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Review Essay 71

Bleddyn E. Bowen. *Original Sin: Power, Technology and War in Outer Space*. New York: Oxford University Press, 2022. ISBN 9780197677315 (hardcover \$29.95); B0BQFJ88MF (Kindle, \$9.99).

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To grasp what Bleddyn Bowen calls “the original sin of space technology” (3)—its military heritage—one only need follow the daily press. Lawmakers are pushing to create a Space National Guard from which the fledgling US Space Force can draw experienced personnel.¹ SpaceX, after providing internet services to Ukrainian troops through its Starlink satellite constellation, has pulled back due to concerns about “weaponization” of the system.² Astranis Space Technologies recently won a \$4.5 million contract to integrate US military communications on one of the company’s payloads. And this is just a sample of American headlines, in one recent month.³

For lay observers, the pace of change in military space may signal the onset of an unnerving sea change. Was not scientific discovery, not military power, the main bequest of space technology? Did not “handshakes in space” between American astronauts and Soviet cosmonauts during the 1970s reflect the pacifying effect of space exploration? Is not the cosmos a laboratory for global amity?

No, no, and no. In *Original Sin* Bowen sets out to puncture these myths and alert readers to a basic truth: the oft-bemoaned “militarization of outer space” unfolding today has been present since the beginning of the Space Age. “The fundamental space technologies created by the military-industrial complexes of the Second World War and the Cold War,” Bowen argues, “committed space technology’s original sin as a tool for warfare, intelligence gathering, and self-interested political-economic power” (3). The satellite and moon races of the 1960s, the birth of planetary science, the communications revolution, and the International Space Station are but the civilian tip of an iceberg whose submarine layers are made up of militarization, aggression, and imperialism.

¹ Connor O’Brien and Lee Hudson, “There’s a New Push to Create a Space National Guard. Lawmakers say the Price is Right,” *Politico*, 03/08/2023, <https://www.politico.com/news/2023/03/08/space-national-guard-biden-00086089>

² Sandra Erwin, “Limits on Ukraine’s Use of Starlink for War Operations is a Lesson for US Military,” *SpaceNews*, March 9, 2023, <https://spacenews.com/limits-on-ukraines-use-of-starlink-for-war-operations-is-a-lesson-for-u-s-military/>

³ Sandra Erwin, “Astranis wins Space Force Contract to Integrate Military Satcom on Commercial Payload,” *SpaceNews*, February 14, 2023, <https://spacenews.com/astranis-wins-space-force-contract-to-integrate-military-satcom-on-commercial-payload/>

Bowen deserves applause for gathering the history and political science literatures into a single volume. His argument, however, neither offers a new take on astropolitics nor engages with his intellectual opponents who, aside from Carl Sagan and Jeff Bezos, go nameless (34, 347–48). Bowen’s assertions about the “sin” of space technology, too, are oversimplified and overwrought. The history of space technology, military and civilian alike, is a complex and variegated one, yet Bowen’s metaphor renders an Old Testament morality tale of good and evil that, while it issues a needed warning, risks reductionism.

Original Sin is divided into three parts. Part I, “The Original Sin of Space Technology,” fuses the Nuclear Age and the Space Age. Space technology, Bowen observes, did not grow from a benign search for knowledge or a political mission to achieve prestige, but rather as part of the Thermonuclear Revolution. “Waging nuclear war is a feature, not a bug, of space technology,” he argues (22). In an itinerant chapter on space technology in Europe, Japan, China, and India, he shows that space technology was inextricably bound to ballistic missile development. Part II, “The Maturation of Spacepower,” explains how, over the course of the mid-to-late Cold War, space systems became integrated into the everyday logistics of militaries around the world. Satellites’ increasing military value, he suggests, make international relations increasingly unstable and increase the risk for war. The last section deals with developments since the 1980s and provides a theory of space war that is distinct from “ultimate high ground” interpretations of space strategy (13). Much of Part III is a recapitulation, albeit refined and expanded, of the arguments in his first book *War in Space*, in which he asserts that near-Earth orbit is a “cosmic coastline” in which certain strategic and tactical lessons from other domains may be reasonably applied.⁴ For Bowen, space warfare “should be approached in the same way we think about naval warfare, aerial combat, and how seapower and airpower contribute to modern strategy and military, economic, and political power” (23).

