and how it can and should function synergistically with other players in the joint military team.”<sup>7</sup>

Gray thought that an in-depth understanding of the theory of war and past strategic frameworks could be used to guide the development of a clearly articulated, all-encompassing strategy for military operations in and through space. Despite a few previous efforts to develop a comprehensive theory of space warfare, he observed that no adequate and fully comprehensive theoretical framework of spacepower yet had been formulated and much work remained to be done.

Gray had many consistent themes in his writings throughout the decades, including his frequent reference to Carl von Clausewitz and the Prussian strategist's theory of war.<sup>8</sup> Clausewitz provided Gray with much of his intellectual ammunition, and "The Influence of Space Power upon History" is no exception in this regard. Clausewitz and Gray both held that the "grammar" and character of strategy are in a constant state of change, but its fundamental nature and logic are eternal. Drawing from this strategic truth, Gray advised that despite space warfare having its own distinct character, spacepower theory needs to fit within our understanding of Clausewitz's writing and the enduring nature of war. Gray wrote, "War in space has its own distinctive characteristics that policy must know and respect, but that war has meaning only for the purposes of policy."<sup>9</sup> Despite being a new domain in which to consider the matter of human conflict, war in space—like war in all other domains—will serve the ends of policy in pursuit of political objectives.

In his seminal book *Modern Strategy*, published in 1999, Gray wrote on spacepower's place within the context of technological innovation and the future of warfare. Drawing on the work of geostrategist Halford Mackinder and Gray's own novel thoughts regarding the strategic influence of geopolitics, Gray explored spacepower from the perspective of geography, writing as follows: "[W]orks of theory explaining spacepower should explore the interconnectedness, indeed interdependence, of the different geographical environments. Spacepower is of little interest per se. Strategic interest lies in the consequences of its application for deterrence and the conduct of war as a whole, within a context lit by steady recognition of the authority of the principle that the land matters most."<sup>10</sup>

Furthermore, Gray noted that up to that point spacepower theory had been approached as almost everything but what it most truly is: the military exploitation of a new geographical medium, and a domain that needs to be understood on its own technical, tactical, and operational terms, if it is to produce maximum strategic effectiveness. Gray made it clear, however, that the unique geography of space does not point the way to some unique logic of strategy, let alone a unique irrelevance of strategy.<sup>11</sup> Hence, spacepower doctrine still must observe the enduring nature of war and strategic theory.

Gray also looked to historical experience to offer insights into the application of spacepower. Drawing on the long-standing precedents of the application of

seapower and airpower, Gray thought that spacepower was likely to play adjunct or supporting roles during conflicts. Despite the dearth of strategic experience in space and spacepower's promise to bring comprehensive changes in the form and structure of armed conflict, Gray noted that spacepower must not be thought of as the panacea for terrestrial security ills. Additionally, he warned that new sources of advantage bring new sources of vulnerability—a maxim that seems especially prescient for the United States and its rivals today within the space domain.<sup>12</sup>

### TEACHER AND MENTOR

Gray had a significant and lasting commitment to his doctoral students, and was kind and generous with his time. He routinely held brown-bag lunches and strategic seminars at the universities at which he taught. During these gatherings, his doctoral students had the opportunity to try out various thesis ideas, debate among themselves, and hear any insights or suggestions that Gray had on the subject. Gray felt it deeply important to prepare the next generation of strategists and strategic thinkers, and it showed whenever he interacted with his students. Even when in the midst of writing his latest book or preparing for the next class, Gray graciously would carve out time in his schedule to hear about his students' research and offer suggestions. Being his usual self when giving pointed feedback, he displayed the gift of using great wit in telling stories and teaching memorable lessons.

Let there be no mistake, however; Gray expected the highest levels of scholarship from those studying under him. As many of his students can attest, he routinely gave extensive feedback on drafts of their doctoral theses. Often, the margins of a thesis were full of his comments—in his famous red ink—regarding language use, the need for clarity, and the pitfalls of overstatement. Gray consistently taught the lesson of never taking for granted that the reader would invest time in your work; one should strive constantly to make one's research and writing the absolute best possible while getting to the “so what?” of the matter.

