PREFACE

This book offers students and the general public a comprehensive understanding of space dynamics from the context of past, present, and future international competition and cooperation. Its focus is on whether conflict in the space environment can be avoided, even as human activity increases, critical orbits close to the Earth become more crowded, and military activities expand. The various chapters cover scientific basics, space history, space politics, the economics of space, military space activity, and space diplomacy. The book does not assume any prior knowledge of space and is aimed at reaching anyone with an interest in learning about this promising but fragile domain of increasing human activity.

I am grateful to Columbia University Press and, specifically, to editor Caelyn Cobb and associate editor Monique Laban for supporting this second edition. Much has changed since the original edition appeared in 2014, as space technologies, actors, and problems have proliferated, along with new space opportunities. My goal is to provide an engaging and informative short volume on key policy issues facing nations in this crucial arena of international relations. The book seeks to give readers a full picture of the civil, commercial, and military dynamics that are likely to shape the future in space, as well as the diplomatic initiatives that might keep it peaceful. Those who finish reading the book should be able to discuss and analyze space policy issues intelligently and more easily track and understand emerging developments in an international context.

I wrote this second edition over the course of 2022 and early 2023. My main goal was to update readers on major space developments since 2014, including space policies under several new U.S. presidents, the worsening of U.S.-Chinese-Russian tensions, and the rapid expansion of commercial space activity over the past decade. When I wrote the first edition, the notion of satellite mega-constellations was just a dream. Small, inexpensive, yet technologically sophisticated cubesats were only just beginning to be sent into orbit. Launch services were also more expensive and much harder to find than they are today, when several commercial rocket companies have lowered costs by developing the technology to land and reuse spent boosters. In terms of satellites in orbit, their number has increased sevenfold in just the past decade: several companies have more than one hundred satellites in orbit, and one has over four thousand. Literally hundreds of new space companies have also been created in the past decade. Many more countries are also active in space than in 2014, and some are seeking military capabilities. All of these factors mean that space is not only more crowded but also more important to life on Earth than it was a decade ago. Yet it faces serious challenges in such areas as traffic control, debris mitigation, and conflict prevention.

This narrative and analysis draw on my more than thirty-five years of professional experience studying space politics and writing about their international dimension. Although considerable academic literature has been published on space competition and cooperation, almost all of it is written in scholarly and specialist jargon. This volume is an effort to bring the key concepts and problems to students and the interested public, who often struggle to find accessible studies on international space policy. The overriding question is: Can we avoid conflict and collectively develop space to benefit all of humankind?

In terms of thanks, I want to recognize Capt. (U.S. Marine Corps) Matthew McClure and Capt. (U.S. Space Force) Mitchell Young for reading and highlighting areas requiring updates in the first edition and for offering their informed suggestions. Each had their tours at the Naval Postgraduate School extended in 2021 because of assignment complications caused by the COVID pandemic, and they volunteered to read the first edition and provide comments on areas needing updating.

I also want to thank Lt. Col. (U.S. Marine Corps, ret.) and Space Systems Engineering and Acquisition chair at the Naval Postgraduate School Gary Thomason, who generously reviewed chapter 5 for accuracy and provided useful comments and insights. In addition, I am grateful to astrophysicist Dr. Aaron Boley of the University of British Columbia (and codirector of its Outer Space Institute) for his willingness to answer my technical questions on the evolving orbital debris problem. Dr. Patrick Besha at NASA headquarters kindly tutored me on the finer points of China's civil space program and answered other questions about NASA. Finally, Dr. Michael Byers of the University of British Columbia (the other codirector of the Outer Space Institute) and an anonymous reviewer graciously agreed to review the whole draft manuscript. Both provided valuable suggestions and corrections. I greatly appreciate all of these individuals who contributed to this volume.

Last, but not least, I want to thank my wife, Sarah Diehl, for tolerating all of the time and attention I had to devote to writing this second edition.

Despite the strength of all this assistance, I remain responsible for any errors or oversights in this book. In addition, all opinions expressed here are my own and should not be interpreted as the official policies of the U.S. Navy or the Department of Defense. Nevertheless, it is my firm hope that readers will come away better educated on this subject and, just as important, interested in learning more.

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