CLAIMING THE COSMOS

Who Owns the Final Frontier?

DARRELL M. WEST

BROOKINGS INSTITUTION PRESS
Washington, DC

CONTENTS

PREFACE

I watched with awe on July 20, 1969, when two Americans landed on the Moon, gathered rocks, took soil samples, and left seismographic equipment to measure moonquakes. I was fourteen years old at the time and the idea humans could land on the Moon left me awestruck. To a little kid, it seemed an extraordinary moment and later it became even more impressive when I discovered that early NASA scientists were worried about the Moon lander performance and how solid the moonscape actually was.

More than fifty years later, space exploration has advanced dramatically with knowledge gained through space-based telescopes, rovers, helicopters, and satellite imagining. Commercial firms such as SpaceX, Blue Origin, Rocket Lab, Firefly Aerospace, Astrobotic, and Intuitive Machines have joined NASA in launching modules into space and countries such as China, Russia, India, Japan, and the United Arab Emirates have organized their own space operations. There are autonomous vehicles for exploration, robotics for dangerous tasks, machines that can generate oxygen, mobile devices for communications, virtual reality for entertainment, high-speed laser communications, and 30 printing for manufacturing.

As documented by the Space Foundation, the global space economy has grown to $613 billion. There are nearly two thousand commercial space companies, and around four hundred thousand people employed in the United States alone. NASA spends around $25 billion each year, but business firms now account for 78 percent of the space sector's expenditures. With an annual growth rate of 8 percent, the space economy is advancing rapidly and dearly emerging as an important domain for many different nations.[1]

With this progress, it is time to analyze the legal, policy, and regulatory aspects of space activities, define the role of private enterprises in space, and

determine how to handle tourism, mining, exploration, defense, and bases. Who should make decisions on the exploration of other celestial bodies and how can we maintain health and safety in destinations filled with radiation and extreme temperatures? What kinds of values should govern those places and how can we build long-term entities? How can various nations coordinate their space activities to minimize conflict and promote extra-terrestrial peace and cooperation?

These questions are important because they coincide with the three pillars of the current space era: commercialization, militarization, and globalization. Commercialization refers to the growing role of private firms in space tourism, mining, communications, defense, and exploration. NASA is shedding its slow, cumbersome, and bureaucratic hierarchy in favor of more nimble commercial entities that are deploying reusable rockets, reducing costs, launching satellites, supplying the International Space Station, and enabling Americans to return to the Moon. Militarization highlights the increasing tendency of the United States and other countries to develop Space Force capabilities, build Golden Dome defenses, test "killer satellites," and improve their intelligence-gathering mechanisms through space. Globalization emphasizes the fact that dozens of countries now are involved with the U.S. Artemis program and a rising number of nations around the world have their own space capabilities and satellite operations.

Even though commercial firms are playing a growing role in space tourism, mining, communications, and exploration, we have to decide how much autonomy is warranted for them and how public-private partnerships in space should be handled. In the science realm, the expansion of space exploration raises existential questions for humanity such as how scientific advancement should take place, the balance between science and religion, and what the discovery of life elsewhere would mean for society, politics, and religion.

In place of the current approaches that now are rising across many countries, we need effective government oversight and an international space

policy that is demilitarized, pan-national, and cooperative in nature. There are a number of principles that should guide tourism and mining as well as the establishment of research bases and camps on other planets and moons: transparency, collaboration, sustainability, human safety, agency oversight, shared infrastructure investment, global cooperation, knowledge-building, demilitarization, and pan-nationalism.

There should be a Space Bill of Rights that augments the Outer Space Treaty and enumerates major rights and prerogatives in space and outlines what private firms and government agencies can and cannot do. We need written rules on how to promote basic human values in space and make sure space communities don't become company towns or government-run entities that harm natural resources or take advantage of workers.

The plan of the book is as follows. Chapter 1 discusses the history of space exploration by various nations and how past Earth-based models represent unfair and inequitable approaches. Chapter 2 addresses basic governance questions such as who makes decisions and what kinds of values are important. Chapter 3 looks at space mining and tourism, and why there needs to be public oversight of these activities. Chapter 4 analyzes questions about community sustainability, which are especially important in light of the limited resources and austere conditions present in places such as Mars and the Moon.

Chapter 5 discusses the existential issues that could arise for society and religion as the search for microbial life advances, and why we should avoid theocracies in space. Chapter 6 looks at how to handle issues of personal conduct, how crime and prisons should be addressed in space, and whether guns should be allowed on other planets. Chapter 7 examines oversight of private companies in space exploration and how to make sure they operate in accordance with basic human values. Chapter 8 outlines a number of principles for space exploration and why we need a U.S. Department of Space Commerce and a Global Space Development Bank to guide future efforts.

I would like to thank several people for their help with this book. Lily Conway, Josie Stewart, and Natasha White provided excellent research assistance on this project. Two reviewers gave me constructive suggestions on the manuscript, and I am very grateful to them. Camille Busette and Molly Reynolds were very helpful in supporting this book as vice presidents of the Brookings Governance Studies program. Yelba Quinn of the Brookings Press and Lilith Dorko of Bloomsbury provided outstanding advice on the manuscript and editorial processes. Rae-Ann Goodwin did an excellent job copy-editing the book and Deborah Maloney skillfully managed the overall production process. A big shoutout to my publicist, Leah Paulos for her exceptional skill in promoting the book. Portions of this volume draw on things I have written and discussed over a number of years. I am responsible for the interpretations presented in this work.