

# The Minimum Means of Reprisal

**American Academy Studies in Global Security**

Carl Kaysen, John Steinbruner, and Martin B. Malin, editors

Robert Legvold, ed., *Thinking Strategically: The Major Powers, Kazakhstan, and the Central Asian Nexus*

Robert Legvold and Celeste A. Wallander, eds., *Swords and Sustenance: The Economics of Security in Belarus and Ukraine*

Steven E. Miller and Dmitri V. Trenin, eds., *The Russian Military: Power and Policy*

Bruno Coppieters and Robert Legvold, eds., *Statehood and Security: Georgia after the Rose Revolution*

Jeffrey G. Lewis, *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age*

The American Academy Studies in Global Security book series is edited at the American Academy of Arts and Sciences and published by The MIT Press. Please direct any inquiries about the series to:

**American Academy of Arts and Sciences**

136 Irving Street

Cambridge, MA 02138-1996

Telephone: (617) 576-5000

Fax: (617) 576-5050

email: [ciss@amacad.org](mailto:ciss@amacad.org)

Visit our website at [www.amacad.org](http://www.amacad.org)

# The Minimum Means of Reprisal China's Search for Security in the Nuclear Age

Jeffrey G. Lewis

American Academy of Arts and Sciences  
Cambridge, Massachusetts

The MIT Press  
Cambridge, Massachusetts  
London, England

© 2007 by the American Academy of Arts and Sciences  
136 Irving Street, Cambridge, MA 02138-1996

All Rights Reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from the publisher.

This book was set in ITC Galliard by Anne Read.  
Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Lewis, Jeffrey G.

The minimum means of reprisal: China's search for security in the nuclear age /

Jeffrey G. Lewis

p. cm. — (American academy studies in global security)

Includes bibliographical references and index.

ISBN 978-0-262-12284-9 (hardcover : alk. paper) — ISBN 978-0-262-62202-8 (pbk. : alk. paper)

1. China—Military policy. 2. Strategic forces—China. 3. Nuclear weapons—China. 4. Nuclear arms control—China I. Title.

UA835.L427 2007

355.02'170951—dc22

2006038615

The views expressed in this volume are those held by the author. They do not necessarily represent the position of the Officers and Fellows of the American Academy of Arts and Sciences.

# Contents

vii **FOREWORD**

xi **ACKNOWLEDGMENTS**

xiii **FIGURES AND TABLES**

xv **ACRONYMS**

**I CHAPTER 1**

The Minimum Means of Reprisal

**25 CHAPTER 2**

Chinese Strategic Forces, 2006

**53 CHAPTER 3**

Chinese Strategic Nuclear Forces: Evolution and Design

**87 CHAPTER 4**

China's Participation in the Conference on Disarmament

**109 CHAPTER 5**

Competing Explanations for China's Arms Control Behavior

**141 CHAPTER 6**

U.S. Nuclear Posture and the Logic of Restraint

**171 CHAPTER 7**

A Legal Undertaking to Prevent an Arms Race in Outer Space

**193 CHAPTER 8**

China's Search for Security in the Nuclear Age

**207 APPENDICES**

Selected Documents Submitted by the Chinese Delegation to the Conference on Disarmament, 1985–2006

**209 Appendix A:** CD/579: China's Basic Position on the Prevention of an Arms Race in Outer Space (15 March 1985)

- 211 **Appendix B:** CD/1606: China's Position on and Suggestions for Ways to Address the Issue of Prevention of an Arms Race in Outer Space at the Conference on Disarmament (9 February 2000)
  - 217 **Appendix C:** CD/1645: Possible Elements of the Future International Legal Instrument on the Prevention of the Weaponization of Outer Space (6 June 2001)
  - 223 **Appendix D:** CD/1679: Possible Elements for a Future International Legal Agreement on the Prevention of the Deployment of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects (28 June 2002)
  - 229 **Appendix E:** CD/1769: Compilation of Comments and Suggestions to the CD PAROS Working Paper (CD/1679) (14 February 2006)
- 241 **ABOUT THE AUTHOR**
- 243 **INDEX**

# Foreword

For more than two decades China has maintained nuclear forces that are smaller and more restrained than those of any of the five major nuclear powers. Based on an extensive review of available evidence, Jeffrey Lewis suggests that this minimal deterrent posture reflects an enduring strategic rationale that says, in essence: Nuclear weapons are only useful for deterring a nuclear attack, and sufficient deterrence can be achieved with a small number of weapons. The expansion of China's nuclear forces—a move predicted, as Lewis documents, by nearly all U.S. intelligence estimates since the 1980s—has yet to occur.

