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Henry D. Sokolski. *Space and Missile Wars: What Awaits.* Arlington: Nonproliferation Policy Education Center, 2021. iii + 277 pp. $7.01, paper, ISBN 978-1-73711-130-6.

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Since the publication in 2021 of *Space and Missile Wars: What Awaits*, the Russian Federation has intentionally destroyed a satellite in orbit,[1] China and Russia have deployed new satellites with the potential to endanger other countries' high-value spacecraft,[2] and Russia has launched a brutal invasion and partial occupation of Ukraine, punctuated by missile barrages against civilian infrastructure[3] and veiled threats about using tactical nuclear weapons.[4] The future of warfare that the authors of *Space and Missile Wars* predicted is here.

Space and Missile Wars presents a panoply of essays examining the current and projected near-future strategic environment in the space, missile, and nuclear sectors. Drawing from the authors' diverse sources of expertise in space- and missile-related matters, *Space and Missile Wars* does an excellent job of both orienting the reader to long-standing and emerging dilemmas in these fields and offering modest proposals for progress on arms control, strategic signaling, and deterrence.

Among the many strengths of this book are the chapters by David Cooper, on long-term prospects for nuclear missile controls, and John Maurer, on arms control among rivals. The former emphasizes the intertwined relationship of long-range missile development with nuclear weapon programs and advocates for measures that will address these threats in tandem. The latter thoughtfully analyzes how states may prefer "equality" or "equivalence" approaches to arms control depending on their strategic situations and recommends areas where negotiators should be prepared to hold fast or grant concessions to maximize their advantages. Separately, Xavier Pasco's French perspective on space security provides a fresh voice from an important ally that charts its own strategic course in space matters, notably aspiring to develop laser weapons as a prominent element of its space defense architecture.

A fascinating speculative chapter by Peter Garretson outlines two different potential paths to armed conflict in space—one arising from an essentially terrestrial dispute, and the other in-

volving competition for space resources. While generally well thought-out, the chapter overlooks one important development that has already taken place. When the author recommends legislation and policy "to specify the Area of Responsibility (AOR) as encompassing the entirety of the Cis-Lunar theater" (p. 41), he fails to acknowledge that United States Space Command's AOR has already been defined to encompass all of outer space beyond one hundred kilometers above mean sea level.[5]

For me, the most problematic chapter in the book is Brian J. Chow's discourse on space traffic management (STM) measures. While it contains a worthwhile discussion of space industry trends and some good ideas about what a US-led STM regime should look like, it displays significant misunderstandings about certain aspects of international space law, particularly in its analysis of the Liability Convention's compensation regime for damages caused by space objects (pp. 88-91, 96).[6] It erroneously excludes damages caused by negligence from fault-based liability, then argues to employ an absolute liability standard for damages caused in space without acknowledging how it would increase liability for launching states that were not at fault. The chapter also seems to take an overly rosy view of how a country's unilaterally declared "red lines" around its satellites could influence customary international law (p. 91n13). Fortunately, a later chapter, "Countering Co-Orbital ASATs: Warning Zones in GEO as a Lawful Trigger for Self-Defense," provides a significantly more nuanced and persuasive argument for warning zones in geosynchronous orbit, and how they could bolster a country's case for self-defense while complying with existing treaty requirements.

In this new era of great-power competition, *Space and Missile Wars* is a timely, insightful, and informative book. I recommend it to anyone with an interest in strategic space, missile, and nuclear affairs.

The views expressed are those of the author and do not reflect the official guidance or position of the United States Government, the Department of Defense, the United States Air Force, or the United States Space Force.

Notes

[1]. US Space Command Public Affairs Office, "Russian Direct-Ascent Anti-Satellite Missile Test Creates Significant, Long-Lasting Space Debris," November 15, 2021, https://www.spacecom.mil/Newsroom/News/Article-Display/Article/2842957/russian-direct-ascent-anti-satellite-missile-test-creates-significant-long-last/.

[2]. Andrew Jones, "China's Shijian-21 Towed Dead Satellite to a High Graveyard Orbit," *SpaceNews*, January 27, 2022, https://spacenews.com/chinas-shijian-21-spacecraft-docked-with-and-towed-a-dead-satellite/ (describing China's capture and removal of a defunct Beidou navigation satellite in geosynchronous orbit, while acknowledging that "this could indicate that China is developing an on-orbit offensive capability"), c.f. Document of the People's Republic of China pursuant to UNGA Resolution 75/36 (2020), https://front.un-arm.org/wp-content/uploads/2021/05/Chinas-Position-on-Outer-Space-SecurityEnglish.pdf (in which China accuses a US commercial satellite life-extension mission as having the potential to be diverted to offensive military use); Brett Tingley, "Pentagon Space Chief Condemns 'Irresponsible' Launch of Russian Inspector Satellite," Space.com, August 18, 2022, https://www.space.com/russia-inspector-satellite-kosmos-2558-irresponsible-behavior.

[3]. Jack Guy et al., "Russian Strikes Leave 10 Million Ukrainians without Power as Temperatures Plummet," CNN, November 18, 2022, https://www.cnn.com/2022/11/18/europe/ukraine-power-grid-first-snow-intl.

[4]. Editorial Board, "Putin Threatens Nuclear War. The West Must Deter Disaster," *Washington Post*, October 3, 2022, https://

www.washingtonpost.com/opinions/2022/10/03/putin-nuclear-war-ukraine-deter/.

[5]. Joint Publication 3-14, "Space Operations," Ch. I, ¶2.a, April 10, 2018, incorporating Change 1, October 26, 2020, https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14ch1.pdf; see also Meredith Roaten, "JUST IN: Space Command, NASA to Sign Agreement on Planetary Defense," ***National Defense***, February 17, 2021, https://www.nationaldefensemagazine.org/articles/2021/2/17/just-in-space-command-nasa-to-sign-agreement-on-planetary-defense.

[6]. Convention on International Liability for Damage Caused by Space Objects arts. 2-3, March 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 (providing absolute liability for damage caused by a spacecraft on the surface of the Earth or to an aircraft in flight, but fault-based liability for damage caused elsewhere).