

NEW SECURITY CHALLENGES

Series Editor: George Christou



The US-China Military &
Defense Relationship during
the Obama Presidency

James Johnson



New Security Challenges

Series Editor
George Christou
University of Warwick
Coventry, UK

“James Johnson’s timely book draws attention to the increasing danger of military conflict between China and the United States. Johnson draws on an impressive array of Chinese and Western sources to provide a well-documented account of the current military-security situation and to highlight warning signs about where it is likely headed in the coming decades.”

—Avery Goldstein, *David M. Knott Professor of Global Politics and International Relations, University of Pennsylvania, USA*

“Clear and consistent in its argument and analysis and it offers excellent insight into the US–China ‘Security’ relationship under Obama, with also some flavour of how this relationship will play out under Trump in the Conclusion.”

—George Christou, *Professor of European Politics and Security, University of Warwick, UK*

“This path-breaking analysis of US perceptions and misperceptions of China’s new capabilities shape their mutual security dilemma provides important new insights into processes of strategic assessment and policy-making in Washington. This book is a must-read for anyone interested in the US–China security relationship in the contemporary world.”

—Ian Hall, *Professor of International Relations, School of Government and International Relations, Griffith University, Australia*

“The book offers an important new angle to explain the deterioration of Sino–US security relationship during the Obama administration. Instead emphasizing the typical structural dynamics favored by the power transition theory, which is exemplified by the Thucydides Trap narrative, this book points out the centrality of perceptions in the making of great power relations. The book thus represents a

major contribution to the study of security dilemma, which is a central phenomenon of great power relations.”

—Zhang Baohui, *Director, Centre for Asian Pacific Studies, Lingnan University, Hong Kong*

“This book rightly re-establishes the central role of misperceptions in International Relations and strategic studies in general. But much more than that, James Johnson’s masterful study of recent US–Sino relations gives us an empirically rich and theoretically informed understanding of the specific ways in which security dilemma dynamics can shape a bilateral relationship. This is first-rate analysis and therefore will be essential reading for scholars and policymakers alike.”

—Benjamin Zala, *Research Fellow, ANU College of Asia and the Pacific, Australia*

The last decade has demonstrated that threats to security vary greatly in their causes and manifestations and that they invite interest and demand responses from the social sciences, civil society, and a very broad policy community. In the past, the avoidance of war was the primary objective, but with the end of the Cold War the retention of military defense as the centrepiece of international security agenda became untenable. There has been, therefore, a significant shift in emphasis away from traditional approaches to security to a new agenda that talks of the softer side of security, in terms of human security, economic security, and environmental security. The topical New Security Challenges series reflects this pressing political and research agenda.

More information about this series at
<http://www.palgrave.com/gp/series/14732>

James Johnson

The US-China
Military and Defense
Relationship during
the Obama Presidency

palgrave
macmillan

James Johnson
University of Leicester
Leicester, UK

New Security Challenges
ISBN 978-3-319-75837-4 ISBN 978-3-319-75838-1 (eBook)
<https://doi.org/10.1007/978-3-319-75838-1>

Library of Congress Control Number: 2018936253

© The Editor(s) (if applicable) and The Author(s) 2018

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use. The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Cover illustration: Getty Images/andriano_cz

Printed on acid-free paper

This Palgrave Macmillan imprint is published by the registered company Springer International Publishing AG part of Springer Nature.
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

This book is dedicated to the memory of my late parents

PREFACE

The United States–China Military and Defense Relationship during the Obama Presidency grows out of a broader intellectual desire to grapple with the causality and nature of misperceptions—especially about a rival’s military capabilities and intentions—of international affairs. In particular, in cases where rival states have radically disparate strategic cultures, histories, and political systems, which in turn may impede effective diplomacy, complicate efforts by policy-makers to accurately assess the military balance of power, and communicate strategic intentions to allies and adversaries, *in extremis* can lead to deterrence failure and conflict.

To this end, this book offers a timely and compelling explanation for the deterioration of Sino–American security relations during the Obama presidency. The United States–China relationship has become one of the (if not the most) vital features of contemporary world politics, which sits at a precarious and dangerous crossroads. How important were misperceptions in the deterioration of Sino–American security relations? What role did emerging military technologies play in shaping ‘new’ security challenges in the Asia-Pacific region? The core argument laid out in this book is that the presence of a ‘security dilemma’ in important ways influenced Washington’s strategic calculations and military policies vis-à-vis China in the Asia-Pacific. This book contends that the failure of the United States to treat the distinction between China’s capabilities and intentions with the requisite attention intensified strategic competition and mistrust in this pivotal bilateral relationship.

The following are some of the initial reactions I got from colleagues when I explained my plans for this book: Not another book on United States–China relations! Have not we sufficiently dealt with the idea that China and the United States are caught in a Thucydides trap and are destined for war? Is not it just another Western-centric realist account of the threat posed by a rising hegemonic power to a status quo one? At first glance, these reactions are not unreasonable. However, rather than simply offering a generic historical account of Sino–American relations, or indeed extrapolating from such an account the likely trajectory of this dyad, this book systematically unpacks the policy rhythms, drivers, and dynamics that defined the course of United States–China military and defense relations under the Obama administration. In addition, the book offers a nuanced and innovative military cross-domain comparative approach that adds analytical depth and rigor to the existing literature. It also lends itself to a conceptual discussion on broader ideas: the existence of parallel security dilemmas, of varying degrees of intensity, inherent to particular military domains (or spheres); and, *ipso facto*, the idea that the *collective* effect of these individual domains could lead to an intensification of the *overall* security dilemma, and thus more than the sum of its parts.

The book builds on several themes I explored during my PhD project including the dangers conflating states' military capabilities and strategic intentions; the implications of emerging military-technological developments (especially those with 'dual-use' features) for Sino–American relations; and, related, the intersection of these emerging military technologies with the shifting military balance in the Western Pacific. My recent research projects and interests also influenced and shaped the evolution of these original ideas and themes. In particular, emerging military technologies and 'new' security challenges for the Asia-Pacific (e.g. cyberspace, artificial intelligence, robotics, autonomous systems, and quantum computing); emerging cross-domain security threats and implications for nuclear policy, deterrence, strategic stability, and arms control; and, related, the militarization of the cyber domain (and related technologies) and future warfare.

The case study chapters incorporate new archival research on Chinese thinking and approaches to emerging military technologies. In contrast to China's conventional weapons, far less analytical attention has thus far been paid to the development of the critical systems and support architecture, which enables and enhances China's broader war-fighting capabilities. This book will examine the implications of this emerging

technological paradigm shift for future warfare in the Asia-Pacific region, and whether such a shift could harbinge a new military revolution, on a par with previous transformative technologies—nuclear, biotech, and aerospace? To be sure, these defense innovations will have significant implications for a myriad aspects of future warfare including deterrence (peace and wartime); the intersection of these technologies with traditional military domains; human–machine collaboration; and, not least, the disparities that exist between Western and Chinese thinking and approaches to these fields. These issues, however, remain undertheorized in the literature, in particular, those that relate to contemporary Sino–American strategic competition. This study will investigate how the relationship between these parallel efforts will likely evolve, and in what ways this ‘new’ military paradigm could influence the future character and conduct of war.

The core argument laid out in this book is that *the presence of a ‘security dilemma’ in important ways influenced Washington’s strategic calculations and military policies vis-à-vis China in the Asia-Pacific*. The book proffers a mid-level theory-building approach, which develops on the empirical base that has applied the security dilemma concept to elucidate Sino–American bilateral relations. The book argues for the continued relevance of the security dilemma concept to understand contemporary United States–China security relations, and elicits evidence of action–reaction policies, arms racing dynamics, and increased levels of mutual mistrust, which are closely associated with an intense and intractable security dilemma. The case studies chapters draw upon a wide array of English and Chinese sources—on military doctrine, strategic culture, offense–defense, and deterrence theory, and cognitive subfields—to build a clear picture of the main sources of United States–China misperceptions, which is a crucial step for understanding the problems these assessments can cause for the conduct of statecraft across strategically competitive dyads.

Viewed through a ‘security dilemma’ theoretical lens this book builds on an existing international relations (IR) empirical base, which has used the dilemma concept to elucidate Sino–American relations. The four case studies will contextualize this theoretical framework with contemporary Sino–American relations, to critically examine several theoretical puzzles including the following: To what extent does the intensity of security dilemma vary between the military domains, and what accounts for these variations? Are there particular features unique (or mutually exclusive) to a particular domain, which makes the security dilemma more or less relevant? Finally, does an integrative (or holistic) analytical approach to

view various military spheres generate a particular set of security dilemma dynamics, which may not otherwise have existed? Admittedly, these studies do not provide a comprehensive analysis of *all* the military domains (and especially cross-domain issues) relevant to this competitive bilateral relationship. Rather, the selection criterion for the studies reflects both the availability and integrity of empirical sources, and to what extent the evidence elicited the kinds of dynamics associated with a security dilemma.

I believe *The United States–China Military and Defense Relationship during the Obama Presidency* contains sufficient empirical and theoretical rigor to make it a useful resource for students of U.S. foreign policy; East Asia studies; China studies (and ‘rising powers’); military and military sociology; diplomatic studies; and more broadly, security, warfare, and strategic disciplines. Beyond academia, the book’s target audience also extends to policy-making, intelligence, and think-tank communities. By contextualizing the latest developments in emerging military technologies in the Asia-Pacific with a wide use of sources on military doctrine, strategic culture, and IR theory the book builds a sobering picture of the United States–China security relationship, which will appeal to specialists and generalists alike with an interest in future conflict, military studies, arms control, and foreign policy issues in Asia more broadly.

The book is organized as follows. The first chapter outlines the book’s overarching arguments, rationale, and contribution to the broader literature. By introducing the reader to the key debates and issues surrounding the military dimensions of the ‘pivot’ (or rebalance) to Asia policy, this chapter frames the discourse in preparation for a deeper exploration of the themes in the case studies that follow. Chapter 2 contextualizes the security dilemma concept with contemporary United States–China relations, and in particular the emergence of the ‘China rise’ discourse. By advancing a clear and straightforward analytical tool kit (or theoretical lens) to interpret the research findings, the book avoids the common trap of using the ‘security dilemma’ concept in an overly accommodative or expansive manner.

Chapters 3, 4, 5, and 6 provide a deep-dive analytical examination of four cases. The sequencing of the case studies reflects my desire to highlight and weave these research puzzles with the empirical materials—especially those pertaining to emerging military technologies and future conflict, and the shifting military balance in the Asia-Pacific. The first explores U.S. misperceptions of Chinese anti-access/area denial (A2/AD) capabilities and intentions and finds that U.S. capacity-based assessments of

Beijing's strategic intentions confounded by the existence of cognitive bias exacerbated U.S. misperceptions. The next three studies focus the theoretical lens on three individual military domains: cyberspace (and related military technologies); long-range precision-strike munitions (especially Chinese antiship 'carrier killers'); and Chinese nuclear weapons for war-fighting (or 'victory-denial') missions. I originally conceptualized these studies as independent original research bodies of work, which their respective length, observations, findings, and empirical scope reflect. However, in an effort to enhance the book's overall flow, cogency, and accessibility the individual cases remain firmly tethered to the core themes and conceptual framework presented in the opening chapters. To this end, the sequencing of the studies reflects my desire to highlight and build on several interrelated issues germane to the strategically competitive United States–China dyad, most notably, emerging military-technological developments and future conflict, asymmetric challenges to America's 'ways of war', and the shifting military balance in the Western Pacific. I hope the reader derives some benefit and intellectual enjoyment from this approach. Finally, the concluding chapter draws out the book's key findings and themes, highlights several implications that follow from the findings of the book, and, finally, reflects on the future direction of United States–China relations in the military and defense arena under the new Trump administration.

It is my pleasure to acknowledge the friends and colleagues who improved this book in innumerable ways throughout its development. I would like to register the support and engagement I have received from my home institution, the University of Leicester—including my head of department, George Lewis, and my fellow researchers and strategists Andrew Futter, Benjamin Zala, David Strachan-Morris, Adam Quinn, Wali Aslam, Oliver Turner, Ian Hall, and Zhang Baohui—for their dedication, commitment, and invaluable insights. Without their mentoring and sage advice, this book would not have been possible. The themes of this book were initially presented at various academic conferences whose hosts, fellow panelists, and audiences provided an invaluable source of feedback and support. Also, the reviewers for *Palgrave Macmillan* made very helpful suggestions for revision, which substantially improved both the substance and style of the book. Finally, I thank my family members for their tireless patience and support.

Leicester, UK
2017

James Johnson

CONTENTS

1	Introduction: Obama’s ‘Pivot’ to Asia and Air–Sea Battle	1
2	Conceptualizing the United States–China Security Dilemma	15
3	Washington’s Perceptions and Misperceptions of China’s Anti-access Area Denial ‘Strategy’	37
4	China’s Vision of the Future Networked Battlefield: Emerging Military-Technological Challenges to the United States	65
5	‘Guam Express’ and ‘Carrier Killers’: China’s Asymmetric Missile Threat to the United States in the Pacific	95
6	Chinese Evolving Approaches to Nuclear ‘War-Fighting’: An Emerging Security Dilemma?	121
7	Concluding Remarks	153
	Further Reading	171
	Index	187

ABOUT THE AUTHOR

James Johnson is a postdoctoral research fellow with the School of History & International Relations at the University of Leicester. Johnson holds a PhD in Politics & International Relations and a master's degree in Asia-Pacific studies. He has published research and lectured in the following areas: security and strategic studies, US–China relations, ‘rising powers’, weapons non-proliferation and arms control, emerging military technologies, Chinese military doctrine, and East-Asia security more broadly defined. Johnson's latest research projects look at ‘new’ security challenges posed by technological developments in cyberspace and related technologies—artificial intelligence, robotics, autonomous systems and quantum communications. He is fluent in Mandarin.

LIST OF ABBREVIATIONS

A2/AD	Anti-access/Area Denial
ABM	Antiballistic Missile
ADIZ	Air Defense Identification Zone
AMS	PLA Academy of Military Science
ASAT	Antisatellite weapons
ASB	Air–Sea Battle
ASBM	Antiship Ballistic Missile
ASCM	Antiship Cruise Missile
ASW	Antisubmarine Warfare
AWACS	Airborne Warning and Control System
BMD	Ballistic Missile Defense
C2	Command and Control
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CCP	Chinese Communist Party
CMC	Central Military Commission
CNA	Computer Network Attack
CND	Computer Network Defense
CNE	Computer Network Exploitation
CNO	Computer Network Operations
CNP	Comprehensive National Power
CNSC	Center for National Security Commission
CPGS	Conventional Prompt Global Strike
CRS	Congressional Research Service
CSBA	Center for Strategic and Budgetary Assessments

CSG	Carrier Strike Groups
DEW	Direct Energy Weapons
DF	Dong Feng
DIA	Defense Intelligence Agency
DoD	U.S. Department of Defense
DSB	U.S. Defense Science Board
DSG	Defense Strategic Guidance
EEZ	Exclusive Economic Zone
ELINT	Electronic Intelligence
EMP	Electromagnetic Pulse
EMRG	Electronic Rail Gun
EO	Electro-Optical
EW	Electronic Warfare
FELs	Free Electron Lasers
FOC	Full Operational Capacity
GPS	Global Positioning System
GSD	General Staff Department
HCV	Hypersonic Cruise Vehicle
HGV	Hypersonic Guide Vehicle
ICBM	Intercontinental Ballistic Missile
IIS	International Institute for International Studies
INEW	Integrated Network Electronic Warfare
IOC	Initial Operational Capability
IRBM	Intermediate-Range Ballistic Missile
ISR	Intelligence, Surveillance, and Reconnaissance
IT	Information Technology
IW	Information Warfare
JAM-GC	Joint Concept for Access and Maneuver in the Global Commons
LACM	Land-Attack Cruise Missile
LRASM	Long-Range Antiship Missile
LRCM	Long-Range Cruise Missile
MaRV	Maneuverable Reentry Vehicle
MFA	Ministry of Foreign Affairs (the People's Republic of China)
MIRV	Multiple Independent Targetable Reentry Vehicle
MOD	Ministry of National Defense (the People's Republic of China)
MR	Military Region
MRBM	Medium-Range Ballistic Missile

NCW	Network-Centric Warfare
NDU	National Defense University
NIPRNET	Nonsecure Internet Protocol Router Network
NMS	U.S. National Military Strategy
NSSS	U.S. National Security Space Strategy
ONI	U.S. Office of Naval Intelligence
OSTP	U.S. Office of Science and Technology Policy
OTH	Over-The-Horizon
PACOM	United States Pacific Command
PGS	Prompt Global Strike
PLA	People's Liberation Army
PLAA	People's Liberation Army Army
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
PLARF	People's Liberation Army Rocket Force
PLASAF	People's Liberation Army Second Artillery Force
PRC	People's Republic of China
PSM	Precision-Strike Munitions
QDR	Quadrennial Defense Review
RMA	Revolution in Military Affairs
S&ED	United States–China Strategic and Economic Dialogues
SAM	Surface to Air Missile
SAR	Synthetic Aperture Radar
SATCOM	Satellite Communication
SIGNIT	Signals Intelligence
SIPRNET	Secret Internet Protocol Router Network
SLBM	Submarine-Launched Ballistic Missile
SLBM	Submarine-Launched Ballistic Missile
SLOC	Sea Line of Communication
SMC	Science of Military Campaigns
SMS	Science of Military Strategy
SRBM	Short-Range Ballistic Missile
SS	Diesel Submarine
SSAC	Science of Second Artillery Campaigns
SSAC	Science of Second Artillery Campaigns
SSBN	Nuclear-Powered Ballistic Missile Submarine
SSF	PLA's Strategic Support Force
SSL	Solid-State Laser
SSN	Nuclear Submarine

THAAD	Terminal High-Altitude Area Defense
TMB	Theater Ballistic Missile
TMD	Theater Missile Defense
TPP	Trans-Pacific Partnership
UAV	Unmanned Aerial Vehicle
UCAV	Unmanned Combat Aerial Vehicle
UN	United Nations
USAF	United States Air Force
USCC	United States–China Economic and Security Review Commission
USN	United States Navy

LIST OF FIGURES

- Fig. 3.1 China's first and second island chains (Office of the Secretary of Defense, U.S. Department of Defense. (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 23) 42
- Fig. 3.2 Estimated ranges of the People's Liberation Army (PLA) conventional anti-access/area denial (A2/AD) ground-based missile capabilities—including the DF-21D (or CSS-5) (Office of the Secretary of Defense, U.S. Department of Defense. (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 31) 49
- Fig. 5.1 Antiship ballistic missile (ASBM) flight trajectory with terminal guidance. It appeared in a 2006 article authored by the PLA's Second Artillery Engineering College (Office of the Secretary of Defense, U.S. Department of Defense. (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 28) 101



Introduction: Obama's 'Pivot' to Asia and Air–Sea Battle

This book applies the security dilemma concept to elucidate the deterioration in United States–China military and defense relations in the Asia-Pacific region during Barack Obama's presidency. It builds upon the existing International Relations (IR) empirical literature that has used this concept to understand United States–China security relations and, in particular, the impact of this condition upon Washington's strategic thinking and military policy responses vis-à-vis China in Asia.¹ The book constructs a robust theoretical framework of analysis to validate the existence of a genuine United States–China 'security dilemma'.² Next, it applies this framework to the empirical research to highlight incidences of Washington's misunderstandings of Beijing's strategic intentions caused by misinterpretations and misperceptions, to explain the deterioration of Sino–American security relations. Chapter 2 addresses several conceptual and analytical gaps in the existing literature, in particular, the undertheorized discourse that relates to the security dilemma and the United States–China asymmetric military balance of power in Asia. While the overriding objective of this book is to build upon the existing discourse, it also generates important theoretical conclusions and implications for security dilemma theorizing itself.

A key finding of this book is that under the Obama administration U.S. military strategy, policies, and postures in the Asia-Pacific were in important ways influenced by the presence of a United States–China security dilemma.

The empirical research elicits clear evidence of action–reaction policies, and spirals of mistrust and arms racing, which are closely associated with intense security dilemmas, conflict, and war. A central theme that runs through the case study chapters of this book is Washington’s tendency to underutilize (or cherry-pick) Chinese empirical sources; and, instead, overemphasize preexisting and familiar frameworks of analyses to assess Chinese military capabilities, to determine Beijing’s strategic intentions. This analytical approach often overlooked and neglected important (or new) information, and conflated an operational military capability as *explicit* proof of the existence of malign Chinese intentions vis-à-vis the United States.

Background and Context: The ‘Pivot’ (or ‘Rebalance’) to Asia

In late 2011, the Obama administration, through the promulgation of a series of official announcements, laid out a plan for the long-term realignment of the center of gravity of U.S. foreign policy, national security, and economic interests toward Asia—and away from Afghanistan and Iraq.³ The central objective underlying this ‘rebalance’ was to devote an increasing American political capital, resources (especially military), and strategic interest toward the Asia-Pacific. Specifically, this shift was designed to increase U.S. credibility and influence upon the regions’ alliances, rules, and norms as China emerges as a regional (and potentially revisionist) power.⁴ President Obama stated in 2011 that the ‘United States will play a *larger and long-term role in shaping this region* [the Asia-Pacific] and its future’.⁵ Similarly, then U.S. Secretary of State Hilary Clinton reiterated that the ‘Asia-Pacific has become a key driver of global politics’, and Clinton asserted that the purpose of the ‘pivot’ was to ‘sustain our [U.S.] leadership, secure our interests, and advance our values across the region’.⁶

Four key developments drove the Obama administration to intensify its focus on the Asia-Pacific⁷:

- First, the increasing economic importance of the region (especially China) to the United States.⁸ Between 1973 and 2010, Asia’s share of the global trade doubled to just over 30 percent, and by 2010, China overtook the United States to become the world’s largest exporter. The extent of this meteoric rise took on greater prominence in the aftermath of the 2007–2008 financial crisis.
- Second, China’s rapidly expanding military capabilities (especially associated with the anti-access/area denial [A2/AD] strategy) and assertive foreign policy, and, in particular, the implications for U.S. military power projection and freedom of navigation in the Western Pacific.⁹

- Third, the reduction of U.S. military operations and presence in the Middle East.¹⁰
- Fourth, to counter the perception among U.S. Asia allies' and partners' effort that domestic-political pressures to cut the U.S. federal budget (especially the Department of Defense [DoD]) could undermine America's security commitments to the region.

Then U.S. National Security Adviser Tom Donilon stated that the 'pivot' policy was built around five key pillars: (1) closer coordination with U.S. treaty allies in Asia (Japan, South Korea, Australia, Thailand, and the Philippines); (2) deepening cooperation and building capacity with the region's 'emerging powers' (India, Indonesia, Vietnam, and Myanmar); (3) forming a 'constructive relationship' with China; (4) increasing levels of engagement with Asia's multilateral institutions (especially the Association of Southeast Asian Nations [ASEAN] and the East Asia Summit [EAS]); and (5) concluding negotiations on new trade and investments, most notably, the Trans-Pacific Partnership (TPP) agreement.¹¹ Since the proclamation of the 'pivot' (or rebalance), the Obama administration took several significant steps to implement each of these pillars¹²:

- In its relations with Japan, the United States convened its first 'two-plus-two' dialogue to revise the Guidelines for the United States–Japan Defense Cooperation, and reaffirmed that the mutual defense treaty covered the Japanese-administered Senkaku Islands, which China also claims as a 'core' sovereign interest.
- In its relations with India, the United States outlined a series of streamlined defense industrial cooperation guidelines, and expanded arms sales and technology transfer arrangements.
- With Vietnam, it announced major expansions of U.S. defense contracts, new logistical access arrangements, and closer maritime relations, especially in the South China Seas.
- In Myanmar, the United States commenced the process of limited opening and diplomatic engagement; for example, Hilary Clinton's state visit in 2011, followed by Obama's in 2013 and 2014.
- In the economic arena, the United States encouraged Japan to join the TPP discussions in 2013; ratified a Free-Trade Agreement (FTA) with South Korea in 2011; and committed the United States to fully joining the EAS.

- In the military sphere, the United States announced new troop deployments to Australia, naval deployments and a Strategic Framework Agreement (SFA) with Singapore, and expanded rotational access to military facilities in the Philippines.
- In its relations with China, Washington increased the level of contact and engagement with Beijing. For example, an expanded role for the Strategic and Economic Dialogue (S&ED); the establishment of a Strategic Security Dialogue to discuss cyber, space, and nuclear concerns; increased military-to-military contact; and during the 2013 Obama–Xi ‘shirtsleeves’ summit in California, a joint commitment was made toward achieving stable bilateral relations.

THE ‘FIRST PACIFIC PRESIDENT’? AREAS OF CONTINUITY AND CHANGE IN U.S. ASIAN POLICY

Many aspects of the ‘pivot’ described earlier represented continuity with America’s long-standing Asia strategy and policies, as opposed to a radical departure from previous administrations. Since the end of World War II, the United States has sought to underwrite stability and security in Asia, by combining a large forward military presence with a pivotal diplomatic role.¹³ Several observers argued that the Obama administration exaggerated the transformative nature of the ‘pivot’.¹⁴ In the military arena, for example, many of the administration’s policies merely built on those undertaken by the Bush administration, which increased America’s strategic focus on Southern and Western Asia through deployments of rotational forces.¹⁵ Furthermore, President Obama expanded other Bush-era policies that were widely accredited to the ‘pivot’, including initiating negotiations for a TPP agreement; promoting a broad-based maritime coalition (against China) in the South China Sea; strengthening strategic partnerships with India, Vietnam, and Indonesia; expanding defense cooperation with Australia, the Philippines, and Japan; and increasing U.S. troop presence in South Korea.¹⁶

Therefore, the ‘pivot’ is best understood as more a change in *means* (i.e. resources, time, and attention devoted to Asia by U.S. policy-makers) rather than representing a major reorientation of the key pillars of American ‘grand strategy’ in Asia—freedom of navigation, military primacy, an open and free market place for U.S. trade, and the promotion of democracy and human rights—which remained fundamentally unaltered during the

Obama administration. The 'pivot' sought to strike an appropriate balance in managing the Sino–American security relationship through a 'two-pronged strategy': engaging and cooperating with China to integrate it further into the global rules-based system (or become 'responsible stakeholders'); while simultaneously asserting U.S. military preeminence in the region to *reassure* U.S. allies and *deter* Chinese regional hegemonic aspirations.¹⁷ An overarching argument this book makes is that the Obama administration failed to find the right balance in managing United States–China relations.¹⁸ The administration's preoccupation with sustaining U.S. military primacy in Asia, in a response to the perception of a destabilizing and potentially revisionist 'rising' power, evinced a classic security dilemma. Chapter 3 explores in detail the nature, strategic rationale, and assumptions underlying U.S. military policies vis-à-vis China during this period.

MILITARY AND DEFENSE DIMENSIONS OF THE 'PIVOT': AIR-SEA BATTLE CONCEPT

In spite of the protestations of several policy-makers within the Obama administration, the military (or hard-power) elements of the 'pivot' received an outsized amount of attention from both the scholarly and policy-making communities—within the United States and China.¹⁹ In addition to the relatively small-scale and largely symbolic marine deployments to Australia and Singapore, the administration stressed that notwithstanding the cuts in overall levels of U.S. defense spending—as a result of the Budget Control Act of 2011—the United States remained committed to maintaining its military presence in Asia. As President Obama asserted in 2011,

[a]s we end today's wars, I have directed my national security team to make our [U.S.] presence and mission in the Asia-Pacific a *top priority*. As a result, defense spending *will not—I repeat will not—come at the expense of the Asia-Pacific*.²⁰ [Emphasis added]

Elaborating on this strategic 'priority', then U.S. Secretary of Defense Leon Panetta stated that '[t]he U.S. military will increase its institutional weight and focus on enhanced presence, power projection, and deterrence in the Asia-Pacific'.²¹ Specifically, Panetta announced plans to increase the proportion of U.S. naval assets in the region from 50 to 60 percent,

together with a desire for building closer maritime relations with U.S. allies and partners in the region—especially in the South China Sea.²² In addition to these broad policy statements several features of this renewed strategic focus were noteworthy.²³ First, a broader distribution of U.S. forces (especially to South East Asia and Guam) compared to the Bush era; second, a more flexible approach to troop deployments in the region (i.e. smaller, more agile, and self-sustaining) from a hitherto emphasis on permanent basing; and third, enhancing the capabilities of American regional allies and partners (including India, Indonesia, New Zealand, and Vietnam) to ensure the ‘capacity for securing *common* interests’.²⁴

A crucial driving force behind the administration’s identification with the Asia-Pacific as a ‘top priority’ region was the rapid expansion of Chinese military capabilities and Beijing’s increasingly assertive foreign policy in the South and East China Seas—especially from 2009 to 2010.²⁵ The DoD stated in 2011 that China’s rise is likely to stand out as ‘a defining feature of the strategic landscape of the twenty-first century’, and that China’s military is ‘now venturing into the global maritime domain, a sphere long dominated by the U.S. Navy’.²⁶ In particular, U.S. threat assessments concluded that China had developed capabilities (e.g. long-range precision missiles, antisatellite weapons, and cyber-warfare capabilities) designed to exploit U.S. military vulnerabilities in the region, which through ‘asymmetric attacks’ could target vital U.S. military assets—especially U.S. command, control, communications, computers, intelligence, surveillance, and reconnaissance systems (C4ISR).²⁷ In response to these emerging military-technological challenges, the Pentagon promulgated several initiatives that were (albeit implicitly) attributed to China’s A2/AD ‘strategy’²⁸; the most prominent of which was the air–sea battle (ASB) operational concept.²⁹ Chapter 3 examines in depth the ASB versus A2/AD debate, and, in particular, the implications of this dangerous dynamic for United States–China strategic stability, military escalation control, and future warfare in the Western Pacific.

SOWING THE SEEDS OF AN INTENSE SECURITY DILEMMA

Opponents of Obama’s ‘pivot’ raised three main objections: first, despite frequent statements from Washington that the ‘pivot’ did not target at any particular nation, critics argued that the ‘pivot’ (especially in the military sphere) unnecessarily antagonized Beijing and worsened United

States–China relations.³⁰ Moreover, the widespread perception (in the United States and China) that the ‘pivot’ was designed to contain and weaken China militarily created several risks. Above all, the ‘pivot’ amplified Beijing’s insecurities and encouraged a more assertive Chinese foreign policy, which undermined regional stability.³¹ Moreover, the policy risked strengthening the hand of China’s military hardliners who long harbored suspicions of U.S. military intentions in the region.³² Also, stoking China’s fear of containment (or encirclement) complicated Washington’s effort to coax Beijing to cooperate on major geopolitical issues such as Iran, North Korea, and, above all, managing tensions in the South China Seas.³³ Finally, an argument was made that further deterioration in United States–China strategic trust could make Beijing less amenable toward maintaining market access for American businesses operating in China.³⁴

Second, it would be unwise for the United States, at a time of increasing instability in the Middle East, to shift (or pivot) its attention and resources away from this geopolitically fragile region. To be sure, one of the main reasons the administration replaced the term ‘pivot’ with ‘rebalance’ was an attempt to assuage concerns (especially U.S. allies in Europe and the Middle East) that the ‘pivot’ represented a fundamental reordering of U.S. global priorities.³⁵ Third, pressure from U.S. Congress to reduce the defense budget would likely undermine the credibility of the ‘pivot’.³⁶ That is, insufficient resources to implement the ‘pivot’ would fail to reassure U.S. regional allies, and simultaneously encourage (rather than deter) Beijing to pursue a revisionist foreign policy in the Asia-Pacific.³⁷

In sum, critics of the ‘pivot’ argued that the conceptualization and implementation of the policy were inconsistent (even contradictory), piecemeal, poorly communicated and coordinated (especially with U.S. allies), and, ultimately, damaging to United States–China relations and regional stability.³⁸ Herein lies the paradox of Obama’s signature strategic turn: a policy designed to deter a rising China instead encouraged Beijing to pursue a more assertive and belligerent course, which in turn reduced the prospects for United States–China cooperation, and, arguably, damaged long-term U.S. security interests in the Asia-Pacific. The case studies in Chaps. 3, 4, 5, and 6 explore the nature and implications of this paradox for United States–China military and defense relations during the Obama presidency.

THE BOOK PLAN

Chapter 2 contextualizes the security dilemma concept to view contemporary United States–China security relations. It begins with a brief theoretical overview of the security dilemma theory, which includes the concept’s shortcomings, misuses, and contemporary revisions. Next, it contextualizes the application of the security dilemma by scholars and policy-makers to elucidate United States–China security relations, and in particular the emergence of a ‘China rise’ (or ‘China threat’) discourse. Finally, it proffers a conceptual framework of analysis (or theoretical lens) for applying the dilemma concept to view Sino–American military and defense relations during the Obama era and addresses several gaps in the existing literature.

Chapter 3, the first of four case studies, builds on the current (albeit limited) literature that examines the key driving forces behind U.S. assessments of the Chinese A2/AD challenge in East Asia. That is, the Obama administration became increasingly concerned that China’s A2/AD capabilities would put at risk U.S. military assets operating in the Western Pacific, which could allow China to deter, delay, and deny U.S. intervention in future regional conflict and crises. This study demonstrates how U.S. perceptions of Chinese A2/AD influenced U.S. decision-making and defense planning in the Asia-Pacific. In particular, it focuses on the strategic ambiguities associated with A2/AD, which provided fertile ground for U.S. misperceptions of Chinese strategic intentions to grow. This chapter concludes that the analytical baseline (or framing assumptions) used by defense analysts to interpret Chinese A2/AD were overly reliant on material (i.e. military) capacity-based assessments to determine Beijing’s strategic intentions that overlooked the evolution of Chinese operational and doctrinal preferences. Specifically, defense analysts frequently, and often erroneously, conflated a Chinese operational *capability* with an underlying strategic *intention*, which conceptualized the United States as its primary (if not sole) target. This study demonstrates that strategic ambiguities and opacity associated with China’s A2/AD capabilities reinforced Washington’s reliance upon capacity-based assessments, which confounded by cognitive bias exacerbated misperceptions of Beijing’s strategic intentions.

Chapter 4 examines the intersection of China’s evolving C4ISR military support ‘systems of systems’ with the cyber, space, and electronic warfare (EW) asymmetric challenges posed to the United States on the

future network-centric battlefield. Compared to China's conventional weapon systems, far less ink has been spilled on Chinese thinking in the development of the critical support architecture that enables and enhances China's technologically advanced war-fighting capabilities. A central argument this chapter makes is that China's war-fighting capabilities fused by C4ISR systems posed greater threats to the United States than the sum of its parts. It describes a discourse within the U.S. defense community which interpreted Chinese 'systems of systems' as specifically designed to exploit U.S. military vulnerabilities in the Western Pacific. The emergence of a 'systems of systems' military paradigm increased the incentives for *both* sides to strike first and preemptively against the other C4ISR systems, which perceptibly worsened strategic stabilizing in the Asia-Pacific during the Obama presidency.

Chapter 5 builds on this military-technological theme and explores the strategic implications of a new generation of stealthier and increasingly survivable Chinese antiship missiles (ASMs) for U.S. naval carrier strike groups operating in the Western Pacific, in particular, the ability of these weapons to evade U.S. missile defenses. This chapter argues that the proliferation of China's maturing precision-strike missile (PSM) regime could presage a new military-technological paradigm on the future networked battlefield in the Western Pacific. It finds that the development and diffusion of these asymmetric weapons increased the risk of military miscalculation, deterrence failure, inadvertent escalation, and ultimately war in this highly contested and strategically competitive arena.

Chapter 6 explores a relatively under-researched discourse which relates to recent indications that Chinese leaders are considering the deployment of nuclear weapons for 'war-fighting' (or victory-denial) missions. It argues that the continued lip service paid to passive and static conceptualizations of Chinese thinking on nuclear and conventional deterrence is no longer appropriate. Recent evidence indicates that these postures are far more integrated, flexible, and dynamic than Beijing's official rhetoric has suggested. Over the past decade, a *de facto* shift toward a limited nuclear war-fighting posture has already taken place, which has prompted a closer alignment of China's nuclear force posture with its more offensively configured conventional stance. Moreover, as many of the barriers impeding a limited nuclear war-fighting doctrine are removed, the long-standing doctrine-capabilities gap between China's nuclear capabilities and the aspirations of many Chinese strategists will likely be reconciled. This chapter also posits that strategic ambiguities and opacity associated with

Chinese nuclear policies and doctrine reinforced Washington's reliance upon worst-case scenario defense planning to determine Beijing's—invariably malign—intentions. Finally, it reflects on the implications of an intense security dilemma in the nuclear domain for Sino–American strategic stability, United States–extended deterrence commitments, and the future nuclear balance in the Asia-Pacific.

The final chapter draws out the books' major findings, themes, and contribution to the literature. It begins with a brief review of the overarching arguments made by each of the case studies. Firmly grounded in the experience of the case studies, this chapter returns to the gaps in the literature (highlighted in Chap. 2) and underscores the book's contribution to the scholarly understanding of United States–China security relations. As a corollary, it affirms the continued relevance of the security dilemma concept to understand worsening United States–China security relations during the Obama presidency. Next, the chapter reflects on possible future directions for United States–China relations in the military arena under the new Trump administration. Early indications do not bode well for the trajectory of this vital competitive security dyad; nor for future strategic stability in the increasingly volatile, contested, militarized, and crisis-prone Asia-Pacific region. Finally, it highlights several implications that follow from the findings of this research and suggests viable directions future research might take from where this book leaves off.

NOTES

1. The Asia-Pacific region includes Northeast Asia, Southeast Asia, and Oceania—or the geographical area between China, Japan, and Australia.
2. The 'security dilemma' is an international relations theoretical concept, and refers to a situation in which actions by a state intended to increase its 'security' (e.g. enhancing military power and alliance-building) can lead other states to respond with similar measures that can cause increased tensions that result in conflict and war, even when neither side desires it. This concept, in particular, contextualized with Sino–American security relations will be elaborated upon in Chap. 2.
3. Clinton, H. (2011). America's pacific century. *Foreign Policy*, 11 October 2011. Available at: <http://foreignpolicy.com/2011/10/11/americas-pacific-century/> (Accessed: 20 May 2012); Obama, B. (2011). Remarks by President Obama to the Australian parliament. *The White House, Office of the Press Secretary*, 17 November 2011. Available at: <https://obamawhitehouse.archives.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament> (Accessed: 12 May 2012).