Ultimately, Gray's teaching and mentorship likely are responsible for at least one generation of spacepower theorists in the United States, as well as around the world. He routinely recognized the talents of aspiring authors and helped ensure that their works saw the light of day through publication.<sup>13</sup> Working behind the scenes, he also advanced the careers of others, including advocating for those he mentored to fill teaching positions at universities when opportunities arose. Gray's generosity and refreshing lack of towering ego were enhanced by the fact that he was incredibly well connected, albeit quietly, within the U.S. military space community. This lent credibility to his own ideas, as well as those of others who studied under him. Through his steadfast efforts and support,

Gray developed and promoted a cadre of individuals who collectively advanced spacepower strategic thought.

### INSIGHTS FOR TODAY'S SPACE PROFESSIONALS

Much has changed since Gray first penned his ideas on spacepower theory. Recently the United States established the newest branch of its armed forces, the U.S. Space Force, and published its inaugural space capstone publication, *Spacepower: Doctrine for Space Forces*.<sup>14</sup>

Because of Gray's consistent message regarding the enduring nature of war despite the application of new technologies and operational concepts, his writings remain timeless in their utility and insights. What follows are some reminders derived from Gray's contributions for today's space professionals and members of the U.S. Space Force, as we consider the reemergence of great-power competition and the ever-expanding national-security interests in space.

#### *Space Is Not a Sanctuary*

Gray routinely held views that differed from the prevalent thinking of the day. Many of his contemporaries viewed space as a sanctuary that should be free of conflict. While today the United States and many of its allies recognize space as a "warfighting domain," this is a recent phenomenon; in the early 1980s, it traditionally was held by most within the U.S. national-security space community that space was a sanctuary, or a domain where military conflict would never extend. Gray disagreed and stated emphatically in *American Military Space Policy*, "No satellite system, no matter how high its orbit or sophisticated its survival aids, enjoys assured survivability. Space is not a sanctuary."<sup>15</sup> Approaching spacepower theory in a way reflecting classical strategy leads to the understanding that militarily useful geographies eventually will be exploited and contested.<sup>16</sup> He observed that many senior U.S. officials of the day incorrectly viewed the survivability of satellites in geosynchronous orbit as an irrefutable certainty.<sup>17</sup>

Many of his thoughts regarding the fallacies of the sanctuary school of thought and the vulnerability of satellites were reflected in the spacepower writings that followed.<sup>18</sup> Providing a perspective based on experience and the fundamentals of strategy, in his 2005 book *Another Bloody Century: Future Warfare* Gray observed as follows: "It is a rule in strategy, one derived empirically from the evidence of two and a half millennia, that anything of great strategic importance to one belligerent, for that reason has to be worth attacking by others. And the greater the importance, the greater has to be the incentive to damage, disable, capture, or destroy it. In the bluntest of statements: space warfare is a certainty in the future because the use of space in war has become vital."<sup>19</sup>

Gray understood the fallacies of viewing space as a sanctuary. Thinking this way would result in developed and fielded space systems being vulnerable to

attack and of questionable survivability during a conflict extending into space. The dogmatic view of space being a sanctuary would lead to the dangerous condition of peacetime efficiency and convenience preventing serious preparations for war. As a practical matter, and on the basis of historical experience, Gray viewed the United States as having no realistic choice other than to be prepared to fight in space—an enterprise that must involve the development of both offensive and defensive capabilities.<sup>20</sup>

### *Challenges of Space Arms Control*

Gray was a consistent critic of many arms-control approaches used during the Cold War, including those related to the space domain.<sup>21</sup> In his 1992 book *House of Cards: Why Arms Control Must Fail*, he wrote the following on the paradox of arms control: “[T]he first paradox, dignified throughout the remainder of this book as ‘the arms control paradox,’ postulates that if arms control is needed in a strategic relationship because states in question might go to war, it will be impractical for that very reason of need, whereas, if arms control should prove to be available, it will be irrelevant.”<sup>22</sup>

