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Thomas Hoerber, Sarah Lieberman, eds. *A European Space Policy: Past Consolidation, Present Challenges and Future Perspectives.* Space Power and Politics Series. London: Routledge, 2019. Illustrations. 226 pp. $155.00, cloth, ISBN 978-1-138-57040-5.

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Countries of all sizes and various cultures, from China to Luxembourg to the United Arab Emirates, are seeking to cultivate indigenous space technology and capabilities. They do this to improve prestige, autonomy, and industrial competitiveness. The nations of Europe began their quest in the early days of the space age, working collectively on efforts that required aggregation of expertise and resources beyond the means of any one European country. The result is a complicated mechanism for the formulation and implementation of space policy.

Individual European countries address space policy in their science and technology ministries and usually in their defense ministries as well. The European Space Agency (ESA), with twenty-two member nations, organizes multinational space research and engineering efforts. For the past three decades, the European Union (EU), which currently has twenty-eight member states, has become increasingly involved in applying space capabilities to societal needs and in support of European industrial policy. The European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) serves the weather monitoring and forecasting needs of its thirty member states.

To assess the overlapping policy influences of these entities, the chapter authors in *A European Space Policy* use a neo-institutional framework in which institutions—shaped by their histories, missions, and norms—are primary actors in the policy process, but the effect of individuals on their institutions (and vice versa) also is recognized. Although the chapter authors approach the subject from a common framework, their perspectives sometimes conflict. The editors encouraged this diversity of viewpoints. Readers will come away with a greater appreciation for the complexity of the situation but no clear picture of a coherent path for the future.

Past analyses have focused on ESA's role in European integration since the space agency's establishment in 1975.[1] The EU's growing interest in space development has brought new funding to Europe's space projects and provided a political and strategic complement to ESA efforts. As the book points out, there was a plan a generation ago to merge ESA into the EU organization, but it was abandoned due to institutional resistance and conflicting organizational circumstances. Two of ESA's members (Norway and Switzerland) are not EU members, and the United Kingdom soon is expected to join this list. Also, ESA engages in a procurement practice called "fair return" that would not be acceptable to the EU. Contributors to ESA's optional programs (for example, launcher devel-

opment, some science projects, and participation in the International Space Station) are promised that their country's industry will receive contracts roughly equivalent to the country's financial contribution to the programs. This has always been an important practice to ESA members, who seek to use their membership to build national industrial capabilities and competitiveness. EU procurement efforts, in contrast, are required to shop for the best bids regardless of geographic origin.

The European approach to space development, at both national and international levels, has always stressed autonomy, industrial policy, and practical applications that bring benefits to European society. This contrasts with US national space policy, which traces its origin to the Cold War era and places far more emphasis on scientific discovery and exploration, mission assurance and security, and stability and responsible behavior in space. These differing evolutionary paths are highlighted in Sarah Lieberman's chapter comparing ESA and the National Aeronautics and Space Administration (NASA).

Despite the recognition in most of the book that European space policy traditionally has been linked to national and regional industrial policy, Iraklis Oikonomou seems to express shock and dismay at the level of influence that industry actors have on policy formulation. His chapter focuses on the EU Space Strategy of 2016, but there is plenty of other evidence indicating that European industry is intended to be a major player.[2] Two prominent documents from the current era of EU involvement are illustrative.

In 2007, the ministers in charge of space activities in ESA's member states, and those responsible for markets, industry, and research within the EU's Competitiveness Council, approved a European Space Policy.[3] Among its strategic objectives were: developing and exploiting space applications; ensuring a strong and competitive space industry; and securing unrestricted access to new and critical technologies, systems, and capabilities in order to ensure independent European space applications. This was reinforced by the 2013 release of the EU Space Industrial Policy in which space is described as a strategic industry.[4] Particular applications are mentioned, but the overarching theme is global prominence in an increasingly competitive world market.