4. Donilon, T. (2011). America is back in the Pacific and will uphold the rules. *The Financial Times*, 27 November 2011. Available at: <https://www.ft.com/content/4f3febac-1761-11e1-b00e-00144feabdc0> (Accessed: 10 May 2012).
5. Obama, B. (2011). Remarks by President Obama to the Australian parliament. *The White House, Office of the Press Secretary*, 17 November 2011. Available at: <https://obamawhitehouse.archives.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament> (Accessed: 12 May 2012).
6. Clinton, H. (2011). America's Pacific Century. *Foreign Policy*, 11 October 2011. Available at: <http://foreignpolicy.com/2011/10/11/americas-pacific-century/> (Accessed: 20 May 2012).
7. O'Rourke, R., Manyin, M., Daggett, S., Dolven, B., Lawrence, S., Martin, M., & Vaughn, B. (2012). *Pivot to the Pacific? The Obama Administration's "Balancing" toward Asia* (March). Washington, DC: Congressional Research Service, 1–2.
8. Since the early 2000s, China's has become increasingly integrated and engaged with the global economy and affairs: for example China's entry into the World Trade Organization (WTO) in 2001, its joint establishment of the Shanghai Cooperation Organization (SCO) in the same year, and more recently, under Chinese President Xi Jinping, the announcement of 'The Silk Road Economic Belt and the 21st-century Maritime Silk Road' (also known as the One Belt, One Road (OBOR) initiative), and the related Asia Infrastructure Investment Bank (AIIB) proposed in 2013, and establishment of the Silk Road Fund in 2014—designed in part as a geopolitical gambit to counter the economic-trade pillar of the 'pivot' symbolized by the Trans-Pacific Partnership (TPP).
9. By 2012, China's annual defense budget equaled those of the United Kingdom and Russia combined, which in subsequent years continued to increase by approximately 10 percent annually. Stockholm International Peace Research Institute. The SIPRI military expenditure database. Available at: <https://www.sipri.org/databases/milex> (Accessed: 21 May 2017).
10. In Obama's second administration, renewed demands of Iranian nuclear-diplomacy, a rapidly deteriorating civil war in Syria, and ongoing operations in Afghanistan continued to consume a significant proportion of Washington's resources, attention, and political capital.
11. Donilon, T. (2013). National security adviser to President Obama discusses U.S. policy in the Asia-Pacific region in 2013. *Asia Society*, 11 March 2013. Available at: <http://asiasociety.org/new-york/complete-transcript-thomas-donilon-asia-society-new-york> (Accessed: 21 April 2017).

12. O'Rourke, R., Manyin, M., Daggett, S., Dolven, B., Lawrence, S., Martin, M., & Vaughn, B. (2012). *Pivot to the Pacific? The Obama administration's "balancing" toward Asia* (March). Washington, DC: Congressional Research Service, 1–2.
13. For discussion on the United States' role in Asia, see Feigenbaum, E.A. (2011). Strengthening the United States' role in Asia. *Council on Foreign Relations*, 16 November 2011. Available at: <https://www.cfr.org/inter-view/strengthening-us-role-asia> (Accessed: 14 May 2017).
14. Silove, N. (2016). The pivot before the pivot: U.S. strategy to preserve the power balance in Asia. *International Security*, 40(4), 45–88.
15. In response to the view held by many Southeast Asian leaders that the United States had neglected the region, the Obama administration in its first term noticeably upgraded its engagement with regional multilateral institutions, that is ASEAN and EAS.
16. For example, during the Bush era, U.S. forces in South Korea were reduced by 40 percent, which subsequently reversed during the Obama presidency. Ross, R.S. (November/December 2012). The problem with the pivot: Obama's new Asia policy is unnecessary and counterproductive. *Foreign Affairs*, November/December 2012. Available at: <https://www.foreignaffairs.com/articles/asia/2012-11-01/problem-pivot> (Accessed: 24 May 2015).
17. Zoellick, R.B. (2013). U.S., China and Thucydides. *The National Interest*, July–August 2013. Available at: <http://nationalinterest.org/article/us-china-thucydides-8642> (Accessed: 21 May 2015).
18. For a contrarian view that argues the Obama administration successfully struck this balance, see Bader, J. (2013). *Obama and China's rise: An insider's account of America's Asia strategy*. NY: Brookings Institution Press.
19. See Campbell, K.M. (2016). *The pivot—The future of American statecraft in Asia*. New York, NY: Hachette Book Group; Campbell, K.M., & Ratner, E. (2014). Far Eastern promises: Why Washington should focus on Asia. *Foreign Affairs*, 93(3), 106–116.
20. Obama, B. (2011). Remarks by President Obama to the Australian parliament. *The White House, Office of the Press Secretary*, 17 November 2011. Available at: <https://obamawhitehouse.archives.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament> (Accessed: 12 May 2012).
21. Panetta, L.E. (2012). Shangri-La security dialogue—Delivered by secretary of defense Leon E. Panetta, Shangri-La hotel, Singapore. *U.S. Department of Defense, Press Operations*, 2 June 2012. Available at: <http://archive.defense.gov/Speeches/Speech.aspx?SpeechID=1681> (Accessed: 23 May 2015).

22. Following the 2010 U.S. DoD Quadrennial Defense Review (QDR), there is evidence of some budgetary prioritization of the U.S. Navy and Air Force—and a relative reduction in the proportion of funding allocated to the U.S. Army. Silove, N. (2016). The pivot before the pivot: U.S. strategy to preserve the power balance in Asia. *International Security*, 40(4), 45–88.
23. O'Rourke, R., Manyin, M., Daggett, S., Dolven, B., Lawrence, S., Martin, M., & Vaughn, B. (2012). *Pivot to the Pacific? The Obama administration's "balancing" toward Asia* (March). Washington, DC: Congressional Research Service, 11–12.
24. Office of the Secretary of Defense, U.S. Department of Defense (January 2012). *Sustaining U.S. global leadership for the 21st century defense*. Washington, DC: U.S. Department of Defense, 2.
25. Johnston, A.I. (2013). How new and assertive is China's new assertiveness? *International Security*, 37(4), 7–48.
26. Office of the Secretary of Defense, U.S. Department of Defense. (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 1.
27. *Ibid.*, 27.
28. Anti-access, area denial (A2/AD) forces are designed by an adversary to complicate the efforts of an outside military power (in this case the United States) to conduct military operations into a 'contested zone'. The Chinese A2/AD challenge in the Asia-Pacific and U.S. responses will be discussed in more detail in the four case study chapters in this book.
29. Office of the Secretary of Defense, U.S. Department of Defense. (2010). *Quadrennial defense review report*. Washington, DC: U.S. Department of Defense. Other initiatives included the 'Third Offset Strategy' announced in late 2014 by Deputy Secretary of Defense Robert Work, and designed to maintain U.S. military-technological primacy against emerging threats—especially Chinese A2/AD conventional capabilities.
30. Chinese officials, scholars, and policy experts responded to the 'pivot' with growing criticism. One official opined that U.S. military exercises and buttressing U.S. alliances in the region were not conducive to regional peace and stability. Other unofficial responses warned that the 'pivot' risked ushering in a new era of 'geopolitical confrontation' and 'zero-sum competition'. Green, M., & Cooper, Z. (2014). Revitalizing the rebalance: How to keep U.S. focus on Asia. *The Washington Quarterly*, 37(4), 25–46.
31. For example, Ross, R.S. (2012). The problem with the pivot: Obama's new Asia policy is unnecessary and counterproductive. *Foreign Affairs*, 91(6), 70–82.

32. O'Rourke, R. et al. (2012). *Pivot to the Pacific? The Obama Administration's "Balancing" Toward Asia*. Congressional Research Service, Washington, DC, 8–9.
33. For example, since 2011 China virtually gave up its efforts to use its influence over North Korea to cajole Pyongyang to terminate or freeze its nuclear program. China also withdrew from its support of the six-party talks to deal with North Korea's evolving nuclear capability. In the case of Iran, having voted for five UN resolutions supporting the imposition of sanctions against Tehran, in 2012, Beijing threatened to veto sanctions on Iranian oil exports.
34. China is the United States' second largest trading partner, its third largest export market, the largest holder of U.S. treasury debt, and a major trading partner for U.S. allies in Asia. Lieberthal, K., & Wang, J. (2012). Addressing U.S.-China Strategic Distrust. *Brookings*, John L. Thornton China Center Monograph Series.
35. Silove, N. (2016). The pivot before the pivot: U.S. strategy to preserve the power balance in Asia. *International Security*, 40(4), 45–47.
36. A critical issue is whether the longer-term procurement plans which flow from the 'pivot' strategy are sufficient to support planned defense expenditure (especially U.S. Naval) in the Pacific and globally. Additionally, the Budget Control Act of 2011 would entail significant reductions in defense spending—including delays and termination of planned investments. However, given the lengthy lead times associated with the development and deployment of major weapons systems, it is very difficult for analysts to determine which specific systems originally conceived in the context of the 'pivot' were canceled due to budgetary pressures. Harold, S.W. (2015). Is the pivot doomed? The resilience of America's strategic 'rebalance'. *The Washington Quarterly*, 37(4), 85–99.
37. For example, China's 2014 declaration of an air defense identification zone (ADIZ) in the East China Sea over islands administered by Japan—and speculation of similar plans for the South China Sea—was widely interpreted as an attempt by Beijing to alter the regional status quo. Campbell, K.M., & Ratner, E. (2014). Far Eastern promises: Why Washington should focus on Asia. *Foreign Affairs*, May/June 2014. Available at: <https://www.foreignaffairs.com/articles/east-asia/2014-04-18/far-eastern-promises> (Accessed: 22 May 2016).
38. For example, Ross, R.S. (November/December 2012). The problem with the pivot: Obama's new Asia policy is unnecessary and counterproductive. *Foreign Affairs*, November/December 2012. Available at: <https://www.foreignaffairs.com/articles/asia/2012-11-01/problem-pivot> (Accessed: 24 May 2015); Harold, S.W. (2015). Is the pivot doomed? The resilience of America's strategic 'rebalance'. *The Washington Quarterly*, 37(4), 85–99.



CHAPTER 2

Conceptualizing the United States–China Security Dilemma

INTRODUCTION

The challenge states face in attempting to disentangle and interpret others' *motives* and *intentions* in the international political system has confounded policy-makers and scholars alike.¹ Some of the most basic security challenges include the following issues: At what point does the legitimate defense of a state's interest become aggressively motivated?² When do the actions of states driven by the desire to sustain the 'status quo' become 'revisionist'?³ At what stage, and under what circumstances, do state actors motivated by 'benign' (or peaceful and nonthreatening) intentions become 'malign' (or aggressive and expansionist)?⁴ These analytical challenges touch on a broader set of empirical and theoretical issues depicted by the 'security dilemma' concept.⁵ Central to these challenges are the various *material* and *psychological* human conditions in international relations (IR) that influence states' security policy decisions and preferences, which comprise the core theoretical foundations of the security dilemma.⁶

The 'material' conditions refer to the ambiguous nature of the employment of military force, and, above all, the type(s) of weapons used by states for this purpose. That is, an adversary may interpret weapons used by states for defensive purposes as nonetheless potentially aggressive and expansionary. The 'psychological' conditions refer to the complex challenges facing policy-makers in attempting to get into the minds of others, and determine states' (especially future) motives and intentions.⁷ In short, the ambiguous

nature of weapons, together with the structural conditions of anarchy and uncertainty in the international system, heightens states' threat perceptions, which if not mitigated (or ameliorated) through cooperative policies can lead to spirals of mistrust, arms racing, insecurity, and ultimately war.⁸ John Herz (1950) coined the term 'security dilemma' in IR.⁹ According to Herz,

[w]herever ... *anarchic society* has existed ... there has arisen what may be called the 'security dilemma' of men, or groups or their leaders. Groups or individuals must be, and usually are, concerned about their security from being attacked, subjected, dominated or annihilated. ... *Striving to attain security from such attack*, they are driven to acquire more power in order to escape the impact of the power of others. This in turn renders them *more insecure* and compels them to *prepare for the worst* ... and the *vicious circle of security and power accumulation* is on.¹⁰

In 'preparing for the worst', Herz's implied that, even states which committed to maintaining the status quo may nonetheless feel 'compelled' to resort to aggression, as a means to attain 'security', which can lead to preventative and preemptive war. Although Herz conceded that under certain circumstances states could escape the dilemma, he stressed that such an escape was not the norm, and that 'ultimately, somewhere, the conflicts caused by the security dilemma are bound to emerge among political units of power'.¹¹

Building on Herz's theoretical foundations, Hubert Butterfield explained how spirals of mistrust develop between states in situations where *neither* side harbors aggressive intentions toward the other¹²:

For you to know that you yourself mean him no harm, and that you want nothing from him save guarantees for your own safety; and it is never possible for you to realize or remember properly that since he *cannot see the inside of your mind*, he can never have the same *assurances of your intentions* that you have ... neither party see[s] the nature of the predicament he is in, for each only imagines that the other party is being hostile and unreasonable.¹³

From Herz's and Butterfield's seminal work several conceptual assumptions can be highlighted: (1) states' inherent uncertainty and fear of others' present and future intentions; (2) the unintentional and defensive nature of the security dilemma; (3) the self-defeating and self-reinforcing outcome of a deteriorating dilemma; and (4) the condition can cause wars, but is not the cause of *all* wars.

This chapter proceeds as follows. First, it provides a brief theoretical overview of the security dilemma concept including contemporary revisions and criticisms; the ways in which the condition can be mitigated (or alleviated); the prospects for cooperation and strategic stability in the presence of the dilemma; and common misuses, ambiguities, and confusing semantics associated with the use of the concept in the literature. Second, it contextualizes the use of the security dilemma by scholars and policy-makers to characterize contemporary United States–China security relations, in particular, from the perspective of the ‘China rise’ (or ‘China threat’) discourse. Finally, it proposes a robust conceptual framework of analysis (or theoretical lens) to apply the ‘security dilemma’ to view United States–China security relations, and describes the gaps in the existing literature this book will address.

PERCEPTIONS, MISPERCEPTIONS, AND THE SECURITY DILEMMA

Robert Jervis contributed a significant amount of theoretical depth and intellectual rigor to the security dilemma concept. Jervis broadly agreed with Herz and Butterfield that the security dilemma is fundamentally structural in nature, but that additional ‘nonstructural’ factors (especially psychological and cognitive) interplay with the core structural regulators, and can intensify (or mitigate) the dilemma—making conflict and war more or less likely to occur.¹⁴ According to Jervis, ‘one state’s gain in security often *inadvertently* threatens others’.¹⁵ These ‘nonstructural’ factors are best understood as ‘regulators’ of the security dilemma’s intensity, as opposed to underlying causes of the condition.¹⁶ That is, one state’s security gain can inadvertently cause another state to feel less secure due to the structural conditions of anarchy and uncertainty in the international system. Jervis’s ideas and insights related to decision-makers’ perceptual biases, and attempt to signal strategic intentions in IR will feature prominently in the theoretical framework of analysis applied in this book to view contemporary United States–China security relations.¹⁷

By emphasizing the importance of perception and misperceptions of state intentions in shaping the states’ foreign policy decisions, Jervis differentiated himself from the main schools of realism at the time. Scholar Jack Snyder highlighted three of Jervis’s most durable contributions to

security dilemma theorizing.¹⁸ First, Jervis demonstrated how the intensity of the security dilemma is conditioned by two key considerations: (1) whether *defense is easier* and cheaper (or defensive-dominant) compared to the *offense* (or offensive-dominant); and, closely related, (2) the extent to which the offensive and defensive weapons are *distinguishable*.¹⁹ That is, in situations where it is cheaper and easier for states to emphasize the defensive, and where this posture is clearly distinguishable from offensive alternatives, the dilemma is *less intense*. Conversely, where the offense is dominant the security dilemma is more intense and conflict is more likely.²⁰

Second, and inspired by the insights of Thomas Schelling, Jervis's research into 'strategic bargaining' played an important role in the wider discourse pertaining to signaling and perception bias, in particular, the impact of these factors on the nature and intensity of the security dilemma.²¹ According to Jervis,

[j]ust as actors need to predict what others will do, so they also want others to make desirable predictions about their own behavior; actors not only perceive others, they *signal in order to project images*, which may be either true or false.²²

In a recent interview Jervis opined that 'signaling doesn't have any impact *except for perception* ... you have to design your signals in terms of how you think others will perceive them'.²³ Or put another way, as a result of perceptual biases actors are prone to *overestimate* the extent to which an adversary's aggressive behavior is a manifestation of malign intent, and *underestimate* the extent to which these actions are a reaction to their own policies and postures.

Third, a seminal insight from Jervis's work on perceptions in international politics is that while a state's words and deeds may reveal (or infer) something important about the state, it is often not clear 'exactly what is being revealed, what is intended to be revealed, and what others will think is being revealed'.²⁴ Thus, the failure of actors to accurately 'get into the minds of others' often causes states to misperceive how others are likely to interpret their words and deeds. Jervis described this phenomenon as the inability to 'recognize that one's own actions could be seen as menacing [or malign intent] and the concomitant belief that the other's hostility can only be explained by its aggressiveness'.²⁵ As a corollary, while states tend to view their own actions as perfectly reasonable and benign, others may perceive them as otherwise.²⁶ Put another way, policy-makers tend to see what they expect to see, and these expectations are often viewed through

a familiar analytical prism of preexisting beliefs, informed by stereotyped lessons of history, analogies, and other routine scripts—which offer shortcuts in making determinations under uncertainty.

AMELIORATING AND MITIGATING SECURITY DILEMMA DYNAMICS

Scholars of various theoretical stripes have generally agreed that the security dilemma is an inescapable condition in world politics, and at best can only be ameliorated or mitigated.²⁷ Defensive realists broadly agree that the condition does not necessarily result in conflict and war between states; rather a variety of ‘material regulators’ can alleviate the dilemma, and, in turn, increase the prospects for cooperation and stability.²⁸ These ‘material regulators’ include the offense–defense balance (and ability to differentiate between them); geographical proximity; access to raw materials; global economic balances; regional and bipolar military balances of power; and the ability of states to extract resources from territorial expansion.²⁹ We can supplement this core list with an additional three regulators: (1) the ‘asymmetric’ distribution of military power; (2) external allies and alliances; and (3) the mixing of ethnic groups.³⁰

It is noteworthy that there has been limited research conducted on the implications of a security dilemma under the conditions of an asymmetrical (or unequal) distribution of military power between states.³¹ The idea of an asymmetrical distribution of military power as a regulator of the security dilemma features prominently in this book to elucidate the United States–China asymmetric military relationship during the Obama presidency. Before explaining this discourse we must first delineate the underlying *causes* of the security dilemma, from the various (material and psychological) *regulators* of the condition. These ‘regulators’ in important ways can affect the intensity of security dilemma; in isolation, however, they cannot cause a ‘security dilemma’. *Ipsa facto*, the absence of these regulators does not necessarily mean that a security dilemma is not present.³²

MISUSES, AMBIGUITIES, AND CONFUSING SEMANTICS

While this book makes the case for the continued relevance of the security dilemma to explain the deterioration in United States–China security relations during the Obama presidency, it remains cognizant of the various theoretical limitations associated with the use of this concept to interpret contemporary interstate relations. Scholars have warned of the analytical

hazards associated with the liberal usage of the security dilemma, including the concept of ‘security’ itself.³³ Arnold Wolfers argued that ‘security’ is an inherently ambiguous concept that encompasses objective and subjective elements.³⁴ Theoretical discourses on the nature of ‘security’ in IR have generally centered on several key themes: What is the *object* of a particular security policy (states, individuals, and regimes)? What *values* do these various objects consider most important? And, what is required to make states *feel* secure enough?

Ken Booth and Nicholas Wheeler highlighted several analytical conundrums to illustrate the challenges faced by scholars in conceptualizing the security dilemma³⁵: What state (even defenders of the status quo) given the opportunity and means is not expansionist (or ‘greedy’)? Given the complexities and uncertainties in actors’ motives, together with the likelihood of misperception in IR, how can one know for sure whether a state is a genuine ‘security seeker’? Under the conditions of structural anarchy in IR, how can states be truly benign? And, related to this, how can scholars reconcile situations in IR where states behave as predominately ‘status quo’, and simultaneously pursue expansionist policies?³⁶ To be sure, historically few states have been completely satisfied with any particular status quo and have generally sought ways and means to improve their *relative* position within the international political system—especially when the perceived costs of doing so are low.³⁷ Indeed, states may pursue expansionist policies as a means to achieve security-seeking ends; thus, these strategic goals are not necessarily diametrically opposed. Furthermore, other factors will likely complicate the ability of states to determine whether a predominately ‘security-seeking’ state simultaneously harbors malign intentions; for example, if the defender of the status quo perceives that an adversary’s relative power is on the rise; if there are military-technological advancements; and if diverging opinions exist on what constitutes the prevailing ‘status quo’—all of which were present in the Sino–American security relationship under the Obama administration.

THE SECURITY DILEMMA AND UNITED STATES–CHINA RELATIONS

The application of the security dilemma by scholars and policy-makers to elucidate United States–China security relations in the post–Cold War era is best contextualized with the broader ‘China rise’ (or ‘China threat’)

discourse.³⁸ This discourse can be traced back to the early 1990s, and is closely correlated to China's rapid economic and military capacity expansion that marked this period.³⁹ During this time, it became conventional wisdom among Western-centric scholars that once its military and economic power had sufficiently matured, China was intent on becoming a regional hegemonic power.⁴⁰ For example, in 2000, the U.S. Department of Defense (DoD) stated that China 'wants to become the preeminent Asian power ... among regional states in East Asia'.⁴¹ Scholar John Mearsheimer predicted that in an effort to force the United States out of Asia, Beijing would likely implement its own version of the Monroe Doctrine.⁴²

In the immediate aftermath of the 2008–2009 financial crisis, references to the 'China threat', and especially to a 'new assertiveness' in Chinese foreign policy, noticeably increased.⁴³ The global financial crisis did appear to mark a key turning point in Beijing's conceptualization of China's ascending position within the hierarchy of global powers,⁴⁴ giving rise to a bolder and more confident foreign policy posture, especially in regional maritime disputes.⁴⁵ Several observers attributed this apparent aggressive policy shift to a perception in Beijing that China's relative power (or polarity) vis-à-vis the United States in the Asia-Pacific had significantly narrowed in the aftermath of the financial crash. Chinese President Xi Jinping's 'new model of great power relations' clearly reflected this perception, and Beijing's broader efforts to legitimize its rise to global (or at least regional) great power status—or a Chinese 'grand strategy'.⁴⁶ Notwithstanding the existence of debate as to the extent and magnitude of this apparent revisionist lurch, the notion of this shift became widely accepted currency within the U.S. defense and scholarly communities.⁴⁷ Irrespective of whether the emergence of this 'new assertiveness' meme accurately reflected the prevailing relative United States–China power parity, perception, in this case, became 'reality'.⁴⁸ That is, there was irrefutable evidence that China had become simultaneously the key engine of economic growth in Asia, as well as one of the region's major sources of strategic insecurity.⁴⁹

From the evolution of the 'China rise' discourse, we can identify three broad themes which typified the use of the security dilemma to characterize contemporary United States–China security relations. First is the narrowing of the public discourse on Chinese foreign policy caused by the amplification (or arguably exaggeration) of the 'China threat', which reduced Washington's diplomatic flexibility in managing complex bilateral

relations with Beijing, and created a self-fulfilling security dilemma.⁵⁰ Moreover, exaggerated characterizations of China as a revisionist power harboring aggressive and expansionist regional ambitions could also heighten levels of uncertainty and anxiety in the Asia-Pacific, worsen strategic instability, and trigger spirals of mistrust, arms racing, and security dilemmas.⁵¹ Therefore, it behooves Washington to ensure that these characterizations are grounded in clear evidence and not made erroneously, lightly, or irresponsibly.⁵² Arguably, the United States–China security dilemma deteriorated not because of events and situations both sides *actually* faced, but rather because of the promulgation of these kinds of amplified memes. IR scholars have described this situation as the inability of states to ‘signal type’, that is, the inability of states to signal benign strategic intentions through reassurances or conciliation, due to the propensity of actors to reject or simply ignore these gestures.⁵³

A good case in point was the U.S. think-tank community’s analysis of China’s alleged ‘militarization’ of the South China Sea.⁵⁴ Specifically, suppositions inferred from Chinese construction projects that deployments of military assets (e.g. combat aircraft and mobile missile launchers) to the disputed islands (especially the Spratly Islands) could be expected in the near future, which implied that Beijing intended to use these strategic outposts as a means to extend its anti-access/area denial (A2/AD) zone (or exclusive zone) to achieve aggressive and expansionist ends. In his congressional testimony, U.S. Pacific Command’s Commander Admiral Harry Harris asserted: ‘China has *fundamentally altered* the physical and political landscape in the South China Sea through large-scale land reclamation and by *militarizing* these reclaimed features.’⁵⁵ For China did not consider deployments of ‘defensive’ military installations as ‘militarization’, but rather a necessary response to U.S. naval Freedom of Navigation (FONOPs) exercises, and other provocative intelligence, surveillance, and reconnaissance (ISR) activities close to China’s coastline. In short, the amplification of United States–China divergences over what was meant by ‘militarization’ caused both sides to perceive the other as engaging in ‘militarizing’ activities, which in turn increased regional strategic instability and intensified the United States–China security dilemma.

Second, scholars have debated the extent to which Washington or Beijing recognized (or even acknowledged) the presence of a ‘security dilemma’.⁵⁶ The dilemma is intensified when states fail to recognize one exists, and, thus, the condition can only be ameliorated if actors are able

demonstrate empathy—or ‘security dilemma sensibility’.⁵⁷ Scholar Alastair Iain Johnston argued that the *problem* for Asia-Pacific security was not only about China’s rise. Rather, the problem is the existence of a United States–China ‘security dilemma’, and thus the *solution*, lies in understanding the ‘mutual constitution’ of the ‘China threat’ (perceived by the United States) and the ‘U.S. threat’ (perceived by China).⁵⁸

Third, since the late 1990s, several prominent IR scholars have applied the security dilemma to explain how several geopolitical flashpoints in the Asia-Pacific evolved and deleteriously impacted United States–China security relations; for example, Beijing’s so-called new assertiveness in the disputed East and South China Seas⁵⁹; A2/AD strategy in China’s near sea; Beijing’s hostility toward U.S. missile defense program in Asia; and the dichotomous interpretation of what constituted the ‘status quo’ in the Taiwan Straits.⁶⁰ Scholars broadly agreed that the existence of a security dilemma led to the promulgation (by both sides) of military policies that worsened United States–China strategic stability, and elicited the kind of arms racing and worst-case scenario (and zero-sum) defense planning closely associated with a deteriorating security dilemma.⁶¹

A CONCEPTUAL FRAMEWORK TO VIEW UNITED STATES–CHINA RELATIONS: ‘THE BHJ FORMULATION’

Firmly grounded in the seminal insights of the security dilemma theory’s founding fathers—Hubert Butterfield, John Herz, and Robert Jervis (or ‘The BHJ Formulation’)—the case study chapters synthesize the concept’s core assumptions and features.⁶² By rigorously defining the *essential* features (or preconditions) and the key *nonessential* features (i.e. causes, regulators, and possible outcomes) of the security dilemma, this framework enables us to validate the existence of a genuine United States–China security dilemma, and, in turn, elucidates the nature and causality of this competitive (yet pivotal) security relationship. The conceptual framework applied in the studies assumes that the security dilemma is *conditional*; that is, no matter how powerfully other (nonessential) features operate, if all of the essential features are not present, a ‘genuine’ security dilemma cannot exist.⁶³ As a corollary, in a situation where either one of both states harbor malign intentions toward the other, a security dilemma is not present.⁶⁴

Essential Features of a Security Dilemma

- **Structural anarchy in IR:** the inescapable uncertainties that exist under structural anarchy in IR, which causes fear, uncertainty, and ‘self-help’ (e.g. bandwagoning) responses by states.
- **Accumulation of power:** states respond to the uncertainty and fear in IR by accumulating ‘power’ (especially weapons) as a means of self-protection (or defense). These capabilities will invariably contain *offensive* elements, which due to the prevalence of ‘dual-use’ technologies may not be easily distinguishable from defensive capabilities.
- **Nonmalign strategic intentions:** the security dilemma is unintentional in nature, and thus can only exist between states that *both* desire security, and without the *intention* of threatening others with expansionist and aggressive words or deeds.

Nonessential Features: Or Security Dilemma Dynamics

- Under structural anarchy in IR, actors cannot be certain of others’ present or future intentions, which tends to exacerbate states’ threat perceptions.
- The security dilemma is often self-reinforcing and self-fulfilling, and may lead to arms racing and war.
- These dynamics also have a tendency to produce self-defeating outcomes: states formulate policies designed to increase their own ‘security’, which inadvertently shifts the relative distribution of power between states (or polarity), and reduces the security for all.
- Arms racing dynamics may lead to inadvertent and accidental conflict and war.
- Structural (or material) and psychological regulators can affect (or mitigate) the intensity of the security dilemma, but cannot eliminate the condition entirely.

CONCEPTUAL CAVEATS AND LIMITATIONS

Notwithstanding the robustness of the ‘BHJ Formulation’, the iteration of a few important caveats at this stage is, however, beneficial. First, given that structural anarchy and some accumulation of power usually (if not always) is present in IR, *ipso facto* the existence of nonmalign intent on both sides constitutes the key variable in determining whether a situation is the result of a genuine security dilemma.⁶⁵ Hence, we face the classical

analytical conundrum of *how* decision-makers can accurately determine the *real* nature of states' intentions—or the problem of 'getting into the minds of others'. Moreover, the fact that states' motives and intentions will likely shift over time, influenced by the ebb and flow of domestic-political agendas, compounds this issue. In addressing this problem, IR scholars have identified several means by which states can determine the strategic intentions of others.⁶⁶ The most obvious is simply to observe how a state behaves (its words and deeds) in response to events or policies, and extrapolating from these responses to recognize its underlying intentions. Alternatively, an actor may signal benign intent (e.g. policies of reassurance or conciliation) and use responses to these signals as a baseline to determine an adversary's intentions.⁶⁷

The security dilemma concept has proven highly accommodative to a broad range of related IR situations and theories, including deterrence, offense–defense, arms racing, arms control, power transition, and polarity theories; accidental, inadvertent, preemptive, preventative, and 'asymmetric' (or hybrid) warfare⁶⁸; ethnic conflict; social constructivism; foreign policy analysis; and psychological and cognitive IR subfields. Scholar Lawrence Freedman cautioned against inconsistent and over-expansive use of concepts and theories to accommodate situations in world affairs, which risks draining these ideas of any meaning or specificity.⁶⁹ In the case of the security dilemma, scholars and policy-makers have often omitted one or more of the concept's essential features (especially nonmalign intent), confusing the possible *outcomes* of the dilemma (i.e. spirals of mistrust, arms racing, and war) with its *causes*.⁷⁰ Cognizant of these kinds of conceptual pitfalls, the case studies approach Sino–American security relations during the Obama presidency with a clear understanding of the security dilemma's causes, assumptions, regulators, possible outcomes, and interplay with other IR theoretical approaches.

ADDRESSING GAPS IN THE EXISTING LITERATURE

This book extends and builds on the empirical base used in the security dilemma concept to view United States–China security relations under the Obama administration; in particular, it contributes to the scholarly understanding of how this approach is relevant for security dilemma theorizing. Furthermore, this book also builds on the relatively under-theorized discourse that considers the United States–China 'asymmetric' military balance of power (and 'asymmetric' weapons) in the Asia-Pacific as a

possible regulator of the security dilemma.⁷¹ Specifically, the book addresses the several empirical and theoretical gaps in the literature:

- To what extent does the intensity of security dilemma *vary* between the military domains, and what accounts for these variations?
- Are there particular features *unique* (or mutually exclusive) to a particular domain, which make the security dilemma more or less relevant?
- Finally, does a more integrative (or holistic) analytical approach to view the various military arenas generate a particular set of security dilemma dynamics, which may not otherwise have existed?⁷²

The literature in security and strategic studies that have empirically tested material with the security dilemma concept has been relatively limited, in particular, that which has used Chinese sources.⁷³ This book engages widely with Chinese sources to establish a robust understanding of how Beijing perceived its strategic environment, which crucially influenced the evolution of China's military doctrine and strategic goals. Next, the case studies contextualize these perceptions to highlight and explain Washington's misunderstandings of Beijing's intentions, caused by misinterpretations and misperceptions—in the presence of a security dilemma. In addition to expanding the empirical base that pertains to the security dilemma, this book also builds on the relatively under-theorized discourse that considers the United States–China asymmetric military balance of power in the Asia-Pacific as a possible regulator of the dilemma. Finally, the studies reflect on the implications for the security dilemma of the failure of states to treat the distinction between others' military capabilities and intentions for the requisite attention.

NOTES

1. The terms 'motives' and 'intentions' have generally been used in an interchangeable manner by IR scholars, but in the context of the security dilemma states' *motives* refer to the actual drivers of their responses to events, while states' *intentions* relate to the actual behavior or policy prescriptions.
2. Throughout this book the terms 'states' and 'actors' together with 'adversary' and 'defender' (or 'status quo state') are used to refer to the relationship between states in the international system. These terms do not *necessarily* imply a state of conflict or that war is imminent, or that a particular nation will necessarily occupy either side of the equation.

3. The ‘status quo’ (or a ‘status quo state’) is a term frequently used by Power Transition Theory (PTT) IR scholars to describe states that consider the international system of states (and international law) as integral features of the international system which need to be upheld and defended. Actors who hold the opposite view are termed ‘revisionists’ (or revisionist states). The term can also relate to a broad range of nonsecurity areas such as economic and trade relations. To be sure, states may be dissatisfied with the status quo in the ‘security’ domain, while they are satisfied with ‘nonsecurity’ relations. This book will focus specifically on the concept of ‘status quo’ (and ‘status quo states’) in the context of the United States–China military balance in the Asia-Pacific.
4. The ‘benign’ and ‘greedy’ or nongreedy concept in this context refers to particular states’ behavior within the international community, and, specifically, whether a state *intends* to expand and accumulate power motivated by security seeking; or instead driven by aggressive and expansionist foreign policies and military doctrines. See, Glaser, C. (1997). The security dilemma revisited. *World Politics*, 50(1), 171–201.
5. For the purposes of clarity, this book differentiates between the ‘security dilemma concept’ (or the security dilemma theory and theorizing) and ‘security dilemma dynamics’. The former denotes a particular condition in IR, while the latter, the various possible causes, conceptual assumptions, regulators, and implications of this condition between states. Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.
6. Booth, K., & Wheeler, N.J. (2008). *The security dilemma: Fear, cooperation, and trust world politics*. London: Palgrave Macmillan, Chap. 2.
7. During his pioneering research on the subject in the 1960s, Thomas Schelling highlighted the significance of this subtle interplay, which conceptualized the ‘power to hurt’ and as ‘a kind of bargaining power’. Schelling, T.C. (1966). *Arms and influence*. London; New Haven: Yale University Press.
8. From a political science perspective, the use of the term ‘anarchy’ refers to an absence of an international political authority that is separate from and superseding sovereign states. There has been some debate among IR theorists relating to the nature of the link between anarchy, the security dilemma, and war. Several scholars have challenged the notion that anarchy in IR *necessarily* results in security dilemmas and conflict. See Trachtenberg, M. (1991). *History and strategy*. Oxford; Princeton, NJ: Princeton University Press; Wendt, A. (1992). Anarchy is what states make of it: The social construction of power politics. *International Organization*, 46(2), 391–425. Kydd, A. (1997). Sheep in sheep’s clothing: Why security seekers do not fight each other. *Security Studies*, 7(1), 114–155.

9. Security dilemmas also exist in other non-IR contexts where anarchical conditions have been established such as environmental climate debates; ethnic conflicts; and even some areas of International Political Economy (IPE), for example currency wars and tariff negotiations. See Posen, B.R. (1993). The security dilemma and ethnic conflict. *Survival*, 35(1), 22–47; Brown, M.E. (1993). *Ethnic conflict and international security*. Princeton, NJ: Princeton University Press; Wheeler, N.J. (2014). Interview with Robert Jervis. *International Relations*, 28(4), 479–504.
10. Herz, J.H. (1950). Idealist internationalism and the security dilemma. *World Politics*, 2(2), 157–180.
11. Herz, J.H. (1951). *Political realism and political idealism: A study in theories and realities*. Chicago: University of Chicago Press, 15.
12. Butterfield, H. (1951). *History and human relations*. London: Collins, 20. Herz originally posited that security dilemmas were all pervasive, but in his later writings, he refuted Butterfield's position that the security dilemma was the root cause of all human conflict. Thus, for Herz the security dilemma was a cause, but not the *only* possible cause of war.
13. *Ibid.*, 21.
14. Jervis, R. (1976). *Perception and misperception international politics*. Princeton, NJ: Princeton University Press, Chap. 3. In this pioneering text, Jervis discusses the interaction between the structure features that exist in the international system (especially anarchy and uncertainty), with the perceptions held by actors in the system.
15. The conceptual framework used by Jervis in this seminal paper on the security dilemma draws on Rousseau's ideas on the 'Stag Hunt' and 'Prisoner's Dilemma' games. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214.
16. Jervis, R. (1976). *Perception and misperception international politics* (pp. 74–77). Princeton, NJ: Princeton University Press.
17. Several scholars have noted, however, that Jervis did not adequately address the issue of the extent to which these cognitive and perceptual factors outweigh, or offset, the structural anarchical ones. See Glaser, C. (1997). The security dilemma revisited. *World Politics*, 50(1), 171–201.
18. Snyder, J.L. (2014). Both fox and hedgehog: The art of nesting structural and perceptual perspectives. In J. Davis (Ed.), *Psychology, strategy and conflict: Perceptions of insecurity in international relations* (pp. 13–24). New York, NY: Routledge.
19. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214.
20. See Glaser, C. (1992). Political consequences of military strategy: Expanding and refining the spiral and deterrence models. *World Politics*, 44(4), 497–538; Lynn-Jones, S.M. (1995). Offense-defense theory and its

- critics. *Security Studies*, 4(4), 660–691; Lieber, K. (2000). Grasping the technological peace: The offense-defense balance and international security. *International Security*, 25(1), 71–104.
21. Snyder, J.L. (2014). Both fox and hedgehog: The art of nesting structural and perceptual perspectives. In J. Davis (Ed.), *Psychology, strategy and conflict: Perceptions of insecurity in international relations* (pp. 13–24). New York, NY: Routledge. Jervis distinguished between actors whose perceptions are either emotionally driven ('motivated') or more cognitively influenced ('nonmotivated'). He stated that 'the former derive from the need to maintain psychological well-being and a desired self-image; the latter from the need for short-cuts to rationality ... [conditioned by] complex and ambiguous information'. In his more recent research, Jervis added a caveat: the influences and drivers of motivated and cognitive influences are hard to separate. Jervis, R. (2002). Signaling and perception. In K.R. Monroe (Ed.), *Political psychology* (pp. 293–314). NJ: Earlbaum.
 22. *Ibid.*, 202.
 23. Wheeler, N.J. (2014). Interview with Robert Jervis. *International Relations*, 28(4), 486.
 24. Jervis, R. (2002). Signaling and perception. In K.R. Monroe (Ed.), *Political psychology* (pp. 293–314). NJ: Earlbaum.
 25. Jervis, R. (1976). *Perception and misperception international politics*. Princeton, NJ: Princeton University Press, 75.
 26. Scholars have often used United States–Soviet relations during the Cold War to illustrate self-images and perceptual bias in IR. See Garthoff, R.L. (1994). *Detente and confrontation: American-soviet relations from Nixon to Reagan*. Washington, DC: Brookings Institution.
 27. Neoliberal IR scholars argue that the existence of 'democratic political structures' can maintain peace between states, precisely *because* they are able to alleviate the security dilemma. See Weinberger, S. (2003). Institutional signaling and the origins of the cold war. *Security Studies*, 12(4), 80–115. Constructivist IR theorists argue that the dilemma is just one of the available avenues by which states—through a process of shifting identities—can influence the nature of anarchy in IR. See Wendt, A. (1992). Anarchy is what states make of it: The social construction of power politics. *International Organization*, 46(2), 391–425.
 28. On theoretical debates relating to these 'material regulators' and the security dilemma theorizing, see Snyder, J.L. (1993). *Myths of empire: Domestic politics and international ambition*. Ithaca, NY: Cornell University Press; Buzan, B., Jones, C.A., & Little, R. (1993). *The logic of anarchy: Neorealism to structural realism*. Chichester; New York: Columbia University Press; Van Evera, S. (1999). *Causes of war*. Ithaca, NY: Cornell University Press; Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.

