



OUTER SPACE

WEAPONS, DIPLOMACY, AND SECURITY

ALEXEI ARBATOV AND VLADIMIR DVORKIN, EDITORS

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FOREWORD

In the fifty years since the United States and Russia raced to launch the first weapons into outer space, the military, commercial, and scientific development of space has advanced at a rapid pace. While space has not transformed—yet—into a new field for armed conflict, its potential for militarization makes cooperation between nations an urgent global priority.

In *Outer Space: Weapons, Diplomacy, and Security*, editors Alexei Arbatov and Vladimir Dvorkin—along with other Russian researchers from the Carnegie Moscow Center’s Nonproliferation Program—explore the strategic implications of space weapons from the Russian point of view. What is the possibility of a space arms race and who would win it? What are the codes of conduct for operating in outer space? Who controls the skies beyond Earth’s limits? Can disagreements be resolved peacefully?

Several recent attempts to develop legal barriers to a space race have failed. But, the authors argue, an agreement on a framework governing space—which lacks borders—must be reached. If outer space should fill with weapons—including highly survivable space systems and information transmission systems used for military purposes—the risk of accidents, false alarms, and command system malfunctions becomes substantial.

The potential risks increase as nations with growing political, military, and economic ambitions—notably China, India, and Pakistan—quickly develop expertise. Their use of space information systems for military purposes could create a tipping

point that would make reversing an arms race impossible. If countries fail to find areas of cooperation, the growing threat of a space arms race and the prospects of conflict in space would inevitably lead to nuclear and missile proliferation, and create an irreversible crisis for the entire nonproliferation regime.

This path is avoidable. By taking a close look at the mixed history of disarmament talks, the evolving relationship between the United States and Russia, and the factors that motivate nations to engage in peaceful negotiations, the authors argue that diplomatic solutions can prevent another space race. Nations will need to be transparent about their goals and the terms covered by formal and informal disarmament agreements to provide a successful framework for negotiations. Rather than banning weapons outright, countries may need to adopt partial solutions and find ways to closely monitor compliance.

As the globalization of economic, political, military, and technological development expands the realm of activity in outer space, this volume provides a compelling road map on how to avoid future conflicts in a critical arena.

Jessica T. Mathews
President
Carnegie Endowment for International Peace

PREFACE

The special nature of space as a sphere of civilian and military activity is drawing increasing interest as more countries develop and enhance their space programs. Ensuring those programs are used to achieve peaceful ends is a growing source of concern for the international community.

This edited volume—produced as part of the Carnegie Moscow Center’s Non-proliferation Program—assesses prospects for preventing the militarization of space, efforts to establish an international legal framework to guide space development, and past and present space weapons programs. By analyzing fifty years of space system development, the authors determine that nations must heed the lessons of previous disarmament negotiations, recognize the changing balance of power in space, and seek areas of cooperation both formally and informally.

Chapter one, “Features of the Outer Space Environment,” by Petr Topychkanov, examines the specific nature of outer space. It provides an overview of the various types of spacecraft and their operation, and explains the relationship between satellite capabilities and the orbits in which they are placed. It also provides a comparative analysis of the operational use of armed forces on land, at sea, in the air, and in space.

In chapter two, “The Peaceful and Military Development of Space: A Historical Perspective,” independent expert Valery Babintsev examines the history of space exploration from the launch of the first Soviet satellite in 1957 to the

present. The chapter analyzes the technical characteristics of the various space launchers and manned and unmanned spacecraft, as well as the increasing use of space-based information systems and technology. It also assesses the outlook for the future development of civilian and military space systems.

In chapter three, "Space Weapons Programs," Vladimir Dvorkin takes a close look at the development of U.S., USSR/Russian, and Chinese systems for destroying satellites, penetrating missile defenses, and launching strikes from space against targets on Earth. He also examines the development of Soviet asymmetrical measures in response to the U.S. Strategic Defense Initiative program in the 1980s, reviews current U.S. research and development projects in the space weapons field, and assesses the latent technological links between missile defense and antisatellite systems as well as the development prospects for space-based missile defense systems and space-to-Earth strike weapons.

Chapter four, "Non-Weaponization of Outer Space: Lessons From Negotiations," by Viktor Mizin, provides a historical overview and analysis of the efforts to create a legal framework for the military use of space, beginning with the 1963 Limited Nuclear Test Ban Treaty and the 1967 Outer Space Treaty, and continuing with the discussions on space-based missile defenses at talks between the United States and the USSR. These talks centered on nuclear and space weapons and the draft agreements made in the 1980s on the prohibition of weapons in space. He examines how each side's position has evolved and how the groundwork already laid on developing legal provisions and norms could be used in future negotiations.

In chapter five, "Codes of Conduct for Outer Space," Sergey Oznobishchev explores informal means of preventing the militarization of space—not through full-scale treaties, but through politically binding voluntary codes of conduct in outer space. Codes of conduct could help create political barriers to the militarization of space and create favorable conditions for subsequent formal negotiations and agreements.