Three main arguments flow from this substantial survey of the Space Age. The first—and central—contention is that contrary to the prevailing language of the space age, “space technologies have not been developed for the benefit of all humankind” (7). Instead, national governments created space systems to pursue self-interested national goals, whether military, political, or economic. Space technology, by providing an imperviously fast delivery system for nuclear warheads, created the existential threat of nuclear Armageddon. The civilian space missions of the 1950s and 1960s disguised projects for military reconnaissance and communication. Incipient space powers used colonial arrangements to acquire land for space-tracking stations. Over time satellites have made militaries more efficient at finding, targeting, and killing people. “Military and spying activities in space are not just as old as humanity’s Global Space Age,” Bowen reminds us. “[I]n fact they *are* the Global Space Age” (3, emphasis in original).

Following a number of historians over the last fifteen years, Bowen also argues that “the Space Age we live in is a global one,” and that astropolitical scholarship needs to catch up (9).⁵ Bowen sets an example by tracing military space technology (including ballistic missiles) far beyond the US-Soviet binary and weaving the national histories of space technology together to demonstrate influence, connectivity, and diplomacy.

Third, from his theories about a cosmic coastline he concludes that Earth orbit is “just another environment that is used for warfare.” There is “nothing special” about it in terms of military strategy or politics, nothing

⁴ Bleddyn E. Bowen, *War in Space: Strategy, Spacepower, Geopolitics* (Edinburgh, UK: Edinburgh University Press, 2020).

⁵ John Krige, et. al., *NASA in the World: Fifty Years of International Collaboration in Space* (London: Palgrave, 2013); Brian Harvey, *Europe’s Space Programme: To Ariane and Beyond* (London: Springer, 2019); Sheng-Chih Wang, *Transatlantic Space Politics: Competition and Cooperation Above the Clouds* (London: Routledge, 2013); Brian Harvey et. al, *Emerging Space Powers: The New Space Programs of Asia, the Middle East, and South America* (London: Springer, 2010); Brian Harvey, *China in Space: The Great Leap Forward* (London: Springer, 2019); Gurbir Singh, *The Indian Space Programme: India’s Incredible Journey from the Third World to the First* (London: AstrotalkUK, 2017).

to distinguish it from the way human behavior has manifested itself in other domains across world history. It is certainly not a conflict-free “sanctuary” (13).

Bowen pitches his book as a “a jarring rejoinder” to utopian beliefs that space is reserved merely for peaceful exploration and international partnership. “Firmly grounded in political and strategic reality,” his book is intended to puncture myths and set the record straight (5). But there are two problems. The first is that Bowen does not specify what these rose-colored beliefs are, who holds them, or why, on their own merits, they fall short. Many thinkers before, during, and after the Cold War did indeed espouse the “idealist, egalitarian, and utopian notions” that Bowen decries in the book, yet across 353 pages we learn little about who they were, or why they believed space technology was essentially a force for good (5). There is no mention, for example, of the British science-fiction writer Arthur C. Clarke, who propounded these ideas widely, nor the American political activist David Lasser.⁶ De Witt Kilgore, who artfully synthesizes the techno-optimist strains of the Western spaceflight imaginary in *Astrofuturism*, appears twice in the footnotes.⁷ If Bowen is to convince us of the naivety of “utopian” ideas, he must stand on firmer ground about its particulars (329).

The second problem is that few scholars, let alone space policy practitioners, believe the myths that Bowen has set out to debunk. Political science scholarship is rife with the realist assumptions and bleak assessments that are the warp and woof of *Original Sin*. Joan Johnson-Freese, James Clay Moltz, David DeVorkin, Paul Stares, Daniel Deudney, and a host of others have written about the tainted nature—even the apocalyptic potentialities—of space technology.⁸ Though Bowen provides a useful introduction to major space security issues and debates, the book relies too heavily on long-established facts. In *Astropolitik* Everett C. Dolman chastised space-for-peace advocates who exhorted humans to preserve the cosmos from weapons, armies, and military theorists. “Unfortunately for their utopian position,” he observed, “the short history of space exploration already belies that hope. The militarization and weaponization of space is not only a historical fact, it is an ongoing process.”⁹ That was more than twenty years ago.

Indeed, the argument that space remains a thoroughly militarized and political realm despite the soaring rhetoric of the Apollo era has been *the* central scholarly observation about the Space Age over the last forty years. Dolman himself was parroting Colin Gray, who fifteen years earlier had written that “states neither do, nor will, behave in space in ways fundamentally different from their settled habits” in other domains.¹⁰ As early as 1967, before *Apollo 11* had even reached the moon, Donald Kash wrote that cooperation had never held more than secondary importance in the American space program. “The very notion of using space

⁶ See, for example, David Lasser, Annual Report to the American Interplanetary Society (appendix item), April 13, 1931, in David Lasser, *The Conquest of Space* (Burlington, ON: Apogee Books, 1931), 181; Arthur C. Clarke, “The Challenge of the Spaceship: Astronautics and Its Impact Upon Human Society,” *Journal of the British Interplanetary Society* 6, no. 3 (December 1946): 66–81.

