

**Brent Ziarnick.** *Developing National Power in Space: A Theoretical Model.* Jefferson: McFarland, 2015. 268 pp. \$45.00, paper, ISBN 978-0-7864-9499-6.

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The Arctic, outer space, and cyberspace are three arenas where conflict is possible today between or among states and nonstate actors. In the past, inaccessibility meant one did not need to worry about a clash in these areas, but in all three, access has expanded (particularly in the case of cyberspace) and looks to continue expanding in the future, potentially leading multiple actors into collision. Brent Ziarnick's 2015 book, *Developing National Power in Space: A Theoretical Model*, tackles the foundations of power in space. Ziarnick, who writes on military space issues and is an instructor at the US Air Force's Space Education and Training Center, would seem a logical choice to explain and expand on the current thinking on space power. The heart of the book is Ziarnick's general theory of space power, which is grounded in Alfred Thayer Mahan's classic examination of sea power and Joseph Schumpeter's theory of economic development. The approach is very thought-provoking and Ziarnick is not one to shy away from strong statements regarding the organization and proper focus of the American space program. The book, however, suffers in a few areas, which undermines the usefulness of the text to a wide audience.[1]

The main theme of the book is "about developing space power. It will present a theoretical model describing how space power is developed

and describe what strategies can be implemented to help foster the development of a nation's space power" (p. 6). The book approaches the question of space power in five chapters. Chapter 1 lays out the author's general theory of space power. Chapter 2 briefly discusses the organization of, and competing visions for, the American space program. Chapter 3 examines organizations and technology. Chapter 4 focuses on the history of US naval power to WWII as an analogy to space power, and chapter 5 presents four future scenarios. The organization of the book is a bit less reader-friendly than it could be. In particular, a concluding chapter might have been helpful to tie together the model and the various other chapters, to summarize the author's main contributions, and perhaps to suggest recommendations. More problematically, chapter 4 seems to be tenuously connected to the rest of the book, even as an analogy, and could have been removed without causing harm, potentially yielding a more focused book on space. Other chapters, particularly chapter 2, tend to cover many relevant but equally disparate topics (e.g., mercantilism and nuclear propulsion); better guideposts might have made it easier to follow the author's argument from beginning to end.

A second issue is that the author relies heavily on a few authors, whose work he cites or uses as inspiration, rather than pushing his own ideas

as far as he might. It is of course intellectually appropriate to take multiple authors' ideas and synthesize them or derive something new. Building on an author's ideas can lead to advancements as well. Ziarnick, however, tends to take an individual author's ideas and modify them to suit his needs. At times, this comes across as simply replacing "sea power" in Mahan's works with "space power" rather than deeply exploring where the analogy works and why. The results of this approach can be seen in the relatively bare-bones bibliography, as well as several pages with quotations that continue for a page or more (e.g., pp. 99-100). This all leaves the book full of interesting but frequently unsupported arguments. Here is where the author could really shine by providing more of his own thoughts on a subject he has clearly spent a lot of time thinking about. Finally, the author has taken the language of Clausewitz and the figures of James R. Holmes and Toshi Yoshihara and created some frankly confusing figures—for example, figure 1.1, "The Grammar of Space Power Delta, Profile View" (p. 18)—that seem unnecessarily complicated.

Regarding the general theory: Ziarnick, probably because his book is steeped in the work of Mahan, brings a bias of classical geopolitics and realist theory. This can be seen in the author's claim that his general theory could apply to many actors, but—in spite of the title—this book is really about American space power (a powerful nation-state). This bias is not necessarily a problem; certainly many authors hold similar views. It might have been more interesting and engaging though for the author to at least acknowledge that in both cases (i.e., geopolitics and realism), challenges exist to these ways of thinking about how the world works. For example, realists tend to view the primary world actors as states and the important relationships as ones of conflict (not necessarily violent) and competition. A security dilemma underlies many states' actions. States seek to increase their own security but doing so tends to increase the insecurity of others. In the