Finally, in chapter six, "Preventing an Arms Race in Space," Alexei Arbatov looks at the prospects for future treaties on banning or limiting space weapons. He examines the latest initiatives, focusing on the Russian-Chinese draft presented at the Disarmament Conference in 2008. He analyzes the legal, strategic, military, and technical difficulties involved in defining the treaty's subject matter along with the possibilities for monitoring compliance, drawing on examples from previous arms control talks, including negotiations on strategic arms reductions. Arbatov also evaluates the evolution of arms control measures and methods for monitoring compliance, and presents a systematized categorization of various space weapons that could be the subject of future treaties and verification procedures.

The authors draw a number of conclusions. First, over the last half century, great strides have been made in the military, commercial, and scientific development of outer space, but it has not yet been transformed into a new field for potential armed conflict. The creation and use of weapons in military operations in space and from space is more costly than using forces and weapons deployed on land, at sea, and in the air.

Second, development of space information systems will continue in two directions: the development of highly survivable space systems comprising small (light), rapidly deployable spacecraft and boosters, and the development of information transmission systems. The potential militarization or weaponization of space could become the biggest threat to its peaceful use and to the development of international cooperation.

Third, the last decade has shown that Washington is disinclined to engage in disarmament negotiations on the basis of goodwill and noble goals alone. Only strategic interests can motivate the United States to undertake serious talks and accept limitations on its own weapons. The existence of military space programs in Russia and China could be an incentive to begin serious negotiations in this area, but if weapons development goes beyond a certain threshold, the arms race may become impossible to reverse, especially given the variety of space weapons and the difficulty of verifying their numbers.

Fourth, previous negotiations on nuclear and space weapons have shown that if one country maintains complete secrecy of its military-technical programs and closes off its decisions to any critical analysis while trying to use negotiations for its own political and propaganda ends, the diplomatic process inevitably ends in deadlock.

Fifth, recent international attempts to erect legal barriers to an arms race in space have been unsuccessful. The resulting deadlock has led the expert community to look for alternative solutions. One possible approach is to reach agreement on a framework or code of conduct in outer space, which would create the political conditions for a rapid transition to full-fledged and legally binding treaties on banning or limiting space weapons.

Sixth, an analysis of the half century of space system development makes it possible to identify two main models for the legal regulation of space activity. One is based on the 1967 Treaty on Outer Space and includes comprehensive bans on general classes of weapons and activities, without going into the technical details of definitions, verification, data exchange, provisions on exceptions to the rules, and mutually agreed-upon understandings. The other model is based on the ABM, SALT I, INF, and START I treaties, which include detailed agreements on all issues, as well as gradual progression in disarmament and control measures, ranging from partial measures to ones that are increasingly broad in scope.

Soviet proposals at multilateral forums and bilateral talks with the United States in the 1980s as well as Russian initiatives over the last decade (including joint initiatives with other countries) were based on the first model. Set against Washington's unconstructive line, these diplomatic initiatives brought Moscow some political and propaganda dividends but did not lead to concrete results in the form of legally binding treaties.

To achieve results in this area, the United States will need to transition its policy from the first to the second model, taking into account the immense complexity and many facets of the issues, the differing stages of development of various technical programs and projects, the technological overlap between the various types of systems, the difficulties involved in defining the subject matter of treaties and implementing verification measures, and the great asymmetry in the geostrategic situations and military policies of different countries.

The ability to agree on definitions of what exactly treaties will cover and to draw up realistic and reliable verification and transparency measures will play a huge role in the success of any practical negotiations. Rather than simply banning deployment, an indirect solution to the problem could be to reach an initial agreement prohibiting tests of antisatellite systems and space-based missile defense systems that result in the destruction of a targeted satellite or ballistic missile and its components during flight. Compliance could be monitored using the technical means of verification of the parties, preferably in combination with cooperation and transparency measures. The initial treaty could have a limited validity period (ten years with the possibility of extension), and in its first stage could include the United States, Russia, and preferably China, and later be extended to other countries.

Seventh, the United States possesses clear technical superiority in space at the moment, but an arms race in space could lead China, Russia, India, Brazil, and Japan, and possibly Iran, Pakistan, and others to balance it. Despite its superiority in space, the United States is also the country that depends most on the security of satellite support systems for its military and civilian activities. It would therefore have the most to lose.

In the long term, the growing threat of a space arms race and the prospect of conflicts in space would inevitably lead to vertical and horizontal nuclear and missile proliferation, and create an irreversible crisis for the entire nuclear nonproliferation regime. Furthermore, if outer space, which lacks national borders, were to become filled with weapons, there would be a substantial danger of accidents, false alarms, command system malfunctions, and so on.

In this era of globalization, the world is experiencing security problems that cannot be resolved unilaterally, especially through the use of military force. There is an urgent need for cooperation among the major powers and all responsible countries to resolve these issues as they seek to combat the

proliferation of weapons of mass destruction, prevent international terrorism, carry out multilateral peacekeeping operations, verify compliance at major stages of the disarmament process, implement effective measures to address climate change and environmental issues, and take action to ensure energy and food security. This book underscores the importance of such cooperation in a new and expanding realm.