⁷ De Witt Kilgore, *Astrofuturism: Science, Race, and Visions of Utopia in Space* (Philadelphia, PA: University of Pennsylvania Press, 2003).

⁸ Joan Johnson-Freese, *Heavenly Ambitions: America’s Quest to Dominate Space* (Philadelphia, PA: University of Pennsylvania Press, 2009); Joan-Johnson Freese, *Space as a Strategic Asset* (New York: Columbia University Press, 2007); Joan Johnson-Freese, *Space Warfare in the 21st Century: Arming the Heavens* (London: Routledge, 2017); James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (Stanford, CA: Stanford University Press, 2008); David H. De Vorkin, *Science With a Vengeance: How the Military Created the US Space Sciences after World War II* (New York: Springer Verlag, 1993); Daniel Deudney, *Dark Skies: Space Expansionism, Planetary Geopolitics, and the Ends of Humanity* (New York: Oxford University Press, 2020); Paul Stares, *The Militarization of Space: U.S. Policy, 1945-1984* (Ithaca, NY: Cornell University Press, 1985).

⁹ Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (London: Routledge, 2001), 5.

¹⁰ Colin S. Gray, “Space and Arms Control: A Skeptical View,” in *America Plans for Space: A Reader Based on the National Defense University Space Symposium* (Washington, DC, 1986), 133–34.

cooperation to create a new political reality would have been so inconsistent with [primary US interests],” Kash wrote, “that one must suppose it was never rejected because it was doubtless never even considered.”¹¹

It is important, in light of today’s increasingly tense space security environment, to heed Bowen’s call for a more sober, realistic history of space technology. Overly sanguine views about a satellite-linked global village, space-based analysis of climate change, or the mind-transforming qualities of what philosopher Frank White calls the Overview Effect can distract from the serious international relations challenges that space technology poses.¹² A clear-eyed account of the Space Age’s “bloody origins” will certainly help soften unwarranted optimism about the nature and future of space technology (5).

Yet in delivering this more forthcoming history, *Original Sin* has sacrificed balance. It creates a simplistic narrative that reduces space technology to its contributions to power. Consider Bowen’s false dichotomy between space activities that are military and therefore bad, and those that are civilian and therefore benign. Here he dismisses the age-old distinction between the “militarization” of space—which implies using space technologies for passive military purposes such as reconnaissance, navigation, and communications—and the “weaponization” of space, which implies a more active, even aggressive use of space technology. That division, he writes, “distract[s] and hide[s] the practical realities of military spacepower” (296). But not all military activities are equal. Surely we cannot lump in the Soviet Union’s development of a fractional orbital bombardment system (FOBS) with NASA’s use of air force pilots in the Gemini, Mercury, and Apollo programs. While Bowen correctly observes that the tactical use of space systems challenges the idea of passive military space systems, using an imaging satellite to target people is of a wholly different quality than using the same satellite to monitor an arms control agreement (237).

Indeed, the role that space technology played in *tempering* international relations through treaty verification is one that Bowen too quickly rejects. Michael Neufeld, John Gaddis and others have argued cogently that the militarization of space, “in short and on balance,” has been historically a force for political stability and economic vitality.¹³ Hence policymakers on both sides of the Iron Curtain supported the protection of “national technical means” of verification—intelligence satellites—in the SALT I negotiations during the early 1970s. Bowen’s book includes a revealing episode from the Lyndon Johnson administration: crucial evidence of Soviet force levels supplied by satellite data helped the United States curb its development of Minuteman intercontinental ballistic missiles by ninety percent, from 10,000 units to 1,000. “Tonight we know how many missiles the enemy has and, it turned out, our guesses were way off,” Johnson said. “We were doing things we didn’t need to do. We were building things we didn’t need to build. We were harboring fears we didn’t need to harbor” (123).