Lewis provides an overview of China's current nuclear force, including its size, delivery vehicles, deployment, command and control arrangements, and operational doctrine. He estimates that the number of nuclear weapons currently in China's arsenal is around eighty. (The current number of nuclear weapons in the U.S. arsenal is approximately 10,000.) China's forces are not launch-ready; warheads are stored separately from their delivery vehicles. The force is controlled by a highly centralized and unified command. Since its initial nuclear test in 1964, China has consistently declared that it would not initiate a nuclear war. Lewis traces the evolution of China's strategic thinking and force posture, and he finds that current choices about force modernization are rooted in an intellectual and organizational context that has continuously emphasized the sufficiency of a limited retaliatory capability.

China's nuclear policies have also been shaped by their international context. Lewis examines in detail the history of China's arms control positions as well as China's perspectives on proposed changes in U.S. capabilities as outlined in the 2001 *Nuclear Posture Review* and other documents. He attributes China's behavior in arms control negotiations to its confidence, on the one hand, in its small deterrent force, and to its concern, on the other, that its deterrent capability be preserved. Evidence of China's confidence can be found in its negotiation of and agreement to the Comprehensive Test Ban Treaty (CTBT). China's concern has been expressed in persistent advocacy for negotiations to prevent the

weaponization of space. Lewis provides a comprehensive examination of China's efforts in the Conference on Disarmament in Geneva to advance new rules governing weapons deployments in space. The United States' refusal to enter into negotiations on space weapons and China's insistence on such negotiations have paralyzed the consensus-bound Conference on Disarmament for the past decade.

China's concern with outer space is understandable. As Lewis explains, advanced satellite communications, observation, and navigation enable the United States to bring decisive military force to bear almost anywhere on Earth with little or no warning. This rapid strike capability is a central element of the U.S. post-9/11 national security strategy. The United States has not achieved with any confidence the ability to wipe out China's deterrent force in a single preemptive strike. But, as Lewis documents, the U.S. aspiration to such a capability—evident in U.S. strategy statements, missile defense deployments, and military planning documents—is alarming to China.

As Lewis points out, the United States reaps considerable benefits from China's continuing embrace of a minimum means of reprisal as the principle behind its strategic posture. These benefits include greater crisis stability, lower proliferation incentives in Asia, and fewer constraints on U.S.-Russian force reductions. Whether China's nuclear posture remains stable will depend on Beijing's continuing confidence in its deterrent force. Lewis suggests that, "China is not likely to ignore indefinitely substantial U.S. preparations to conduct preventive interference against Chinese strategic forces." He notes that although a major buildup of strategic forces in China is possible, it is unlikely. More likely is the acquisition of asymmetric means of hampering U.S. preemptive capabilities. These means may include countermeasures to defeat U.S. missile defenses and, possibly, anti-satellite capabilities placing U.S. space assets at risk.

Yet, China has appeared to prefer an alternative future. For the tenth year running, in May 2006, China advanced proposals at the Conference on Disarmament for new legal instruments to prevent outer space from being weaponized. In October 2006, the United States released a new National Space Policy. The policy asserts that the United States will deny access to space to those "hostile to U.S. national interests" and "will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space." To preserve the benefits conferred by China's current force posture, the United States

would do well to heed Lewis's recommendations: China's confidence in its small deterrent force should not be undermined by the U.S. pursuit of preemptive dominance. The new U.S. space policy offers no reassurance on this score.