On the limitations of arms control and its frequent pitfalls, Gray noted that many arms-control proponents asserted that the United States needed an arms-control agreement far more than the Soviet Union did, because of the disparity in space dependencies between the two sides. These advocates, however, tended to neglect such crucial issues as the scope of activity to be constrained, methods of verification, and the Soviet theory of war.<sup>23</sup> On the whole, when considering the various space arms-control proposals, he viewed them as “pious nonsense,” because unduly uncritical obeisance was paid to an arms-control credo that reflected a triumph of hope over experience. Cutting to the crux of the problem, Gray explained that “[h]istory and the common sense of international politics tells us that one cannot legislate against military technologies that states have strong incentives to pursue.” In contrast to the arms-control advocates of the time, the Soviets understood and used the arms-control process as one of several interdependent instruments of conducting international relations effectively and limiting the strengths of other countries, including the United States.<sup>24</sup>

Gray thought that the United States should not sign any arms-control treaty formally conceding superiority to the Soviet Union.<sup>25</sup> He thought historical experience had demonstrated that the Soviet Union had violated arms-control agreements when it was administratively convenient, militarily advantageous, and economically efficient to do so.<sup>26</sup> Without a sound understanding of the technological trends that should be encouraged or discouraged, “arms control negotiators are engaged in an exercise that is little more than a lottery.” Gray was a staunch advocate of the United States maintaining its strategic advantage in space

capabilities, and he consistently advised U.S. policy leaders that the United States should not seek to obtain, or settle for, equality in space weaponry (whether it be equality in deployment or nondeployment of space capabilities).<sup>27</sup> He confessed, “I am profoundly skeptical of the likely practical value of the arms control process to help fashion a military space environment conducive to the best interests of the United States.” Gray believed that solutions to the dilemmas of deterring conflict must be sought in the realm of politics, “not in weapons technologies or in arms-control band-aids.”<sup>28</sup>

A key takeaway for space professionals is that these inherent problems associated with arms control likely will reemerge during any future discussions on banning military technologies that states have strong incentives to pursue, such as direct-ascent, hit-to-kill antisatellite missiles or on-orbit kinetic-kill vehicles.

### *Be Wary of the Next “Big Idea”*

Gray noted that there is a long history of the periodic reemergence of technology’s application as a “hot” and “new” strategic concept within the U.S. defense community. He observed the succession of purportedly novel strategic concepts that repeatedly have gained popularity, and then official endorsements, on the basis of a largely false promise of superior performance. He warned, “There will always be a market for new sounding ideas expressed in jargon and neatly acronymic. They come, they go, and they reappear in slightly different guise in the future.”<sup>29</sup> Technology zealots’ claims that new strategic concepts will guarantee winning of the next war fall within the “zone of snake oil salesmanship.”<sup>30</sup>

Because space warfare frequently involves advanced technology, and because space only recently has come to be considered a domain for conflict, space professionals should remain vigilant against those touting the next “big idea.” Consistent through much of his writings, Gray advised current and future strategists that there are just three defenses against the usually false—or at least exaggerated—strategic promise of the hot, new concept: common sense, experience, and a sound education in strategy—especially in the enduring works of Thucydides, Sun-tzu, and Clausewitz.<sup>31</sup>

### *Predictive Failure Will Occur*

Gray also observed a frequent trend—especially within defense policy circles and think tanks within Washington, DC—of seeking to predict the future. He warned against this predilection and the pervasive use of the phrase “the foreseeable future.” Gray warned that the future is not knowable in any detail. One of the responsibilities of the strategist, Gray advised, is to prevent “the enthronement of the kind of official strategic certainty which precludes the development of strategic and military postural flexibility.”<sup>32</sup> Experts and policy makers who advance



a knowable and certain future are dangerous to their organizations, as well to those in the fighting forces who will need to carry out their ill-conceived vision.

In contrast, Gray thought that strategists need to acknowledge the reality that predictive failure will occur. Strategists must contend with friction, chance, and uncertainty, and consequently strategists should be adaptable and flexible over a range of plausible—and some implausible—threats, to protect national interests wherever they lie. In providing guidance regarding an unknowable future, Gray wrote that “strategists have no choice other than to cope with their unavoidable ignorance as best they may.”<sup>33</sup> Consequently, today’s space professionals and strategists should plan across the gamut of scenarios and potential futures to account for the inherent failings of predictive analysis.