Of the idea that satellites helped stabilize the Cold War through treaty verification, Bowen writes that “it is at best a mitigation against the fact that several individuals can choose to unleash nuclear Armageddon at a moment’s notice at any time,” a reality he believes to have been brought about by space technology (148). But unless the dual-use problem makes all technological definitions meaningless, space systems did not bring about the nuclear revolution... *nuclear* systems did. The dual nature of space technology is a dilemma, not a damnation. What could we reasonably have expected national governments to do? Eisenhower was concerned about duplication and the growth of a garrison state. Britain and France were in mountains of debt. Khrushchev needed a propaganda coup.¹⁴ Why not use ready pools of engineers, technicians, and physicists already at work in the nuclear program? The use of space rockets as ballistic missiles was a rational

¹¹ Donald E. Kash, *The Politics of Space Cooperation* (West Lafayette, IN, 1967), 128.

¹² Frank White, *The Overview Effect: Spaceflight and Human Evolution* (Reston, VA: American Institute of Aeronautics and Astronautics, 2014).

¹³ Neufeld quoted in Bowen, *Original Sin*, 148; John Lewis Gaddis, *The Long Peace: Inquiries Into the History of the Cold War* (New York: Oxford University Press, 1987), chap. 7.

¹⁴ On Eisenhower, Khrushchev, and European politics, see Walter McDougall, *...the Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985).

choice necessitated by available talent, limited budgets, and the time pressures of a technology race. Blaming space technology for the prospect of nuclear war makes about as much sense as crediting nuclear technology for launching the satellite communication revolution into orbit.

Imperfect though Christian ethics may be in defining the legacy (or present condition) of space technology, *Original Sin* does make important contributions to the international relations literature and to popular understandings about astropolitics. First, Bowen deserves credit for further internationalizing the story of space technology. Although the globality of the Space Age is obvious to scholars, as is evident in the vast secondary literature Bowen cites for his roving chapter on space technology “beyond bipolarity,” newcomers to the fields of space history, space security, and astropolitics will benefit enormously from the synthesis *Original Sin* offers of technological and political developments in countries all over the world. While popular culture continues to pitch space power as a US-Soviet affair through shows such as Apple TV+’s *For All Mankind*, Bowen has supplemented a growing body of literature that breaks down the Cold War paradigm of space history.

Bowen’s analogy of a “cosmic coastline” (13), moreover, usefully critiques strategic assumptions about the military value of space that have plagued Western—particularly American—thought for more than half century. From the moment, in 1958, that Lyndon Johnson uttered “whoever gains that ultimate position [space] gains control, total control, over the Earth,” military debates have never been able to shake the delusional “high ground” thesis of space power.¹⁵ While Mahanian analogies also present dangers, Bowen’s coastline thesis, in which he compares Earth orbit to liminal naval space, is a more measured and presentist approach to space war. The conclusions he draws in his penultimate chapter are grounded in orbital mechanics and the real, as opposed to imagined, capabilities of satellites. Military debates will be better for it.

One final point, perhaps the most vital. In the introduction Bowen acknowledges that although space technology has not escaped its original sin, the reader “need not accept a fatalist, doomed, or cynical future” (7). But in rendering space technology’s cruel Genesis and development, the book does not leave much room for optimism, much less hope. “Moving away from an idealistic view of space... is an important step in trying to make things better,” he concludes in the final chapter (325). Fair enough. But in making my way through *Original Sin*, I had hoped that beyond the initial task of “exploring how we got to where we are in the first place,” Bowen’s book might offer a second step, a prescription as to how we might solve the dark potentialities of space technology. That is, how we might escape its original sin. Yet other than a nod to approaching astropolitics “as a global negotiation” over space systems, we are offered few actionable possibilities, let alone a picture of what a “better” situation might look like (349–50). *Original Sin* is a sober drink, but the glass is half-empty.

Stephen Buono is an Ernest R. May Fellow at Harvard University, where he is at work on two books. His first project, *The Province of All Mankind* (forthcoming from Cornell University Press), narrates the birth of outer space as a realm of American foreign policy and international law. The second, commissioned by NASA, is a history of lunar governance in the Cold War. He has been a Humanities Postdoctoral Fellow at Stanford University’s Freeman Spogli Institute for International Studies and a NASA Aerospace History Fellow. In the fall, he will join the Social Science faculty at the University of Chicago.

¹⁵ Lyndon B. Johnson, ‘Speech to a Meeting of the Democratic Conference 7 January, 1958,’ in *A Time For Action: A Selection from the Speeches and Writings of Lyndon B. Johnson 1953–64* (New York: Atheneum, 1964): 43–44; Thomas Karas, *The New High Ground: Systems and Weapons of Space Age War* (New York: Holiday House, 1983).