This book is part of the American Academy's "Reconsidering the Rules of Space" project. The project is examining the implications of U.S. policy in space from a variety of perspectives, and considering the international rules and principles needed for protecting a long-term balance of commercial, military, and scientific activities in space. The project has also produced a series of papers and monographs intended to help inform public discussion of legitimate uses of space, and induce a further examination of U.S. official plans and policies in space. The papers and monographs are available on the American Academy's website ([www.amacad.org](http://www.amacad.org)).

We join Jeffrey Lewis in thanking two anonymous reviewers for their comments on an earlier draft of this book. We also thank John Grennan, Jennifer Gray, Anne Read, and Kathy Garcia for their respective contributions to preparing the book for publication. The Rules of Space project is carried out under the auspices of the American Academy of Arts and Sciences and its Committee on International Security Studies. It is supported by a generous grant from the Carnegie Corporation of New York. We thank the Carnegie Corporation for its support and Patricia Nicholas for her assistance.

John Steinbruner  
*University of  
Maryland*

Carl Kaysen  
*Massachusetts Institute  
of Technology*

Martin Malin  
*American Academy  
of Arts and Sciences*



# Acknowledgments

This book is based on my doctoral dissertation, which celebrates at some length the many people to whom I am indebted for insight, encouragement, and kindness. I cannot better express my appreciation for those souls, so, as my affection and admiration remain unchanged, I simply refer readers to the original expression of gratitude to: John Steinbruner, I.M. “Mac” Destler, Steve Fetter, Tom Schelling, George Quester, Wade Boese, Kris Bergerson, Jeremy Bratt, Jonah Czerwinski, Jonathan Dean, Nancy Gallagher, Lisbeth Gronlund, Laura Grego, Adam Grissom, Theresa Hitchens, Mike Horowitz, Iain Johnston, Paul Kerr, Michael Krepon, Gregory Kulacki, Li Bin, Joseph Logan & Ronya Anna, Clay Moltz, Götz Neuneck, Stacy Okutani, Dan Pittman, Todd Sechser, Rob Sprinkle, Nina Tannewald, Chuck Thornton, David Wright, Logan Wright, Zhao Wuwen, Jennifer Ober, and my parents.

After completing my dissertation, I was fortunate to spend the better part of the 2004–2005 and 2005–2006 academic years continuing my research as a postdoctoral fellow with the Advanced Methods of Cooperative Security Program with the Center for International and Security Studies at Maryland (CISSM). I placed the final, sometimes agonizing, touches on the manuscript shortly after becoming Executive Director of the Project on Managing the Atom, at the Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University.

Maryland and Harvard have provided wonderful academic settings for reflection. Both the Advanced Methods program and the Project on Managing the Atom are generously supported by the John D. and Catherine T. MacArthur Foundation.

In addition to the long list of people thanked in the dissertation, I must also thank the American Academy of Arts and Sciences, including the series editors: John Steinbruner, Carl Kaysen, and Martin Malin; Jennifer Gray; John Grennan; and two anonymous reviewers.

Although the suggestions of my colleagues have tremendously improved the manuscript from its initial form, even the most generous assistance, as I have enjoyed, cannot probe all the unexamined premises, correct all the infelicities of language, and mend all the errors. That responsibility lies with the author alone.



# Figures and Tables

- Figure 1-1: How Much is Enough?
- Figure 1-2: Comparative View of the Security Benefit of Nuclear Weapons
- Table 2-1: Operationally Deployed Strategic Warheads
- Table 2-2: Estimated PRC Missile Deployments
- Table 2-3: Intelligence Community Estimates of Chinese ICBM Deployments
- Table 2-4: Ten-Year Projections of Chinese Missile Threats (1974, 1984, and 1993)
- Figure 3-1: China's Nuclear Forces, 1965–2005
- Table 3-1: DIA Projection of Selected Chinese Strategic Forces, 1984–1994
- Figure 4-1: Chinese Nuclear Tests, 1982–1996
- Table 5-1: Purposes and Plausible Achievements for Chinese Nuclear Testing at Various Yields
- Figure 6-1: U.S. Missile Defense Appropriations, 1985–2005
- Table 6-1: Notional U.S. Missile Defense Architectures
- Table 6-2: Selected Programs Supporting the Non-nuclear Strike
- Table 6-3: General Procedures for Weapons Development
- Table 6-4: Cold War Alerts to DEFCON 3 or Above
- Table 7-1: Confidence-building Measures in the Hague Code
- Table 7-2: Obligations and Definitions in Selected Chinese Working Papers Submitted to the CD