29. See Quester, G.H. (1977). *Offense and defense in the international system*. New York; London: Wiley; Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214; Snyder, J.L. (2014). Both fox and hedgehog: The art of nesting structural and perceptual perspectives. In J. Davis (Ed.), *Psychology, strategy and conflict: Perceptions of insecurity in international relations* (pp. 13–24). New York, NY: Routledge; Glaser, C. (1992). Political consequences of military strategy: Expanding and refining the spiral and deterrence models. *World Politics*, 44(4), 497–538; Van Evera, S. (1999). *Causes of war*. Ithaca, NY: Cornell University Press. Historically states have tended to face greater challenges in projecting their military power over long distances, especially at sea. See Mearsheimer, J.J. (2001). *The tragedy of great power politics*. New York; London: Norton, 83–84.
30. See Christensen, T.J., & Snyder, J.L. (1990). Chain gangs and passed bucks: Predicting alliance patterns in multi-polarity. *International Organization*, 44(2), 137–168; Posen, B.R. (1993). The security dilemma and ethnic conflict. *Survival*, 35(1), 22–47; Acharya, S. (2007). Security dilemmas in Asia. *International Studies*, 44(1), 57–72; Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.
31. Notable and recent exceptions include Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623; Acharya, S. (2007). Security dilemmas in Asia. *International Studies*, 44(1), 57–72.
32. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214; Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.
33. Schweller, R.L. (1998). *Deadly imbalances: Tripolarity and Hitler's struggle for world conquest*. NY: Columbia University Press; Jervis, R. (2002). Signaling and perception. In K.R. Monroe (Ed.), *Political psychology* (pp. 39–42). NJ: Earlbaum.
34. Wolfers, A. (1952). “National security” as an ambiguous symbol. *Political Science Quarterly*, 67(4), 481–502.
35. Booth, K., & Wheeler, N.J. (2008). *The security dilemma: Fear, cooperation, and trust world politics*. London: Palgrave Macmillan, 4–5, & 38.
36. Jervis, R. (2002). Signaling and perception. In K.R. Monroe (Ed.), *Political psychology* (pp. 293–314). NJ: Earlbaum.
37. This opportunistic strategy has been termed by Steven Van Evera as a ‘window of opportunity’. Van Evera used this concept to describe preemptive power shifts in the relative balance of power between states. However, these ‘windows’ are invariably more *perceived* than determined by reality. Van Evera, S. (1999). *Causes of war*. Ithaca, NY: Cornell University Press, Chap. 2.

38. Chengxin, P. (2004). The “China threat” in American self-imagination: The discursive construction of other as power politics. *Alternatives: Global, Local, Political*, 29(3), 305–331; Deng, Y. (2008). *China’s struggle for status: The realignment of international relations*. New York, NY: Cambridge University Press; Friedberg, A., & Ross, R.S. (2009). Here be dragons. *The National Interest*, (103), 19–34.
39. Until the 1990s, the dominant opinion among both Western and Chinese scholars was that since 1949 China has pursued a relatively peaceful (or benign) trajectory, avoiding major conflict and wars, and employing military power in a limited fashion. See Johnston, A.I. (1995–1996). China’s new ‘old thinking’: The concept of limited deterrence. *International Security*, 20(3), 26; Scobell, A. (2003). *China’s use of military force: Beyond the great wall and the long march*. New York, NY: Cambridge University Press, 16–23. China’s use of military force (as opposed to the *threat* to use military force) declined in the post–Cold War era; since the 1990s, however, Beijing has placed an increasing emphasis on the accumulation of offensive-dominant capabilities—supported by the evolution of an equally offensive military doctrine. See Swaine, M., & Tellis, A.J. (2000). *Interpreting China’s grand strategy: Past, present and future*. Santa Monica, CA: RAND Corporation; Goldstein, A. (2005). *Rising to the challenge: China’s grand strategy and international security*. Stanford, CA: Stanford University Press.
40. See Bernstein, R., & Munro, R. (1997). *The coming conflict with America*. Washington, DC: Council on Foreign Relations; Wortzel, L. (1998). *China’s military potential*. Carlisle, PA: Strategic Studies Institute, Army War College; Johnston, A.I. (2004). Beijing’s security behavior in the Asia-Pacific: Is China a dissatisfied power? In J.J. Suh, P.J. Katzenstein & A. Carlson (Eds.), *Rethinking security in East Asia (Studies in Asian security)*. Stanford, CA: Stanford University Press, 34–96; Kaplan, R. (2010). The geography of Chinese power. *New York Times*, 19 April 2016. Available at: <http://www.nytimes.com/2010/04/20/opinion/20iht-edkaplan.html> (Accessed: 8 May 2014); Mearsheimer, J.J. (2014). *The tragedy of great power politics*. New York; London: Norton & Company; Rosato, S. (2014). The inscrutable intentions of great powers. *International Security*, 39(3), 48–88; Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese anti access, area denial, U.S. air sea battle, and command of the commons in East Asia. *International Security*, 41(1), 7–48.
41. Office of the Secretary of Defense, U.S. Department of Defense. (June 2000). *Report to congress pursuant to the FY2000 national defense authorization act*. Washington, DC: U.S. Department of Defense, 272.

42. Mearsheimer, J.J. (2001). *The tragedy of great power politics*. New York; London: Norton. For a contrarian view, that comes closest to maintaining that ‘nothing has changed’ in the durability and sustainability of the United States’ unipolar era, see Beckley, M. (2011). China’s century? Why America’s edge will endure. *International Security*, 36(3), 41–78.
43. Frequently cited examples of this ‘new’ assertive foreign policy include (1) Chinese bans on rare earth metal exports to Japan following the Diaoyu/Senkaku Islands incident in 2010; (2) a ban on banana imports from the Philippines following the 2012 Scarborough Shoal incident; (3) Chinese intransigence at the 2009 Copenhagen Summit on climate change; and more recently (4) recalcitrant Chinese responses to U.S. arms sales to Taiwan, and the official visit to the United States by the Dalai Lama in 2016; (5) allegations of Chinese (economic and trade) aggression in its disputes with the Philippines and Vietnam over the South China Seas following the 2016 Hague arbitral tribunal ruling, and visa restrictions imposed on Korean celebrities in response to the decision to deploy the Terminal High Altitude Area Defense (THAAD) system in South Korea.
44. See Johnston, A.I. (2013). How new and assertive is China’s new assertiveness? *International Security*, 37(4), 7–48; Bader, J. (2013). *Obama and China’s rise: An insider’s account of America’s Asia strategy*. NY: Brookings Institution Press, Chap. 7; Swaine, M. (2010). Perceptions of an assertive China. *China Leadership Monitor*, 32 (Spring); Landingin, R. & Kwong, R. (2012). Philippine business warns on China standoff. *Financial Times*, 15 May 2012. Available at: <http://www.ft.com/intl/cms/s/0/24d5cdf2-9e80-11e1-a767-00144feabdc0.html#axzz3zSIh4ors> (Accessed: 10 February 2013); West, K. (2012). Banana Crisis blamed on Philippine-China dispute. *ABC News*, 29 June 2012. Available at: <http://www.abc.net.au/news/2012-06-29/an-banana-exporters-caught-in-philippines-china-dispute/4100422> (Accessed: 10 February 2013); Hyo-Sik, L. (2016). Cosmetics, entertainment stocks hit by China’s THAAD backlash. *The Korea Times*, 5 August 2016; http://www.koreatimes.co.kr/www/news/biz/2016/08/123_211227.html (Accessed: 10 February 2013).
45. Friedberg, A. (2015). The sources of Chinese conduct: Explaining Beijing’s assertiveness. *The Washington Quarterly*, 37(4), 133–134; Shambaugh, D. (2010). The year China showed its claws. *The Financial Times*, 16 February 2010. Available at: <http://www.ft.com/intl/cms/s/0/7503a600-1b30-11df-953f-00144feab49a.html#axzz431FHEnb4> (Accessed: 10 February 2013).
46. President Xi defined this ‘new type of great power relations’ as (1) no conflict or confrontation, through emphasizing dialogue and treating each other’s strategic intentions objectively; (2) mutual respect, including for each other’s core interests and major concerns; and (3) mutually beneficial cooperation, by abandoning the zero-sum game mentality and advancing

- areas of mutual interest. Li, C. & Xu, L. (2014). Enthusiasm and American cynicism over the “new type of great power relations”. *Brookings Op-ed*. 4 December 2014. Available at: <https://www.brookings.edu/opinions/chinese-enthusiasm-and-american-cynicism-over-the-new-type-of-great-power-relations/> (Accessed: 8 May 2017).
47. Johnston, A.I. (2013). How new and assertive is China’s new assertiveness? *International Security*, 37(4), 7–48; Silove, N. (2016). The pivot before the pivot: U.S. strategy to preserve the power balance in Asia. *International Security*, 40(4), 45–88.
 48. Beckley, M. (2011). China’s century? Why America’s edge will endure. *International Security*, 36(3), 41–78; Khong, Y.F. (2013). Primacy or world order? The United States and China’s rise—A review essay. *International Security*, 38(3), 153–175. IR theorists have long debated whether military ‘parity’ between states increases or decreases the likelihood of conflict and war. See Waltz, K.N. (1979). *Theory of international politics*. Boston, Mass: McGraw-Hill; Lemke, D., & Werner, S. (1996). Power parity, commitment to change, and war. *International Security*, 40(2), 235–260.
 49. Swaine, M. (2010). Perceptions of an assertive China. *China Leadership Monitor*, 32 (Spring), 2. Friedberg, A. (2015). The sources of Chinese conduct: Explaining Beijing’s assertiveness. *The Washington Quarterly*, 37(4), 133–134.
 50. See Johnston, A.I. (2003). Is China a status quo power? *International Security*, 27(4), 50. Godwin, P. (2010). Asia’s dangerous security dilemma. *Current History*, 109(728), 264–266. Scobell, A. (2012). Learning to rise peacefully? China and the security dilemma. *Journal of Contemporary China*, 21(76), 713–721; Allison, G. (2012). Thucydides’ trap has been sprung in the Pacific: China and America are the Athens and Sparta of today, says Graham Allison. *The Financial Times*, 21 August 2012. Available at: <http://www.ft.com/intl/cms/s/0/5d695b5a-ead3-11e1-984b-00144feab49a.html?siteedition=intl#axzz3AEPoyH5A> (Accessed: 12 February 2013).
 51. Schelling, T.C. (1960). *The strategy of conflict*. Cambridge, MA; London: Harvard University; Nye, J.J. (2010). *Cyber power*. Cambridge, MA: Harvard Kennedy School.
 52. Mastro, O.S. (2015). Why Chinese assertiveness is here to stay. *The Washington Quarterly*, 37(4), 151–170; Johnston, A.I. (2013). How new and assertive is China’s new assertiveness? *International Security*, 37(4), 7–48.
 53. Kydd, A. (1997). Sheep in sheep’s clothing: Why security seekers do not fight each other. *Security Studies*, 7(1), 114–155; Glaser, C. (2004). When are arms races dangerous? Rational versus suboptimal arming. *International Security*, 28(4), 44–84; Johnston, A.I. (2013). How new and assertive is China’s new assertiveness? *International Security*, 37(4), 7–48.

54. For example, Poling, G. (2017). *China's big three near completions: Asian Maritime Transparency Initiative (AMTI)*. Washington, DC: Center for Strategic and International Studies; Townshend, A., & Medical, R. (2016). *Shifting waters: China's new passive assertiveness in Asian maritime security*. Sydney, Australia: Lowy Institute.
55. United States Senate Committee on Armed Services (2017). *United States Pacific command, and United States forces in Korea: Testimony to U.S. congress by Admiral Harry B. Harris, Jr., USN commander, United States Pacific command*. Washington, DC: United States Senate.
56. See Christensen, T.J. (1999). China, the U.S.-Japan alliance, and the security dilemma in East Asia. *International Security*, 23(4), 49–80; Christensen, T.J. (2001). Posing problems without catching up. *International Security*, 25(4), 5–40; Deng, Y. (2006). Reputation and the security dilemma: China reacts to the China threat theory. In A.I. Johnston, & R.S. Ross (Eds.), *New directions in the study of China's foreign policy* (pp. 186–216). Stanford, CA: Stanford University Press, 186–216; Glaser, B.S., & Medeiros, E.S. (2007). The changing ecology of foreign policy-making in China: The ascension and demise of the theory of “peaceful rise”. *The China Quarterly*, 190(190), 291–310.
57. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 181.
58. Johnston, A.I. (2004). Beijing's security behavior in the Asia-Pacific: Is China a dissatisfied power? In J.J. Suh, P.J. Katzenstein, & A. Carlson (Eds.), *Rethinking security in East Asia (Studies in Asian security)*. Stanford, CA: Stanford University Press, 54.
59. For example, at least since 2010 China's coastguard has conducted regular patrols in the waters around the Senkaku Islands, designed to challenge Japan's administrative control of the islands and adjoining seas.
60. Glaser, C., & Fetter, S. (2001). National missile defense and the future of U.S. nuclear weapons policy. *International Security*, 26(1), 40; Friedberg, A. (2005). The future of U.S.-China relations. *International Security*, 30(2), 23; Lieber, K., & Press, D. (2006). The end of MAD? The nuclear dimension of U.S. primacy. *International Security*, 30(6), 7–47.
61. See Blair, B., & Chen, Y. (2006). Editor's notes: The space security dilemma. *World Security Institute*, 2(1); Johnson-Freese, J. (2007). *Space as a strategic asset*. New York, NY: Columbia University Press; Gompert, D.C., & Libicki, M. (2014). Cyber warfare and Sino-American crisis instability. *Survival*, 54(7), 7–22; Johnson-Freese, J. (2015). *Testimony before the U.S.-China economic and security review commission—'China's space & counter-space programs'*. Washington, DC: U.S.-China Economic and Security Review Commission; Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese anti access, area denial, U.S. air sea

- battle, and command of the commons in East Asia. *International Security*, 41(1), 7–48.
62. Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 594.
 63. For example, despite the existence of arms spiraling, the European scramble for the empire during the eighteenth and nineteenth centuries was not *caused* by a security dilemma.
 64. Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.
 65. The competing schools of structural realism generally agree on this point.
 66. Several IR scholars have debated these kinds of issues in relation to the security dilemma. See Jervis, R. (1976). *Perception and misperception international politics*. Princeton, NJ: Princeton University Press; Snyder, J.L. (1985). Perceptions of security dilemma in 1914. In R. Jervis, R.N. Lebow, & J.G. Stein (Eds.), *Psychology and deterrence*. Baltimore: Johns Hopkins University Press; Lebow, R.N., & Stein, J.G. (Eds.). (1989). *Psychology and deterrence*. Baltimore: Johns Hopkins University Press; Larson, D. (1997). *Anatomy of mistrust: U.S.-soviet relations during the cold war*. Ithaca: Cornell University Press.
 67. Tang, S., & Montgomery, E.B. (2007). Uncertainty and reassurance in international politics. *International Security*, 32(1), 193–200; Kydd, A. (2007). *Trust and mistrust in international relations* (3rd ed.) Princeton University Press.
 68. For a theoretical study on ‘asymmetrical conflict’, see Arreguin-Toft, I.M. (2005). *How the weak win wars: A theory of asymmetric conflict*. New York: Cambridge University Press.
 69. Freedman, L. (2013). *Strategy: A history*. Oxford: Oxford University Press, 220–221.
 70. Collins, A.R. (2000). *The security dilemma of Southeast Asia*. London: Palgrave Macmillan; Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.
 71. ‘Weapons asymmetry’ in this context is conditioned by the overwhelming superiority of the United States in all military domains. That is, the ‘asymmetrical’ features of China’s weapons are conditioned by the nature of the prevailing United States–China military balance of power, or an asymmetric distribution of military power. In other words, it is the ‘target’ of these weapons, as opposed to any intrinsic asymmetric features of these weapons themselves, which determines ‘asymmetry’. As this chapter described, the military balance of power between states is one of the core ‘material regulators’ of the security dilemma.
 72. Several scholars have conducted this kind of comparative weapons analysis, and in a few cases have also used security dilemma explanations, for exam-

- ple studies on space, cyber, and electronic warfare (EW) domains. See Pollpeter, K. (2012). Space, cyber, and electronic warfare: Controlling the information domain. In A.J. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China’s military challenge* (pp. 163–194). Seattle and Washington, DC: The National Bureau of Asian Research, 163–194;
- Gompert, D.C., & Saunders, P. (2011). *The paradox of power: Sino-American strategic restraint in the age of vulnerability*. Washington, DC: National Defense University Press.
73. Notable exceptions include Finkelstein, D.M. (2007). China’s national military strategy: An overview of the “military strategic guidelines”. In R. Kamphausen, & A. Scobell (Eds.), *Right sizing the people’s liberation army: Exploring the contours of China’s military*. Washington, DC: National Defense University Press, 69–140; Wishik, A.L. (2011). An anti-access approximation: The PLA’s active counterattacks on exterior lines. *China Security, World Security Institute*, 1(19), 37–48; Fravel, T.M., & Twomey, C.P. (2015). Projecting strategy: The myth of Chinese counter-intervention. *The Washington Quarterly*, 37(4), 171–187; Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese anti access, area denial, U.S. air sea battle, and command of the commons in East Asia. *International Security*, 41(1), 7–48.



CHAPTER 3

Washington's Perceptions and Misperceptions of China's Anti-access Area Denial 'Strategy'

INTRODUCTION

This chapter builds on the current (albeit limited) literature that elucidates the driving forces behind Washington's perceptions and interpretations of the Chinese anti-access/area denial (A2/AD) challenge in East Asia.¹ In particular, it focuses on the strategic ambiguities associated with A2/AD that provided fertile ground for U.S. misperceptions of Chinese strategic intentions to grow. A central contribution of this case study is to demonstrate Washington's perceptions of Chinese A2/AD-operated and A2/AD-influenced U.S. defense planning in the Asia-Pacific. The conclusions reached in this chapter, in particular, U.S. misperceptions and strategic ambiguities associated with Chinese A2/AD, are framed by the theoretical assumptions associated with the security dilemma concept, as well as several closely related cognitive psychology subfields used by scholars to further their understanding of contemporary United States–China security relations.²

Since the 1990s, China's military has been transformed into a more professional and capable fighting force. U.S. defense analysts have become increasingly concerned that the People's Liberation Army's (PLA) newly acquired A2/AD capabilities could put at risk vital U.S. military assets and platforms (or the U.S. 'infrastructure of command') in the Asia-Pacific region, which U.S. forward forces require to bring its force projection power to bear.³ China's multifaceted and increasingly integrated and

sophisticated A2/AD capabilities have been interpreted by several defense analysts as a harbinger of a broader strategic challenge to Washington's power projection capacity, its military freedoms (or its 'command of the commons'), and the 'American way of war'.⁴ As international relations (IR) scholars have opined, the security dilemma between states is more intense when one side significantly increases its defense spending and capabilities, and, simultaneously, acquires enhanced force projection capabilities—both of which China has done since the late 1990s.⁵

This chapter provides a rigorous assessment of the key driving forces behind U.S. perceptions of Chinese strategic intentions related to A2/AD. What is Beijing seeking to achieve through its military modernization efforts, and why is it seeking to achieve it? What are the key assumptions, drivers, and strategic calculations underlying Beijing's military goals? Scholars, defense analysts, and policy-makers alike have actively sought answers to these questions. To be sure, responses to these questions, and in particular the critical assumptions underlying these responses, will have significant implications for the future of U.S. strategic calculations and force postures in Asia, United States–China relations, and regional peace and stability.

Washington's military response to the perceived challenges and strategic ambiguities posed by A2/AD has been most closely associated with the air–sea Battle (ASB) operational concept (renamed JAM-GC in 2015), which was calibrated to signal deterrence to Beijing, secure the regional status quo, and hedge against the risk that Washington's worst-case scenario expectations could actually be realized.⁶ However, in prescribing a battle plan specifically designed to address the A2/AD 'military problem set', the ASB authors' implicitly cast China as a revisionist rising power harboring 'malign' (i.e. expansionist or aggressive) intent. The action–reaction policy dynamics and spirals of mistrust, and arms racing attributed to ASB perceptibly worsened United States–China security relations—and reduced the security for both sides.⁷

This case study elucidates the propensity of the U.S. defense community to conflate Chinese A2/AD capabilities with *explicit proof* of the existence of a coherent and homogeneous strategy and doctrine underwriting these weapons, to fulfill the requirements of particular missions—and that conceptualized the United States as the primary (if not the only) target. It argues that defense analysts by overlooking (or deemphasizing) Chinese operational doctrinal preferences and plans, and relying too heavily on

pure material capabilities, have reinforced U.S. bureaucratic biases and 'mirror-imaging' propensities. Extrapolations from Chinese A2/AD capabilities—grounded in a fundamentally non-Chinese framework of analysis—constituted a critical component in Washington's assessment of the trajectory of Beijing's strategic intentions. As a corollary, the critical assumptions underlying these assessments has resulted in misperceptions of the nature and evolution of Chinese military doctrine and strategic intentions vis-à-vis the United States, in particular, how this operational framework will guide and inform Beijing in the use of military force in future wars in the Asia-Pacific.

Notwithstanding the fact that several Chinese A2/AD capabilities do *appear* (or have the ability) to directly target the United States in the region, *possession* of these capabilities does *not necessarily* confer strategic intent—malign or otherwise. It is important to note that any military prognosis related to the ASB versus A2/AD debate is concerned more with the future military balance and cross-domain warfare in the Western Pacific.⁸ Thus, determining for sure the accuracy of the worst-case scenario, assumptions that underpinned ASB will be decided by the long-term potential and evolution of emerging military technologies; military doctrine; weapon procurements; and the trajectory of regional strategic competition and geopolitical change. This case study, by removing the burden of proof associated with determining whether Beijing intends to exclude the United States from areas of the Western Pacific, focuses on the critical U.S. framing assumptions (or analytical baselines) themselves, which have left ample scope for misperceptions confounded by institutional cognitive biases.

This chapter proceeds as follows. First, it highlights the major driving forces underlying U.S. threat perceptions associated with Chinese A2/AD capabilities. Second, it unpacks some of the strategic ambiguities and uncertainties related to China's 'active defense' core strategic concept, and a Chinese doctrinal penchant for the use of early and preemptive strikes. Third, it considers the nature, extent, and assumptions driving U.S. misperceptions of Chinese strategic intentions to demonstrate how these cognitive biases influenced U.S. military policy vis-à-vis China. Finally, it ties in the chapter's central themes to briefly reflect on implications for United States-China crisis stability and military escalation control for future conflict or crisis, which pits Chinese A2/AD against ASB in the Asia-Pacific.

WASHINGTON'S HEIGHTENED THREAT PERCEPTIONS AND CHINA'S EXISTENTIAL A2/AD CHALLENGE

Chinese A2/AD capabilities have increasingly been perceived by Washington as a potential challenge to U.S. military freedom, putting at risk the core features of the U.S. military and defense architecture in East Asia—the lynchpin of Washington's power projection since the end of the Cold War. These features have enabled the United States to fulfill its regional treaty commitments and sustain a relatively unfettered freedom of navigation in the Western Pacific, comprising a vital component of America's global 'command of the commons'.⁹ The Department of Defense (DoD) has conceptualized Chinese A2/AD capabilities in the following way: 'anti-access' strategies and capabilities (e.g. precision-guided ballistic, and cruise antiship weapons) are *designed to delay or prevent* an adversary from entering into a region of conflict; 'area denial' strategies and capabilities (e.g. advanced air defense networks and guided rockets, artillery, mortars, and missiles) are *designed to restrict the freedom of action* of an adversary *once it is in* a theater of operations.¹⁰ These concepts have been used interchangeably to characterize China's efforts to *prevent* the United States from intervening militarily in a Taiwan Straits contingency.¹¹

A broad survey of U.S. empirical sources relating to Chinese A2/AD capabilities reveals several key themes that illustrate how Washington conceptualized the A2/AD challenge. Although the A2/AD concept is not a Chinese strategic term per se—the term is seldom found in official Chinese military sources—several seminal features associated with the concept enable this study to establish a critical analytical baseline to compare Washington's A2/AD strategic construct with Beijing's military doctrinal preferences, and broader strategic goals. For this purpose, we can identify eight overarching themes that had an outsized impact on U.S. assessments of Beijing's strategic intentions. This approach enables a more robust case to be made for the deterioration of United States–China security relations in the Asia-Pacific, caused by U.S. misinterpretations of Chinese intentions and compounded by cognitive bias, strategic ambiguity, and limited Chinese military transparency—all of which are closely associated with an intense security dilemma:

- Beijing's military modernization is primarily concerned with restricting access and the freedom of movement to U.S. forward forces operating in a 'contested zone' in and around China's periphery.¹²
- A2/AD 'strategy' is predicated on keeping U.S. forces at bay primarily by deploying long-range precision cruise and ballistic missiles—which the U.S. DoD anticipates will soon be capable of reaching U.S. bases in Guam.¹³
- A2/AD capabilities primarily target U.S. overseas military bases, weapons systems, and platforms—especially naval carrier strike groups.
- A2/AD capabilities fulfill primarily *wartime* objectives, but particular aspects also have *peacetime* applications—notably cyberspace, space, and electronic warfare (EW) capabilities.
- A2/AD is institutionalized at a *strategic level* and integrated into Beijing's broader national security strategic calculus, that is China's comprehensive national power (CNP).
- A2/AD capabilities and guiding doctrines are *asymmetric* in nature. In this context, 'asymmetry' is defined relative to U.S. regional military primacy. During Beijing's 2015 *Victory Day Parade* the *Dongfeng DF-21D* antiship ballistic missile (ASBM) was described by Chinese state media as an '*assassin's mace* for maritime *asymmetric warfare*'.¹⁴
- A2/AD capabilities emphasize advanced long-range missile strike capabilities, in particular, the use of 'asymmetric' conventional weapons systems to enhance China's strategic deterrence.¹⁵
- The areas in between and surrounding China's first and second island chains (or China's 'near seas') define the geographical scope and focus of the A2/AD 'strategy' (Fig. 3.1).¹⁶

'ACTIVE DEFENSE' AND CHINESE STRATEGIC AMBIGUITIES

The People's Liberation Army's (PLA) authorized doctrinal text *The Science of Military Strategy* (SMS) described the 'active defense' concept as a cornerstone in strategic theory, guiding the military modernization efforts of successive generations of Chinese leaders.¹⁷ At the heart of this principle is the premise of 'striking only after the enemy has struck' and that when it does 'strike' China will use offensive operations at all levels of war. According to the PLA's first Deputy Chief of General Staff, General Zhang Qinsheng, 'active defense' is 'on the whole' strategically *defensive*, but 'on the specifics'



Fig. 3.1 China's first and second island chains (Office of the Secretary of Defense, U.S. Department of Defense. (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 23)

potentially offensive—or uses offensive actions to achieve defensive goals.¹⁸ China's official National Defense White Papers (from 2002 to 2015) also made itinerant references to 'active defense'. The 2008 White Paper, for example, described the concept in the following way:

'Active defense' features 'defensive operations, self-defense and striking and getting the better of the enemy *only after the enemy has started an attack*'.¹⁹

Similarly, the SMS summarized this approach as follows:

Strategy (or military strategy) in China's new periods is taking the national comprehensive power as its foundation; [the concept of] *active defense* as its guidance; and winning local war under high-tech conditions as its basic [starting] point to construct and exercise military strength ... for the *purpose of protecting national sovereignty and security*.²⁰

External analysts are familiar with both the Chinese cult of 'defense' and the 'active defense' concept.²¹ An area of ongoing debate and controversy, however, relates to the strategic ambiguity caused by how the Chinese *self-defense* principle—enshrined within 'active defense'—can be reconciled with a seemingly contradictory doctrinal emphasis on early and preemptive attacks. The use of the *self-defense* principle in the SMS can in part be attributed to Beijing's desire to be able to claim the legal and moral high ground in the event where *defensive* military force is required. It is noteworthy that active defense operation 'does *not require* China to actually suffer a physical blow ... "active defense" *provides the basis for preemptive action*'.²² For example, the SMS states as follows:

Under high-tech conditions, for the defensive side, the strategy to gain mastery by *striking only after the enemy has struck does not mean waiting for enemy's strike passively* ... the *first shot* [early or preemptive strike] on the plane of *politics and strategy* must be differentiated from the first shot on the plane of tactics ... if any country or organization *violates the other country's sovereignty or territorial integrity*, the other side will have the *right to fire the first shot*' ... *military counterattacks may be taken*.²³

This passage implies that a significant amount of strategic ambiguity exists in what Beijing might consider a *sine qua non* (or 'red lines') for violating its 'sovereignty or territorial integrity'. That is, if any red lines were (or were perceived to be) breached, what operational doctrine and

escalation ladders would guide Beijing in its decision to order ‘first shot(s)’ or preemptive strikes? Moreover, although the SMS stressed that the use of preemptive or early strikes should not be ‘expansive and *extrovert offensive* ... but *strategically defensive*’ they did not, however (aside from detailing several generic potential targets), elaborate on *how* at an *operational level* these kinds of military campaigns would be managed or controlled.²⁴ Chinese strategic-cultural traditions which emphasized the element of surprise, choosing ‘the unexpected time, place, and pattern of war which the *enemy finds most reluctant and difficult* to deal with’, compounded these ambiguities.²⁵ Strategic ambiguities of this kind indubitably complicate the challenge for defense analysts in fathoming how active defense might be interpreted by Beijing to guide and inform its strategy thinking, operational doctrine, force postures, weapons procurements, and training requirements.

WASHINGTON’S CAPACITY-BASED ASSESSMENTS AND PROJECTING U.S. STRATEGY

U.S. interpretations of China’s A2/AD ‘strategy’ have been heavily dependent upon identifying particular military capabilities that would *be required* to accomplish A2/AD missions. That is, in the formulation of their assessments U.S. defense analysts have tended to identify specific military capabilities that corroborate the operational prerequisites considered necessary for an A2/AD ‘strategy’. As a result, these capabilities were often taken as *explicit proof* of the existence of a coherent operational doctrine, and homogeneous strategy. In other words, the PLA’s *capabilities* have served as the starting point (or analytical baseline) for U.S. assessments and interpretations of Chinese strategic *intentions*—with the use of Chinese empirical sources used to *fill in the gaps* where expedient. Analyst Anton Lee Wishik posited that ‘extrapolations from Chinese capabilities make up a vital component of the U.S. A2/AD *assessment of China’s military strategy*’.²⁶ To be sure, this kind of reverse engineering does not necessarily invalidate the conclusions reached by U.S. defense analysts—many of which appear reasonable and accurate.²⁷ Rather, the problem lies with the underlying assumptions extrapolated from Chinese A2/AD military capabilities to determine the trajectory of Beijing’s strategic intention vis-à-vis Washington.

While China has acquired—and is actively in the process of developing—military capabilities that *could* accomplish A2/AD missions, for now at least, the PLA lacks a sufficiently mature operational doctrine to effectively integrate and guide an A2/AD ‘strategy’. If such a coherent operational doctrine had existed, one would expect to have seen evidence of its impact upon military procurements and training requirements, together with reports of these activities in official PLA press announcements—if only for the purpose of publicly justifying the fiscal outlay for these acquisitions. Furthermore, a mature operating doctrine would also be required to guide military commanders in use of A2/AD weapons for deterrence signaling, which did not appear to be the case.²⁸ For example, the evidence indicated that China’s submarine fleet (a core component of A2/AD) was seldom deployed for deterrence-signaling operations—with the possible exception of the surfacing of a *Song* attack submarine near the U.S. *Kitty Hawk* carrier in 2006.²⁹ In 2015, the DoD reported that the PLA Navy (PLAN) commenced its first nuclear-armed submarine (SSBM) deterrence patrol (or ‘continuous at sea deterrence’ operations), which signaled to potential adversaries (especially the United States) China’s first credible second strike capacity.³⁰

Scholar Stephen Biddle argued that military capabilities *alone* say very little about states’ underlying strategic intentions (or military power), unless capabilities are integrated into states’ military doctrine, to harness its strengths and minimize its weaknesses.³¹ Scholars have long recognized that differences in military doctrine, operating frameworks, and strategic cultures can lead to misperceptions and misunderstandings between states.³² By placing an undue emphasis on material measures (i.e. numbers and technologies) of Chinese A2/AD military capabilities, U.S. defense analysts have overlooked Chinese military operational preferences and doctrine—which will crucially influence the trajectory of Chinese strategy, and indicate (implicitly or explicitly) how and under what conditions future warfare will be fought in the Western Pacific.

Capacity-based threat assessments have constituted a long-standing methodology applied by the Pentagon; for example, since 2000 the DoD has applied this approach in their annual reports to Congress on the PLA.³³ These include a series of inferences and deductions extrapolated from Chinese A2/AD capabilities to determine the nature and likely trajectory of Chinese strategic objectives, and grounded in a United States-centric analytical framework informed by U.S. military doctrine,

organizational and bureaucratic traditions, operating practices, and strategic culture.³⁴ For example, in its 2016 report, the DoD stated the following:

China is investing in military programs and weapons *designed* to improve extended-range power projection, anti-access/area denial ... [that will] also *enable* the PLA to conduct a range of military operations in Asia beyond China's traditional territorial claims.³⁵

Similarly, the former head of the U.S. Pacific Command, Admiral Willard, stated that 'elements of China's military modernization *appear designed* to challenge our [U.S.] freedom of action'.³⁶ Finally, in a widely cited and 'semi-authorized' report published by the Center for Strategic and Budgetary Assessments (CSBA), the authors drew a similar conclusion—albeit in a more strident tone:

Many of the capabilities the Chinese military is acquiring reflect deliberate A2/AD operational approach that is *specifically designed* to keep [U.S. forces] ... from approaching close to China. The PRC *appears purposefully developing and fielding offensive capabilities that challenge U.S. freedom of action in all domains*.³⁷

Although the language used in these statements (i.e. 'appears' and 'designed') was carefully chosen to soften the diplomatic blow of openly criticizing China, the military policy prescriptions that emerged clearly signaled to Beijing the following: the United States considered the 'new' options offered to Beijing from its expanding A2/AD capabilities as an overt (offense) challenge, and, in turn, a response to this challenge would come at a strategic level. Robert Jervis opined in cases where the offense is dominant, especially when the offensive–defensive balance is not clearly distinguishable, the security dilemma between states is more intense.³⁸

Several issues have complicated the challenge for U.S. defense analysts in their assessments of Chinese A2/AD, which reinforced the (over)reliance on capacity-based worst-case scenario defense planning, exacerbated strategic ambiguities, and gave space for misperceptions and cognitive biases to grow. First, the lead times associated with the development of new and technologically advanced capabilities are relatively long, and new programs (e.g. warships and stealth bomber replacements) can often take decades to mature.³⁹ Thus, the major concern for the U.S. defense planners

was how Chinese A2/AD might develop in the *future*. Except for contingencies in close proximity to China's coastline, however, most analysts anticipate that at least in the near term, U.S. air and sea dominance in the Asia-Pacific would remain unchallenged.⁴⁰ From a theoretical perspective, the cognitive impact of actors' expectations of an adversary's *future* strategic intentions, upon their *present* perceptions, can be described as follows:

The expectations and perceptual mind-set of an actor broadly reflects: 'estimates of what the world is like [presently] and therefore of what the person is *likely to be confronted with*', and that these expectations '*create predispositions* that lead actors to notice certain things, *neglect others* ... [and consequently actors] find it *difficult to consider alternatives*'.⁴¹

Second, the lack of Chinese military transparency and limited access to information on several seminal areas of Chinese military affairs include the PLA's command and control structures; stove-piped decision-making processes; and dual-use assets. The 2014 DoD report to Congress explicitly underscored these concerns:

China's lack of transparency surrounding it[s] military capabilities and strategic decision-making has led to increased concerns in the region of China's intentions. The report added that such concerns would likely 'intensify' in the absence of transparency specifically related to the PLA's A2/AD modernization programs.⁴²

Several prominent IR scholars have posited that the extent to which military transparency reveals states' strategic intentions is dependent upon the ability to distinguish between offensive and defensive weapons; if they are not easily distinguishable (especially when 'dual-use' technologies are involved), states' intentions will remain uncertain—even if transparency is improved.⁴³

In addition to Chinese military opacity, Washington's China policy also restricted defense analysts' access to potentially high-value information, which reinforced the propensity to place undue attention on Chinese material capabilities—over its military doctrine and preferences. Noteworthy, U.S. restrictions on both National Aeronautics and Space Administration (NASA) and the White House Office of Science and Technology Policy (OSTP) in collaborating, coordinating, or participating

bilaterally with China on space policy significantly reduced the possibility for United States–China cooperation in the space domain.⁴⁴ Importantly, these restrictions denied Washington access to vital military-related information on China’s dual-use space industry including the PLA’s standard operating procedures, decision-making processes, and organizational structures. Improved access to this kind of information may have helped address Washington’s significant knowledge gaps in the development of Chinese space technologies, and, in turn, could have enabled a more robust understanding of Beijing’s strategic intentions in this increasingly contested domain. According to Jervis, the failure of actors to actively seek new empirical evidence where such information is *available and relevant* constitutes an ‘irrational way’ of processing information, which intensifies the security dilemma.⁴⁵ Moreover, the uncertainty created by the lack of information about adversary’s military capacities can exacerbate misperceptions between states, and increase the likelihood of conflict—akin to a form of ‘information asymmetry’, that is an insufficient appreciation of an adversary’s capabilities and interests.⁴⁶

The historical record has shown that actors tend to assess an adversary’s military capabilities and strategic intentions through an analytical prism (or ‘military lens’); shaped by their own military doctrines, organizational, bureaucratic traditions, customs, and strategic cultures.⁴⁷ A wide range of complex factors can influence accurate assessments of states’ military capabilities and intentions; and thus, determinations are in large part conditioned by actors’ perceptions of the ‘relative’ military balance. Opacity and the inherent ambiguity of weapons in the international system compound this analytical challenge, which exacerbates strategic ambiguities and reinforces preexisting cognitive biases.⁴⁸ As a corollary, in all but the most unambiguous of sources, new information merely confirms preexisting and familiar frameworks of analysis—or the problem of ‘mirror-imaging’.⁴⁹ A good case in point of this tendency are extrapolations drawn from the Pentagon’s estimates of the strike ranges of Chinese missiles to *infer* (or project) the existence of a Chinese A2/AD ‘strategy’,⁵⁰ designed to prevent and deter U.S. forces from operating inside of China’s first island chain.⁵¹ In other words, Chinese weapons that fulfilled the (United States–defined) operational requirements of A2/AD were taken as explicit proof of the existence of a coherent strategy guiding the use of these weapons—U.S. analysts seldom sought Chinese sources to corroborate their assessments (Fig. 3.2).