The primary EU-sponsored space projects are the Galileo satellite navigation system and Copernicus, the European Earth observation program that serves scientific, economic, security, and disaster relief missions. Multiple chapter authors seem convinced that EU participation in space development is essential not because it brings a new source of funding but because ESA, as an unelected technical organization, lacks democratic legitimacy and therefore should not drive European space policy. This is a debatable view since ESA is beholden to the science and technology ministers of its member countries, who collectively must approve its operating budget every three years. This is analogous to the relationship between NASA and the US Congress, and any suggestion that NASA should not be a driver in the formulation of US national space policy would be treated skeptically, to say the least. (ESA's budget is far smaller than NASA's: 5.72 billion euros/6.34 billion dollars in 2019, compared to about 20 billion dollars for NASA.[5])

One puzzling aspect of the book is its organization. The chapter by Andrew Thomas is about public opinion on space exploration in China. It does not belong in a book about European space policy, despite the few words in the chapter that make an unsatisfying attempt to link it to the subject. It is especially unusual that it is placed as chapter 1.

The book should begin with a chapter that sets the scene—beyond the theoretical aspects covered in the introduction—especially to accommodate readers who are unfamiliar with the subject matter. The closest we get to this is the contribution from Frans von der Dunk, which covers legal challenges and appears as chapter 4. It would be help-

ful to provide early exposition of some concepts and historical information that may not be familiar to all readers. To give one example, multiple authors refer to the ESA concept of Space 4.0, but a full explanation of this concept is not presented until chapter 9. Other organizations in the space community use such labels as Space 2.0 and 3.0, so there is a strong possibility of confusion.

Part 3 of the book is called "Future Perspectives," but the final chapter by Harald Koepping Athnanasopoulos is the only one that features a future-oriented topic. The chapter discusses the Moon Village concept articulated by ESA's director general, but there are many more policy issues on the horizon that merit attention. What other concepts for lunar exploration and development should ESA consider? Should ESA continue its participation in the International Space Station to 2030, as NASA has suggested? After that date, what should come next in human spaceflight aboard orbiting research platforms? How should the growing efforts of space industry drive changes in the European space research agenda? What is Europe's role in space traffic management as the satellite population is expected to grow dramatically? What should be the nature of Europe's space-related collaboration with Russia and China given current tensions?

With regard to security, is there a need to rebalance public spending between the civil and military space sectors? In Europe, risk reduction for space technologies and development of space infrastructure are done primarily by the civil sector, so civil space budgets, individually and collectively, are much higher than military space budgets. Military programs are left mostly to individual nations, where space projects must compete with other defense priorities, and military planners are concerned that their investment in a space system may yield most of its benefits to another service or agency, or even another country. Cross-border military space agreements traditionally have involved sharing of data, not sharing of space systems.

Rather than tackle these practical policy questions, the book mostly emphasizes the theoretical considerations regarding institutional behavior. Although there is some analysis of specific policy language (for example, in Lorna Ryan's chapter on governance) and some historical background (such as Daniel Sagath, Maarten Adriaensen, and Christina Giannopapa's chapter on integration of Central and Eastern European countries), readers will need to consult other sources for more complete information in such areas as the mechanics of the policy process within each of the relevant organizations, the space policies of individual European countries, the accomplishments of European space efforts to date, or proposals for the next generation of space projects.

It will be up to the reader to decide whether the focus on neo-institutionalism provides a useful framework or an undue constraint on the discussion.

Notes

[1]. For example, see Roger Bonnet and Vittorio Manno, ***International Cooperation in Space: The Example of the European Space Agency*** (Cambridge, MA: Harvard University Press, 1994); and Stacia Zabusky, ***Launching Europe: An Ethnography of European Cooperation in Space Science*** (Princeton, NJ: Princeton University Press, 1995).

[2]. European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, "Space Strategy for Europe," COM(2016) 705, October 26, 2016, https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/COM-2016-705-F1-EN-MAIN.PDF.

[3]. Commission of the European Communities, Communication from the Commission to the Council and the European Parliament, "European Space Policy," COM(2007) 212, April 26, 2007, http://

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[4]. European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, "EU Space Industrial Policy: Releasing the Potential for Economic Growth in the Space Sector," COM(2013) 108, February 28, 2013, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0108&from=EN.

[5]. United Space in Europe, "Funding," http://www.esa.int/About_Us/Welcome_to_ESA/Funding (accessed January 5, 2020).

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