### *Space Is Critical, but Avoid Overstatement*

Gray frequently advised that spacepower should fit within a joint war-fighting framework and the larger wartime effort. He commented, “Spacepower must always be useful, but its precise roles and actual strategic utility will be distinctive to each class and case of conflict.”<sup>34</sup> The lesson for competition in space is that planning should include conditions in which space-related activities will contribute significantly to war’s conclusion, and those situations in which it will not. When advocating for the importance of including spacepower and space capabilities in joint and coalition warfare, Gray advised, “Space warriors today should not compensate for the general underappreciation in the armed services by indulging in overstatement.”<sup>35</sup> It is paramount that space professionals understand fully the implications of space being a war-fighting domain, while acknowledging the limits of spacepower.

Even though there are no reasons why space operations cannot deliver decisive strategic effects to achieve success, the conditions allowing for such a victory should be considered rare indeed. This is because for conflict to have the greatest impact and affect the strategic level of war, it must affect the preponderance of people where they live. Gray wrote, “[A]ll conflict must have terrestrial reference because man can live only upon the land.” As a result, there will be practical limits to what space operations can achieve strategically, no matter how significant a level of command of space is achieved or how well operations are executed. Although command of space may achieve strategic effect, tactical and operational space actions will be strategically decisive in determining a war’s outcome only on the rarest occasions. This is because strategic effect is decided by the target, not by the means of attack.<sup>36</sup>

Gray viewed spacepower as often augmenting the effectiveness of air, sea, and land power.<sup>37</sup> In noting how space forces and capabilities should be used during conflict, Gray observed, “Military space ventures have been inherently adjunct, supportive, and ancillary to the main terrestrial action of modern strategy.”<sup>38</sup>

Each branch of the armed forces has distinctive strengths and limitations, and space forces must contribute to this joint endeavor to achieve success in deterrence and war. Space warfare necessitates thinking about spacepower from a joint perspective and an all-domain approach. Consequently, spacepower and associated space capabilities should embrace their role within the application of land-, maritime-, and air-focused military forces.

Being in a supporting role, however, does not make space forces less important. Indeed, winning in the space domain is still critical. Gray commented, “As the leading edge of overall U.S. combat potency, space power will decide the course and outcome of some conflicts, even though space forces may not themselves be combat forces with offensive capabilities.”<sup>39</sup>

Gray’s ideas and writings inspired many to advance the cause of strategy, including that related to the space domain.<sup>40</sup> His ability to explain the most complex ideas in a simple manner while always answering the “so what?” question was a true gift to the development of spacepower theory. He crafted strategic lessons for spacepower on the basis of the universal principles of strategy and essential unity in all strategic experience.

While many of Gray’s ideas were considered novel and counter to mainstream spacepower thinking at the time, his writings and ideas have gained acceptance over time. In fact, his “intellectual fingerprints” are all over many of the most significant works on spacepower, even including the aforementioned *Spacepower: Doctrine for Space Forces*, which was published in June 2020. Most importantly, because his ideas on strategy are based on historical experience within the context of the enduring nature of war, his writings remain timeless in their relevance today and will remain so into the future.

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#### NOTES

- The views expressed in this article are solely those of the author and do not necessarily reflect those of Falcon Research, the George Washington University, or the U.S. government.
1. Because Gray later in his career used *spacepower* as one word, that is the usage employed here, except when referencing quoted material.
  2. Colin S. Gray, *American Military Space Policy: Information Systems, Weapon Systems and Arms Control* (Lanham, MD: Univ. Press of America, 1984), p. ix.
  3. Colin S. Gray, *The Navy in the Post-Cold War World: The Uses and Value of Strategic Sea Power* (University Park: Pennsylvania State Univ. Press, 1994), p. 133.
  4. Colin S. Gray, *War, Peace, and Victory: Strategy and Statecraft for the Next Century* (New York: Simon & Schuster, 1990), pp. 122, 227.
  5. Colin S. Gray, “The Influence of Space Power upon History,” *Comparative Strategy* 15, no. 4 (October–December 1996), p. 293. Using similar language a few years later, Gray wrote: “*Spacepower* refers to the ability to use space and to deny such use to a foe.” Colin S. Gray, *Modern Strategy* (London: Oxford Univ. Press, 1999), p. 244.