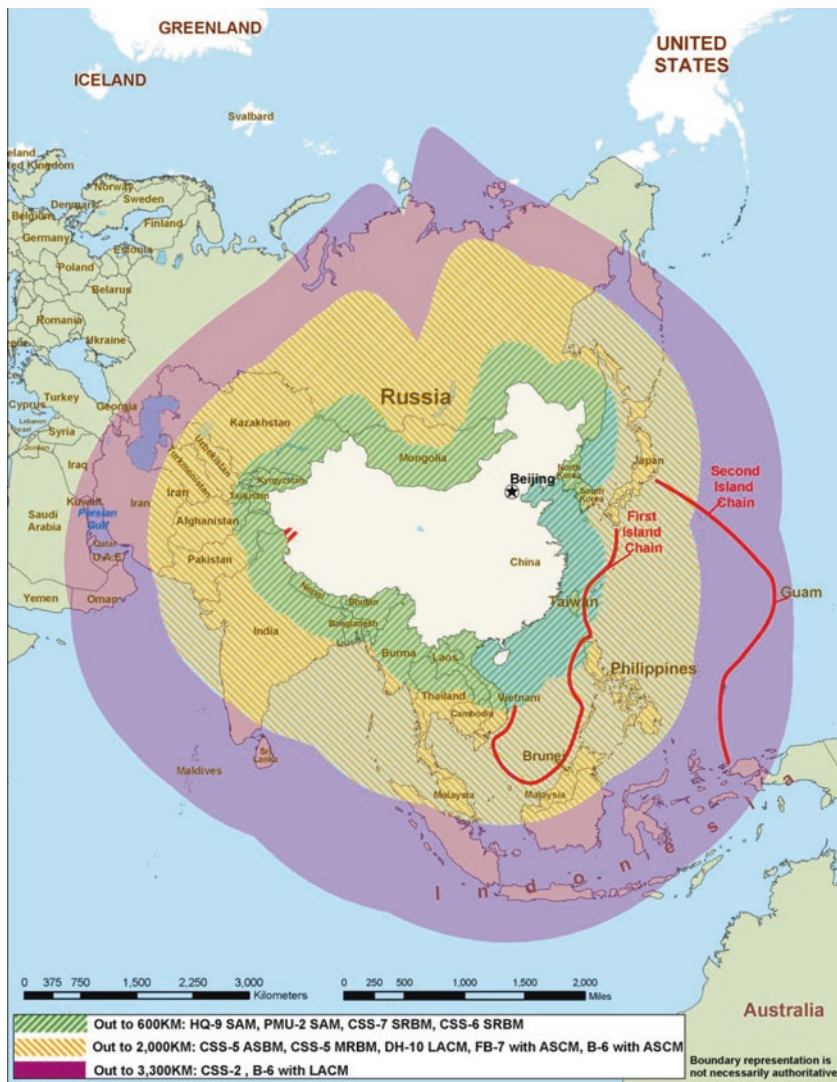


Fig. 3.2 Estimated ranges of the People's Liberation Army (PLA) conventional anti-access/area denial (A2/AD) ground-based missile capabilities—including the DF-21D (or CSS-5) (Office of the Secretary of Defense, U.S. Department of Defense. (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 31)

Similarly, defense analysts expressed concern that China's power projection capacity (especially long-range precision-strike missiles [PSMs]) could extend out to the 'second island chain'—circa 3000 km from China in a line that connects Guam, Japan, and Papua New Guinea.⁵² For example, the DoD stated that China was '*seeking the capacity to hold [U.S.] surface ships at risk through a layered capability reaching out to [China's] "second island chain"*', offering Beijing '*pre-emptive and coercive options in a regional crisis*'.⁵³ This assertion was predicated on the assumption that the *possession* or the development of a capacity to fulfill 'preemptive and coercive' operations was emblematic of a shift in the trajectory of Chinese military doctrine—*offensive* at both a tactical and strategic level. A central argument this chapter makes is that irrespective of the logic or accuracy of U.S. 'A2/AD assessments' inferences were invariably made *before* gaining a reasonable amount of equivalence with Chinese military doctrine or strategic concepts. To be sure, a wider range of Chinese sources would have enabled analysts to more rigorously apply U.S. A2/AD approximations to represent Chinese operational preferences and plans, and, in turn, shift the focus away from pure military 'material' considerations.

IMPLICATIONS FOR FUTURE MILITARY ESCALATION CONTROL, DETERRENCE, AND STRATEGIC STABILITY IN THE ASIA-PACIFIC

The potential implications for future regional crisis stability and escalation management as a result of ASB pitted against Chinese A2/AD could be exacerbated by several strategic, tactical, and operational features associated with these competing concepts: the deployment of offensive-dominant capabilities guided by preemptive and early-use operational doctrines; an increasing dependence upon (and a tactical preference in the use of) technologically advanced dual-use military capabilities and systems; the development of 'dual payload' missile systems, which blurred the traditional conventional-nuclear threshold (discussed in Chaps. 5 and 6); a Chinese military doctrinal propensity to overstate the effectiveness and utility of tactical military signaling, and underestimate the potential escalation risks associated with these signals; and finally, a penchant (on both sides) for secrecy and strategic ambiguity in the development and accumulation of offensive weapons. In aggregate, these features increased the risk that misunderstandings—caused by misperceptions and misinterpretations—could

weaken regional escalation management, and intensify Sino–American strategic competition. As IR theorists opined, in cases where incentives (or disincentives) exist for each side *not to cooperate*, both sides will likely pursue their own narrow self-interests, and become predisposed to view the other as an adversary (or at least a potential one), which leaves *both* sides worse off.⁵⁴

Given the high escalatory risks associated with launching a conventional attack on a nuclear-armed state, the early ‘deep-strike’ operations envisaged by ASB proved particularly controversial. Operations of this kind, by potentially increasing China’s vulnerability to U.S. attacks risked triggering dangerous escalatory ‘use them or lose them’ pressures in Beijing.⁵⁵ Notwithstanding China’s long-standing ‘no first use’ nuclear pledge, however, ‘it would be imprudent to take the policy at face value, given [China’s] changing strategic circumstances’.⁵⁶ That is, Beijing’s fear that its command and control structures could be impaired or destroyed (especially through U.S. cyberattacks) would likely increase the incentives to authorize preemptive and early strikes against U.S. cyberspace and space-based assets.⁵⁷ Simply put, the strategic ambiguities associated with ASB–A2/AD offense-dominant capabilities meant that they were perhaps *only* effective if used to attack early on in a conflict—*before* the other side had time to respond with countermeasures.⁵⁸

ASB critics argued that the concept prescribed an *operational approach* to what was fundamentally a *strategic challenge* in Asia. Specifically, the Pentagon offered very few indications of what Washington’s strategic objectives might be (and how they might alter) in the event of a United States–China conflict or crisis (or thinking the unthinkable), which defense planners need to consider.⁵⁹ ASB defense analyst Dan Blumenthal ‘put the *operational cart before the strategic horse* ... contemplating an attack on a nuclear-armed country [China] in depth, it would be wise to know for what purpose the U.S. would take such risks’.⁶⁰ Thus, insufficient calibration of ASB with Washington’s ‘rebalance’ policy, and more broadly U.S. ‘grand strategy’, caused a fair amount of consternation and anxiety within the U.S. defense community, among America’s Asian-based allies, and, above all, in Beijing. To be sure, the uncertainties and strategic ambiguities associated with ASB increased the risk that Beijing’s mistrust of U.S. strategic intentions (already heightened by the ‘rebalance’) could increase.⁶¹

According to senior PLA officer Gaoyue Fan, ‘if the U.S. military develops Air-Sea Battle ... the *PLA will be forced to develop anti-Air-Sea Battle doctrine and capabilities*’.⁶² Similarly, China’s state-sponsored

newspaper *The People's Daily* stated that 'if the U.S. takes the ASB system seriously, *China has to upgrade its anti-access capabilities ... to deter any external interference*'.⁶³ Finally, the following passage from the latest version of the doctrinal SMS indicates that Beijing's response to ASB risked triggering a conventional weapons arms race:

China needs to [in response to the ASB concept] continue to innovate a series of tactics to attack unmanned aerial vehicles, stealth technology, cruise missiles, carrier strike groups, and space platforms, and to *defend against* ISR, precision strike, cyber-attacks, space attacks and develop its special asymmetrical ... style of warfare.⁶⁴

Therefore, insufficient appreciation by Washington of how Beijing perceives U.S. military policies and postures in Asia (or 'security dilemma sensibility') increased the risks of creating a self-fulfilling and self-reinforcing security dilemma.⁶⁵ As security dilemma theorists have noted, the difficulty states face in putting themselves into the *minds of others* often causes actors to erroneously assume that its intentions (signaled by words and deeds) are *necessarily* interpreted by the recipient as they were originally intended.⁶⁶

Two additional factors related to the ASB–A2/AD dynamic could exacerbate future crisis stability and escalation management in the Asia-Pacific. First, it does not appear as though future ASB operations would incorporate a demonstration by the United States of its nuclear retaliatory capacity. Several analysts have argued that a demonstration of this capacity would be vital to deter a Chinese nuclear counterstrike.⁶⁷ However, the success of nuclear-signaling operations aimed at China would likely be compromised by Chinese strategists' continued embrace of the Cold War era 'stability–instability paradox' logic.⁶⁸ Following this logic, Beijing would likely assume that in the event of a crisis or conflict its nuclear deterrent would be sufficient to restrain the United States in the use of nuclear weapons, and, in turn, provide China with operational flexibility during a *conventional* conflict. Chinese overconfidence in the 'stability–instability paradox' logic could, however, encourage defense planners to underestimate the inherent escalation risks during a conventional conflict.⁶⁹ Moreover, the opacity surrounding Chinese nuclear posture, together with the strategic ambiguities surrounding China's 'no-first-use' pledge (discussed fully in Chap. 6), may compound the risk of nuclear escalation.⁷⁰

Second, the evidence suggests that Chinese strategists have a tendency to overestimate the utility of tactical operations to signal (resolve and deterrence) and simultaneously underestimate the escalatory risks inherent in the use of such tactics.⁷¹ Under crisis conditions, China's relatively underdeveloped (and heavily stove-piped) crisis management theory and decision-making mechanisms could compound strategic ambiguities, which, in turn, increase the risks of deterrence failure and escalation.⁷² IR scholars have observed that military-signaling tactics tend to be highly subjective in nature, and that the effectiveness of these efforts are determined by a combination of technical, administrative, and perceptual processes; a breakdown in any of these interconnected processes could result in misinterpretations, miscalculations, and, ultimately, inadvertent or accidental war.⁷³

CONCLUSION

A central argument this chapter makes is that, irrespective of the rationale, accuracy, or reasonableness of U.S. assessments of Chinese A2/AD, inferences made by defense analysts were often decided *before* achieving sufficient equivalence with Chinese military doctrine and operational preferences. Instead, U.S. defense analysts selectively interpreted (or cherry-picked) Chinese empirical sources to support preexisting (worst-case scenario) and familiar frameworks of analysis, rather than using these sources to establish analytical baselines to frame their assumptions. This well-established analytical approach overemphasized the capacity of A2/AD, which in turn reinforced analysts' bureaucratic cognitive biases and 'mirror-imaging' proclivities. Defense analysts conflated A2/AD capabilities with the operational prerequisites considered by the United States necessary to construct and integrate a coherent strategy. The problem, therefore, resided with analysts' underlying critical assumptions, extrapolated from Chinese A2/AD military capabilities to determine the likely trajectory of Beijing's strategic intentions. Thus, greater engagement with relevant Chinese sources would have assisted analysts to form empirically more robust approximations of Chinese A2/AD, and, in turn, reduce the reliance upon pure material assessments. Many of Chinese A2/AD capabilities did *appear* (or had the ability) to target the military assets of the United States in Asia, but possession of these capabilities did not necessarily confer an underlying strategic intention—malign or otherwise.

This study identified two key factors that complicated the challenge for defense analysts in their assessment of Chinese A2/AD, which, in turn, reinforced the U.S. propensity for capacity-based methodologies, and gave space for misperceptions and cognitive biases to grow. First, the long lead times associated with the development of new and technologically advanced capabilities meant that the most pressing concern for U.S. defense planners was the likely trajectory of Chinese A2/AD. That is, the cognitive impact of analysts' expectations of Beijing's *future* intentions upon their *present* perceptions created predispositions, which invariably interpreted relevant or new information as merely confirming preexisting and familiar frameworks of analysis—or 'mirror-imaging'. Second, weak military transparency and limited information on several key aspects of Chinese military affairs (especially dual-use technologies and civil–military relations) reinforced the U.S. penchant to place an undue emphasis on China's material capabilities. Another key finding was that, by prescribing ASB as countervail to address the A2/AD 'military problem set', Washington implicitly cast China as a revisionist rising power, which worsened the United States–China security dilemma. Under crisis or conflict conditions, several strategic, tactical, and operational features associated with ASB versus A2/AD will likely worsen future regional strategic stability, reduce incentives for United States–China cooperation, and, in the presence of a security dilemma, increase the risk of misperception and miscalculation.

Acknowledgment This chapter is derived from an article published in *The Pacific Review*, January 2017, copyright held by the publishers Taylor & Francis, LLC, available online: <https://doi.org/10.1080/09512748.2016.1239129>.

NOTES

1. Anti-access/area denial (A2/AD) strategic concepts that were first used by the U.S. DoD in their 2001 Quadrennial Defense Review (QDR). In recent years, a number of countries have increased their investments in A2/AD capabilities (especially antiship cruise and ballistic missiles, submarines, and aircraft carriers) including China, Russia, and Iran. In addition to the A2/AD potential threats posed by China, the DoD in its QDR report stated that Iran has also deployed a variety of A2/AD capabilities that could overwhelm U.S. layered naval defenses operating in the Persian Gulf. See Office of the Secretary of Defense, U.S. Department of Defense.

- (2010). *Quadrennial defense review report*. Washington, DC: U.S. Department of Defense, 31–33.
2. As described in Chap. 2, the use of cognitive and psychology concepts and methods by IR scholars has added intellectual depth to the security dilemma concept. See Boulding, K.E. (1959). National images and international systems. *The Journal of Conflict Resolution*, 3(2), 120–131; Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press; Garthoff, R.L. (1994). *Detente and confrontation: American-Soviet relations from Nixon to Reagan*. Washington, DC: Brookings Institution. For United States–China relations, see Friedberg, A. (2005). The future of U.S.-China relations. *International Security*, 30(2), 7–45; Godwin, P. (2010). Asia's dangerous security dilemma. *Current History*, 109(728), 264–266; Scobell, A. (2012). Learning to rise peacefully? China and the security dilemma. *Journal of Contemporary China*, 21(76), 713–721; Johnston, A.I. (2013). How new and assertive is China's new assertiveness? *International Security*, 37(4), 7–48; Mearsheimer, J.J. (2014). *The tragedy of great power politics*. New York; London: Norton & Company; Liff, A., & Ikenberry, J. (2014). Racing toward tragedy?: China's rise, military competition in the Asia Pacific, and the security dilemma. *International Security*, 39(2), 52–91.
 3. Cliff, R., Burles, M., Chase, S.M., Eaton, D., & Pollpeter, K. (2007). *Entering the dragon's lair: Chinese anti access strategies and their implications for the United States*. Santa Monica: RAND Corporation; Montgomery, E.B. (2014). Contested primacy in the Western Pacific: China's rise and the future of U.S. power projection. *International Security*, 38(4), 115–149; Office of the Secretary of Defense, U.S. Department of Defense. (2015). *Military and security developments involving the People's Republic of China, 2015*. Washington, DC: U.S. Department of Defense.
 4. Posen, B.R. (2003). Command of the commons: The military foundation of U.S. hegemony. *International Security*, 28(1), 5–46.
 5. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214; Christensen, T.J. (1999). China, the U.S.-Japan alliance, and the security dilemma in East Asia. *International Security*, 23(4), 49–80.
 6. The ASB concept is one component of the overarching 2012 Joint Operational Access Concept (JOAC), and was renamed as part of a 'major rethink' by the DoD as the Joint Concept for Access and Maneuver in the Global Commons (JAM-GC) in 2015. Goldfein, D. (2015). Document: Air Sea Battle name change memo. *USNI*, 8 January 2015. Available at: <http://news.usni.org/2015/01/20/document-air-sea-battle-name-change-memo> (Accessed: 8 June 2015). Former U.S. Secretary of Defense Chuck Hagel originally articulated the Pentagon's 'Third' Offset Strategy

in late 2014. In a speech in January 2015, more details were offered by Deputy Secretary of Defense Robert Work. Work, R. (2015). The third offset strategy and its implications for partners and allies, remarks as delivered by Deputy Secretary of Defense Bob Work. Washington, DC. *U.S. Department of Defense*, 28 January 2015. Available at: <http://www.defense.gov/News/Speeches/Speech-View/Article/606641/the-third-us-offset-strategy-and-its-implications-for-partners-and-allies> (Accessed: 29 January 2015). Although this new concept appeared to have been formulated to replace the often-criticized ASB, it has not been officially stated to date. Rather, the Third Offset Strategy—together with the Defense Innovation Initiative (DII)—can be best viewed as a strategy that can enable the technologies that underpin ASB: leveraging U.S. advantages in new and emerging military technologies to counter the perception of weakening U.S. dominance in several more ‘traditional’ conventional military domains.

7. The United States also faced advanced A2/AD threats from the Soviet Union during the Cold War. This experience has arguably made it easier for U.S. analysts to use similar (and familiar) strategic frames of reference to assess China’s military capabilities. In contrast to the contemporary United States–China security relationship, however, both the United States and the Soviet Union broadly agreed that they were engaged in a *competitive* bilateral security relationship—even if disagreement existed as to the nature and outcome of this rivalry. Much debate and contention, however, surrounds the nature and trajectory of contemporary United States–China strategic relations. See Rosen, S.P. (2002). *War and human nature*. New York, NY: Hill & Wang; Mahnken, T.G. (Ed.). (2012). *Competitive strategies for the 21st century—Theory, history, practice*. Stanford, CA: Stanford University Press.
8. Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese anti access, area denial, U.S. air sea battle, and command of the commons in East Asia. *International Security*, 41(1), 7–48.
9. For example, Krepinevich, A.J. (2010). *Why Air-Sea Battle?* Center for Strategic and Budgetary Assessments, Washington, DC; Krepinevich, A.J. (2015). How to deter China: The case for archipelagic defense. *Foreign Affairs*, 94(2), 1–10; Cliff, R. (2011). *Anti-access measures in Chinese defense strategy—Testimony before the U.S. China economic and security review commission*. Washington, DC: The RAND Corporation; McDevitt, M. (2011). The PLA navy’s anti access role in a Taiwan contingency. In P. Saunders, C. Yung, M. Swaine & A. En-Dzu Yang (Eds.), *The Chinese navy: Expanding capabilities, evolving roles* (pp. 191–214). Washington, DC: National Defense University Press.

10. Office of the Secretary of Defense, U.S. Department of Defense. (2012). *Joint operational access concept (JOAC)*. Washington, DC: U.S. Department of Defense, 6–7.
11. McDevitt, M. (2011). The PLA navy's anti access role in a Taiwan contingency. In P. Saunders, C. Yung, M. Swaine, & A. En-Dzu Yang (Eds.), *The Chinese navy: Expanding capabilities, evolving roles* (pp. 191–214). Washington, DC: National Defense University Press.
12. Blumenthal, D. (2012). The U.S. response to China's modernization. In A. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 309–340). Washington, DC: The National Bureau of Asian Research (NBR); Dutton, P., Erickson, A.S., & Martinson, R. (2014). China's near sea combat capabilities. *Naval War College: China Maritime Studies Institute, 11* (February).
13. According to the U.S. DoD, China is developing conventional ballistic weapons capable of reaching as far as Guam, Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2015). *Annual report to congress: Military power of the people's republic of China*. Washington, DC: U.S. Department of Defense, 40. In 2015, China officially revealed the DF-26 intercontinental range ballistic missile (IRBM); a dual-payload missile system officially described by China as 'capable of targeting large- and medium-sized targets on water'; Erickson, A.S. (2015). Showtime: China reveals two 'carrier-killer' missiles, *The National Interest*, 3 September 2015. Available at: <http://nationalinterest.org/feature/showtime-china-reveals-two-carrier-killer-missiles-13769> (Accessed: 3 July 2015).
14. Ibid.
15. Christensen, T.J. (2001). Posing problems without catching up. *International Security*, 25(4), 5–40.
16. The *first chain* refers to the chain of major archipelagos from the East Asia continental mainland coast composed of the Kuril Islands, Japanese Archipelago, Ryukyu Islands, Taiwan, the Northern Philippines, and Borneo. The *second chain* refers to the chain of archipelagos out from the East Asian continental coast and beyond the first chain—composed of the Bonin Islands, Marianas Islands, and Caroline Islands—from Honshu to New Guinea. Office of the Secretary of Defense, U.S. Department of Defense. (2010). *Military and security developments involving the People's Republic of China, 2010*. Washington, DC: U.S. Department of Defense, 22–23. For a recent discussion on how Chinese analysts conceptualize the 'Island Chains' in Asia see, Erickson, A.S., & Wuthnow, J. (2016). 'Barriers, Springboards and Benchmarks: China Conceptualizes the Pacific 'Island Chains'', *The China Quarterly*, 225, 3–4.

17. Peng Guangqian, & Yao Youzhi (Eds.). (2005). *The science of military strategy* (English Edition ed.). Beijing, China: Military Science Press, 454–459. This chapter has primarily used officially ‘authorized’ Chinese materials from the following sources listed in order of their authoritativeness: China’s official *National Defense White Papers* (published since 1998, and renamed China’s ‘Military Strategy’ in 2015); officially sanctioned military doctrinal texts (especially the *Science of Military Strategy*); articles from China’s official military PLA press; and commentary and opinions from Chinese analysts and strategists affiliated with China’s premier military teaching and research institutes. See Godwin, P.H., & Miller, A.L. (2013). China’s forbearance has limits: Chinese threat and retaliation signaling and its implications for a Sino-American military confrontation. *Institute for National Strategic Studies, National Defense University*, 6(71), 1–120; Fravel, T.M. (2016). *China’s changing approach to military strategy: The science of military strategy from 2001 and 2013*. (No. 2016-15). Cambridge, MA: MIT, Political Science Department. For a recent comparative study on the relative ‘authoritativeness’ of Chinese military empirical sources, see McReynolds, J. (Ed.). (2016). *China’s evolving military strategy*. Washington, DC: Jamestown Foundation. China does not have a concept of ‘military doctrine’ that is directly comparable to U.S. military equivalents. Instead, the PLA’s official ‘doctrine’ (i.e. documents containing details relating to specific campaigns and current operational procedure) remains classified.
18. Rinehart, I., & Gitter, D. (2015). *The Chinese military: Overview and issues for Congress*. Washington, DC: Congressional Research Service, 7.
19. Ministry of National Defense, The People’s Republic of China. (2008). *China’s national defense in 2008*. Beijing, China: Information Office of the State Council.
20. Peng Guangqian, & Yao Youzhi (Eds.). (2005). *The science of military strategy* (English Edition ed.). Beijing, China: Military Science Press, 104.
21. Scobell, A. (2003). *China’s use of military force: Beyond the great wall and the long march*. New York: Cambridge University Press.
22. Blasko, D.J. (2014). The evolution of core concepts: People’s war, active defense, and offshore defense. In R. Kamphausen, D. Lai, & T. Tanner (Eds.), *Assessing the people’s liberation army in the Hu Jintao era* (pp. 81–128). Carlisle, PA: Strategic Studies Institute and the U.S. Army War College Press.
23. Peng Guangqian, & Yao Youzhi (Eds.). (2005). *The science of military strategy* (English Edition ed.). Beijing, China: Military Science Press, 135–136.
24. *Ibid.*, 459–546.
25. *Ibid.*

26. Wishik, A.L. (2011). An anti-access approximation: The PLA's active counterattacks on exterior lines. *China Security, World Security Institute, I*(19), 39.
27. *Ibid.*, 44–45.
28. Goldstein, A. (2013). First things first: The pressing danger of crisis instability in U.S.-China relations. *International Security*, 37(4), 49–89; Medcalf, R., & Thomas-Noone, B. (2015). *Nuclear-armed submarines in Indo-Pacific Asia: Stabilizer or menace?* Sydney, Australia: Lowy Institute for International Policy.
29. McVadon, E.A. (2012). China's navy today: Looking toward blue water. In A.S. Erickson, & L.J. Goldstein (Eds.), *China goes to sea: Maritime transformation in comparative historical perspective* (pp. 373–400). Washington, DC: Naval Institute Press, 387; Twomey, C.P. (2014). What's in a name: Building anti-access, area denial capabilities without anti-access, area denial doctrine. In R. Kamphausen, D. Lai, & T. Tanner (Eds.), *Assessing the people's liberation army in the Hu Jintao era* (pp. 129–170). Carlisle, PA: Strategic Studies Institute and the U.S. Army War College Press.
30. Office of the Secretary of Defense, U.S. Department of Defense. (2015). *Military and security developments involving the People's Republic of China, 2015*. Washington, DC: U.S. Department of Defense, 58–59.
31. Biddle, S. (2005). *Military power: Explaining victory and defeat in modern war*. Princeton, NJ: Princeton University Press.
32. George, A.L. (1980). *Presidential decision-making in foreign policy*. Boulder, CO: Westview Press, 66–67; Payne, K.B. (2001). *The fallacies of cold war deterrence and a new doctrine*. Kentucky, KY: Lexington, University Press of Kentucky; Twomey, C.P. (2010). *Military lens: Doctrinal difference and deterrence failure in Sino-American relations*. Ithaca and London: Cornell University Press.
33. For a classic study published on the inherent conceptual problems in estimating another state's military power, and the analytical challenges associated with estimating the trajectory of a state's military capabilities—especially the analytical dangers associated with the false assumption that states are 'rational-decision' makers, which produce consistent and well-defined strategic objectives, see Marshall, A.W. (1966). *Problems of estimating military power*. Santa Monica, CA: RAND Corporation. For a discussion on the challenges inherent in linking assessments of the military balance to predictions of the use of force for coercion, see Betts, R.K. (1985). Conventional deterrence: Predictive uncertainty and policy confidence. *World Politics*, 37(2), 153–170. And, on the board literature that covers the role of strategic culture, civil–military culture, organizational structure, intelligence bureaucracies, and implications of military technological change in

- international security relations, see Cohen, E.A. (1988). Toward better net assessment: Rethinking the European conventional balance. *International Security*, 13(1), 50–89; Mahnken, T.G. (Ed.). (2012). *Competitive strategies for the 21st century—Theory, history, practice*. Stanford, CA: Stanford University Press.
34. Finkelstein, D.M. (2007). China's national military strategy: An overview of the "military strategic guidelines". In R. Kamphausen, & A. Scobell (Eds.), *Right sizing the people's liberation army: Exploring the contours of China's military*. Washington, DC: National Defense University Press (pp. 69–140); Finkelstein, D.M. (2016). *Initial thoughts on the reorganization and reform of the PLA*. Washington, DC: CNA China Studies, 76.
 35. Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 57.
 36. Willard, R. (2011). *Statement of Admiral Robert F. Willard, U.S. navy commander, U.S. Pacific Command before the house armed services committee on U.S. Pacific command posture*. Washington, DC: House Armed Services Committee.
 37. Van Tol, J. (2010). *Air Sea battle: A point-of-departure operational concept*. Washington, DC: Center for Strategic and Budgetary Assessments, 3–4.
 38. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214.
 39. Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese anti access, area denial, U.S. air sea battle, and command of the commons in East Asia. *International Security*, 41(1), 10–11.
 40. Dobbins, J.C., Gompert, D., Shlapak, D., & Scobell, A. (2011). *Conflict with China—Prospects, consequences and strategies for deterrence*. Santa Monica, CA: RAND Corporation.
 41. Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press, 141–146.
 42. Office of the Secretary of Defense, U.S. Department of Defense. (2014). *Military and security developments involving the People's Republic of China, 2014*. Washington, DC: U.S. Department of Defense, i.
 43. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214; Glaser, C. (1997). The security dilemma revisited. *World Politics*, 50(1), 174.
 44. Johnson-Freese, J. (2015). US-China: Civil space dialogue. *The Diplomat*, 7 August 2015. Available at: <http://thediplomat.com/2015/08/us-china-a-civil-space-dialogue/> (Accessed: 10 August 2015).
 45. Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press, 58–117.

46. Morrow, J.D. (1989). Capabilities uncertainties, and resolve: A limited information model of crisis bargaining. *American Journal of Political Science*, 33(November), 941–972; Fearon, J.D. (1995). Rationalist explanations for war. *International Organization*, 49(3), 379–414.
47. Wu, X. (2008) *Managing crisis and sustaining peace between China and the United States*, *Peaceworks no. 61*. Washington, DC: US Institute of Peace; Twomey, C.P. (2010) *Military lens: Doctrinal difference and deterrence failure in Sino-American relations*. Ithaca and London: Cornell University Press.
48. Betts, R.K. (1985). Conventional deterrence: Predictive uncertainty and policy confidence. *World Politics*, 37(2), 153–170. Lieber, K. (2000). Grasping the technological peace: The offense-defense balance and international security. *International Security*, 25(1), 71–104.
49. Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press, 172–203.
50. McDevitt, M. (2011). The PLA navy's anti access role in a Taiwan contingency. In P. Saunders, C. Yung, M. Swaine, & A. En-Dzu Yang (Eds.), *The Chinese navy: Expanding capabilities, evolving roles* (pp. 191–214). Washington, DC: National Defense University Press; Willard, R. (2011). *Statement of Admiral Robert F. Willard, U.S. navy commander, U.S. Pacific Command before the house armed services committee on U.S. Pacific command posture*. Washington, DC: House Armed Services Committee; Cliff, R. (2011). *Anti-access measures in Chinese defense strategy—Testimony before the U.S. China economic and security review commission*. Washington, DC: The RAND Corporation; Office of the Secretary of Defense, U.S. Department of Defense. (2015). *Military and security developments involving the People's Republic of China, 2015*. Washington, DC: U.S. Department of Defense, 46–60.
51. Erickson, A.S., & Wuthnow, J. (2016). Barriers, springboards and benchmarks: China conceptualizes the Pacific 'Island Chains'. *The China Quarterly*, 225, 3–4.
52. Montgomery, E.B. (2014). Contested primacy in the Western Pacific: China's rise and the future of U.S. power projection. *International Security*, 38(4), 115–149; Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 71–72; Erickson, A.S., & Wuthnow, J. (2016). Barriers, springboards and benchmarks: China conceptualizes the Pacific 'Island Chains'. *The China Quarterly*, 225, 3–4.
53. Office of the Secretary of Defense, U.S. Department of Defense. (2012). *Military and security developments involving the People's Republic of China, 2012*. Washington, DC: U.S. Department of Defense, 8.

54. Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press, 58–117.
55. Goldstein, A. (2013). First things first: The pressing danger of crisis instability in U.S.-China relations. *International Security*, 37(4), 70.
56. Blumenthal, D. (2012). The U.S. response to China's modernization. In A. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 309–340). Washington, DC: The National Bureau of Asian Research (NBR), 335.
57. Gompert, D.C., & Kelly, T. (2013). Escalation cause: How the Pentagon's new strategy could trigger war with China. *Foreign Policy* 2 August 2013. Available at: <http://foreignpolicy.com/2013/08/03/escalation-cause/> (Accessed: 5 May 2014).
58. Goldstein, A. (2013). First things first: The pressing danger of crisis instability in U.S.-China relations. *International Security*, 37(4), 67.
59. Bitzinger, R., & Raska, M. (2013). *The Air-Sea battle debate and the future of conflict in East Asia* (February). S. Rajarathnam School of International Studies: RSIS Policy Brief, 4.
60. Blumenthal, D. (2012). The U.S. response to China's modernization. In A. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 309–340). Washington, DC: The National Bureau of Asian Research (NBR), 335.
61. The expanding range and scope of Chinese A2/AD capabilities during this period can be in large part attributed to Beijing's suspicions of U.S. intentions and capabilities in the Western Pacific.
62. Sayers, E., & Fan, G. (17 March 2011). *Air-Sea battle: An exchange* (No. 17). Honolulu, Hawaii: PacNet, 1–2.
63. People's Daily Online. (2011). Air-Sea battle plan renews old hostility. *People's Daily*, 14 November 2011. Available at: <http://en.people.cn/90780/7643679.html> (Accessed: 26 June 2015).
64. Cunningham, F.S., & Fravel, M.T. (2015). Assuring assured retaliation: China's nuclear posture and U.S.-China strategic stability. 40(2), 42.
65. Glaser, C. (2015). A U.S.-China grand bargain? The hard choice between military competition and accommodation. *International Security*, 39(4), 49–90.
66. Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press, 58–110.
67. Blumenthal, D. (2012). The U.S. response to China's modernization. In A. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 309–340). Washington, DC: The National Bureau of Asian Research (NBR).
68. Snyder, G. (1965). The balance of power and the balance of terror. In P. Seabury (Ed.), *The balance of power* (pp. 184–201). San Francisco, CA: Chandler.

69. Morgan, F.E., Mueller, K.P., Medeiros, E.S., Pollpeter, K.L., & Cliff, R. (2008). *Dangerous thresholds: Managing escalation in the 21st Century*. Santa Monica, CA: RAND Corporation; Christensen, T.J. (2012). The meaning of the nuclear evolution: China's strategic modernization and US-China security relations. *Journal of Strategic Studies*, 35(4), 447–487; Goldstein, A. (2013). *China's real and present danger: Now is the time for Washington to worry*. NY: Council on Foreign Relations, Inc.
70. Recently, several Chinese analysts have implied that 'no-first-use' is more of a guideline than an unwavering commitment. See, Christensen, T.J. (2012). The meaning of the nuclear evolution: China's strategic modernization and US-China security relations. *Journal of Strategic Studies*, 35(4), 447–487; Office of the Secretary of Defense, U.S. Department of Defense. (2015). *Military and security developments involving the People's Republic of China, 2015*. Washington, DC: U.S. Department of Defense, 31–32.
71. For example, Beijing's 2015 *Victory Day Parade* was a very public vehicle for displaying several of the PLA's advanced strategic missile systems. During peacetime, such displays of military strength serve to bolster Chinese strategic deterrence, and signal to the United States (and to China's regional neighbors) Beijing's ambitions and coercive capacity. On offense–defense theory and military signaling, see Lynn-Jones, S.M. (1995). Offense-defense theory and its critics. *Security Studies*, 4(4), 660–691; Lieber, K. (2000). Grasping the technological peace: The offense-defense balance and international security. *International Security*, 25(1), 71–104; Morgan, F.E., Mueller, K.P., Medeiros, E.S., Pollpeter, K.L., & Cliff, R. (2008). *Dangerous thresholds: Managing escalation in the 21st Century*. Santa Monica, CA: RAND Corporation, 47–83.
72. See Johnston, A.I. (2016). The evolution of interstate security crisis-management theory and practice in China. *Naval War College Review*, 69(1), 29–31; Chase, M.S., Engstorm, J., Cheung, T.M., Gunness, K.A., Harold, S.W., Puska, S., & Berkowitz, S.K. (February 2015). *China's incomplete military transformation—Assessing the weaknesses of the people's liberation army (PLA)*. Santa Monica, CA: RAND, 1–33.
73. Schelling, T.C. (1966). *Arms and influence*. London; New Haven: Yale University Press; Jervis, R. (1970). *The logic of images in international relations*. Princeton, NJ: Princeton University Press.



China's Vision of the Future Networked Battlefield: Emerging Military-Technological Challenges to the United States

INTRODUCTION

While much recent analysis has focused on the People's Liberation Army's (PLA) advanced weapon systems, far less analytical attention has been paid to the development of China's command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) architecture, which fuses and augments individual weapon systems into a collective whole—a critical enabler and force multiplier of China's technologically advanced war-fighting capabilities.¹ In the event China implements anti-access/area denial (A2/AD) operations in the 'near seas',² integrated C4ISR systems would play a pivotal role in enhancing the PLA's awareness, coordination, and targeting capacity, which are necessary to seize military dominance on the modern battlefield.³ That is, a comprehensive and fully networked C4ISR would knit together China's expanding suite of high-tech weapons capabilities, and effectively marshal them to maximize China's force projection in ranges, scope, accuracy, and lethality within the near seas, and potentially beyond.⁴

A central argument this chapter makes is that the potential threats posed to the United States by C4ISR are heightened (or perhaps only exist) in the context of the weapons systems that they enable and enhance, that is they are not threatening in their own right. In other words, weapons systems enhanced by C4ISR would likely pose greater threats to an adversary than they otherwise would. Specifically, this case study focuses

on the intersection of China's C4ISR and the war-fighting capabilities these systems have made operationally viable, in particular, the strategic intentions that underlie these efforts.

This chapter proceeds as follows. First, it utilizes Chinese military writings and official national security publications to establish the key strategic motives and intentions that underlie Beijing's pursuit of advanced C4ISR systems, contextualized as part of a broader effort to develop a networked military force, to enable integrated joint operations and win future 'local wars under the conditions of informatization'—or network-centric warfare. This section includes a discussion on Chinese military concepts, doctrines, technological priorities, and efforts by Beijing to leverage China's burgeoning civilian resources to support military modernization—inextricably (and explicitly) linked to Beijing's overall national security objectives. These national security priorities have guided and informed the development of China's C4ISR capabilities, which in turn will determine the kinds of military missions these systems enable. For example, the use of long-range precision-strike munitions for early and preemptive strikes; stealth jet-fighters (e.g. the J-20) to bypass enemy air-defense systems, and destroy land-based command and control centers; as well as other emerging technologies to disrupt, disable, and destroy C4ISR systems including antisatellite missiles (ASATs), rail guns, and 'stealth-defeating' quantum radars.