# Acronyms

ABM – Antibalistic Missile

ASW – Anti-submarine Warfare

AWE – Atomic Weapons Establishment

BMD – Ballistic Missile Defense

BMDO – Ballistic Missile Defense Organization

BMDS – Ballistic Missile Defense System

C2 – Command and Control

C2I – Command, Control, and Intelligence

C4ISR – Command, Control, Communications, Computers, Intelligence,  
Surveillance, and Reconnaissance

CAV – Common Aero Vehicle

CCCPC – Central Committee of the Chinese Communist Party

CCP – Chinese Communist Party

CD – Conference on Disarmament

CIA – Central Intelligence Agency

CMC – Central Military Commission

CSC – Special Commission of the CCCPC

CTBT – Comprehensive Nuclear Test Ban Treaty

CWC – Chemical Weapons Convention

DARPA – Defense Advanced Research Projects Agency

DEFCON – Defense Condition

DF – Dong Feng

DIA – Defense Intelligence Agency

DoD – Department of Defense

DoE – Department of Energy

DSB – Defense Science Board

DSTC – Defense Science and Technology Commission

EHF – Extremely High Frequency

EIF – Entry-into-force

ESD – Environmental Sensing Device

FMCT – Fissile Material Cut-off Treaty

GBI – Ground Based Interceptors

GMD – Ground-based Midcourse Defense

GPALS – Global Protection Against Limited Strikes

HDBT – Hard and Deeply Buried Target

HEU – Highly Enriched Uranium

IADS – Integrated Air Defense System

IAEA – International Atomic Energy Agency

IAPCM – Institute of Applied Physics and Computational Mathematics

ICBM – Intercontinental Ballistic Missile

IFICS – In Flight Interceptor Communication System

INF – Intermediate-range Nuclear Forces

IOC – Initial Operating Capability

IRBM – Intermediate-range Ballistic Missile

ISC – International Seismological Centre

JL – Julang

LPAR – Large Phased Array Radar

LTBT – Limited Test Ban Treaty

MEO – Medium-Earth Orbits

MIRV – Multiple Independently Targetable Reentry Vehicle

MOU – Memorandum On Understanding  
MRBM – Medium-range Ballistic Missile  
MRV – Multiple Reentry Vehicle  
MSX – Midcourse Space Experiment  
NASIC – National Air and Space Intelligence Center  
NIC – National Intelligence Council  
NIE – National Intelligence Estimate  
NMD – National Missile Defense  
NPT – Nuclear Nonproliferation Treaty  
NRDC – National Resource Defense Council  
NTM – National Technical Means  
ODA – Overseas Development Assistance  
OSI – On-site Inspections  
PAL – Permissive Action Link  
PAROS – Preventing An Arms Race In Outer Space  
PBV – Post-boost Vehicle  
PDD – Presidential Decision Directive  
PLA – People’s Liberation Army  
PNE – Peaceful Nuclear Explosion  
PRC – People’s Republic of China  
QRA – Quick Reaction Alert Airplane  
RV – Reentry Vehicle  
SBIRS – Space-based Infra Red System  
SDI – Strategic Defense Initiative  
SLBM – Submarine-launched Ballistic Missile  
SOI – Space Object Identification  
SR – Space Radar

SRBM – Short-range Ballistic Missile

SSBN – Nuclear Ballistic Missile Submarine

SSM – Surface-to-surface Ballistic Missile

SSTL – Surrey Satellite Technology Ltd.

START – Strategic Arms Reduction Treaty

STSS – Space Tracking and Surveillance System

TMD – Theater Missile Defense

TSAT – Transformational Communication Satellite

UEWR – Upgraded Early Warning Radar

UNIDIR – United Nations Institute for Disarmament Research

WMD – Weapons of Mass Destruction

XSS – Experimental Spacecraft System