



## Book Review

**Radosław Bielawski, *Potęgometryczny wymiar militaryzacji przestrzeni kosmicznej* (Wydawnictwo Wojskowej Akademii Technicznej, 2021, ISBN 978-83-7938-348-1 ), 248 pp.**

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In the last decade, we have observed a growing significance of the space sector for national and global security. Among the most important determinants of this state of affairs is the rapid development of space technologies and their democratization. These two factors have constituted a new global security environment, which has become a framework for a new arms race in outer space. Nowadays, we witness growing dynamics among the states with space capabilities, which invest a lot of effort and resources to position themselves at the head of the peloton. The competition, however, is not limited only to the traditional superpowers like the U.S., Russia, Europe, or China, but, due to the democratization of space technologies, currently includes also India, Iran, and North Korea.

The new arms race has induced the need for an in-depth understanding and measurement of the parties involved. Radosław Bielawski's book entitled *Potęgometryczny wymiar militaryzacji przestrzeni kosmicznej* [Powermetric Dimension of Outer Space Militarization] is the first, in the Polish language, thorough analysis of weaponization and militarization of outer space with the use of the powermetrics models. Radosław Bielawski is an academic working at the Polish Military University of Technology in Warsaw, Poland, specializing in the militarization of outer space. He has published on, i.a., space threats to national security and space laser communication systems.

Bielawski's book is best suited for scholars and policymakers working in the field and those with at least a basic level of knowledge and understanding of the global space sector, its technologies, and poweronomic and powermetric modeling. Otherwise, the described military and economic capabilities of the analyzed states and the constructed upon them models may be difficult to understand.

The monograph is divided into two parts. In the first one, consisting of seven chapters, the author provides a systematic list of current space weapons and a categorization of the military space threats and describes the states with the largest potential of the current and future military capabilities in outer space, namely, the United States of America, Russian Federation, People's Republic of China, Islamic Republic of Iran, People's Republic of Korea,

and the Republic of India. The second part is dedicated to the power estimation of the parties-states participating in the space arms race. The book is constructed in such a way as to provide a thorough answer to the main research question, namely: What is the current level of militarization and weaponization of outer space? Having answered it in the first part of the book, the author moves to verification of the book's primary hypothesis, which is formulated as follows: There is a relationship between the degree of advancement of militarization of space and the power of the state, in such a way that a state with a high indicator of power and high militarization capabilities also has a high degree of militarization and weaponization of space. The second part of the book examines the thesis using various empirical data in the form of poweronomic and powermetric indicators and models. The author has demonstrated that there is indeed such a correlation – the states with high power indices and well-developed military capabilities also possess high potential in the area of militarization and weaponization of outer space.

The author provides a thorough and systematic overview of every analyzed state's current space weapon capabilities, including space-based kinetic, space-based electronic, and space-based cyber weapon systems. Moreover, each chapter in this part of the book is opened with the respective political background and drive for space militarization and weaponization. It is worthy of mentioning that the book focuses only on the six chosen states and does not include any country from Europe or the European Union as a whole. According to the author, this choice is not accidental but based on the preliminary research the author carried out before putting the monograph together. It seems that France and the United Kingdom were omitted due to their relatively small involvement in the military use, particularly the weaponization of outer space. These states, although in many aspects much more developed when it comes to the space sector from Iran or North Korea, do not pose a threat to the global status quo. The European Union, on the other hand, although often holding the second place in various quoted by the author power ranking, is not a state itself and therefore does not possess a joint and coherent program for space militarization and weaponization. In this respect, the European Space Agency differs significantly from other national space agencies, which is a straightforward consequence of its multi-national structure. Its state members do not constitute one political entity and often do not share the security goals and policies, which translates into not having and working on developing shared military capabilities in space. It might change in the future due to the establishment in May 2021 of a new EU's space agency – the European Union Agency for the Space Programme (EUSPA), which, apart from running EU's satellite observation and navigation programs, has started the process of commencing more security-oriented programs among the EU members states. This, however, is an issue of the future and the reason why it was not included in the discussed publication.

The biggest asset of the book, in my opinion, is its second part, where the author brings together several powermetric indices, models (i.a., Hafeznia's, Sułek's, Orłowski's, the PSI methodology), ranking, and reports (i.a., MBR, GFR, NPRC, RAND, GMIR), and uses these data to describe and quantify states on the space power scale. The employed methodology is fitting, the arguments carefully carried out, and the conclusions sound. So far, as the author demonstrated, the space capabilities have been rarely used in constructing powermetric reports and rankings. I agree that this state of affairs requires change.

The last thing I would like to mention before moving to the final conclusion are the annexes, which I find remarkably helpful. Here Bielawski put together a comprehensive and chronological list of attacks on space systems. It must have required much analytical work, but it definitely paid off – the reader now has quick access to very interesting and significant for the field data.

In his final conclusions, Bielawski rightly points out a disproportionate global development of both kinetic and non-kinetic space weapon systems. The U.S. is at the forefront of

the race but closely followed, in some aspects, by Russia and China. Only four states officially possess the ASAT systems, namely the U.S., Russia, China, and India. The space laser weapon systems are developed by the U.S., Russia, and China; the microwave systems – by the U.S. and China. The other parties involved in the race lack the necessary technologies. On the other hand, electronic and cyber warfare technologies, which are less technologically complex and require fewer resources, are successfully developed also by Iran and North Korea.

Bielawski offers a broad overview of the current processes of militarization and weaponization of outer space and their powermetric dimensions. He provides a sound argument why the space capabilities of states should be included in power measurement. Having read the book, the readers will grasp the growing significance of outer space for national and international security.