Second, it examines the nature of the discourse that emerged within the U.S. defense community which conceptualized these systems as specifically designed to target America's Achilles' heel (especially in space and cyberspace), which the U.S. military is dependent on to bring to bear its force power projection. This section also examines Washington's military countervails to these perceived threats (e.g. the Air-Sea Battle concept and the Third Offset Strategy), in particular, the implications of these policies and postures for future regional strategic stability, and military escalation management.⁵

Third and closely related, it considers the increasing prominence of dual-use space technologies in Chinese military writings (notably space-based intelligence, surveillance, and reconnaissance) as a critical means to project China's military power. Such a strategy is analogous with the possession of a sufficiently networked joint military force capable of locating, tracking, and targeting U.S. military bases and carrier strike groups (CSGs) in the Western Pacific—especially the use of long-range precision cruise and ballistic missiles.⁶

Finally, the study reflects on the implications of a potentially dangerous dynamic, whereby both the United States and China would possess increasingly sophisticated C4ISR systems to support advanced offensive-dominant capabilities and strategic concepts, designed to deny the other side the asymmetric upper hand that these capabilities would enable.⁷ The chapter argues that in future warfare these dynamics will increase the incentives to strike first, lower the threshold for the use of military force, cause 'use or lose' situations, and, compounded by misperception, cause deterrence failure and inadvertent cross-domain warfare.⁸

KEY DRIVING FORCES BEHIND CHINA'S PURSUIT OF MILITARY 'INFORMATIZATION'

The genesis of China's C4ISR capabilities can be traced back to the early 1990s, and can in large part be attributed to the impact several developments involving the United States had upon Beijing's threat perceptions: the U.S. Revolution in Military Affairs (RMA); the closely related Network-Centric Warfare (NCW) concept⁹; and above all, demonstrations of U.S. network warfare prowess (e.g. the 1990–1991 Gulf War, the 1995–1996 Taiwan Straits Crisis, and the 1999 Belgrade embassy bombing).¹⁰ According to scholar David Shambaugh, Chinese analysts were especially alarmed by the performance of U.S. forces during *Operation Desert Storm* because

Nearly every aspect of the campaign reminded the PLA high command of its deficiencies: electronic warfare, precision guided munitions, stealth technology; precision bombing ... campaign coordination through airborne command and control systems ... space-based early warning and surveillance in targeting and intelligence gathering.¹¹

Military performances of this kind highlighted the PLA's outmoded and inadequate military capabilities and support systems. Chinese strategists concluded that the PLA's ability to win future modern wars would be determined by 'information technology ... the vanguard of the new technological revolution ... [and] information warfare', that is cyber warfare.¹² PLA analyst Major General Zhang Ling stated that 'informationized war of the future will be second only to nuclear war in terms of firepower'.¹³ Underlining the importance of 'informatization' to China's national security, President Xi Jinping stated that 'we should be fully aware of the

importance and urgency of internet security and informatization' and that 'without cyber security there is no national security, without informatization, there is no [military] modernization'.¹⁴ Assessments of this kind elevated the goal of winning 'local wars under conditions of informatization' to a national strategic priority, and prompted significant changes to the PLA's force structure, operational doctrines, and training priorities.¹⁵ These include the application of information technology (IT) in all domains and aspects of modern warfare, and to construct a clear battlefield picture to track, locate, and target an adversary's (especially the U.S.) military assets with long-range precision-guided missiles.¹⁶

China's 2008 National Defense White Paper placed these goals within a specific developmental timeframe: by 2010 establish a 'foundation' for military 'informatization'; by 2020 achieve 'major progress' toward this goal; and by 2050, 'fully' realize this transformation.¹⁷ China's most recent *Military Strategic Guidelines* prioritized the following areas in the development and implementation of C4ISR systems:

- Progress in the development of asymmetric war-fighting capabilities
- Military-technological advancements to meet the demands of future warfare
- Leveraging civilian innovation to facilitate and support military modernization
- Acquiring, imitating, and reverse-engineering foreign military technologies as part of a wider 'leapfrog strategy'¹⁸
- Learning from the experiences of advanced militaries (especially the U.S.), and in some cases collaborating with them (e.g. artificial intelligence [A.I.]), to overcome the PLA's organizational and technological shortcomings, and limited combat experience¹⁹

By the late 1990s, influenced by U.S. network-centric warfare and systems of systems theory, Chinese analysts began to recognize the critical role integrated operational C4ISR capabilities would play in future warfare to enhance overall combat effectiveness across all military domains.²⁰ The Integrated Network Electronic Warfare (INEW) operational concept clearly demonstrated the importance Beijing attached to the synthesis of technologically advanced military domains to asymmetrically seize the battlefield 'information superiority' against an advanced military power.²¹ According to the U.S. DoD, INEW was designed 'to *deny* an adversary

access to information essential to conduct combat operations' to accomplish China's 'information dominance' strategic objectives.²² For example, Chinese strategists have conceptualized the use of C4ISR systems in a potential offensive Taiwan scenario, whereby networked joint forces (or integrated command platforms) would deploy salvos of precision-strike missiles (PSMs) as a vanguard to destroy Taiwan's anti-aircraft defenses.²³ According to the authors of the authorized doctrinal *Science of Military Strategy* (SMS),

[s]ystems versus systems conflict activities entail a heavy reliance by both sides on information, information systems, *informationised weapons and equipment*, with a focus on information flow, involving operations on *land, sea, air, in space, within the electromagnetic spectrum, information*, and cognitive domains.²⁴

China's 2015 defense white paper emphasized that the PLA should be able to fight and win 'informationized local wars'. The report stated that 'integrated combat forces will be employed to prevail in system vs. system [i.e. C4ISR] operations featuring information dominance, precision strikes, and joint operations' to meet the offensive and defensive operational requirements of modern warfare.²⁵ The white paper also asserted that 'space and cyberspace have become the new commanding heights in strategic competition', and that China will develop sufficient capabilities in both domains to protect its strategic interests. Similarly, the most recent edition of the *SMS* explicitly argued that the PLA should integrate space, cyber, and EW operations to 'paralyze enemy operational systems'.²⁶

In 2015, as part of broader military reforms, the PLA Strategic Support Force (SSF) was created as a 'new-type combat force' to spearhead China's efforts to integrate the PLA's hitherto siloed space, cyber, and EW domains to fight and win future informatized wars.²⁷ Although several unknowns exist as to the precise responsibilities of the SSF, there is sufficient evidence to indicate the forces' basic structure, leadership, unit-level composition, and trajectory.²⁸ PLA Rear Admiral Yin Zhuo asserted that the SSF would provide 'battlefield support' (or an 'information umbrella') to support the PLA's joint forces in the following ways: (1) develop a space-based early warning system to support a 'launch-on-warning' nuclear posture²⁹; (2) control the PLA's cyber warfare and EW capabilities; and (3) maintain dual-use satellites (e.g. *Beidou*) to enhance the PLA's space-based

ISR capabilities.³⁰ A *People's Daily Online* article opined that the SSF's C4ISR systems could enable China to conduct integrated command operations as complex as the 2011 U.S. raid on Osama Bin Laden.³¹

These restructuring efforts were designed to strengthen military joint operations in several key ways: to establish a permanent joint C2 structure; to integrate C4ISR support networks; to reduce the dominance of the PLA's ground forces; and to promote joint training and logistics.³² It remains to be seen, however, whether the PLA is able to overcome its historical organizational shortcomings, in particular, its deep-seated interservice rivalry, poor communications and information sharing caused by endemic stovepiping, and minimal experience (especially during live combat) with modern military technology.³³

Improvements to the PLA's interoperability created new challenges for U.S. forward forces operating in Asia. In particular, the effective integration of C4ISR with China's long-range (conventional and nuclear) PSMs with other A2/AD kinetic capabilities (e.g. submarines, stealth jet-fighters, air defenses, ASATs, and missile defense systems) could pose a serious threat to U.S. carrier strike groups and strategic hubs in the Western Pacific, for example, during a maritime strike on Taiwan, or the blockade of critical sea lanes in the South China Seas.³⁴ Thus, a more integrated joint PLA war-fighting force may fundamentally shift the regional military balance, which is already rapidly moving in Beijing's favor. According to the authors of an internal PLA magazine, China must prepare to fight to safeguard its military superiority and 'central leadership' in the South China Sea, which, given the shifting military balance and the perceived inability (and unwillingness) of the United States to contest, other states would be unable to challenge.³⁵ Moreover, a fully networked war-fighting force may also increase the costs of war for potential regional adversaries (i.e. Japan, Vietnam, Philippines, or South Korea) to such an extent that leaders may conclude that (even with U.S. military support) it would be futile to resist China with force, and instead, they may choose to bandwagon with Beijing.

As part of a broader strategic objective to accomplish full military 'informatization', Beijing has actively leveraged China's civilian technology and governmental agencies.³⁶ A recent United States-China Economic and Security Review Commission report stated that the PLA 'is heavily reliant upon China's commercial I.T. sector to aid research and development into dual-use and military grade microelectronics and telecommunications', to improve the military's C4ISR capabilities.³⁷ Beijing has

issued several defense white papers that make replete references to the importance of this symbiotic relationship, in particular, in the development of military-use cyber, space, and EW capabilities. For example, the 2011 Space White Paper explicitly framed China's military–civilian space activities as part of a broader strategic effort to protect 'national security', and to build up its national 'comprehensive strength'.³⁸

At a recent address during the annual parliamentary session, Chinese President Xi Jinping called for deepening military–civilian integration (or in Chinese lexicon 'civil–military fusion'), while emphasizing the strategic importance of technical innovation for the PLA's military modernization including training, recruitment, weapons innovation, and strategic planning. Xi stated that 'military innovations should take a central role in producing indigenous military wares; and that the governments from the state to the local levels should promote integration between the civilian and the military sectors'.³⁹ Recent evidence suggests that despite continued bureaucratic obstacles the PLA has already begun to establish mechanisms to implement 'civil–military fusion' in the military-technological domain.⁴⁰ For example, in late 2016, Beijing created the Military–Civil Integration Intelligent Equipment Research Institute, to focus on research areas including intelligent robotics, A.I., unmanned systems, and military 'brain science'.⁴¹

THE WORLD'S FIRST 'QUANTUM POWER'?

In 2016, China launched the world's first quantum satellite, *Micius*, which clearly demonstrated Chinese advances (albeit nascent) in quantum information science.⁴² It also underscored Beijing's prioritization of innovation in critical technologies to strengthen China's national security, which several Chinese analysts have equated with the strategic impact of nuclear weapons.⁴³ President Xi Jinping emphasized the strategic importance of quantum technologies to national security, and, in particular, in the context of cyber security.⁴⁴ This high-level focus evinced clear recognition by Beijing of the potential strategic implications quantum technologies could augur for the future networked battlefield.⁴⁵

It has been reported that China has developed potentially 'unhackable' quantum cryptography to secure military communications, and is pursuing quantum-computing capabilities to encrypt standard forms of military communication networks, as well as a range of disruptive technologies with military applications (e.g. 'stealth-defeating' quantum radars).⁴⁶

Although it is difficult to substantiate the development status or trajectory of China's quantum capabilities, Chinese strategists appear confident that quantum communications are deployable for 'local wars' in the near seas.⁴⁷ In contrast, the U.S. military has yet to make significant investments in the development of quantum communications systems, under the apparent assumption that this technology would not significantly enhance U.S. communication security.⁴⁸ If China were to become the world's first quantum power, it would challenge U.S. technological dominance in all forms of information-centric networked warfare, in particular, stealth capabilities, global intelligence gathering, and military satellite networks.⁴⁹ A White House official recently warned that America's information-centric 'ways of war' were increasingly under siege from China's quantum technology advances, and threatened to offset (or neutralize) U.S. military-technological lead.⁵⁰

The Pentagon's Third Offset Strategy was designed to address the perceived asymmetric challenges posed by Chinese military-technological advances (including quantum computing), and to sustain U.S. military primacy. Several analysts have posited that China's quantum technology could expose U.S. military communications to new vulnerabilities during peacetime, which during a conflict or crisis might shift the asymmetric information balance decisively in Beijing's favor.⁵¹ Simply put, even limited deployments of quantum technologies could radically shift the future military balance in Asia. To be sure, such a shift may potentially present a far greater challenge to U.S. power projection compared with China's previous 'assassin mace' (or silver bullet) capabilities (e.g. ASATs, antiship precision munitions, cyber, space, and EW).⁵²

ASYMMETRIC THREATS TO AMERICA'S SOFT BELLY IN THE WESTERN PACIFIC

U.S. defense analysts frequently cited Chinese sources that emphasized the tactical advantages of targeting a superior adversary's C4ISR capabilities early on (and preemptively) in a conflict, striking at the enemy's 'eyes, ears, brain and nervous system'.⁵³ Chinese analysts tended to conceptualize an adversary's C4ISR systems as one of the easiest and most vulnerable targets on the modern battlefield.⁵⁴ That is, while Chinese analysts recognized the critical role C4ISR plays in enabling U.S. military power they also considered U.S. dependence on these systems—especially to support

precision-missile strikes in expeditionary warfare—a tactical weakness China could exploit.⁵⁵ Furthermore, they assumed that in the initial phase of war, the United States would target the PLA's C4ISR, and, thus, a strong incentive existed for Beijing to preemptively escalate a conflict, to neutralize U.S. military superiority, and to secure escalation dominance.⁵⁶ In a recent testimony to U.S. Congress, then commander of the U.S. Air Force Space, Commander General John Hyten, stated that potential adversaries (China and Russia) are 'developing kinetic, directed-energy, and cyber tools to deny, degrade and destroy our [U.S.] space capabilities'. In response, Hyten asserted that the DoD had developed countermeasures to disrupt an adversary's counter-space weapons (especially Chinese ASATs), for example, hardening U.S. satellites against antijamming technologies.⁵⁷

Recent evidence indicated that the PLA successfully mapped and penetrated U.S. Nonsecure Internet Protocol Router Network (NIPRNET), which the military depends on for much of its sensitive unclassified intelligence gathering.⁵⁸ Underscoring the perceived gravity of this threat, commander of the U.S. Cyber Command Admiral Michael Rogers stated that 'cyber operations from China are still targeting and exploiting U.S. government and defense' computer networks.⁵⁹ In 2017, the DoD reported that China continued to use its cyber capabilities to access networks and extract information from the U.S. defense sector to build a more accurate picture of U.S. defense networks, logistics, and capabilities, which Chinese defense planners could exploit during a crisis or conflict.⁶⁰ In response to this challenge, the Pentagon launched a new cyber-warfare military force for the U.S. Pacific Command, CyberPAC.⁶¹

CHINA'S DUAL-USE SPACE TECHNOLOGIES WAR-FIGHTING FORCE MULTIPLIERS

The United States has increasingly viewed China's dual-use space technology (especially contextualized with space-based ISR satellites) as a critical force multiplier for the PLA's offensive 'counter-space' capabilities.⁶² According to the U.S. DoD, China has continued to develop and field 'dual-use' space-based ISR systems that 'could be applied to *counter-space* missions'.⁶³ Former U.S. Director of the Defense Intelligence Agency (DIA) Ronald Burgess Jr. stated that space-based ISR support China's 'growing ability to deny, degrade the space assets of potential adversaries',

and to enhance its broader range of conventional capabilities.⁶⁴ Similarly, U.S. deputy commander of U.S. Strategic Command Vice Admiral Charles Richard recently warned that ‘while we’re not at war in space, I don’t think we can say we are exactly at peace either’, and that ‘with rapidly growing threats to our space systems ... we must prepare for a conflict that extends into space’.⁶⁵

Several U.S. defense analysts posited that the kinds of satellites China would need to operate beyond the near seas, and successfully target U.S. carrier strike groups and bases (with long-range precision-strike missions), would be heavily reliant upon dual-use space-based ISR capabilities.⁶⁶ For example, China’s *Gaofen-4* dual-use remote-sensing satellite series—first launched into geosynchronous orbit in 2016—was thought to be specifically designed to supply the PLA’s PSMs with ISR support, especially anti-ship munitions (analyzed in Chap. 5). Additionally, China’s recent intercontinental ballistic missile tests benefited from C4ISR support provided by *Yuanwang* space-tracking naval ships.⁶⁷ External analysts extrapolated from these C4ISR advances a capacity to cue the PLA’s A2/AD offensive missile forces (e.g. antiship ballistic and cruise missiles) in ranges out to China’s ‘second island chain’—approximately 2000 km from China’s coastline.⁶⁸ According to the DoD, however, it is ‘unclear’ whether China possessed the technical capacity to collect accurate real-time information to successfully target U.S. carriers strike groups and bases with precision-strike munitions ‘beyond the first island chain’.⁶⁹

Underscoring these technical challenges, the U.S. Office of Naval Intelligence (ONI) asserted that building a detailed air and maritime picture of China’s near seas (approximately 875,000 square nautical miles) is a ‘daunting task’. Furthermore, the addition of the Philippine Sea—a key interdiction body of water in any future Taiwan or South China Sea contingency—would add 1.5 million square nautical miles to the already vast area China would need to monitor.⁷⁰ Washington’s main concern, therefore, is that once these technical impediments are successfully navigated, a fully networked A2/AD in extended ranges, scope, and lethality may embolden Beijing to behave more assertively and aggressively in defending and securing its regional interests and unresolved territorial claims. For example, the DoD warned that a layered networked war-fighting capability reaching out to the second island chain would give China new ‘preemptive and coercive options’ in a regional crisis (i.e. in the East and South China Seas, and the Taiwan Straits).⁷¹ China’s response to the incoming Trump administration’s new arms package for Taiwan clearly

signaled to Washington a more confident and emboldened China, consummate with an increasingly credible war-fighting capacity. A Chinese Ministry of Defense (MoD) spokesperson stated that it would be ‘futile’ and ‘doomed’ for Taiwan to contemplate using military force to prevent unification with Mainland China—irrespective of U.S. military support.⁷²

As Chap. 2 described, the security dilemma between states is more intense when technologically advanced capabilities incorporate dual-use features, offensive and defensive weapons are not easily distinguishable, and the offensive is *perceived* to dominate.⁷³ Thus, when it is relatively cheaper and easier for states to emphasize a defensive (or nonthreatening) military posture, and this posture is clearly distinguishable from an offensive one, the security dilemma is less intense, and the prospects of avoiding conflict increase.⁷⁴ In the case of China’s dual-use space industry, there was little Beijing could have done to remove from the minds of U.S. defense planners the *possibility* that Chinese space assets would not be used in future military operations targeting the United States. That, in turn, intensified the United States–China security dilemma, and reinforced the Pentagon’s penchant for worst-case scenario assessments of China’s strategic intentions (discussed in Chap. 3).⁷⁵

Washington could not be certain that China’s dual-use *Beidou* navigation satellites would not be integrated into the PLA’s weapons guidance systems to enable coercive and preemptive strikes. Former U.S. Strategic Command head James Cartwright warned that more advanced U.S. long-range PSMs would be required to protect U.S. missile defense systems from Chinese ground-based ASAT lasers.⁷⁶ In 2015, the U.S. intelligence community claimed that a high-altitude (circa 30,000 km) Chinese rocket test was a disguised ASAT test.⁷⁷ To be sure, this rocket test demonstrated that the U.S. military’s hitherto geostationary orbit sanctuary (where many high-value U.S. intelligence satellites reside) could no longer be taken for granted.⁷⁸ Beijing could not be adequately assured that the U.S. military would not deploy its missile defense capabilities to destroy China’s satellites, and threaten its nuclear retaliatory capability.⁷⁹ Chinese analysts frequently cited U.S. space policies and tests (e.g. the 2008 SM-3 missile test against an errant satellite) as evidence that China must continue to pursue the development of space weapons.⁸⁰

U.S. restrictions on collaborating and coordinating with China on space policy—by National Aeronautics and Space Administration (NASA) and the White House Office of Science and Technology Policy (OSTP)—further dimmed the prospects for future United States–China cooperation

and strategic stability in space.⁸¹ Importantly for the United States–China security dilemma, these restrictions denied defense analysts access to vital information related to the development of China’s dual-use space industry, including the PLA’s evolving standard operating procedures, decision-making processes, and organizational structure. To be sure, improved access to this kind of information may have helped address Washington’s knowledge gaps in the development of Chinese space technologies, and, in turn, facilitated a more robust understanding of Beijing’s strategic objectives in this increasingly contested and competitive domain.⁸²

International relations (IR) scholars have observed that uncertainties created by the lack of information of an adversary’s military capabilities can exacerbate misperceptions between states, and increase the likelihood of war.⁸³ Moreover, in cases where incentives (or disincentives) exist for each side *not to cooperate*, both sides will likely pursue their own narrow self-interests, and become predisposed to viewing the other as an adversary—or a potential one. The 2011 U.S. National Security Space Strategy (NSSS) stated that the space battlefield has become increasingly ‘congested, contested and competitive’, and that, in response, the United States must maintain its ‘space dominance’ by *denying* the use of space assets to others—especially China and Russia.⁸⁴ Similarly, the head of U.S. Air Force’s Space Force Structure Plans for the Space and Cyberspace Superiority Division, Lieutenant Colonel Kyle Pumroy, stated that in response to growing threats from China (and Russia) in the space domain, the United States ‘[m]ust invest in more survivable, resilient [defensive and offensive] capabilities, and train on how to fight against those threats for when the high-end space attack comes’.⁸⁵

IMPLICATIONS FOR UNITED STATES–CHINA CRISIS STABILITY AND ESCALATION MANAGEMENT

China’s increasing military dependence on C4ISR to fulfill its regional strategic objectives has created a potentially dangerous and destabilizing dynamic⁸⁶: China and the United States have accumulated increasingly sophisticated C4ISR systems (and related technologies), calibrated to *deny* the other side the tactical upper hand in the use of the weapons these systems enable and enhance.⁸⁷ In response to this perceived heightened threat environment, the Pentagon has pledged to ‘accelerate *initiatives* to *counter* an adversary’s ... ISR and space-enabled precision strike’ capabilities to posture itself to fight and win in future operating environments.⁸⁸

The Third Offset Strategy was explicitly calibrated to strengthen U.S. deterrence if ‘potential competitors reach parity with us [the U.S.] in certain areas’.⁸⁹ Then U.S. Deputy Secretary of Defense Robert Work stated that this was done to ‘maintain [U.S.] space capabilities, through all phases of conflict, regardless of [asymmetric] actions to *deny* us the ultimate high ground’. Work’s comments were widely interpreted as signaling to America’s competitors (especially China and Russia) a renewed emphasis on *offensive* solutions to defend U.S. military dominance in the increasingly contested and competitive military-technological advanced domains.⁹⁰ Chinese sources indicate that analysts perceived this initiative as a continuation of the Pentagon’s preexisting (offset) strategy (i.e. Air–Sea Battle and the Defense Innovation Initiative) aimed at China, reflective of ‘Cold War thinking’, and destabilizing for future United States–China relations and regional peace.⁹¹ In response to this (perceived) emerging military-technological arms race, Chinese analysts and strategists prescribed an acceleration of the development of emerging military technologies (e.g. quantum computing; rail guns; stealth technologies; robotics; and autonomous systems), together with the integration of civilian and military technologies to gain a decisive edge.⁹²

Scholars have long warned of the dangers of states’ overdependence on military technology to increase ‘security’.⁹³ Robert Jervis observed that the security dilemma is at ‘its most vicious when commitment, strategy or *technology* dictates that the *only route to security lies through expansion*’ of military power.⁹⁴ This logic relates closely to the common misperception held by policy-makers that the accumulation of military capabilities necessarily leads to increased security—the opposite is very often the case.⁹⁵ U.S. efforts to counter (or offset) the perceived asymmetric threats posed to its long-standing military-technological leadership have often proven ineffective.⁹⁶ Instead, and paradoxically, Washington’s article of faith in discovering an allusive technological ‘silver bullet’ has presented other states (notably China and Russia) with increased opportunities and incentives to find ways to exploit U.S. military dependencies on these technologies—especially cyber and space. Thus, China only needs to find relatively low-cost and technically viable countervails to the Pentagon’s latest weapon systems to pose a challenge to U.S. forward forces operating in Asia—without the need to achieve parity (or symmetry) with the United States. In a future military contingency involving Taiwan, for example, advances in China’s war-fighting capabilities has meant it is highly

improbable that the United States would be able to use its aircraft carriers strike groups in the manner in which they were dispatched during the 1996 Taiwan Crisis.⁹⁷

The prospects for regional crisis stability and escalation control in future networked warfare have been worsened by the tendency of Chinese analysts and strategists to underestimate the potential collateral damage, escalation risks, and unintended consequences associated with the use of military-technological capabilities—especially in cyberspace. The evidence suggests that Chinese strategists tend to assume that *because* these weapons exist, they can be deployed in the same way as other conventional capabilities.⁹⁸ It is noteworthy that there has been very little discussion in Chinese military writings on the various shortcomings and limitations associated with the U.S. experience with RMA. For example, Chinese analysts have frequently conceptualized cyber warfare as a relatively low-cost and easy (asymmetric and low-risk) way to degrade and destroy an adversary's C4ISR systems.⁹⁹ Chinese overconfidence in the utility of military-technological capabilities could lower the threshold for future conflict, and, *in extremis*, risk-inadvertent or accidental cross-domain warfare.¹⁰⁰ For example, inexperienced commanders of China's unmanned aerial vehicles (UAVs) on tracking and monitoring missions in the disputed South China Seas might overreach and engage in escalatory risk-taking, which could inadvertently trigger military escalation.¹⁰¹

Under crisis and wartime conditions routine military operations become inherently vulnerable; thus, it is a mistake to regard military-technological advances as a means to overcome the Clausewitzian 'fog and friction' of war.¹⁰² In the case of cyber warfare, the absence of clearly defined escalation ladders and thresholds could increase the perceived time pressures to react early and preemptively, and, in turn, reduce the search for alternatives to military force.¹⁰³ Moreover, a response to a *cyberattack* may not necessarily be confined to cyberspace.¹⁰⁴ As the commander of the U.S. Cyber Command noted, 'there is no international consensus on a precise definition of a use of force, in or out of cyberspace' for deterrence purposes.¹⁰⁵ In the case of space, little evidence exists of Chinese discussion or strategic thinking on the vulnerability of high-value space-based ISR satellites, and the difficulty of replacing these vital assets—few states maintain meaningful stockpiles of these capabilities.¹⁰⁶ Jervis warned that 'when weapons are *highly vulnerable*, they must be employed *before* [or preemptively] they are attacked'.¹⁰⁷

CONCLUSION

This chapter makes the following key arguments. First, the research found Beijing's pursuit of C4ISR capabilities was best understood as part of a broader Chinese national security narrative, which links the development of C4ISR to Beijing's broader strategic calculus. China's efforts to become the first 'quantum power' clearly demonstrate the critical link between Beijing's national security goals and the prioritization of innovation in military-use technologies. This high-level focus reflects recognition of the myriad potential applications and strategic implications of this nascent technology on the future battlefield, and, above all, to counter U.S. military superiority and shift the regional military balance further in China's favor.

Second, Washington's main concern was that once the various technical and organizational shortcomings were overcome, a fully networked war-fighting force would afford Beijing new options in the use of these offensive weapons for preemptive and coercive missions—especially the use of long-range PSMs. Specifically, holding U.S. carrier strike groups and bases in the Western Pacific is risky because of asymmetric cross-domain joint operations. Moreover, the possession of these capabilities could embolden Chinese leaders to behave more assertively and aggressively to defend (and secure) Beijing's expanding regional interests and unresolved sovereignty claims too, and, in turn, neutralize U.S. military-technological strategic advantages and achieve escalation dominance in future warfare. In short, China's mutually reinforcing A2/AD offensive capabilities, fused by C4ISR systems, perceptibly heightened U.S. threat perceptions. That is, the United States considered China's force multiplied war-fighting capabilities *collectively* as far more threatening compared to the sum of their parts.

Third, the critical role Chinese dual-use space technologies played in completing the complex kill-chain sequencing associated with long-range conventional precision munitions amplified U.S. threat perceptions.¹⁰⁸ Additionally, recent U.S. regulatory and fiscal restrictions on United States–China space cooperation further weakened the prospects for ameliorating the deteriorating security dilemma in this strategically competitive and increasingly contested domain.

Fourth, as the United States and China continue to accumulate ever-sophisticated offensive capabilities (to deny the other side the perceived asymmetric upper hand), the mutual vulnerabilities of their respective C4ISR systems will inevitably increase. As a corollary, in future warfare

both sides will likely respond *symmetrically* to the threats posed by an adversary, to protect their own systems and neutralize the war-fighting capabilities of the other. Under crisis or wartime conditions, a destabilizing dynamic of this kind will likely increase the incentives for both sides to strike first and preemptively, which, in turn, may lower the threshold for conflict (especially in cyberspace), and create dangerous ‘use-or-lose’ dynamics. Moreover, the apparent tendency of Chinese analysts to underestimate the potential for collateral damage, and the unintentional escalatory risks associated with the use of emerging military technologies, could compound these risks.

Several implications and future research topics follow from the findings in this chapter. First, it remains to be seen how effective China’s newly commissioned SSF military service will be in overcoming the PLA’s organizational and technical weaknesses, and successfully integrate China’s war-fighting capabilities to fulfill the requirements of joint operations on the modern battlefield—especially beyond China’s near seas. Second, and related, it is unclear what the SSF’s precise responsibilities will be for China’s kinetic counter-space capabilities (e.g. ASATs, directed energy weapons, lasers), and how effectively this service will coordinate with the newly formed PLA Rocket Force to win future informatized warfare. Third, external analysts will need to closely monitor the trajectory of China’s next-generation dual-use innovations (e.g. quantum computing, cyber warfare, space-based ISR, directed energy devises, and A.I.), which will have significant implications for the future military balance and strategic stability in Asia.¹⁰⁹

The DoD recently described advances in A.I. and autonomous systems as ushering in a ‘new era of human-machine collaboration and combat teaming’.¹¹⁰ Similarly, Chinese strategists have opined that rapid advances in A.I. (and related automative technologies) will harbringer the next military revolution.¹¹¹ For now, however, it is unclear how the relationship between these parallel efforts will evolve, and in what ways this military paradigm might affect the character of war on the future multidomain battlefield, where traditional boundaries between war and peace, and the lines between conventional–nuclear and offense–defense are increasingly obscured. In the final analysis, the prospects for devising concrete measures to mitigate (or manage) the emerging United States–China technology-driven arms race appear bleak; thus, the risk that both states will remain locked in dangerous path dependencies rooted in opposing perceptions of the other’s respective strategic interests—for example, in the South China Seas and on the Korean Peninsula—continues to increase.

NOTES

1. Modern military C4ISR systems are the central nervous system of the military organization—designed to exploit new weapons technologies and improve battle situational awareness for integrated joint military operations.
2. China's 'near seas' include the South and East China Seas, and Yellow Seas.
3. According to the U.S. DoD, 'anti-access' actions are intended to slow the deployment of an adversary's forces into a combat theater, or cause them to operate at distances from the conflict beyond which they would prefer to do so. 'Area denial' actions affect maneuvers *within* a combat theater and are intended to impede an adversary's operations within areas where forces cannot (or will not) prevent access. Office of the Secretary of Defense, U.S. Department of Defense. (2015). *Military and security developments involving the People's Republic of China, 2015*. Washington, DC: U.S. Department of Defense, 33–50.
4. Several recent open-source Chinese military research reports published from the mid-2000s demonstrated an increasing focus on the development of advanced weapons systems to extend the power-projection ranges of Chinese missile strike capabilities.
5. With the change of administration in 2017 there has been some speculation regarding the longevity of the Third Offset Strategy. According to the DoD, this strategic focus remains ongoing. Pomerleau, M. (2017). The Relationship between third offset and multi-domain battle. *C4ISRnet*, 7 April 2017. Available at: <http://www.c4isrnet.com/articles/the-relationship-between-third-offset-strategy-and-multi-domain-battle> (Accessed: 10 April 2017).
6. Johnson, J.S. (2017). China missiles threaten new arms race. *Newsweek*, 27 March 2017. Available at: <http://www.newsweek.com/china-missiles-threaten-new-arms-race-us-574590> (Accessed: 29 March 2017).
7. 'Electronic Warfare' refers to any action involving the use of the electromagnetic spectrum to control the spectrum to attack an adversary or impede enemy countermeasures. 'Cyber warfare' refers to actions taken by a nation-state to penetrate another state's computers or networks with the intention of causing damage or disruption. Office of the Secretary of Defense, U.S. Department of Defense. (2007). *Military and security developments involving the People's Republic of China, 2007*. Washington, DC: U.S. Department of Defense, i–x.
8. Nye, J.J. (2017). Deterrence and dissuasion in cyberspace. *International Security*, 41(3), 44–71.
9. Then Chief of Naval Operations Admiral Jay Johnson coined the U.S. concept of Network-Centric Warfare (NCW) in 1997.

10. The accidental bombing of the Chinese Belgrade Embassy was cited by Chinese analysts as the catalyst for former Chinese President Jiang Zemin's order to develop so-called Assassin's mace weapons and C4ISR systems to prepare the PLA for the high-tech challenges of future wars, especially to deter the United States.
11. Shambaugh, D. (2004). *Modernizing China's military: Progress, problems, and prospects*. London: University of California Press, 69–70.
12. The use of concepts such as 'information warfare', 'information domain', and 'network warfare' are broadly analogous to the U.S. 'cyber warfare' concept. However, Chinese analysts also use other concepts to describe distinct components of this broader idea including psychological, network, intelligence, and electromagnetic warfare. Pollpeter, K. (2010). Towards an integrative C4ISR system: Informationization and joint operations in the people's liberation army. In R. Kamphausen, D. Lai, & A. Scobell (Eds.), *The PLA at home and abroad: Assessing the operational capabilities of China's military* (pp. 193–235). Seattle, WA: U.S. Army War College and National Bureau of Asian Research.
13. Wortzel, L.M. (2013). *The dragon extends its reach: Chinese military power goes global*. Washington, DC: Potomac Books, 31. At least since the early 2000s, the Chinese term 'informationized' (or 'informationalized') has been frequently used by Chinese authorized empirical sources. However, these sources have rarely explicitly (or adequately) defined the term, and its use by Chinese analysts has been ambiguous at best.
14. Zhu, N. (2014). Xi Jinping leads internet security group. *Xinhua News Service*, 27 February 2015. Available at: http://news.xinhuanet.com/english/china/2014-02/27/c_133148273.htm (Accessed: 10 April 2017).
15. Since the 1990s, the PLA's force size has been downsized on three occasions: in 1997, 2002, and 2015. The most recent reorganization announced by Chinese President Xi Jinping in 2015 represented a wider reform agenda promulgated at the November 2013 Third Plenum of the 18th Central Committee. This agenda included a shift away from the PLA's historical focus on its dominant ground forces, toward maritime and airborne forces—both considered crucial for informationized warfare.
16. In addition to space-based ISR systems, China currently builds its maritime picture via several other sources: tactical reporting in China's littoral ranges; ground-based radars (surface-wave and sky-wave versions); airborne ISR (including UAVs) to support short- and medium-range ballistic missiles. Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 36–37.

17. China's National Defense white papers from 2011 to the latest report in 2015 reiterated these broad military 'informatization' objectives.
18. In 2017, the U.S. DoD stated that 'China uses a *variety of methods* to acquire foreign military and dual-use technologies, including cyber theft (or espionage), targeted foreign direct investment, and exploitation of the access of private Chinese nationals to such technologies'. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*. Washington, DC: U.S. Department of Defense, ii and 72.
19. Chinese military leaders have established a well-documented tradition of studying and learning from advanced military organizations (especially the United States), doctrines, and operations. For example, Chinese strategists still hold U.S. military operations in Kosovo (1999) and in Afghanistan and Iraq as 'gold standards' in modern warfare. Peng, G., & Yao, Y. (Eds.). (2005). *The science of military strategy* (English Edition ed.). Beijing, China: Military Science Press, 256–257.
20. PLA Communication Command Academy. (2011). *Comprehensive integrated study of the military information system*. Beijing, China: Haichao Publishing House, 68–170; National Defense University. (2011). *Information system-based system of systems operational capability building in 100 questions*. Beijing, China: National Defense University Press, 30–31. By 2004, Chinese military writings began explicitly to connect the PLA's practical understanding of command and control (C2) automation, with its overall C4ISR framework.
21. Dai, Q. (2002). On integrating network warfare and electronic warfare. *Zhonggou Junshi Kexue, February* (1), 112–117.
22. Office of the Secretary of Defense, U.S. Department of Defense. (2010). *Military and security developments involving the People's Republic of China, 2010*, 37; Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*, 50.
23. *Information system-based system of systems operational capability building in 100 questions*. Beijing, China: National Defense University Press, 48–49.
24. Peng, G., & Yao, Y. (Eds.). (2005). *The science of military strategy* (English Edition ed.). Beijing, China: Military Science Press, 380.
25. Ministry of National Defense, The People's Republic of China. (2015). *China's military strategy, 2014*. Beijing, China: Information Office of the State Council.
26. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 148.

27. Chinese analysts have acknowledged the benefits of the U.S. Cyber Command in effectively consolidating cyber functions under a single entity, centralizing the management of cyber resources, and combining offensive and defensive cyber capabilities under one military organization. See Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*, 35 and 42. For a recent study on China's recent military reforms, see Saunders, P.C., & Wuthnow, J. (2017). *Chinese military reforms in the age of Xi Jinping: Drivers, challenges, and implications*. (No. 10). Washington, DC: Institute for National Strategic Studies, National Defense University.
28. For example, it remains unclear what the SSF's precise role in the space domain will be: will the force's responsibilities include kinetic ASATs, or will these continue to be controlled by the PLA Second Artillery Force's successor—the PLA Rocket Force (PLARF)? Costello, J. (2016). The strategic support force: Update and overview. *China Daily*, 16(19), 1–14.
29. Chinese analysts have argued that a 'launch on warning' nuclear deterrence posture would be beneficial to enhance China's nuclear retaliatory readiness, and they highlight that such a shift would be consistent with China's no-first-use nuclear policy. See Xue, B. (2010). Study on the development of contemporary strategic warning system. *Military History Research*, 3, 102; Yawed, J., & Tang, L. (2013). Discussion and revelation of American 'Quick global attack' plan. *Journal of the Academy of Equipment Command & Technology*, 3, 60. Chapter 6 discusses the potential strategic implications of a formal shift by China to a 'launch on warning' nuclear deterrence posture.
30. Li, G.S. (2016). The strategic support force is a key to winning throughout the course of operations. *People's Daily Online*, 5 January 2016. Available at: <http://military.people.com.cn/n1/2016/0105/c1011-28011251.html> (Accessed: 30 March 2017).
31. Saunders, P.C., & Wuthnow, J. (2017). *Chinese military reforms in the age of Xi Jinping: Drivers, challenges, and implications*. (No. 10). Washington, DC: Institute for National Strategic Studies, National Defense University, 28.
32. Ibid.
33. Chase, M.S., Engstorm, J., Cheung, T.M., Gunness, K.A., Harold, S.W., Puska, S., & Berkowitz, S.K. (2015). *China's incomplete military transformation—Assessing the weaknesses of the People's Liberation Army (PLA)*. Santa Monica, CA: RAND Corporation, 116.
34. In the future, other regional maritime states in the Asia-Pacific (notably Japan, India, Vietnam, and the Philippines) will also have to consider how to respond to a better organized, trained, and technologically equipped, and potentially emboldened PLA war-fighting force in the region.