case of space power, putting weapons in space might make the United States feel more secure at the expense of other major powers (e.g., China or Russia). However, realism is challenged by a number of other theories that assert this is not actually how the world works. Neoliberals, for example, might focus on the role of the UN and the Outer Space Treaty and how the cooperation between states can lead to peaceful, joint space activity and the prevention of unilateral, aggressive moves in space. Of course, Ziarnick is not required to make counterarguments to his theory, but it would strengthen his theory to do so, if only to explicitly refute them. Similar issues arise regarding a nation's intent for developing space power. For Ziarnick, a follower of Schumpeter, economics underlie space power and the foundational logic of space power is to generate wealth from space activities. If one does not agree with Schumpeter's views on economic growth and development, Ziarnick's general theory becomes equally problematic.

Another puzzling issue is that for a book on space power, the book seems oddly light on discussions about space. There is little mention of the Outer Space Treaty (which the author views as a misstep), satellites and antisatellite weapons, communications and intelligence, ballistic missile defense, current companies' forays into space tourism and development, US space policy, etc. Private companies and even universities are getting into the space game. The recent development of reusable rockets would seem to be a major technological improvement if the goal is to increase access in particular by reducing costs. Similarly, cubesats represent a radically different way of thinking about satellites. Finally, inflatable space habitats may finally dramatically increase the number of people in space via space tourism. Some history is presented in chapter 2, particularly regarding the split between the military and civilian (NASA) sides of the American space program, and chapter 5 looks at future scenarios. However, other countries' space programs (e.g.,

China's or Russia's) are barely mentioned. This is a bit odd, since Ziarnick is obviously knowledgeable in this area, at least historically, as evidenced by his discussion of Project Orion (a nuclear-propelled spacecraft proposed in the 1950s).

Finally, chapter 5 offers four scenarios of the future of American space power in 2053. Conceptually, this is an interesting direction to take and an appropriate approach for the book. There are a number of reasons to develop scenarios, for example: to force decision-makers to consider low-probability/high-impact events that otherwise might be downplayed or to develop indicators to see if one of the scenarios is becoming more or less likely as time passes. Mr. Ziarnick's rationale is that "planners consider multiple different futures and develop stories that leaders can use to 'test' the validity or appropriateness of projects and programs against each story" (pp. 201-202). Ziarnick creates four examples: "Space Pearl Harbor" (our space assets are attacked and need to be replaced); "Taking the High Ground" (put US weapons in space or deny others that ability); "Hammer of God" (planetary defense from, e.g., a comet hitting Earth); and "Eat at Joe's" (planetary defense against an intelligent adversary, e.g., aliens). Developing the scenarios more fully could have been an interesting way to go in the book. Interestingly, the scenario that is missing is a peaceful use of space, where nothing much happens. One possibility for why this scenario is not considered is that Ziarnick pays less attention to the drivers that create the scenarios. For example, one driver could be whether or not nations abandon (overtly or covertly) the norms enshrined in the Outer Space Treaty of 1967; a second driver could be whether the barriers to space access and use remain relatively high or are lowered to the point where almost anyone (nation, company, university) can put things into orbit. Ziarnick does, however, suggest three foci to prepare for the above scenarios: (1) improve launch vehicle or deep space propulsion technology, (2) peaceful space efforts to increase strategic access, and (3)

developing a group of people to implement the space program and form a new space service. Each of these could be profitably explored in greater detail.

Overall, it is difficult to recommend this book to a wide audience. It may resonate most with those who already embrace Mahan and thus share the author's outlook. While the intended audience may be decision makers, a better audience might be those students or scholars steeped in space studies who are interested in the American space program and could use this book as a good starting point for a discussion of both the history and possible futures of that program. Ziarnick brings up several interesting points that are worth reflecting on for readers prepared to dig deeply into the book.

#### Note

[1]. The views expressed in this book review are those of the author and do not reflect the official policy or position of the National Intelligence University, the Department of Defense, or the United States government.

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