6. Gray, *Modern Strategy*.
7. Gray, "The Influence of Space Power upon History," pp. 304, 307.
8. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton Univ. Press, 1989).
9. Gray, *The Navy in the Post-Cold War World*, pp. 135–36, 305.
10. Gray, *Modern Strategy*, p. 256. For further discussion of the space domain as geography, see Colin S. Gray, series editor's preface to Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (London: Frank Cass, 2002), pp. xi–xii.
11. Gray, *Modern Strategy*, pp. 254–55, 259.
12. Gray, "The Influence of Space Power upon History," pp. 293, 298, 303.
13. For example, see Dolman, *Astropolitik*; Steven Lambakis, *On the Edge of Earth: The Future of American Space Power* (Lexington: Univ. Press of Kentucky, 2001); and John B. Sheldon and Colin S. Gray, "Theory Ascendant? Spacepower and the Challenge of Strategic Theory," in *Toward a Theory of Spacepower: Selected Essays*, ed. Charles D. Lutes and Peter L. Hays (Washington, DC: National Defense Univ. Press, 2011).
14. U.S. Space Force, *Spacepower: Doctrine for Space Forces* (Washington, DC: Headquarters U.S. Space Force, June 2020).
15. Gray, *American Military Space Policy*, p. 105.
16. Gray, *Modern Strategy*, p. 244.
17. Gray, *American Military Space Policy*, p. 94.
18. For descriptions of the sanctuary and vulnerability schools of thought, along with their limitations, see David E. Lupton, *On Space Warfare: A Space Power Doctrine* (Maxwell Air Force Base, AL: Air Univ. Press, 1988).
19. Colin S. Gray, *Another Bloody Century: Future Warfare* (London: Weidenfeld and Nicolson, 2005), p. 307. There are so many more insights from Gray's writings that cannot be detailed here for the sake of brevity. For an in-depth discussion of the advantages and limitations of using analogies, see Sheldon and Gray, "Theory Ascendant?"
20. Gray, *American Military Space Policy*, pp. 69, 94, 104.
21. Colin S. Gray, "Space Arms Control: A Skeptical View," *Air University Review* 37, no. 1 (November–December 1985), pp. 73–86.
22. Colin S. Gray, *House of Cards: Why Arms Control Must Fail* (Ithaca, NY: Cornell Univ. Press, 1992), p. 17.
23. Gray, *American Military Space Policy*, p. 5.
24. *Ibid.*, p. 8; Gray, "Space Arms Control," pp. 74, 76.
25. Gray, "Space Arms Control," p. 77.
26. Gray, *House of Cards*, p. 17.
27. Gray, *American Military Space Policy*, pp. 76–77.
28. Gray, "Space Arms Control," pp. 74, 78.
29. Colin S. Gray, *Fighting Talk: Forty Maxims on War, Peace, and Strategy* (Westport, CT: Greenwood, 2007), p. 65.
30. Gray, "The Influence of Space Power upon History," p. 299.
31. Gray, *Fighting Talk*, p. 65.
32. *Ibid.*, pp. 155, 160.
33. *Ibid.*, p. 155.
34. Gray, *Modern Strategy*, p. 264.
35. Gray, "The Influence of Space Power upon History," p. 299.
36. Colin S. Gray, *Airpower for Strategic Effect* (Maxwell Air Force Base, AL: Air Univ. Press, 2012), pp. 278, 282.
37. Gray, *The Navy in the Post-Cold War World*, p. 158.
38. Gray, *Modern Strategy*, p. 254.
39. Gray, "The Influence of Space Power upon History," p. 303.
40. Beatrice Heuser et al., "Policy Roundtable: Remembering Colin Gray," *Texas National Security Review* 3, no. 3 (Summer 2020), available at [tnsr.org/](https://tnsr.org/); David J. Lonsdale, "Colin S. Gray: A Reminiscence," *War on the Rocks*, 22 June 2020, [warontherocks.com/](https://warontherocks.com/).