35. Kyoto News. (2017). Chinese's military dominance in South China Sea complete. *ABS-CBN News*, 20 March 2017. Available at: <http://news.abs-cbn.com/overseas/03/20/17/chineses-military-dominance-in-s-china-sea-complete-report> (Accessed: 8 April 2017).
36. For example, the China Electronics Technology Group Corporation (CETC) continues to play a central role in China's broader civil–military integration initiatives, including in military applications for quantum technology.
37. Krekel, B., Adams, P., & Bakos, G. (2012). *Occupying the information high ground: Chinese capabilities for computer network operations and cyber espionage—Prepared for the U.S.-China economic and security review commission*. Washington, DC: Northrop Grumman, 10.
38. Ministry of National Defense, The People's Republic of China. (December 2011). *China's space activities in 2011*. Beijing, China: Information Office of the State Council, Part I. China National Defense white papers from 2011, 2013, and 2015 consistently characterized space and cyber domains as emerging as the 'new commanding heights in strategic competition', which elevated the importance of the cyberspace to the '*new domain of national security* [that China has the right] to protect' with defensive and offensive means. Ministry of National Defense, The People's Republic of China. (2015). *China's military strategy, 2014*. Beijing, China: Information Office of the State Council.
39. Li, G. (2017). Xi underlined innovation in military upgrading. *People.cn*, 13 March 2017. Available at: <http://en.people.cn/n3/2017/0313/c90000-9189415.html> (Accessed: 11 April 2017).
40. China's 13th Five Year Plan (2016–2020) prioritized several focus areas for research and innovation that had military implications including aerospace engines; A.I.; quantum communications; automation and robotics; nanotechnology; neuroscience; deep space exploration; and on-orbit servicing and maintenance. Office of the Secretary of Defense, U.S. Department of Defense. (2014). *Military and security developments involving the People's Republic of China, 2014*, 68–69.
41. Kang, Y. (2017). Military-civil integration development committee established. *Xinhua News Service*, 23 January 2017. Available at: http://news.xinhuanet.com/finance/2017-01/23/c_129458492.htm (Accessed: 12 June 2017).
42. 'Quantum information science' encompasses quantum communications and cryptography; quantum computing; and quantum navigation. Costello, J., & Kania, E. (2016). Quantum leap (part 1): China's advances in quantum information science. *China Brief*, 16(18), 11–16. Chinese efforts to develop quantum information science and Artificial Intelligence (A.I.) increased in importance in the aftermath of the leaks by former

- NSA contractor Edward Snowden which demonstrated the disparity between the PLA's offensive cyber-warfare capabilities vis-à-vis those of the United States. See Kania, E. (2017). China's quest for an AI revolution in warfare. *The Strategy Bridge*, 8 June 2017. Available at: <https://thestategybridge.org/the-bridge/2017/6/8/-chinas-quest-for-an-ai-revolution-in-warfare> (Accessed: 11 June 2017).
43. See Zheng, Y. (2013). *Lectures on the science of information operations*. Beijing, China: Military Science Press, 79–91; Wang, J. (2015). Quantum Technology: Informatization and the Changing face of Warfare. *PLA Press*, 27 September 2015. Available at: http://www.81.cn/jkhc/2014-01/08/content_5726287.htm (Accessed: 27 March 2017); Chen, S. (2016). Quantum teleportation breakthrough earns Pan Jianwei's team China's top science award. *South China Morning Post*, 8 January 2016. Available at: <http://www.scmp.com/tech/science-research/article/1899060/quantum-teleportation-breakthrough-earns-pan-jianwei-team> (Accessed: 2 June 2017); Yu, D. (2015). In China quantum computing comes of age. *Caixin Global*, 6 February 2015. Available at: <http://www.caixinglobal.com/2015-02-06/101012695.html> (Accessed: 28 March 2017).
44. In 2013, President Xi visited Anhui Quantum Communication Technology Co. Ltd. for a collective learning session, and met with Pan Jianwei, the deputy chief of staff of the PLA's new Northern Theater Command. QuantumCTek (2013). Anhui quantum communication innovation achievement debut: Central Politburo team learning event. *QuantumCTek*, 13 September 2013. Available at: <http://www.quantum-sh.com/news/146.html> (Accessed: 13 June 2017).
45. During China's 2015 18th Party Congress' Fifth Plenum, President Xi Jinping included quantum communication as a priority research strategy focus for 'major breakthroughs' by 2030. China plans to conduct quantum distribution experiments on the *Tiangong-2* space station—launched in late 2016. Costello, J., & Kania, E. (2016). Quantum leap (part 1): China's advances in quantum information science. *China Brief*, 16(18), 11–16.
46. In 2017, the U.S. DoD reported that China has made 'notable advances in cryptography research', which would have significant implications for China's military—especially secure communications. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*, 34.
47. Ibid.
48. The value of quantum cryptography for military use has been subject to some debate—the substitution of standard encryption technology for quantum variants does not remove the basic vulnerabilities inher-

- ent to communication systems. Mehta, A. (2015). Air force study shows potential limits of quantum technology. *Defense News*, 9 August 2015. Available at: <http://www.defensenews.com/story/defense/air-space/air-force/2015/08/09/air-force-study-shows-potential-limits-quantum-technology-pentagon/31233467/> (Accessed: 28 March 2017).
49. Costello, J., & Kania, E. (2016). Quantum leap (part 2): The strategic implications of quantum technologies. *China Brief*, 16(19), 22–27.
 50. During a recent DoD's Defense Innovation Board (DIB) session, a call was made for greater collaboration between the private and state sectors (or 'citizen-leaders-innovators') in the study of new innovative cutting-edge technologies for military applications—especially investment in A.I. and machine learning. Pellerin, C. (2016). Defense innovation board makes interim recommendations. *DoD News, Defense Media Activity*, 5 October 2016. Available at: <https://www.defense.gov/News/Article/Article/965196/defense-innovation-board-makes-interim-recommendations> (Accessed: 3 April 2017).
 51. Ravindranath, M. (2016). America's lead in quantum computing is 'under siege'. *Defense One*, 7 December 2016. Available at: <http://www.defenseone.com/technology/2016/12/americas-lead-quantum-computing-under-siege/133698/> (Accessed: 10 June 2017).
 52. See Costello, J., & Kania, E. (2016). Quantum leap (part 2): The strategic implications of quantum technologies. *China Brief*, 16(19), 22–27. The value of quantum cryptography for military use has been subject to some debate—the substitution of standard encryption technology for quantum variants does not remove the basic vulnerabilities inherent to communication systems. Mehta, A. (2015). Air force study shows potential limits of quantum technology. *Defense News*, 9 August 2015. Available at: <http://www.defensenews.com/story/defense/air-space/air-force/2015/08/09/air-force-study-shows-potential-limits-quantum-technology-pentagon/31233467/> (Accessed: 28 March 2017).
 53. Zhang, H. (2005). Action/reaction: U.S. space weaponization and China. *Arms Control Today*, 1 December 2005. Available at: https://www.armscontrol.org/act/2005_12/DEC-CVR (Accessed: 10 December 2014).
 54. According to Chinese analysts, other potential targets described by Chinese analysts in authoritative publications include missile positions and launchers; military transportation and logistical hubs (such as ports and airfields); key military facilities and bases; critical infrastructure; and carrier strike groups (CSGs). Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press; *The science of military campaigns*. Beijing, China: Guofang University Publication, 161–172.

55. Currently, U.S. civilian and military agencies possess approximately 500 satellites, of which an estimated 20 percent are deployed for military purposes. This compares to China's estimated 142 satellite deployments, of which at least 95 are owned and controlled by the PLA. Defense analysts expect Chinese dependencies on these systems to increase, especially in ranges beyond China's near seas. See Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese anti access, area denial, U.S. air sea battle, and command of the commons in East Asia. *International Security*, 41(1), 7–48.
56. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 148–150. Also see Zhu, H. (Ed.). (2009). *Strategic Air Force*. Beijing: Blue Sky Press, 39; China's evolving perspectives on network warfare: Lessons from science of military strategy. *China Brief*, 15(8), 1–3; Zhu, H. (Ed.). (2009). *Strategic Air Force*. Beijing: Blue Sky Press, 39.
57. Gertz, B. (2016). China's military in 2016: Missiles, intelligence and the SCS. *Asia Times*, 28 December 2016. Available at: <http://www.atimes.com/chinas-military-2016-missiles-intelligence-scs/> (Accessed: 10 January 2017); McReynolds, J. (2015).
58. For example, in 2011, U.S. analysts alleged that Chinese hackers took control of two NASA satellites—*Landsat-7* and *Terra* EOS AM-1. Wolf, J. (2011). China key suspects in US satellite hack: commission. *Reuters*. Available at: <http://www.reuters.com/article/us-china-usa-satellite-idUSTRE79R4O320111028> (Accessed: 28 October 2011).
59. Rogers, M. (2016). *Hearing to receive testimony on United States cyber command in review of the defense authorization request for fiscal year 2017, and the future years defense program, written testimony of Michael Rogers*. Washington, DC: Senate Armed Services Committee.
60. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*, 59.
61. To date, limited information has been released on this new military force. Gertz, B. (2016). China's military in 2016: Missiles, intelligence and the SCS. *Asia Times*, 28 December 2016. Available at: <http://www.atimes.com/chinas-military-2016-missiles-intelligence-scs/> (Accessed: 10 January 2017).
62. Chinese C4ISR capabilities could act to enhance the PLA's counter-space power projection during a crisis or conflict in several ways: (1) space-based satellite communication, navigation, meteorology, and robotics could be utilized to support and enable directed energy weapons (DEWs), direct ascent ASATs, and missile defenses; (2) space-based ISR systems

- could be used to defend and protect China's expanding C4ISR capabilities; (3) space-based ISR systems could enhance the PLA's cyber-warfare capabilities; and related, (4) space-based ISR systems could be used to complete the 'kill-chain' sequencing for long-range precision-strike missiles (e.g. antiship cruise and ballistic missiles).
63. The term 'dual-use' in this context refers to the various military and civilian uses of weapons technologies and weapons systems, and the civilian–military industrial structures that develop them. China is not the only state developing space technologies for military applications—Japan, Russia, and Pakistan also run similar programs.
 64. Burgess, R.L. (2012). *U.S. defense intelligence agency—Annual threat assessment, statement before the senate armed services committee U.S. states senate, 16 February 2012*. Washington, DC: U.S. Defense Intelligence Agency, 19.
 65. Daniels, J. (2017). Space arms race as Russia, China emerges as 'rapidly growing threats' to US. *CNBC*, 27 March 2017. Available at: <http://www.cnbc.com/2017/03/29/space-arms-race-as-russia-china-emerge-as-rapidly-growing-threats-to-us.html> (Accessed: 30 March 2017).
 66. The U.S. DoD has identified several Chinese space-based ISR satellites with dual-use capabilities including the *Yaogan*; *Haiyang*; *Huanjing*; *Qianwei*; and *Gaofan* series. The *Yaogan* series represents a core component of China's maritime ISR architecture, and includes electro-optical (EO), synthetic aperture radar (SAR), and electronic intelligence (ELINT) variants—which appear to perform military ISR functions, for example maritime surveillance and early-warning infrared sensors to detect ballistic missile launches. Reinsch, W.A., & Shea, D.C. (2016). *2016 report to congress of the U.S.-China economic and security review committee, 114th congress, 2nd session, November 2016*. Washington, DC: U.S.-China Economic and Security Review Committee, 213.
 67. Tate, A. (2016). China commissions new space tracking ship. *IHS Jane's 360*, 15 July 2016. Available at: <http://www.janes.com/article/62292/china-commissions-new-space-tracking-ship> (Accessed: 1 April 2017).
 68. The over-the-horizon and maritime targeting C4ISR challenges for successful antiship ballistic missile (ASBM) targeting are especially complex. See Yuan, L., & Jiang, J. (2004). An exploration of anti-satellite weapon development. *Winged Missiles Journal, December* (12), 46; Chang, X. (2005). *Military astronautics*. Beijing, China: National Defense Industry Press, 259–260.
 69. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*, 31 and 61.

70. Additionally, a wide range of military, law enforcement, and commercial shipping vessels operating in these waters would further complicate missile locating, tracking, and targeting in any future conflict.
71. Office of the Secretary of Defense, U.S. Department of Defense. (2012). *Military and security developments involving the People's Republic of China, 2012*, 12.
72. Blanchard, B. (2017). China says weapons won't stop unification with Taiwan. *Reuters*, 30 March 2017. Available at: <http://www.reuters.com/article/us-china-taiwan-defence/idUSKBN171173> (Accessed: 31 March 2017).
73. Jervis, R. (1978) 'Cooperation under the security dilemma', *World Politics*, 30(2), 193.
74. Despite the ongoing scholarly debates surrounding the continued utility of 'offensive–defensive' related concepts and theories in IR, the idea that where the offense holds a dominant position (or is offensive-dominant) the security dilemma is intensified continues to receive wide acceptance. For examples of these debates, see Lynn-Jones, S.M. (1995). Offense-defense theory and its critics. *Security Studies*, 4(4), 660–691; Lieber, K. (2000). Grasping the technological peace: The offense-defense balance and international security. *International Security*, 25(1), 71–104; Lynn-Jones, S.M., Miller, S.E., Brown, M.E., & Cote, O.R. (2004). *Offense-defense theory and its critics*. Cambridge, MA: MIT Press.
75. Hagt, E. (2006). Mutually assured vulnerabilities in space. *World Security Institute (WSI) China Security*, 2(1), 84–106; Johnson, J.S. (2017). Washington's perceptions and misperceptions of Beijing's anti-access area-denial (A2-AD) 'strategy': Implications for military escalation control and strategic stability. *The Pacific Review*, 30(3), 271–288.
76. In 2015, the PLA published the book *Light War*, which gives a central role to fighting a future war using lasers—in addition to cyber weapons, direct energy weapons, and rail guns. Gertz, B. (2017). Get ready for China's laser-weapons arsenal. *The National Interest*, 12 April 2017. Available at: <http://nationalinterest.org/blog/the-buzz/get-ready-chinas-laser-weapons-arsenal-20138?page=show> (Accessed: 13 April 2017).
77. Gertz, B. (2013). China conducts test of new anti-satellite missile. *Freebeacon*, 14 May 2015. Available at: <http://freebeacon.com/national-security/china-conducts-test-of-new-anti-satellite-missile/>.
78. Chinese media reported that this was a high-altitude space-exploring rocket test, and part of a project to study space weather—reaching an altitude of 10,000 km.
79. The most recent edition of the doctrinal SMS explicitly identified U.S. space-based ISR as one of the main strategic threats China faces. Shou, X. (ed.) (2013) *The science of military strategy*. Beijing, China: Military

- Science Press, p. 148. In 2012, China launched *Beidou* to supply its navigation network with regional Positional, Navigation and Timing (PNT), which has reportedly been integrated into the PLA's weapons guidance systems. The DoD anticipates *Beidou-2* enabling global PNT coverage will be operational by 2020. Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*, 61.
80. Hou, M. (Ed.). (2010). *Direction and implication of the development of the U.S. anti-satellite weapons* (Social Sciences Edition ed.). Beijing, China: Beijing University of Aeronautics and Astronautics.
 81. Despite the United States–China renewed government-to-government interactions on space policy in 2006, the political momentum has stalled in the aftermath of the 2011 NASA appropriations.
 82. For example, United States–Soviet cooperative projects in the space sector (e.g. the 1975 Apollo-Soyuz mission) increased channels of communications between scientists and engineers on both sides, which helped ameliorate perceptions of a Cold War space race.
 83. Fearon, J.D. (1995). Rationalist explanations for war. *International Organization*, 49(3), 379–414.
 84. U.S. Office of the Director of National Intelligence. (2011). *U.S. national security space strategy—Unclassified summary*. Washington, DC: U.S. Department of Defense.
 85. Pawlyk, O. (2017). US air preparing for war in space. *Military.com*, 4 April 2017. Available at: <http://www.military.com/daily-news/2017/04/04/us-air-force-preparing-war-space.html> (Accessed: 8 April 2017).
 86. Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese anti access, area denial, U.S. air sea battle, and command of the commons in East Asia. *International Security*, 41(1), 7–48.
 87. The air–sea battle (ASB) operational concept (renamed in 2014) stressed the importance of hardening U.S. C4ISRs, to protect U.S. military assets in the Asia-Pacific against Chinese A2/AD asymmetric threats and preemptively disrupting and destroying China's A2/AD precision-strike 'kill-chain'. ASB also called for the accumulation of a variety of conventional offensive capabilities. Office of the Secretary of Defense, U.S. Department of Defense. (2013). *Air-sea battle: Service collaboration to address anti-access & area denial challenges*. Washington, DC: Air-Sea Battle Office.
 88. Office of the Secretary of Defense, U.S. Department of Defense. (2014). *Quadrennial defense review report*. Washington, DC: U.S. Department of Defense, 20–37. The 2012 U.S. Defence Strategic Guidance (DSG) stated that the United States 'will employ cutting-edge technology in the

- future ... we will also invest in cyber ... in space ... in unmanned systems ... we will invest in the newest technology*'. Office of the Secretary of Defense, U.S. Department of Defense. (January 2012). *Sustaining U.S. global leadership for the 21st century defense*. Washington, DC: U.S. Department of Defense.
89. Pellerin, C. (2015). Work: Human-machine teaming represents defense technology future. *DoD News, Defense Media Activity*, 8 November 2015. Available at: <https://www.defense.gov/News/Article/Article/628154/work-human-machine-teaming-represents-defense-technology-future> (Accessed: 10 April 2017).
 90. Clark, C. (2015). Dep. sec defense Work invokes 'space control', analyst fear space war escalation. *Breakingdefense.com*, 15 April 2015. Available at: <http://breakingdefense.com/2015/04/depsecdef-work-invokes-space-control-analysts-fear-space-war-escalation/> (Accessed: 8 April 2017).
 91. Ye, J. (2015). Review: U.S. Military's 'National defense innovation initiative'. *Contemporary International Relations*, 1, 35–40; Wang, Q. (2014). The US third 'offset strategy': The global impact of unmanned systems. *China Defense Daily*, 15 November 2014. Available at: http://www.81.cn/jkhc/2014-11/15/content_6225368.htm (Accessed: 15 June 2017).
 92. Jiang, L. (2015). Why military-civilian integration has become a national strategic interest. *People's Daily*, 30 May 2015. Available at: <http://opinion.people.com.cn/n/2015/0531/c1003-27080928.html> (Accessed: 17 June 2017).
 93. Ferris, S.P., & Keithly, D.M. (1999). Auftragstaktik, or directive control in joint and combined operations. *Parameters, Autumn*(3), 118–133; Kaufman, A. (2005). Caught in the network: How the doctrine of network-centric warfare allows technology to dictate military strategy. *Armed Forces Journal*, 142(7), 20–22.
 94. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214.
 95. *Ibid.*, 182–183.
 96. For example, despite U.S. technological superiority during the Vietnam War and the Second Iraqi War *Operation Iraqi Freedom and Enduring Freedom* (2009–2011), Washington failed to achieve its military objectives. For a recent research on the durability of U.S. military superiority vis-à-vis China in the Asia-Pacific, see Heginbotham, E., Nixon, M., Morgan, F.E., Heim, J.L., Hagan, J., Li, S. (Eds.). (2015). *The U.S.-China military scorecard: Forces, geography, and the evolving balance of power 1996–2014*. Santa Monica, CA: RAND Corporation.
 97. White, H. (2013). *The China choice*. Oxford: Oxford University Press.

98. Pollpeter, K. (2012). Space, cyber, and electronic warfare: Controlling the information domain. In A.J. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 163–194). Seattle and Washington, DC: The National Bureau of Asian Research.
99. Most U.S. analysts have agreed that cyber warfare is 'offensive-dominant' in nature. See Gompert, D.C., Libicki, M., & Cavaiola, L.J. (2015). Cyber house rules: On war, retaliation and escalation. *Survival*, 57(1), 81–104. For an opposing view on the debate that in cyber warfare the 'defense' has the advantage, see Rid, T. (2012). Think again: Cyberwar. *Foreign Policy*, 192(March/April), 5–32.
100. Lindsay, J.R., & Reveron, D.S. (2015). Conclusions: The rise of China and the future of cybersecurity. In J.R. Lindsay, T.M. Cheung & D.S. Reveron (Eds.), *China and cybersecurity: Espionage, strategy and politics in the digital domain* (pp. 333–355). Oxford: Oxford University Press.
101. Easton, I.M., & Hsiao, R. (2013). *The Chinese people's liberation army's unmanned aerial vehicle project: Organizational capacities and operational capacities*. Washington, DC: Project 2049 Institute.
102. It is noteworthy that there has been very little discussion in Chinese military writings on the various shortcomings and limitations associated with the U.S. experience with RMA.
103. Nye, J.J. (2017). Deterrence and dissuasion in cyberspace. *International Security*, 41(3), 44–71.
104. Ibid.
105. It remains uncertain as to what might constitute an act of 'cyber warfare', or how either side would react if (yet undefined) cyber 'red lines' were breached—or perceived to have been. Both the United States and China continue to explore concepts and capabilities for deterrence in cyberspace. Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China*, 2016, 43; Nye, J.J. (2017). Deterrence and dissuasion in cyberspace. *International Security*, 41(3), 41–71.
106. The U.S. DoD has reported that China could also use nuclear weapons in space to destroy and disable an adversary's satellites. Recent evidence indicates that China has been developing space capabilities to enable the PLA to replace smaller damaged or destroyed satellites relatively quickly, but these satellites are considered inadequate in size and capacity for counter-space operations. Pollpeter, K.L. (2015). *Testimony before the U.S.-China economic and security review commission for the hearing on "China's space and counter space programs"*. San Diego, CA: University of California Institute on Global Conflict and Cooperation.

107. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 193.
108. Johnson, J.S. (2017). China missiles threaten new arms race. *Newsweek*, 27 March 2017. Available at: <http://www.newsweek.com/china-missiles-threaten-new-arms-race-us-574590> (Accessed: 29 March 2017).
109. For recent coverage on China's research, developments, and innovation in the defense industry, see Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*, 68.
110. Pellerin, C. (2015). Work: Human-machine teaming represents defense technology future. *DoD News, Defense Media Activity*, 8 November 2015. Available at: <https://www.defense.gov/News/Article/Article/628154/work-human-machine-teaming-represents-defense-technology-future> (Accessed: 10 April 2017).
111. China's Central Military Commission (CMC) Joint Staff Department recently called for the PLA to leverage A.I. and related technologies to advance toward 'intelligentized' command and decision-making in its construction of a joint operations command system. Wang, L. (2017). National people's congress representative Liu Guozhi: Artificial intelligence will accelerate the process of military transformation. *Xinhua News Service*, 8 March 2017. Available at: http://news.xinhuanet.com/mil/2017-03/08/c_129504550.htm (Accessed: 12 June 2017).



‘Guam Express’ and ‘Carrier Killers’: China’s Asymmetric Missile Threat to the United States in the Pacific

INTRODUCTION

Since 1945, Washington’s Asia-Pacific strategy has been predicated on forward-based forces (to deter adversaries and reassure U.S. regional allies and partners), and using its regional strategic hubs to project military power—especially Guam.¹ The question facing the United States is how to counter the challenge to its hitherto unfettered power projection in the Pacific posed by China’s rapidly maturing precision-strike missile (PSM) regime, which could presage the emergence of a new military-technological paradigm—or a leveling of the military-technological battlefield.² If the United States is unable to maintain its *de facto* monopoly in the development and synergism of PSMs, its ability to project power in the Asia-Pacific will likely diminish, and U.S. military assets in the region will become increasingly vulnerable.

Former U.S. Navy Rear Admiral Eric McVadon described China’s anti-ship ballistic missile (ASBM) capability as the ‘strategic equivalent of China’s acquiring nuclear weapons in 1964’.³ Similarly, defense analysts have argued that heightened U.S. threat perceptions as a result of this new capability could portend a fundamental shift in the future trajectory of the military balance of power in the region—away from the United States and its allies in favor of Beijing. Such a shift (or even the perception of one) will increase the risk of military miscalculation, rapid (and potentially unmanageable) military escalation; deterrence failure; and, ultimately,

inadvertent and accidental war.⁴ This chapter contextualizes China's antiship (cruise and ballistic) missiles (ASMs) augmented and integrated with the People's Liberation Army's (PLA's) broader anti-access/area denial (A2/AD) capabilities, which have increased Beijing's ability to hold U.S. forces at risk in future regional warfare, in particular, as part of the multi-axis strikes against U.S. carrier strike groups (CSGs) and bases in the Western Pacific.⁵

In future warfare, Chinese ASMs will force U.S. defense planners to decide whether they would be prepared to risk dispatching U.S. CSGs into the range ring of these missile systems—at least 1500 km.⁶ Viewed as part of a broader effort by China to track and target U.S. surface fleets—augmented by sophisticated command, control, communications, computers, intelligence, surveillance, and reconnaissance systems (C4ISR) systems (described in Chap. 4)—ASMs have important implications for future military escalation management and deterrence in the region. The extent to which China is able to master the complex operating 'kill chain' (required to successfully maneuver ASBMs in the critical terminal guidance phase against moving targets at sea)⁷ could make the difference between deescalating and escalating a crisis—especially given a Chinese doctrinal preference to deploy ASBMs for both precision strike, and tactical warning signaling.⁸

During its 2015 Victory Day Parade Beijing officially revealed two ASBM variants: (1) a conventionally armed road-mobile medium-range ballistic missile (MRBM), *Dongfeng* DF-21D, officially described by Chinese state media as an 'assassin's mace for maritime asymmetric warfare' able to strike 'targets on water'; and (2) a solid-fuel road-mobile (and potentially nuclear-capable) intermediate-range ballistic missile (IRBM) follow-up, the *Dongfeng* DF-26, which China began fielding in 2016.⁹ The DF-26 is China's first conventionally armed ballistic missile capable of reaching Guam, and if paired with a nuclear warhead, it will be China's first missile capable of conducting long-range nuclear precision strikes against U.S. naval targets in the Western Pacific.¹⁰ The extended range of the DF-26 prompted foreign observers and neitzens to label this ASM China's 'Guam Express' (or 'Guam Killer'), derived from the 'Carrier Killer' label used to describe its predecessor. Noteworthy, the public parading of China's ASBMs implied that these weapons were operational and already integrated into the PLA Rocket Force's inventories.

The chapter proceeds as follows. First, engaging closely with Chinese sources, it explains some of the key drivers underlying China's interest in

developing ASMs as part of a broader strategic effort to build a regional precision missile force. It considers the prominence of domestic-political interests and, specifically, the centrality of U.S. policies and regional operations in Asia, and Beijing's strategic thinking. This examination includes discussion on Chinese approaches to 'strategic deterrence', to understand how ASMs became one of the mainstays of China's deterrence posture. Second, it assesses the nature of Washington's heightened threat perceptions caused by these potentially 'game-changing' weapons. Next, it highlights U.S. knowledge gaps in the development of Chinese ASMs, and examines evidence of qualitative arms racing in the proliferation of PSMs. The study concludes with an assessment of U.S. responses to address this challenge (Air–Sea Battle, the Third Offset Strategy, and the expansion of U.S. missile defense and long-range precision-strike programs). Finally, it considers the key implications of this emerging missile regime for regional stability, military escalation management, and arms control—including the possible reexamination of the 1987 United States–Soviet intermediate-range nuclear force (INF) treaty.¹¹

KEY DRIVERS BEHIND CHINA'S ASMs: TAIWAN AND BEYOND

According to authoritative Chinese doctrinal sources, Beijing's pursuit of the world's first ASBM capability began as early as the mid-1990s.¹² Subsequently, Chinese analysts have conceptualized this capacity as a mainstay 'asymmetric'¹³ (i.e. relatively low-cost and high-impact weapons) to locate, track, and target U.S. CSGs within China's 'near-sea' region.¹⁴ The key strategic drivers underlying Beijing's pursuit of ASMs can be divided into three broad categories, and consistent with China's core 'active defense' strategic principle (described in Chap. 3), the use of *offensive* military force in order to achieve *defensive* strategic goals.

The first is the defense and protection of China's 'core interests' including China's sovereignty and territorial integrity, vital military assets and platforms, and space-based and cyber assets. Of these 'core interests' (interpreted by external analysts as a *casus belli* to defend those interests), deterring Taiwan from declaring formal independence from the mainland remains paramount.¹⁵ Chinese strategists consider ASMs (especially the DF-21D) as an optimal weapon to wield in the event of U.S. military intervention in a Taiwan Strait contingency, to ensure that the terms of Taiwan's future reunification are favorable to Beijing. Chinese military

writings have made replete references to the ability of ASMs to *deter* the U.S. military from encroaching on China's core sovereign and territorial 'interests' in the Asia-Pacific.¹⁶ For example, former PLA Navy Senior Captain Duan Xiaoxian stated that ASMs would *only* be used 'to deal with Taiwan independence forces and *those who sought to support them*'.¹⁷ Thus, Chinese strategists conceptualized ASMs as part of Beijing's broader strategic goal, in conjunction with China's broader A2/AD capabilities, to develop an effective conventional deterrence capacity to keep the United States out of the Taiwan Straits, and, simultaneously, to manage the threat perceptions of America's regional allies and partners.¹⁸

The authoritative *The Science of Second Artillery Campaigns* (SSAC) described in detail how ASBMs might be deployed as an 'assassin's mace' asymmetric weapon to 'achieve command of the seas ... [against] military intervention by a *powerful enemy*' (i.e. the United States),¹⁹ which implied Chinese strategists conceptualized U.S. CSGs as the main target for ASBMs. At a conceptual level, the SSAC *explicitly* highlighted ways ASBMs could be used against CSGs including firing warning salvos (or 'shots across the bow') in front of CSGs for military deterrence and signaling purposes; destroying carrier-based aircraft with sub-munitions; deploying nuclear-generated electromagnetic pulses against the sensors systems controlling missile defense *Aegis* destroyers; and, finally, attacking CSGs command and control systems with electronic warfare capabilities—which could render them redundant.²⁰ From Chinese open sources, however, it remains unclear whether in the event of a crisis or conflict the *primary* mission of ASBMs would be to directly attack U.S. carriers or to use them instead as a precursor (or opening salvo) to other forms of A2/AD kinetic attacks (e.g. submarine, land- and air-launched antiship cruise missiles, and air-launched land-attack missiles).²¹

Second, domestic-political factors have played a prominent role in China's pursuit of ASMs. Above all, Beijing considered its ability to defend China's 'core interests' as critical to sustaining the legitimacy of the Chinese Communist Party's (CCP) rule. To be sure, the PLA's core mandates, strategic guidelines, and military modernization priorities clearly reflect this overarching political objective.²² Chinese strategists have increasingly perceived Washington's network of regional military alliances, bases, and recent U.S. military operations in the Asia-Pacific (especially U.S. navy freedom of navigation operations in the South China Seas) as affirmation of America's intention to strategically encircle China.²³ For example, Chinese strategists have viewed the recent hardening of U.S.

bases at Guam, given its proximity to China's core interests, with especial concern and consternation (e.g. deployments of U.S. fighter jets, submarines, aircraft carriers, and missile defenses).²⁴ To be sure, heightened Chinese threat perceptions prompted a renewed emphasis on the development of a range of asymmetric strike capabilities designed to counter (or blunt) U.S. military strength, and, in turn, deter, deny, and overwhelm future U.S. military intervention in the region.²⁵

Furthermore, the possession of ASMs conferred a deep sense of national pride and symbolized the advancement of China's military prowess, consummate with its great power status aspirations.²⁶ This symbolism was particularly potent given the perceived ability of ASMs to put at risk U.S. aircraft carriers, to overwhelm U.S. missile defense interceptors, and, in particular, to threaten America's regional 'strategic hubs'.²⁷ Specifically, the ASBM program has attracted a fair amount of attention from the Chinese blogosphere and popular media outlets, which clearly reflected a general sense of national pride generated by these capabilities. In short, this asymmetric capability offered Beijing an attractive strategic option to expand China's force power projection, and enhance China's strategic deterrence, without the political risks associated with large troop deployments, or the enormous costs of building a fleet of aircraft carriers.²⁸

Third, (as Chap. 4 described), the goal of developing a regional (and eventually a global) long-range precision-strike capability closely aligns with China's broader military-strategic objective of achieving full military 'informatization' by 2050. From this broader strategic perspective, the development of ASMs can be best understood as comprising a single (albeit important) component of China's wider efforts to fully mobilize its aerospace, I.T., and space industry for the purposes of fielding a long-range precision-strike capability. What remains unclear from Chinese military writings, however, is the extent to which Beijing's pursuit of ASMs was driven by these kinds of 'technological imperatives', in particular, whether Chinese leaders adequately appreciated the potential strategic ramifications of deploying ASMs in the Asia-Pacific.²⁹

Noteworthy, Chinese open sources that debated the feasibility and tactical aspects of ASMs generally omitted several key issues, which exacerbated U.S. uncertainties and strategic ambiguities associated with these weapons³⁰: What would the PLA's ASM operational and launch doctrines include? How would the PLA use ASMs in preemptive strike campaigns? Would Beijing launch ASMs as a single salvo (as a warning signal), or employ them as part of multiple-strike salvo operations, and compensate

for the potential inaccuracy of these missiles;³¹ How would the PLA coordinate and execute multiple-strike salvos, and what kind of doctrine would guide these missions?³² U.S. Deputy Secretary of Defense Robert Work underscored the asymmetric challenge posed to U.S. CSGs and bases in the region from China's 'relatively cheap' long-range precision missiles. Work warned that as Chinese technologies catch up with the United States in the 'guided munitions warfare regime', America must demonstrate the ability to win the emerging missile 'salvo competition', which will 'underwrite [the United States] conventional deterrence in the twenty-first century'.³³

In sum, the central challenge U.S. defense planners faced was how the possession of 'fully operational' ASMs might alter Beijing's perception of its external strategic environment and the military balance vis-à-vis the United States,³⁴ and whether such a shift would embolden Chinese leaders to behave in a more aggressive and expansionist manner in future regional flashpoints.³⁵ That is, if Beijing believed it possessed the means to hold Guam and U.S. CSGs at risk, it may be more predisposed to the use of military force during a crisis, which in turn would seriously impair the ability of the United States to assure its regional allies, and deter Chinese military escalation.³⁶ Simply put, and irrespective of the various technical challenges associated with the use of long-range precision missiles, the *mere possession* of these weapons could increase the likelihood of United States–China conflict. Moreover, in future warfare Washington would need to rely more on its nuclear arsenal, to deter the possibility of not only a Chinese nuclear attack, but also long-range conventional ones (Fig. 5.1).³⁷

ASYMMETRIC CHALLENGES TO THE U.S. 'ACHILLES' HEEL' IN THE WESTERN PACIFIC

From the mid-2000s, U.S. DoD analysts began to publicly discuss the potential threats posed by China's incipient ASM capability.³⁸ In 2008, the DoD stated that Chinese ASBMs were '*designed* to strike ships at sea, including aircraft carriers'.³⁹ By 2011, the DoD reported that ASBMs had achieved initial operational capacity (IOC), and that China, 'continues to field' this weapon in small numbers (in ranges of at least 1500 km),⁴⁰ supported and enhanced by C4ISR targeting systems and maneuverable warhead variants.⁴¹ According to analyst Andrew Erickson, 'for the first

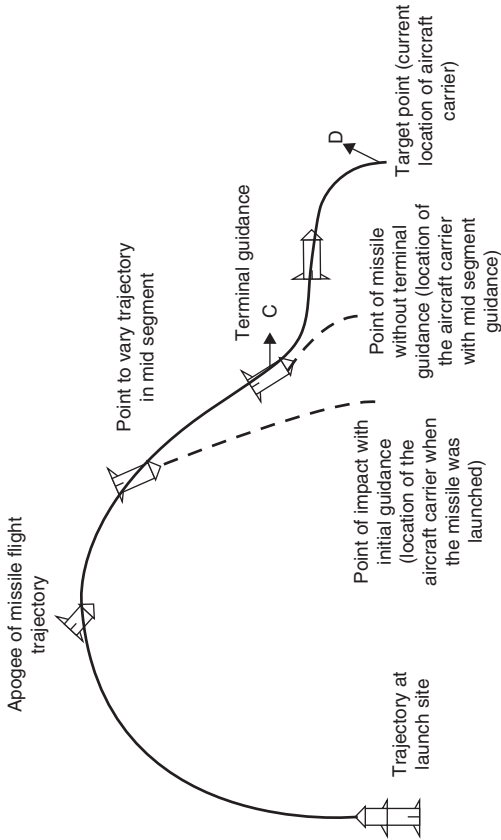


Fig. 5.1 Antiship ballistic missile (ASBM) flight trajectory with terminal guidance. It appeared in a 2006 article authored by the PLA's Second Artillery Engineering College (Office of the Secretary of Defense, U.S. Department of Defense, (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 28)

time since the 1920s the U.S. faces a direct threat to the platform [aircraft carriers] that has represented the core of its naval power projection'.⁴²

This new asymmetric challenge prompted U.S. defense planners (perhaps for the first time) to seriously consider how effective ASBMs might be under combat conditions against U.S. missile defenses, and, in turn, the implications for the future U.S. deterrence posture in Asia. The DoD recently highlighted the potential risks posed to U.S. ballistic missile defenses from ASBMs:

The PLA is 'developing and testing several new classes and variants of *offensive missiles* [such as the DF-21D ASBM] including hypersonic glide vehicles ... and developing other methods to *counter* [U.S.] ballistic missile defenses'.⁴³

In response, the United States has developed, tested, and deployed a range of countermeasures; specifically designed to break the complex 'kill chain' associated with these weapon systems.⁴⁴ Former U.S. Chief of Naval Operations Admiral Greenert outlined a variety of 'soft-kill' (or passive) and 'hard-kill' (or active) countermeasures designed to 'break as many links as possible' in the ASBMs' 'kill chain', to 'spoof', 'confuse', and 'terminate' the C4ISR systems and launch platforms that supported this weapon.⁴⁵

Statements from senior U.S. military commanders signaled (at least publicly) a high level of confidence in the ability of these countermeasures to effectively manage the ASBMs' problem set. For example, former U.S. Navy Chief of Naval Operations Admiral Roughead stated that 'I really do think it [China's ASBM] is not the "game-changer" people have played it up to be' and that the United States has 'systems that can counter weapons like [the DF-21D]'. Similarly, former Commander of the U.S. Navy's Seventh Fleet in Asia Vice Admiral Van Buskirk 2011 asserted that ASBMs are 'not the Achilles' heel of our aircraft carriers or our navy ... it is [only] one [of the] weapons, one technology that is out there ... but we will carefully monitor and adapt to it'.⁴⁶

Notwithstanding the operational effectiveness of U.S. countermeasures, if China deployed ASBMs as part of an integrated multi-axis A2/AD campaign in the Western Pacific, the risks posed to U.S. surface fleets would be substantial—especially during the early stages of a regional conflict.⁴⁷ According to analyst Roger Cliff, even if the United States was able to effectively exploit ASBMs' operational weaknesses, by diverting or splitting the attention of U.S. missile defenses during a combat scenario,

it would still create significant challenges for the U.S. military, in particular, if ASBMs were launched in conjunction with ASCMs against U.S. military assets.⁴⁸ That is, Beijing could tactically use ASBMs to divert the United States' attention and resources away from a potentially more formidable (and likely preemptive) multi-axis attack,⁴⁹ for example, combining Chinese attack submarines and airborne capabilities.⁵⁰ Therefore, rather than viewing ASMs as a stand-alone weapon, the U.S. defense analysts—similar to their Chinese counterparts—conceptualized these asymmetric weapons as *only one* (albeit significant) component of China's mutually reinforcing A2/AD tool kit, which complicated U.S. regional defense planning. As analyst Toshi Yoshihara described,

ASBMs may not need to produce mission kills against the [United States'] surface fleet to *complicate U.S. plans*. They only need to reach the fleet's defensive envelope for the *Aegis* BMD to engage the incoming threats ... forcing the defender to expend valuable ammunition. ... *Even inaccurate ASBMs could compel the Aegis to exhaust its weapons inventory, leaving it defenseless against further PLA actions.*⁵¹

The Pentagon's most recent Quadrennial Defense Review (QDR) also highlighted these concerns: 'the QDR prioritizes investments that support our interests and missions, with particular attention to ... stand-off strike platforms and weapons, technology to counter cruise and ballistic missiles'⁵²; for example, new carrier-based (E-2D) early-warning systems, long-range surface-to-air missiles, the F-35C fighter jet, electromagnetic rail guns, and directed energy weapons (DEWs).⁵³

In addition to ballistic missiles, cruise missiles offered Beijing an enhanced degree of operational and tactical flexibility in multi-axis missions. Cruise missiles can be launched from a variety of platforms (ground, sea, and air) and ranges, and their low flying altitude and limited radar signature makes them particularly stealthy and difficult to defend against—especially when used in conjunction with ballistic missiles in preemptive strikes.⁵⁴ Analyst Robert Haddick described China's new supersonic ASCM as the 'most dangerous anti-ship missile China has produced', and how this ASM posed a greater threat to the United States compared to the much discussed DF-21D ASBM.⁵⁵ These tactical advantages, together with significant qualitative improvements made to these weapon systems, created an additional cause for concern for U.S. defense planners⁵⁶; and reinforced the perception that the U.S. risks losing its lead in the rapidly evolving Asia-Pacific 'salvo competition'.⁵⁷

MISSILE ‘SALVO COMPETITION’ AND QUALITATIVE ARMS RACING IN ASIA⁵⁸

During this period of an increasingly competitive precision-strike regime, the evidence suggests the emergence of the kind of action–reaction policies and arms-racing dynamics associated with an intense security dilemma. China’s pursuit of ASMs perceptibly increased the strategic emphasis Washington placed on the expansion of its ballistic missile defense (BMD) program in the Asia-Pacific region.⁵⁹ From a Chinese perspective, U.S. regional missile defense policies exacerbated Beijing’s threat perceptions, and arguably expedited the development of its offensive missile forces.⁶⁰

The United States consistently maintained that its BMD program was not designed to alter the strategic balance with ‘major nuclear-armed states’ (including China), but rather aimed at defending the United States from ‘rogue nations’ (North Korea and Iran).⁶¹ The Pentagon’s most recent Ballistic Missile Defense Review (BMDR), however, explicitly elucidated the potential risks associated with Chinese ballistic missiles (including ASBMs).⁶² Moreover, the timing of U.S. Terminal High-Altitude Area Defense (THAAD) deployments to Guam was in large part calibrated by the Pentagon (albeit not officially) to countervail China’s expanding long-range precision-strike capabilities.⁶³ In 2013, the DoD stated that China ‘is working on a range of technologies to *attempt to counter U.S. and other countries’ ballistic missile defense (BMD) systems*’.⁶⁴ Despite the DoD’s tacit acknowledgment of the logic underlying the ‘security dilemma’, however, little evidence emerged to suggest that Washington was persuaded by this logic to formulate measures to ameliorate the United States–China security dilemma.⁶⁵ As Chap. 2 described, at the heart the security dilemma is the inability of states to ‘*recognize* that one’s own actions could be seen as menacing, and the concomitant belief that the others hostility can *only* be explained by its aggressiveness’.⁶⁶

IMPLICATIONS FOR CRISIS STABILITY & MILITARY ESCALATION IN THE ASIA-PACIFIC

Four interrelated features of ASMs increase the risk of crisis instability and military escalation.

First, missile warhead ambiguity associated with ASMs increases the risk of escalatory ‘use or lose’ dynamics.⁶⁷ That is, the intended target of long-range precision (ballistic or cruise) missiles could mistake a conventionally

armed ballistic strike for a nuclear-armed one, and in turn inadvertently trigger nuclear retaliation.⁶⁸ For example, a conventional ASBM attack on U.S. CSGs could also be interpreted by U.S. defense planners as a nuclear-generated electromagnetic pulse (EMP) attack against U.S. onboard missile defenses sensors, or even as a precursor to a nuclear attack—tactics consistent with Chinese military doctrine.⁶⁹ Moreover, recent reports that China has developed ‘dual-payload’ (armed with conventional and nuclear warheads) ballistic missiles will likely increase the dangers associated with ASMs and warhead ambiguity, in particular, if future missiles are augmented with hypersonic boost-glide variants.⁷⁰ Finally, if China’s dual-payload missiles are stored in close proximity to their other conventional missile forces (which is currently not thought to be the case), the implications for regional strategic stability would be especially deleterious.⁷¹

Second, an equally pressing tactical issue is ambiguities related to military targets (especially targets for U.S. long-range precision missiles), which received far less analytical attention compared to warhead ambiguities.⁷² That is, Beijing might misinterpret a U.S. conventional precision strike against China’s conventional missile command and control centers and launch platforms (envisioned by Air–Sea Battle), as an attempt to deny or degrade Beijing’s control over its nuclear second-strike capacity (discussed in Chap. 6).⁷³ Furthermore, the increasingly comingled—conventional and nuclear—features of Chinese missile force structures, doctrines, and strategic concepts amplified the risk that a U.S. attack targeting the PLA’s *conventional* structures is misinterpreted by Beijing as a first strike against its nuclear deterrent.⁷⁴

Third, (as Chap. 4 described), the U.S. DoD anticipated that the China’s rapidly evolving C4ISR architecture will soon be able to effectively integrate (and shorten) the ASM’s complex ‘kill chain’ sequence. To be sure, qualitative advancements of this kind will likely increase the operational and tactical attractiveness of ASMs as an asymmetric weapon of choice against U.S. surface fleets, and, in turn, may lower the threshold in the use of this weapon. Furthermore, recent reports of the development of several enhancements to China’s missile forces will improve the survivability, accuracy, and lethality of ASMs for a broader range of missions, including preemptive strikes; tactical military signaling; and strategic deterrence operations.⁷⁵ To be sure, any perceived shift in the trajectory of Chinese military doctrine and force postures as a result these kinds of technological advances would galvanize the domestic-political momentum in Washington, advocating additional investments to U.S. missile (offensive and defensive) capabilities in the Asia-Pacific.⁷⁶

Fourth, the Chinese military doctrinal preference for preemptive (and early) strike tactics could make Beijing more predisposed to using ASMs during a regional crisis or conflict, to seize the early initiative, sustain China's military dominance, and preserve the credibility of China's 'strategic deterrence'.⁷⁷ Moreover, given that U.S. military countermeasures to Chinese A2/AD were similarly calibrated to strike early and preemptively against China's military targets (especially C4ISR systems), the proclivity for Chinese strategists to view ASMs as indispensable asymmetric tools for strategic deterrence will likely increase.⁷⁸

Washington's concerns related to Chinese ASMs were compounded by the tendency of Chinese strategists to *overestimate* the efficacy of employing missiles for military signaling purposes, and, simultaneously, to *underestimate* the potential escalation risks associated with such tactics—especially in the event that tactical signals are poorly executed or misinterpreted by the intended recipient.⁷⁹ Chinese analysts have generally assumed that in a regional crisis or conflict, involving the United States, China's nuclear deterrent would be sufficient to ensure that escalation risks are contained at a conventional level.⁸⁰ An overconfidence in the ability to control escalation might prompt Beijing to countenance the use of conventional missiles (including ASMs) as 'fire-breaks' (between conventional and nuclear warfare), which it would *not expect* an adversary to breach. Assumptions of this kind may cause China to underestimate the escalation risks inherent in the use of conventional weapons during a conflict—or the 'fog of war'.⁸¹

Theoretical studies on military signaling have observed that these tactics tend to be highly subjective in nature; a combination of technical, administrative, and perceptual processes determine their efficacy. A breakdown in the various interconnected processes involved (i.e. technical, administrative, and perceptual) can cause misinterpretations, miscalculations, and, ultimately, inadvertent and accidental war.⁸² In the case of United States–China military relations, the effectiveness of these 'processes' would likely be complicated by Washington's poor understanding of Chinese military decision-making processes, civil–military relations, operational doctrine, and China's incipient crisis-management structures.⁸³

Chinese strategists conceptualized the employment of fully operational ASBMs for a variety of 'warning shot' deterrence-signaling tactics against U.S. CSGs.⁸⁴ U.S. defense analysts have identified two approaches conceptualized by Chinese strategists in the use of ASBMs for deterrence signaling (or 'warning shots') against U.S. CSGs, which could risk miscalculation and inadvertent military escalation.⁸⁵

The first is the use of ASBMs for 'shots across the bow' (or other 'near miss strike'). Analyst Owen Cote argued that such a technically challenging operation would still have a relatively wide margin of error due to the time required for ASBMs to complete its complex 'kill chain' sequence, *before* the terminal guidance phase.⁸⁶ Thus, the use of ASBMs for 'shots across the bow' would require a very high level of precision with minimal room for error, and could therefore easily trigger a potentially unmanageable escalatory spiral—especially in the event of targeting errors. Second, Chinese military doctrine also conceptualized the use of ASMs to signal revolve (or restraint) under crisis conditions. For example, ASBMs could target *specific parts* of a U.S. aircraft carrier, considered less likely to destroy the ship. However, this kind of signaling, perhaps even more so than a 'shot across the bow' tactics (but for similar technical reasons), would risk a fatal (if unintentional) blow to a U.S. carrier and significantly increase the likelihood of inadvertent military escalation.

China's ASMs (especially the dual-payload DF-26) have also contributed to recent debates in Washington on the durability and viability of the 1987 INF Treaty.⁸⁷ These debates were driven by recent Russian violations of its treaty commitments, together with the apparent inability of the United States to effectively respond to Chinese deployments of ground-based intermediate-range (ballistic and cruise) missiles in Asia.⁸⁸ As a result, several defense analysts proposed adjustments to the INF Treaty that would permit U.S. ground-based intermediate-range missile deployments to Asia (or an 'Asia option').⁸⁹ Other observers have questioned the logic of this approach, and argued instead that any modification to the INF regime would worsen regional strategic stability, and therefore the United States should maintain the status quo.⁹⁰ Recent evidence indicated that qualitative and quantitative advancements to Chinese PSMs have prompted other regional actors to contemplate the development of similar (offensive) capabilities.⁹¹ For example, Japan expressed an interest in exploring the development of a long-range strike capability similar to the U.S. *Tomahawk* (or land-attack cruise missile [LACM]) system.⁹²

Simply put, the continued regional proliferation of PSMs will likely exhort Washington to reconsider the strategic trade-offs involved in the deployment of ground-launched theater-range missile systems in the Asia-Pacific to enhance its deterrence posture vis-à-vis Beijing, and, in turn, reaffirm the continued credibility of U.S. regional treaty commitments.⁹³ Related questions of strategic importance to reflect upon include whether America's regional allies would agree to host U.S. theater-range missile

systems; whether these states might consider developing their own missile systems to mitigate the strategic challenge posed by China; and whether they could be coaxed to participate in a regional arms-control dialogue.⁹⁴

CONCLUSION

This chapter makes the following key arguments. First, notwithstanding the actual operational feasibility of China's ASMs (or the peaceful assurances from Beijing), the *mere possibility* that these asymmetric weapons may be used by China as part of multi-axis (and likely preemptive) strikes, in conjunction with the PLA's broader A2/AD capabilities against U.S. CSGs and bases in the Western Pacific, perceptibly amplified U.S. threat perceptions. Specifically, that China's rapidly maturing precision-strike regime could presage the emergence of a new military-technological paradigm, and a fundamental shift in military balance in Asia, in turn increasing the risk of regional (especially qualitative) arms racing and future United States–China conflict.

Second, the Chinese doctrinal preference in the use of ASMs for both precision strike and tactical warning signaling missions could augur deleterious implications for future military escalation and deterrence in the Asia-Pacific. Moreover, the penchant for U.S. defense analysts to overemphasize the quantitative and technical features of Chinese ASMs compounded Washington's knowledge gaps in its understanding of Chinese operational concepts and strategic thought (i.e. 'active defense'), which in large part were shaped and informed by perceived threats posed from U.S. military policies and postures (especially U.S. missile defense programs) in the region. To be sure, the failure on both sides to acknowledge the central driving forces underlining the others' threat perceptions and strategic thinking (or a failure of empathy) increased the risk of future misunderstandings and misperceptions in this competitive strategic domain.

Third, and related, in prioritizing investments in military systems and operational concepts designed to counter (or offset) the challenge posed by an emerging missile salvo competition with China, the risk of dangerous escalatory 'use or lose' dynamics increased. In future warfare in the Pacific, these dynamics could lower the threshold in the use of ASMs, as Chinese defense planners are forced to decide whether to use ASMs in preemptive (and early) strikes, to maintain the asymmetric upper hand and escalation dominance.

Finally, several aspects related to Chinese long-range precision missiles could worsen regional crisis stability, complicate escalation management, and increase the risk of military miscalculations and accidental (or inadvertent) conflict: (1) warhead and targeting ambiguities associated with ASMs, compounded by dual-payload missiles and the development of hypersonic variants; (2) the increasing comingling of China's conventional and nuclear capabilities, strategies, and doctrines; (3) the shortening of the ASM's complex 'kill chain' sequence enabled by sophisticated C4ISR systems; and (4) the tendency of Chinese strategists to *overestimate* the efficacy of ASMs for military signaling, and *underestimate* the escalation risks associated with these tactics.

This book argues about how strategic competition and action–reaction policy dynamics characterized United States–China security relations during the Obama era. The nature of the arms race in the long-range precision-strike domain, however, is not the sort postulated by Cold War era IR scholars. Rather, the dynamics that emerged in the Asia-Pacific during this period were far more multipolar and qualitative in nature, where domestic-political considerations played a prominent role. Moreover, the absence of a broader multilateral framework for conventional or nuclear arms control (such as an INF or Strategic Arms Reduction Treaty (START) regime) could accelerate the pace of the proliferation of PSMs. To be sure, how the new Trump administration approaches the strategic challenges in this domain will have important implications for future arms control, escalation management, strategic stability, and in turn the credibility and durability of U.S. extended deterrence commitments in the Asia-Pacific.

Acknowledgment This chapter is derived from an article published in *Comparative Strategy* 2017, copyright held by the publishers Taylor & Francis, LLC, available online: <https://doi.org/10.1080/01495933.2017.1361204>.

NOTES

1. Pellerin, C. (2014). Work: Guam is a strategic hub to Asia-Pacific rebalance. *DoD News*, Defense Media Activity, 19 August 2014. Available at: <https://www.defense.gov/News/Article/Article/603091/work-guam-is-strategic-hub-to-asia-pacific-rebalance> (Accessed: 9 January 2017).
2. The United States faces a similar threat in the Persian Gulf from Iran and in the Baltic Seas from Russia. See Feigenhauer, P. (2012). Putin declares his defense agenda for the next decade. *Eurasian Daily Monitor*, 38(9).

3. Hagt, E., & Durnin, M. (2009). China's anti-ship ballistic missile: Developments and missing links. *Naval War College Review*, 62(4), 87.
4. Erickson, A.S., & Yang, D. (2009). On the verge of a game-changer. *U.S. Naval Institute*, 135(5), 53–86; Stokes, M. (2012). *Missile forces: The second artillery force and the future of long-range precision strike*. Washington, DC: The National Bureau of Asian Research, 150; Friedberg, A.L. (2014). *A contest for supremacy: China, America, and the struggle for mastery in Asia*. W.W. Norton & Company, 15–20.
5. Cruise missiles propelled by jet engines are often described as 'pilotless airplanes', and during the terminal guidance phase they missile-approach their targets at similar flight paths. See Gromley, D.M., Erickson, A.S., & Yuan, J. (2014). *A low-visibility force multiplier: Assessing China's cruise missile ambitions*. Washington, DC: National Defense University Press, 2; U.S. National Air and Space Intelligence Center. (2013). *Ballistic and cruise missile threat*. Washington, DC: U.S. National Air and Space Intelligence Center, 26.
6. The additional range of the DF-26 will further complicate China's complex targeting challenge.
7. The 'kill chain' is a military term to describe the sequence of events required for a missile system to successfully destroy or disable its intended target.
8. As Chap. 4 described, the ability of Chinese C4ISR systems to provide the requisite reconnaissance to support ASBMs (especially in ranges beyond China's first chain island) remains a work in progress. See Wilson, J. (2016). *China's expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission, 12.
9. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*. Washington, DC: U.S. Department of Defense, 31. Erickson, A.S. (2015). Showtime: China reveals two 'carrier-killer' missiles. *The National Interest*, 3 September 2015. Available at: <http://nationalinterest.org/feature/showtime-china-reveals-two-carrier-killer-missiles-13769> (Accessed: 7 September 2015). Beyond these observations very little is known of the DF-26 and its variants.
10. China has possessed the capacity to target Guam with nuclear missiles for several decades. Prior to the development of the DF-26, the PLA's conventional capabilities were dependent on air force and naval platforms to reach Guam. Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 25 and 67.

11. The United States–Soviet INF Treaty required the prohibition of ground-launched ballistic and cruise missiles with ranges of 500–5500 km. China’s recent development of intermediate-range cruise and ballistic missiles has prompted debate on the durability of this treaty. See Reinsch, W.A., & Shea, D.C. (2015). *2015 report to congress of the U.S.-China economic and security review committee, 114th congress, 1st session, November 2015*. Washington, DC: U.S.-China Economic and Security Review Committee, 370.
12. The U.S. *Pershing II* Theater Ballistic Missile (TBM) boasted similar ballistic missile capabilities to Chinese ASBMs—the missile was terminated in 1987 to comply with the Intermediate Nuclear Forces Treaty (INF). The development of the Chinese DF-21D ASBM was reportedly partially based on the U.S. *Pershing II*. See Perrett, B. (2015). U.S. Navy Sees Chinese HGV as part of a wider threat. *Aviation Week*, 27 January 2015. Available at: <http://aviationweek.com/awin/us-navy-sees-chinese-hgv-part-wider-threat> (Accessed: 25 August 2015).
13. The ‘asymmetric’ features of Chinese ASMs are conditioned by the tactical, operational, and strategic advantages of this relatively low-cost missile system compared with the overwhelming superiority of U.S. carrier strike groups (CSGs) and supporting fleets in the Western Pacific. In other words, ASBMs are *only* asymmetric in the context of U.S. military primacy, that is the presumed ‘target’ of ASBMs.
14. Erickson, A.S. (2013). *Chinese anti-ship ballistic missile (ASBM) development: Drivers, trajectories and strategic implications*. Washington, DC: The Jamestown Foundation, 1–5.
15. Ministry of National Defense, The People’s Republic of China. (2015). *China’s military strategy, 2014*. Beijing, China: Information Office of the State Council.
16. Ministry of National Defense, The People’s Republic of China. (2008). *China’s national defense in 2008*. Beijing, China: Information Office of the State Council.
17. Chinese analysts frequently cite the 1996 Taiwan crisis as one of the major drivers behind Chinese military modernization efforts—including the pursuit of ASBMs. See Hagt, E., & Durnin, M. (2009). China’s anti-ship ballistic missile: Developments and missing links. *Naval War College Review*, 62(4), 11.
18. For example, China’s boost-glide and hypersonic weapons (currently under development) could be used to evade Japanese or South Korean missile defense systems.
19. Chinese military writings have frequently used the ‘assassin’s mace’ to describe various asymmetric weapons (also referred to as ‘silver bullet’ or ‘trump card’ weapons) including ASBMs, ASCMs, LACMs, ASATs, and

- C4ISR systems. See Bruzdziński, J.E. (2004). Demystifying the ‘shashou-jian’: China’s “assassin’s mace” concept. In A. Scobell, & L. Wortzel (Eds.), *Civil-military changes in China: Elites, institutes, and ideas after the 16th party congress* (pp. 309–363). Carlisle, PA: U.S. Army War College Strategic Institute. Erickson, A.S., & Yang, D. (2009). On the verge of a game-changer. *U.S. Naval Institute*, 135(5), 53–86.
20. *Ibid.*, 61–62.
 21. The Office of Naval Intelligence. (2015). *The PLA navy: New capabilities and missions for the 21st century*. Washington, DC: The Office of Naval Intelligence, 19.
 22. Johnston, A.I. (2016). The evolution of interstate security crisis-management theory and practice in China. *Naval War College Review*, 69(1), 29–72.
 23. Wilson, J. (2016). *China’s expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission, 5–6.
 24. *Ibid.*, 7. In 2014, the U.S. Navy announced plans to deploy a fourth submarine to Guam. This followed the deployment in 2013 of Terminal High-Altitude Area Defense (THAAD) systems to Guam.
 25. Friedberg, A.L. (2014). *A contest for supremacy: China, America, and the struggle for mastery in Asia*. W.W. Norton & Company, 219–220.
 26. Chinese analysts and policy-makers have tended to characterize U.S. military and defense policies in Asia as designed to prevent China from achieving the kind of great power status that it believes it deserves. See Shambaugh, D. (2000). Sino-American strategic relations: From partners to competitors. *Survival*, 42(1), 97–115.
 27. For example, researchers at the PLA’s Second Artillery Engineering College developed a series of theoretical models to modify and improve ASBMs’ maneuvering reentry vehicles systems (MaRVs), which could enhance the ability of ASBMs to defeat U.S. BMD interceptors. See Chase, M.S. (2014). Second artillery in the Hu Jintao era: Doctrine and capabilities. In R. Kamphausen, D. Lai, & T. Tanner (Eds.), *Assessing the people’s liberation army in the Hu Jintao era* (pp. 301–353). Carlisle, PA: Strategic Studies Institute and the U.S. Army War College Press, 301–353.
 28. The PLA’s power projection capacity continues to be constrained by several factors including an underdeveloped blue-water naval capacity, minimal overseas bases, a lack of refueling aircraft (for air-to-air fueling), and an operational aircraft carrier fleet.
 29. Several U.S. analysts have argued that China’s 2007 ASAT test indicated an inadequate appreciation by Beijing of the strategic implications a weapons test of this kind could have. See Lewis, J., & Kulacki, G. (2008). Understanding China’s anti-satellite test. *The Nonproliferation Review*, 15(2), 335–347.

30. The majority of Chinese open-source literature pertaining to ASMs has centered on the *general feasibility* of this weapon such as the various technical challenges in the development of ASBMs, for example accurate targeting and terminal guidance challenges. See Erickson, A.S. (2013). *Chinese Anti-Ship Ballistic Missile (ASBM) development: Drivers, trajectories and strategic implications*. Washington, DC: The Jamestown Foundation, 58–59.
31. The use of ASBMs in multiple salvo operations, especially in conjunction with other precision-strike missile systems capabilities, could compensate for the relatively wide ‘margin of error’ associated with the successful terminal guidance of this missile system. See Cote, O.R. (2012). Assessing the undersea balance between the U.S. and China. In T.G. Mahnken (Ed.), *Competitive strategies for the 21st century—Theory, history, practice* (pp. 184–206). Stanford, CA: Stanford University Press.
32. Kazianis, H.J. (2015). Is China’s ‘carrier killer’ really a threat to the U.S. navy? *The National Interest*, 2 September 2015. Available at: <http://www.nationalinterest.org/blog/the-buzz/chinas-carrier-killer-really-threat-the-us-navy-13765?page=show> (Accessed: 7 September 2015).
33. Work, R. (2015). Deputy secretary of defense speech: China Aerospace Studies Institute, 22 June 2015. Available at: <https://www.defense.gov/News/Speeches/Speech-View/Article/606683/china-aerospace-studies-institute> (Accessed: 10 January 2017).
34. A ‘fully operational’ ASBM would need to be effectively fused with C4ISR systems, to supply real-time satellite imagery, accurate target-locating information, satellite reconnaissance, navigation, and continued tracking ability. The U.S. DoD recently stated that it is ‘*unclear* whether China has the capability to collect accurate targeting information and pass it to launch platforms *in time for successful strikes in sea areas*’. Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2015). *Military and security developments involving the People’s Republic of China, 2015*. Washington, DC: U.S. Department of Defense, 37.
35. According to U.S. DoD officials, China in 2015 deployed ASCMs on the disputed South China Sea Woody Island, and reportedly test-fired the YJ-62 ASCM—which follows the deployment of an advanced air defense missile system (the HQ-9) on the same group of islands in the same year. Gertz, B. (2016). Pentagon concerned by Chinese anti-ship cruise firing. *Freebeacon*, 30 March 2016. Available at: <http://freebeacon.com/national-security/pentagon-concerned-chinese-anti-ship-missile-firing/> (Accessed: 5 January 2017).
36. A recent RAND Corp. report estimated that with an inventory of only 50 IRBMs (e.g. the DF-26), Beijing could keep Anderson base at Guam closed to large aircraft for more than a week, and with 100 IRBMs it could

- shut down these facilities for almost two weeks—assuming a 75 percent missile-targeting reliability rate. Heginbotham, E., Nixon, M., Morgan, F.E., Heim, J.L., Hagan, J., & Li, S. (Eds.). (2015). *The U.S.-China military scorecard: Forces, geography, and the evolving balance of power 1996–2014*. Santa Monica, CA: RAND Corporation, 64–65.
37. Mearsheimer, J.J. (1983). *Conventional deterrence*. Ithaca, NY: Cornell University Press.
 38. The U.S. DoD began to publicly discuss Chinese ASBMs as early as 2004. In 2005 a DoD report to Congress explicitly contextualized ASBMs with broader Chinese A2/AD missions and strategies. See Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2005). *Military and security developments involving the People's Republic of China, 2005*. Washington, DC: U.S. Department of Defense, 4–33.
 39. Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2008). *Military and security developments involving the People's Republic of China, 2008*. Washington, DC: U.S. Department of Defense, i.
 40. Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2011). *Military and security developments involving the People's Republic of China, 2011*. Washington, DC: U.S. Department of Defense, 29.
 41. In 2017, the U.S. DoD reported that the PLA Navy ‘is improving its over-the-horizon (OTH) targeting capability ... which can be used in conjunction with reconnaissance satellites to locate targets [i.e. U.S. CSGs] at great distances from China ... thereby *supporting long-range precision strikes, including employment of anti-ship ballistic missiles (ASBMs)*’, Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*. Washington, DC: U.S. Department of Defense, 57.
 42. Erickson, A.S. (2013). *Chinese Anti-Ship Ballistic Missile (ASBM) development: Drivers, trajectories and strategic implications*. Washington, DC: The Jamestown Foundation, 8.
 43. Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*. Washington, DC: U.S. Department of Defense, 37.
 44. The Pentagon’s Air–Sea Battle operational concept emerged as one of the central U.S. countervails to address the A2/AD ‘military problem set’ and preserve U.S. military power projection and navigation freedoms in the Western Pacific. Other DoD programs with similar strategic objectives

- have subsequently emerged including the U.S. Defense Innovation Initiative (DII) and the 'Third Offset Strategy'. These initiatives were designed to leverage U.S. advantages in emerging military technologies to counter the perception of declining U.S. dominance in several conventional military domains—especially precision-guided munitions, space, and cyber domains. O'Rourke, R. (2014). *China naval modernization: Implications for U.S. navy capabilities—Background and issues for congress*. Washington, DC: Congressional Research Service, 55.
45. Admiral Greenert described 'hard-kill' measures as 'knocking it [ASBM] down, a bullet on a bullet' including improved versions of the missile defense SM-3 interceptors; the acceleration in the development of the electronic rail gun (EMRG); high-power free-electron lasers (FELs), and solid-state lasers (SSLs). 'Soft-kill' measures included jamming, spoofing, and other confusion and decoy tactics, as the missiles approach their targets—especially the use of EW. *Ibid.*, 67–69.
 46. Talmadge, E. (2011). 3-Star: Anti-carrier missile won't stop navy. *Navy Times*, 15 February 2011. Available at: <http://archive.navytimes.com/article/20110215/NEWS/102150313/3-star-Anti-carrier-missile-won-t-stop-Navy> (Accessed: 15 September 2015).
 47. For example, China could launch an opening salvo of missile strikes to degrade or weaken U.S. air defenses, missile defenses, and its command and control centers as a precursor to a more intense round of precision air strikes. Heginbotham, E., Nixon, M., Morgan, F.E., Heim, J.L., Hagan, J., & Li, S. (Eds.). (2015). *The U.S.-China military scorecard: Forces, geography, and the evolving balance of power 1996–2014*. Santa Monica, CA: RAND Corporation, 153–200.
 48. Analyst Roger Cliff highlighted the various technical challenges and time-sensitive issues associated with BMD (e.g. *Aegis* SM-3) interceptions of ASBMs. Kazianis, H.J. (2012). Behind the China missile hype—Interview with Roger Cliff of RAND Corporation. *The Diplomat*, 20 January 2012. Available at: <http://thediplomat.com/2012/01/behind-the-china-missile-hype/?allpages=yes> (Accessed: 8 May 2015).
 49. For example, during *The Battle of Midway* of 1942 the United States by subjecting Japanese naval forces to a multi-axis attack was able to successfully overcome Japan's air defenses.
 50. The YJ-18 is reportedly capable of reaching supersonic speeds during the terminal phase of its flight, which would significantly inhibit the reaction time available to the United States—compared to its sub-supersonic predecessors. See The Office of Naval Intelligence. (2015). *The PLA navy: New capabilities and missions for the 21st century*. Washington, DC: The Office of Naval Intelligence, 19–21.

51. Yoshihara, T. (2011). Chinese views of sea-based ballistic missiles defense. In A.S. Erickson, & L.J. Goldstein (Eds.), *Chinese aerospace power: Evolving maritime roles* (pp. 343–359). Washington, DC: Naval Institute Press.
52. Office of the Secretary of Defense, U.S. Department of Defense. (2014). *Quadrennial defense review report*. Washington, DC: U.S. Department of Defense, 61. Recent U.S. tests of a sophisticated layered missile defense system combining *Aegis* and Terminal High-Altitude Area Defense (THAAD) missile defense systems—designed to simultaneously detect, track, and destroy ballistic and cruise missiles—have been considered by analysts as a direct response to heightened threat perceptions posed by the Chinese multi-axis A2/AD challenge.
53. Currently, the United States possesses sea-based skimming supersonic target vehicles to develop defenses for supersonic ASCMs, but lacks an equivalent supersonic ASCM capability.
54. For example, China's new YJ-12 long-range air-launched supersonic ASCM potentially more than doubles the ranges of the PLA's previous systems (estimated 400 km), and, with its ability to perform evasive maneuvers as it approaches its target, poses new challenges to U.S. missile defenses—especially as China improves its bomber in-air refueling capabilities. Pilger, M. (2015). *China's new YJ-18 anti-ship cruise missile: Capabilities and implications for U.S. forces in the Western Pacific*. Washington, DC: U.S.-China Economic and Security Review Commission, 5.
55. Currently, the United States possesses sea-based skimming supersonics target vehicles to develop defenses for supersonic ASCMs, but lacks an equivalent supersonic ASCM capability. Haddick, R. (2014). China's most dangerous missile (so far). *War on the Rocks*, 2 July 2014. Available at: <https://warontherocks.com/2014/07/chinas-most-dangerous-missile-so-far/> (Accessed: 2 January 2017).
56. Recent evidence indicates that China possesses several cruise missiles that are able to target Guam including air-launched land-attack cruise missiles (LACMs); air-launched antiship cruise missiles (ASCMs); and sea-launched antiship cruise missiles. Technical upgrades made to China's bomber fleet (i.e. the H-6Ks) have increased the ranges of the PLA's air-launched precision cruise missiles (i.e. the CJ-20 and the dual-payload CJ-10A LACM, and the new YJ-12 long-range supersonic ASCM) for missions that potentially reach Guam for the first time. Fisher, R.D. (2017). China's H-6K bomber shows new strike capabilities. *IHS Jane's 360*, 9 January 2017. Available at: <http://www.janes.com/article/66779/china-s-h-6k-bomber-shows-new-strike-capabilities> (Accessed: 10 January 2017).
57. Gertz, B. (2016). Pentagon concerned by Chinese anti-ship cruise firing. *Freebeacon*, 30 March 2016. Available at: <http://freebeacon.com/national-security/pentagon-concerned-chinese-anti-ship-missile-firing/> (Accessed: 5 January 2017).

58. The dynamic between two militaries that each has PGMs and precision defensive capabilities can be called a 'salvo competition'. In this competition, both combatants seek to gain the advantage by improving their capabilities to attack with precision and/or defend against precision strikes.
59. In 2009, U.S. President Barack Obama announced a significant shift in the strategic direction of the *Aegis* ballistic missile defense (ABMD) program, which resulted in a so-called Phased Adaptive Approach (PAA) in East Asia.
60. Chinese analysts have consistently criticized U.S. BMD for undermining its conventional missile deterrent against Taiwan, and potentially allowing the United States to subject China to 'nuclear blackmail'. See Lawrence, S., Rinehart, I., & Hildreth, S. (2013). *Ballistic missile defense in the Asia-Pacific region: Co-operation and opposition*. Washington, DC: Congressional Research Service, 1–21.
61. Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2010). *Military and security developments involving the People's Republic of China, 2010*. Washington, DC: U.S. Department of Defense.
62. *Ibid.*, 3–9.
63. Entous, A., & Barnes, J. (2014). U.S. plans new Asia missile defenses. *Wall Street Journal*, 23 August 2012. Available at: <http://online.wsj.com/articles/SB10000872396390444812704577605591629039400> (Accessed: 1 January 2017).
64. Office of the Secretary of Defense, Office of the Secretary of Defense, U.S. Department of Defense. (2013). *Military and security developments involving the People's Republic of China, 2013*. Washington, DC: U.S. Department of Defense, 31–32.
65. Several recent initiatives by Washington to engage China in senior-level dialogue on nuclear and BMD issues resulted in limited success. The 2009–2016 rounds of the United States–China Strategic and Economic Dialogues (S&ED) focused on cyber and maritime security issues, and avoided direct discussion on either nuclear or BMD issues.
66. Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press, 75.
67. Van Evera, S. (1999). *Causes of war*. Ithaca, NY: Cornell University Press.
68. Strategic ambiguities related to warhead ambiguity for escalation control featured heavily in U.S. debates surrounding the Pentagon's 2006 proposal to deploy a conventionally armed version of the nuclear *Trident* missile—a proposal to deploy conventional missiles on U.S. *Trident* submarines was rejected by Congress because of these concerns. See Pollack, J. (2009). Emerging strategic dilemma in U.S.-China relations. *Bulletin of the Atomic Scientists*, 65(4), 53–63.

69. For example, China could use a nuclear-armed ballistic missile to create a high-altitude EMP attack intended (temporarily or permanently) to disable or destroy U.S. C4ISR systems—or other civilian or military systems.
70. Hypersonic weapons are able to maintain missile flight speeds of Mach 5 to Mach 10, and sustain these speeds for a duration beyond the ability of any existing ballistic missiles. It is unclear, however, whether Beijing intended to arm its hypersonic weapons with nuclear or conventional payloads—or both. See Pollack, J.H. (2015). Boost-glide weapons and US-China strategic stability. *The Nonproliferation Review*, 22(2), 155–164.
71. Because of the opacity surrounding Chinese nuclear policy, there is very limited information on how the PLA stores its nuclear warheads. Most foreign analysts assume that the PLA maintains separate stores for its nuclear warheads and missiles—or a ‘de-alerted’ posture. See Lewis, J. (2013). China’s nuclear modernization: Surprise, restraint, and uncertainty. In A. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China’s military challenge* (pp. 67–96). Washington, DC: The National Bureau of Asian Research (NBR).
72. Acton, J.M. (2013). *Silver bullet? Asking the right questions about conventional prompt global strike*. Washington, DC: Carnegie Endowment for International Peace, 1–4.
73. The evidence suggests that the PLA maintains shared command and control structures for both its nuclear and conventional arsenals. See Pollack, J.H. (2015). Boost-glide weapons and US-China strategic stability. *The Nonproliferation Review*, 22(2), 155–164.
74. Christensen, T.J. (2012). The meaning of the nuclear evolution: China’s strategic modernization and US-China security relations. *Journal of Strategic Studies*, 35(4), 467.
75. Hallion, R.P., Bedke, C.M., & Schanz, M.V. (2016). *Hypersonic weapons and US national security: A 21st century breakthrough* (January). Arlington, VA: The Mitchell Institute for Aerospace Studies Air Force Association, 2–34; O’Rourke, R. (2013). *China naval modernization: Implications for U.S. navy capabilities—Background and issues for congress*, Congressional Research Service, Washington, DC, pp. 70–72.
76. Christensen, T.J. (2012). The meaning of the nuclear evolution: China’s strategic modernization and US-China security relations. *Journal of Strategic Studies*, 35(4), 447–487. Several U.S. defense analysts have advocated investment in long-range strategic missiles programs such as the Long-Range Strike Bomber (LRS-B)—comprising heavy-stealth payloads that would allow the United States to operate beyond the ranges of Chinese missiles. See Wilson, J. (2016). *China’s expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission, 15.

77. The Chinese concept of 'strategic deterrence' describes a broader and multifaceted version of deterrence that includes nuclear and conventional, as well as cyber, space, and electronic warfare domains. Chinese state media described the PLA's dual-payload DF-26 as 'a new weapon for *strategic deterrence*'. See Chase S.M., & Chan, A. (2016). *China's evolving approach to 'integrated strategic deterrence'*. Santa Monica, CA: RAND Corporation.
78. McDevitt, M. (2011). The PLA navy's anti-access role in a Taiwan contingency. In P. Saunders, C. Yung, M. Swaine, & A. En-Dzu Yang (Eds.), *The Chinese navy: Expanding capabilities, evolving roles* (pp. 191–214). Washington, DC: National Defense University Press, 209–210.
79. Morgan, F.E., Mueller, K.P., Medeiros, E.S., Pollpeter, K.L., & Cliff, R. (2008). *Dangerous thresholds: Managing escalation in the 21st century*. Santa Monica, CA: RAND, 7–45.
80. Ibid.
81. Snyder, G. (1965). The balance of power and the balance of terror. In P. Seabury (Ed.), *The balance of power* (pp. 184–201). San Francisco, CA: Chandler, 184–201.
82. Schelling, T.C. (1966). *Arms and influence*. London; New Haven: Yale University Press.
83. Saunders, P.C., & Scobell, A. (Eds.). (2015). *PLA influence on China's national security policymaking*. Stanford, CA: Stanford University Press, 1–33.
84. Erickson, A.S., & Yang, D. (2009). On the verge of a game-changer. *U.S. Naval Institute*, 135(5), 53–86.
85. Goldstein, A. (2013). First things first: The pressing danger of crisis instability in U.S.-China relations. *International Security*, 37(4), 49–89.
86. Cote, O.R. (2012). Assessing the undersea balance between the U.S. and China. In T.G. Mahnken (Ed.), *Competitive strategies for the 21st century—Theory, history, practice* (pp. 184–206). Stanford, CA: Stanford University Press.
87. The INF treaty in eliminating a class of strategic moves has been regarded as a milestone in United States–Russia security relations, and prohibiting Russia from deploying these missiles for 'political coercion' purposes on Europe's borders—as China has done in Taiwan since the 1990s. Wilson, J. (2016). *China's expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission, 15.
88. Other states, notably India, North Korea, Iran, Pakistan, Israel, and Turkey, have also expanded their ballistic and cruise missile capabilities in the post–Cold-War era. See Ghoshal, D. (2016). China and the INF treaty. *Comparative Strategy*, 35(5), 363–370.

89. To date, China has not expressed any intention to join the INF Treaty. *Ibid.*, 364.
90. Hallex, M. (2014). China's mighty missile threat: What should America do about it? *National Interest*, 13 September 2014. Available at: <http://nationalinterest.org/feature/chinas-mighty-missile-threat-what-should-america-do-about-it-11271> (Accessed: 10 January 2017).
91. From a technical perspective, a maneuverable medium-range ballistic missile system (such as the DF-21D ASBM) would not be too dissimilar to a 'regional' version of the U.S. Conventional Prompt Global Strike (CPGS) program. Gormley, D.M. (2015). US advanced conventional systems and conventional prompt global strike systems. *The Nonproliferation Review*, 22(2), 123–139.
92. Pollack, J.H. (2015). Boost-glide weapons and US-China strategic stability. *The Nonproliferation Review*, 22(2), 128.
93. Montgomery, E.B. (2014). China's missile forces are growing: Is it time to modify the INF treaty? *National Interest*, 2 July 2014. Available at: <http://nationalinterest.org/feature/chinas-missile-forces-are-growing-it-time-modify-the-inf-10791> (Accessed: 10 January 2017).
94. Wilson, J. (2016). *China's expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission, 13–15.



Chinese Evolving Approaches to Nuclear 'War-Fighting': An Emerging Security Dilemma?

INTRODUCTION

The existing literature that relates to Chinese nuclear capabilities and doctrines has tended to emphasize stability and nonbellicosity in Chinese approaches to nuclear deterrence and military escalation, encapsulated by the long-standing 'minimum deterrence' and no-first-use (NFU) policies.¹ In general, the literature has painted a relatively benign, static, and isolated (from China's conventional war-fighting capabilities) picture of the evolution of Chinese thinking on strategic deterrence, which risks underestimating the increasingly dynamic, integrative, and flexible features of this shifting security paradigm.² That is, by overemphasizing the gradualist and passive aspects of China's 'official' nuclear posture scholars and policy-makers may overlook the possibility that as many of the barriers (technological, military-organizational, and arms control) to a 'limited nuclear war-fighting doctrine' are removed, the doctrine-capabilities gap between China's nuclear capabilities and the modest war-fighting ambitions and the aspirations of Chinese strategists will finally be reconciled.³

This study argues that Chinese thinking on nuclear strategy includes positions in favor of a more flexible and robust nuclear posture, which has yet been endorsed in official documents, and is indicative of an underlying receptivity to innovation (especially technological) in this area. A 'formal' doctrinal shift (or even the perception of one) would closer align China's nuclear posture and forces with its more offensively configured conventional

stance. The chapter provides a much-needed analysis on the key areas of intersection and divergence in Chinese thinking on strategic (conventional and nuclear) deterrence, as well as the increasing commingling of Chinese conventional and nuclear capabilities and doctrine to support a limited ‘war-fighting’ strategic posture.⁴ In particular, it highlights the increasing convergence of China’s conventional and nuclear missile forces to fulfill the requirements of an integrated strategic deterrence posture, predicated on targeting an adversary’s military assets (especially counterforce targets) with nuclear weapons asymmetry, preemption, and a preference for limited strategic ambiguity—‘the threat that leaves something to chance’.⁵ ‘War-fighting’ in the context of nuclear weapons has often been treated as meaning ‘damage limitation’ or pursuit of a disarming first-strike capability. For the purposes of this discussion, the author defines a ‘war-fighting’ doctrine as victory denial; military escalation control; or coercing an end to a conflict on acceptable terms, potentially including the use of tactical (or ‘theater’) weapons preemptively to achieve limited deterrence objectives and the use of nuclear weapons for victory-denial purposes at all stages of warfare.

China’s nuclear deterrence posture has for decades been defined by ‘minimal deterrence’, de-mated and de-alerted nuclear warheads, and an NFU policy. In contrast, China’s conventional deterrence posture has been characterized by Western defense analysts as being based on war-fighting, preemption, asymmetry, and supported by the development of offensive-dominant capabilities. The closer alignment of these force postures would serve to accomplish China’s regional military objectives, informed at a strategic level by the active defense strategic concept (described in Chap. 3), and at a tactical level, by the use of asymmetric weapons in preemptive strikes for high-intensity warfare.⁶ To be sure, any major modifications to the composition of Chinese nuclear forces to meet the operational requirements of war-fighting doctrine would be viewed by Washington as a fundamental challenge to the military balance in the Asia-Pacific region.

This chapter argues that the security dilemma concept provides a compelling explanation for understanding the emerging (albeit under-researched) discourse that relates to the evolution of Chinese capabilities and doctrines associated with a ‘limited’ nuclear war-fighting posture.⁷ This theoretical lens enables a robust elucidation of several important questions: To what extent does the available evidence indicate a shift in

Chinese doctrine and nuclear escalation philosophy, which punctuates offensive military operations in the conventional domain with ‘tactical’ (or nonstrategic) ones in the nuclear domain?⁸ What are the key drivers underlying Beijing’s countenance of a nuclear war-fighting doctrine? Finally, is this shift emblematic of Beijing’s broader revisionist ambitions (inferred by many U.S. defense analysts) to replace the United States in the Asia-Pacific as the regional hegemon?⁹

Responses to these questions, in particular, to the critical assumptions underlying these assessments, will have significant implications for future United States–China deterrence, U.S. extended deterrence, security assurances, and regional strategic stability. The existence of a United States–China security dilemma in the conventional military arena is fairly well established in recent international relations (IR) scholarship (including this book); however, such a dynamic in the nuclear realm has so far appeared relatively limited, but would be especially be destabilizing and difficult to mitigate.¹⁰ This chapter argues that during the Obama era the ingredients for an intense security dilemma were already present in this domain, and are likely to worsen.¹¹

For the purposes of evaluating U.S. past and current thinking on Chinese nuclear capabilities and intentions, this case study has used a broad range of unclassified reports published by the U.S. Department of Defense (DoD) and U.S. Congress. In addition, it has selectively used research from prominent Western-centric think tanks, and U.S. defense experts and scholars—or the so-called U.S. defense community.¹² The relative opacity surrounding China’s official nuclear policies and posture has made it empirically challenging for external analysts to know with confidence the nature of Beijing’s intentions in the nuclear domain, in particular, Chinese thinking on the use of nuclear weapons during crisis or wartime conditions.¹³ More recently, however, Chinese analysts and strategists have become relatively more open to discussing a wider range of nuclear issues with external observers.¹⁴ To this end, this study makes extensive use of Chinese official national security publications and authoritative Chinese-language open sources.¹⁵

The chapter proceeds as follows. First, it examines evidence that intimates the reconciliation of the Chinese nuclear ‘capabilities–doctrine’ debate, which emerged in the late 1980s.¹⁶ The removal of many of the military-technological, organizational, political-ideational, and arms-control constraints (i.e. the Treaty on the Non-Proliferation of Nuclear

Weapons) impeding the implementation of a limited war-fighting doctrinal concept has cleared the path toward a substantially more powerful, survivable, mobile, flexible, and accurate nuclear weapon capability for employment at all stages of the escalation ladder—especially for counter-force missions.

Second, it considers the evolution of Chinese approaches to integrated strategic deterrence, which combines conventional (space and cyberwarfare) and nuclear capabilities and concepts, to deter and deny victory to a superior adversary in high-intensity local ‘informatized’ warfare. The chapter examines how these approaches have been conceptualized by Chinese strategists, and from the latest evidence, proffers ways in which these views might be incorporated into assessments by Beijing of its future nuclear posture. In particular, it argues that China’s increasingly commingled and diversified strategic missile forces have already been incorporated into a limited war-fighting posture.

Moreover, China’s renewed interest in the development of tactical theater weapons has, in conjunction with its conventional forces, enhanced the credibility of its nuclear deterrence, and enabled the kinds of early and preemptive strike tactics consistent with a limited war-fighting posture.¹⁷ This approach increasingly strains the credibility of Beijing’s official rhetoric, which depicted China’s nuclear posture as inherently restrained, in contrast to its conventional forces. This chapter argues that Beijing’s characterization of its declaratory nuclear posture became increasingly out of step with the evolution of Chinese force structure and Chinese military writings; thus, the lip service paid to this stance by the majority of external observers needs to be adjusted to reflect the more nuanced realities.

Finally, it reflects on the implications of a Chinese nuclear limited war-fighting posture for the trajectory of the United States–China nuclear balance and regional strategic relations, in particular, the prospects for a destabilizing security dilemma in the nuclear domain.¹⁸ It argues that the ambiguities and opacity associated with China’s nuclear policies and war-fighting doctrines will likely reinforce Washington’s reliance upon worst-case scenario capacity-based defense planning to infer Beijing’s—invariably malign—intentions (analyzed in Chap. 3). In turn, these security dilemma dynamics could lower the nuclear threshold, increase the risk of United States–China deterrence failure, and cause a war-fighting posture of the kind supported by Chinese proponents of a more robust nuclear stance, to become a self-fulfilling prophecy.¹⁹

CHINA'S REAPPRAISAL OF NUCLEAR 'WAR-FIGHTING'

The existing literature that relates to China's nuclear posture has tended to emphasize stability and continuity of Chinese nuclear deterrence, underpinned by the mainstay minimum deterrence and NFU policies. However, this status quo bias has overstated the static and passive nature of Chinese nuclear thinking, and understated the increasing dynamism, flexibility, and integrated (with China's conventional forces) features of China's nuclear posture. That is, *quantitative*-based net assessments of China's nuclear arsenal have failed to adequately appreciate (or anticipate) the impact several recent *qualitative* changes to the People's Liberation Army's (PLA) nuclear force structure has had on how Chinese strategists conceptualized 'deterrence'—especially the increasing alignment of the PLA's offensive-dominant conventional war-fighting posture, with its nuclear weapons and operating doctrines.²⁰ Although only a few Chinese strategists have explicitly advocated a shift in the function of nuclear weapons, from minimal deterrence to war-fighting, these minority views have, however, reflected broader pressures to assimilate Western nuclear strategies into traditional Chinese approaches to nuclear thinking.²¹

In his analysis of Chinese-language archives on nuclear policy during the mid-1990s, scholar Alastair Iain Johnston argued that Chinese strategists never *genuinely* accepted a minimum deterrence posture.²² Johnston opined that since the late 1980s Chinese strategists have developed a concept of 'limited deterrence' (or limited 'war-fighting') to describe the kind of nuclear posture China should aspire to, once the conditions are opportune. The concept was designed to *deter* both nuclear and conventional warfare, and in the last resort, *compel* the adversary to back down, to secure 'escalation dominance'—in other words, escalate to de-escalate. According to some Chinese strategists, the successful implementation of a limited war-fighting posture requires sufficient amounts of accurate, survivable strategic missile forces (capable of penetrating an adversary's missile defenses) to ensure a second-strike capacity; tactical theater missiles to target soft military targets (or 'asymmetric escalation' capabilities)²³; missile defense systems; and space-based early-warning systems to de-escalate future regional warfare.²⁴ Moreover, Chinese strategists have consistently (and explicitly) differentiated between the requirements of a 'minimum' deterrence and a 'limited' war-fighting posture, the latter clearly associated with the use of nuclear weapons for victory denial at all stages of warfare—especially against a conventionally superior military adversary.

Recent evidence suggests that far from fading into obscurity or being eschewed by Beijing's official rhetoric, Chinese strategic thinking on limited war-fighting has continued to shape and inform China's nuclear modernization efforts.²⁵ These Chinese publications suggest, therefore, the emergence of a pent-up interest in an expanded role for China's nuclear weapons, which has yet to be integrated into China's formal doctrine. Furthermore, the apparent contradictions inherent in a nuclear posture that simultaneously argues for restraint and victory-denial nuclear war-fighting will likely be reconciled, as the gap between the aspirations of Chinese strategists and what the PLA's strategic forces are capable of doing narrows.²⁶

In short, qualitative improvements to Beijing's nuclear force structure over the past two decades have given China the *ability* to use nuclear weapons (and preemptively) in regional wars, which implies a much broader and discriminate use for nuclear weapons than envisaged by proponents of minimum deterrence or assured retaliation.²⁷ Some external observers have argued that China could adopt a tiered (or more nuanced) approach to its nuclear posture. That is, China should continue to adhere to minimum deterrence and NFU for its 'strategic' nuclear force, while adopting a limited war-fighting posture for its 'nonstrategic' (nuclear and conventional) missile forces. However, the research suggests that such a dichotomous approach to deterrence is not consistent with Chinese thinking on 'integrated strategic deterrence', which encompasses the PLA's space, cyber, and electronic warfare (EW) capabilities.²⁸

Over the past two decades, many of the impediments that prevented a *de facto* limited war-fighting posture have been removed. Unimpeded by these constraints, Beijing's strategic thinking on future regional warfare will likely more accurately reflect the new (and more flexible) options it has amassed in both the nuclear and conventional domains, to optimize the synergies which exist between these domains, for limited local high-intensity 'informatized' warfare. Former PLA Second Artillery commander Zhao Xijun stated that a 'flexible application' of deterrence across conventional and nuclear domains, and from a strategic to tactical level of warfare is 'indispensable for effective and credible deterrence'.²⁹ China's 2008 National Defense white paper and most recent Military Strategy reiterated this conceptualization of deterrence.³⁰

The major obstacles that have prevented (or constrained) the adoption by China of a nuclear war-fighting posture include military-technological, military-organizational, and arms control.

Military-Technological

Western literature is rich in discussion of the role technology and innovation have played in China's nuclear modernization.³¹ In particular, observers have emphasized the diversification from liquid-fueled to solid-fueled systems and from silo-based to road-mobile systems, and the introduction of multiple independent targetable reentry vehicles (MIRVs) for China's strategic missile forces.³² The impact of these military-technological advances for China's nuclear operating doctrines intimated a clear departure from a minimum deterrence posture toward a more offensive-dominant and integrated war-fighting doctrine.³³ Or, put another way, military-technological advancements across a range of capabilities and domains has meant that China's nuclear posture in *aggregate* can no longer be accurately conceptualized independently of its broader conventional capabilities and concepts.³⁴ Rather, these domains (especially space, cyber, and missile defense) have been inexorably synthesized into a force structure, which incorporates war-fighting tools designed to deter *both* conventional and nuclear wars.³⁵ That is, Chinese offensive-dominant space, cyber, and conventional precision-strike capabilities have been inexorably fused into China's nuclear deterrence posture (for integrated strategic deterrence)—a trend that is likely to continue as new and increasingly sophisticated capabilities are fielded. As Columbia University's Robert Jervis has argued, in cases where the offense is dominant, especially when the offense–defensive balance is not clearly distinguishable, the security dilemma between states is more intense.³⁶

During a military parade in 2015 Beijing revealed its new intermediate-range ballistic missile (IRBM) *Dong-Feng 26* (DF-26), a dual-payload weapon capable (albeit untested) of targeting land and maritime targets in ranges out to Guam. According to the U.S. DoD, China began to field the DF-26 in 2016, offering Beijing 'its first precision strike capability against *theater (or counter-force) targets*'—for war-fighting missions in regional conflicts.³⁷ Furthermore, improved space-based intelligence, surveillance, and reconnaissance (ISR) capabilities could allow China to shift from an assured retaliation posture (i.e. the ability to absorb a first strike) to one analogous with a launch-on-warning stance, which would have significant implications for the PLA's existing operating doctrines.³⁸ In 2017, the Pentagon for the first time reported that China aspired to develop a launch-on-warning nuclear posture, to enable a 'more rapid response to enemy attack', and that China is developing a space-based early-warning capability to support such a posture.³⁹

China's most recent Military Strategy white paper, which proposed enhancements to the PLA's nuclear 'strategic early warning and command and control systems ... to *deter* other countries from using *or threatening to use* nuclear weapons against China',⁴⁰ suggests (albeit not explicitly) that a shift toward a launch-on-warning stance for enhancing China's nuclear deterrence that retains the option for a first-strike capacity is under consideration—a view that has also resonated within China's strategic community.⁴¹ Similarly, the authors of the latest authoritative doctrinal *Science of Military Strategy* (SMS) explicitly stated that China would not need to wait to absorb a nuclear attack *before* it launched a counterstrike, which forms part of the discussion on the merits of a launch-on-warning posture.⁴² It is noteworthy that neither of these texts reflects on the potential escalation risks associated with a launch-on-warning posture, in particular, the possibility of accidental launches caused by false (or misunderstood) signals, technical issues, or errors of judgment, all of which could trigger dangerous 'use it or lose it' dynamics.⁴³

Several recent technological innovations will likely expedite a new emerging generation of offensive-dominant strategic missiles across the entire nuclear triad, which will have profound implications for the trajectory of Chinese nuclear posture and policies.⁴⁴ These enhancements have given Beijing new options to threaten the use of nuclear weapons *below* the strategic level—at a tactical level against counterforce targets.⁴⁵

First, China has enhanced the survivability and lethality of the PLA's intercontinental ballistic missiles (ICBMs) with road-mobile launchers and MIRVs (e.g. the refitted DF-31A and the new DF-41 ICBMs).⁴⁶ In 2016, amid rising tensions with the United States in the South China Seas—and three days before former U.S. Defense Secretary Ash Carter scheduled a visit to USS *Stennis* in the region—China tested its new road-mobile DF-41 ICBM with two MIRVs.⁴⁷ Analyst Rick Fisher opined that this test indicated the DF-41 was in its final testing phase ahead of deployment, and, with the capacity to deliver as many as ten MIRVs, would further complicate the task of U.S. missile defense interceptors in the region.⁴⁸

Second, China operates four (a fifth is believed to be under construction) second-generation ballistic nuclear-powered missile submarines (SSBNs), armed with short-range submarine-launched ballistic missiles (SLBMs) (known as JL-1 and JL-2) that were successfully tested in 2012.⁴⁹ According to the Pentagon, 'China will probably conduct its first SSBN *nuclear deterrent patrol* in 2016'. This capacity gave Beijing its 'first

credible second-strike nuclear capacity',⁵⁰ which will have significant implications for how China handles (and potentially mates) its submarine nuclear warheads during peacetime operations.⁵¹

Third, in 2016 the DoD reported for the first time a potential nuclear role for Chinese long-range bombers (the H-6K), which in 2012 were deployed on debut deterrence missions.⁵² Moreover, major upgrades to Chinese onboard command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) systems for the HK-6K enabled long-range nuclear precision-strike missions—a capacity that only the United States, Russia, and France have possessed since the Cold War.⁵³ China is also reported to be developing a small number of nuclear-capable air-launched land-attack cruise (ALCM) missiles (the CJ-20) to launch from its refitted HK-6K bombers.⁵⁴ The deployment of nuclear-capable ALCMs would signal that China is developing a new air-launched war-fighting strike capacity to augment its ballistic tactical weapons and core strategic forces.

Finally, recent advances in hypersonic boost-glide technology could significantly enhance the maneuverability and speed of China's nuclear-capable (and conventional) high-precision missiles for regional preemptive strikes, in particular, to penetrate U.S. missile defense systems.⁵⁵ To be sure, whether Chinese hypersonic weapons will be armed with nuclear payloads will strongly indicate how Beijing intends to integrate these variants into future PLA operational doctrines.⁵⁶ Robert Jervis warned that the security dilemma is 'most vicious when commitment, strategy or *technology* dictates that the *only route to security lies through expansion*' of military power.⁵⁷

In sum, these military-technological advancements have enhanced the accuracy, speed, precision, ranges, maneuverability, and survivability of Chinese nuclear weapons in a manner that appears incongruous with the requirements of minimum deterrence. This approach suggests that China is less willing to accept qualitative inferiority with the United States (and to a lesser extent India and Russia) in the nuclear arena required for minimal deterrence, and is increasingly convinced of the deterrence value of a limited war-fighting posture to ensure a robust second-strike capacity and control escalation.⁵⁸ Moreover, the pace and extent of these qualitative advances appear to have outpaced changes to China's military doctrine, that is the formal conceptual structures that supposedly guide the development and operation of forces. As a corollary, even in the absence of formal changes to China's nuclear doctrine, the integration of its nuclear

weapons and operations with nonnuclear capabilities in offense-dominant domains, together with the ongoing qualitative advances associated with China's nuclear modernization, risks intensifying the security dilemma with the United States, including (most worryingly) in the nuclear domain itself.

Military-Organizational

In 2015, China announced a major military reorganization, which included a new nuclear missile command structure. Most notably, the PLA's Second Artillery Force (PLASAF), responsible for China's strategic missiles, was replaced by the new PLA Rocket Force (PLARF). This reorganization formally elevated Chinese strategic forces to an equal footing with the PLA's army, navy, and air force services.⁵⁹ Chinese President Xi Jinping stated that the Rocket Force is a 'core force of strategic deterrence' to uphold national security, enhance the PLA's nuclear deterrence and counterstrike capacity, build a long-range precision-strike capability, and buttress China's position as a major military power. *De facto* it appears that Xi Jinping has embraced a war-fighting doctrine for the Rocket Force. Xi stated that the core mission of the Rocket Force was to

[e]nhance credible and reliable nuclear deterrence and counter nuclear strike capability in accordance with the strategic requirements of *nuclear and conventional missiles* and of *full-area war deterrence* ... and strive to build a powerful modernized rocket force.⁶⁰

Xi also called on the Rocket Force to enhance China's nuclear deterrence and counterstrike capacity, in particular, using medium- and long-range precision-strike missiles (PSMs) to ensure a credible and reliable nuclear deterrent.⁶¹

Notwithstanding the claims of China's Ministry of National Defense that the creation of the Rocket Force would not alter China's nuclear policies, the official sanctioning of this new military service symbolized the convergence of Beijing's expansive conceptualization of 'strategic deterrence', with the necessary qualitative advances in the PLA's strategic forces to fulfill the requirements of nuclear war-fighting.⁶² Moreover, this intersection occurred without the political dogma and ideational constraints faced by earlier generations of Chinese military leaders. In short, the promotion of Chinese strategic forces, together with significant qualitative

enhancements to its capabilities, has finally aligned China's (nuclear and conventional) war-fighting tools and the aspirations of its military leaders, with a command structure and the political will necessary to formalize a doctrinal shift.

What remains unknown, however, is how Chinese thinking and operational doctrines will evolve to reflect the inexorable linkages that have formed between China's integrated strategic deterrent capabilities and its reorganized military structure. For example, although Chinese strategists have frequently discussed cross-domain warfare to deter adversaries and control escalation they have rarely considered the risks associated with these tactics, including how weaknesses in one domain could be offset by the strengths in another and, related, how capabilities in one domain might be used to deter (or control escalation) conflict in another.⁶³ To be sure, questions such as these will become more pressing as China diffuses its burgeoning cross-domain war-fighting capabilities across its reconfigured military services.⁶⁴ It also remains unclear from existing sources how Chinese strategists expect the trajectory of these reforms to impact China's ability to coordinate its disparate war-fighting tools and, in turn, how a more powerful and dynamic strategic missile force structure might enable a broadening of Chinese war-fighting posture into other domains (especially space and cyber).⁶⁵

Arms Control

Though little is known of the precise link between Beijing's official position (especially its decision-making processes) on arms control, and the evolution of China's nuclear limited war-fighting doctrinal preferences, the evidence suggests these positions have reinforced one another.⁶⁶ Thus, Beijing's attitude toward nuclear arms control and disarmament is best viewed through the lens of China's broader strategic objectives: to safeguard its security; to frustrate nuclear blackmail (especially from the United States); to deter others from initiating a first strike; and to prevent U.S. missile defenses from neutralizing China's retaliatory capacity.⁶⁷ While Beijing remains committed to its obligations under Article VI of the Non-Proliferation Treaty (NPT), and has maintained (if very lukewarm) support for the Comprehensive Test Ban Treaty (CTBT) and Fissile Material Cut-off Treaty (FMCT) negotiations, it has consistently placed the onus on the United States and Russia to take the initiative, *before* it would contemplate engaging in nuclear disarmament dialogue.⁶⁸

China's series of defense white papers have iterated the concept of a 'lean and effective' nuclear force; however, this concept does not impose specific numerical constraints on China's nuclear arsenals. From a Chinese perspective, *lean* implies a modest force posture, and underscores Beijing's desire to avoid a costly arms race in the nuclear arena; while *effective* permits qualitative improvements to enhance the survivability, accuracy, lethality, and credibility of China's strategic deterrence, and, above all, to counter the United States' ballistic missile defense (BMD) system.⁶⁹ According to Major General Yao Yunzhu, 'to keep the arsenal *effective*, China has to modernize it to *ensure credibility* after a first nuclear strike'—or a second-strike capacity. To be sure, a 'lean and effective' nuclear force aligns with the basic requirements of minimal deterrence.⁷⁰ However, one of the problems with 'minimal deterrence' is that it requires an accurate understanding of the level of damage an adversary finds *unacceptable*, which will inevitably change over time; a 'credible' deterrent today may not be perceived so in the future. As Chinese scholar Li Bin has emphasized, 'China's promise to not get involved in arms races does not rule out ... security dilemmas'.⁷¹ Moreover, a limited war-fighting capacity does not require parity (or symmetry) with other nuclear powers (the United States and Russia) to be *effective*. Rather, the doctrine is asymmetric in nature, and, as a corollary, China only requires sufficiently credible war-fighting capabilities to deter and deny victory to an enemy.

Chinese strategists have often (and ambiguously) declared a general commitment to minimum deterrence, while simultaneously advocating first-strike and preemptive warfare, in the nuclear and conventional domains.⁷² For example, the doctrinal *Science of Second Artillery Campaigns* (SSAC) stated the following:

The most important type of future regional wars will be conventional conflicts under conditions of nuclear deterrence, *deterrence and actual war-fighting will exist at the same time*, and their function and effectiveness will be *mutually complementary*.⁷³

This apparent contradiction can be explained by the confluence of Chinese conceptualizations of conventional and nuclear war-fighting and deterrence, which contrast with external observers' overly passive and static perceptions of Chinese deterrence.⁷⁴

Therefore, the only remaining arms control policy preventing a formal shift to a nuclear war-fighting posture is China's cornerstone NFU

commitment.⁷⁵ Over the past decade, however, Chinese strategists have questioned the strategic logic underpinning China's adherence to NFU, which has raised concerns that Beijing could place conditions on this commitment, or even do away with it entirely.⁷⁶ Chinese strategists have discussed several broad scenarios under which Beijing might attach caveats to its NFU policy, which also tacitly countenanced first nuclear strike tactics.⁷⁷ Most controversially, nuclear weapons could be considered in retaliation against a *conventional* attack on Chinese strategic nuclear forces, and, in particular, to counter U.S. BMD and long-range precision forces.⁷⁸ To be sure, Beijing's long-held hostility toward missile defense systems led to the prioritization of initiatives specifically designed to increase the survivability and penetrability of China's nuclear forces to survive a first strike (e.g. solid-fueled road-mobile missiles, MIRVed warheads, and SSBMs).⁷⁹ Several external observers have argued that the Chinese defense community, in highlighting internal debates on the conditions China could place on its NFU pledge, deliberately stoked ambiguity to strengthen Chinese deterrence.⁸⁰ To be sure, the lack of clarity surrounding Chinese internal debates will continue to undermine the credibility of China's adherence to NFU, while keeping the option open for Beijing to formalize its *de facto* limited war-fighting posture.⁸¹

CHINESE EVOLVING APPROACHES TO 'STRATEGIC DETERRENCE'

Chinese conceptualization of deterrence (or the Chinese term *weishi*) is best understood as a form of coercion, which includes elements of *both* 'deterrence' and 'compellence'.⁸² In short, nuclear deterrence and compellence are often indistinguishable.⁸³ That is, there is the threat of military force to coerce an adversary to comply with a particular set of demands, combined with a capacity to inflict precise and targeted damage, a demonstration of the willingness to use this capacity, and a tactical preference for military signaling, to convey the *means* and *will* to carry out these threats.⁸⁴

Chinese thinking on deterrence has also been influenced by a strategic-cultural tradition that emphasizes minimalism, ambiguity, flexibility, and patience. Chinese strategists have frequently drawn upon historical military discourses and strategic theories (e.g. Mao's Theory of People's War, and active defense) to inform and authenticate their thinking on deterrence,

and the relationship between threats and capabilities.⁸⁵ China's 2015 Victory Day Parade represented a very public demonstration of Beijing's growing confidence in its enhanced strategic deterrence, above all, vis-à-vis the United States. For example, Chinese state media officially described the PLA's new dual-payload DF-26 IRBM as a 'new weapon for *strategic deterrence*'.⁸⁶

Evolving Chinese conceptions of strategic deterrence (or in Chinese lexicon 'integrated strategic deterrence') share similarities with the U.S. 'peace through strength' concept, which is a multifaceted and holistic version of deterrence.⁸⁷ As doctrinal SMS highlighted,

[t]he comprehensive employment of all types of strategic deterrence to give full play to deterrence as a whole for serving national military strategy ... an *integrated strategic deterrence* is formed ... [with] *conventional* force as the mainstay, *nuclear* force as the back-up and reserve force as the support.⁸⁸

The inexorable blurring of the PLA's conventional and nuclear (and offensive and defensive) capabilities, by shortening the time frame for crisis decision-making, and compressing the (albeit poorly defined) United States–China nuclear escalation ladder, will likely pose increasing risks to future United States–China strategic stability in Asia.⁸⁹ Moreover, under crisis conditions these risks could exacerbate existing United States–China misperceptions and misunderstandings, which are baked into the competing doctrines and operational concepts on both sides: for example, US air–sea battle (ASB; renamed Joint Concept for Access and Maneuver in the Global Commons), and China's anti-access/area denial (A2/AD) strategy (discussed in Chap. 3).

EVOLVING CHINESE THINKING ON TACTICAL THEATER WEAPONS AND MISSILE DEFENSE

Since the 1980s, Chinese strategists have expressed a clear preference for tactical nuclear weapons (especially dual-capability ballistic and cruise missiles) as a way to build rungs on the 'nuclear ladder', and to enhance the credibility of China's nuclear deterrence against superior adversaries. Chinese-language sources have indicated that China has possessed the ability to develop low-yielding tactical nuclear weapons since the 1970s. However, no clear evidence has emerged to corroborate reports that China has deployed (or mated) warheads of these kinds with delivery vehi-

cles.⁹⁰ Similarly to North Atlantic Treaty Organization (NATO) defense planners during the Cold War era, Chinese defense planners have viewed the possession of a range of nuclear options (including tactical weapons) as strategically advantageous to avoid a Solomonic choice: using strategic nuclear weapons preemptively (precluded by NFU) or remain vulnerable to a nuclear first strike.⁹¹ Moreover, Chinese strategists have envisioned augmenting tactical nuclear weapons with conventional asymmetric capabilities (e.g. antiship ballistic and cruise missiles, antisatellite weapons [ASATs], and cyber warfare), to target a superior adversary's command and control structures, and evade its missile defenses.⁹²

Chinese military writings have generally avoided explicitly detailing under what circumstances (and against what kind of adversaries) China may consider deploying tactical nuclear weapons.⁹³ That said, given the types of military targets described by Chinese analysts, and that the target would likely be nuclear-armed, we can infer that China's tactical nuclear weapons (especially dual-capable missiles) would feature prominently in the formulation of a limited war-fighting deterrence posture.⁹⁴ For example, China possesses several nuclear-capable intermediate-range ballistic missiles (IRBMs) and medium-range ballistic missiles (MRBMs) (e.g. the road-mobile DF-21 and the new DF-26), which, according to Beijing, can perform medium- to long-range precision attacks on both land and large- to medium-sized maritime targets in estimated ranges of 3000–4000 km; that is, they are capable of targeting US bases in Guam and US aircraft carriers operating in the Western Pacific (discussed in Chap. 5).⁹⁵

In terms of doctrine, former Second Artillery deputy commander Lieutenant General Zhao Xijun opined that China should not only have '*strategic* nuclear forces but also *campaign and tactical* nuclear forces' to ensure the credibility of its deterrent posture at *all levels* of war.⁹⁶ Moreover, Zhao's comment that Chinese tactical weapons can carry a nuclear warhead or special warhead according to the needs of the task and strike targets implied that the capabilities for this purpose already exist.⁹⁷ Although Zhao's comments do not represent official military strategy, his views are nonetheless indicative of an increasingly expansive conceptualization of strategic deterrence advocated by Chinese strategists, to ensure a credible deterrence posture at all levels of warfare on the modern battlefield.

For example, evidence suggests that, in spite of Washington's reassurances, the decision to deploy Terminal High-Altitude Area Defense (THAAD) systems in South Korea have heightened Beijing's fears and directly influenced its regional strategic calculations.⁹⁸ Since this decision

was announced in 2015 China has perceptibly intensified efforts to develop hypersonic (and possibly nuclear-capable) variants for its short- and intermediate-range ballistic and cruise missiles, to penetrate US layered missile defense systems.⁹⁹ Furthermore, THAAD systems have been the target of regular cyber-espionage attacks attributed to Chinese IP addresses. Chinese-language open-source evidence indicates that Chinese strategists have increasingly viewed proposals from the Obama administration to modernize its nuclear triad (especially proposals for new air-launched nuclear-capable cruise missiles) as the continuation of the ‘basic characteristics of a war-fighting strategy’.¹⁰⁰ These developments, together with other US military countermeasures and offsetting concepts, will likely convince Beijing of the tactical advantages and strategic necessity of ‘formally’ adopting a limited nuclear war-fighting doctrine, to prepare for future regional informatized warfare.

IMPLICATIONS OF A CHINESE NUCLEAR LIMITED WAR-FIGHTING POSTURE

If U.S. defense planners concluded that developments to the PLA’s war-fighting capabilities (e.g. space-based ISR systems to enable a ‘launch-on-warning’ posture) could haringer a radical shift in the trajectory of Chinese approaches to strategic deterrence, the implications for United States–China strategic relations, U.S. regional extended nuclear assurances, and nuclear deterrence in future warfare would be profound.¹⁰¹ Moreover, China’s propensity for strategic ambiguity and opacity in the nuclear domain, in particular, the intended purpose of its (offensive) war-fighting capabilities, will likely reinforce the Pentagon’s preference for worst-case scenario capacity-based assessments, which in turn inform and guide U.S. countermeasures (discussed in Chap. 3).¹⁰²

As a corollary, fearful that security gains by the United States will come at China’s expense, the formalization of a nuclear war-fighting posture may become a self-fulfilling prophecy. Recent evidence indicates that Chinese strategists have viewed the expansion of China’s (offensive and defensive) capabilities as both *reasonable* and *necessary* responses to counter (and deter) U.S. military policies and postures in the region, designed to contain China’s power and influence in Asia, and undermine its nuclear deterrence.¹⁰³ For example, Chinese strategists have viewed recent U.S. proposals to modernize its nuclear triad, in particular, to develop a new

air-launched nuclear-capable cruise missile, with especial consternation.¹⁰⁴ Structural-realist IR scholars have described how spirals of mistrust can develop between states, even in situations where *both* sides are 'security seekers' (described in Chap. 2)¹⁰⁵:

For you to know that you yourself mean him no harm, and that you want nothing from him save guarantees for your *own safety*, and it is never possible for you to realize or remember properly that since he *cannot see the inside of your mind*, he can never have the same *assurances of your intentions* that you have ... neither party see the nature of the predicament he is in, for each only imagines that the other party is being *hostile and unreasonable*.¹⁰⁶

Moreover, in cases where incentives (or disincentives) exist for each side *not* to cooperate, both sides will likely pursue their own narrow self-interests, and become predisposed to viewing the other as an adversary, which under the presence of the security dilemma leaves both sides worse off.¹⁰⁷

The evidence suggests that Chinese strategists acknowledge the trade-off created by the strategic ambiguities surrounding Beijing's nuclear policies and postures. That is, there is the risk that this approach could easily backfire, and prompt Washington to enrich and improve its military policies and postures to counter these uncertainties: for example, the Third Offset Strategy, ASB, U.S. naval freedom of navigation operations in the South China Seas, proposals to modernize the U.S. nuclear triad, and the expansion of U.S. missile defenses in Asia.¹⁰⁸ Equally, a failure by Washington to more rigorously appreciate the evolving nature of Chinese thinking on strategic deterrence and escalation philosophy will increase the risk that in a strategic environment highly susceptible to crisis instability, the United States might be unable to effectively deter acts of aggression by China (e.g. aggressive assertions of sovereignty in South China Seas or the Taiwan Strait).¹⁰⁹

Cold War-era scholarship on nuclear deterrence observed that in situations where a conventionally weaker state with a secure second-strike capacity faces a more powerful adversary, conflict will more easily (and inadvertently) cross the nuclear threshold—especially if theater tactical weapons are present.¹¹⁰ In the case of the Sino-American strategic relations, the Chinese belief (described in Chap. 5) that its nuclear deterrent will *necessarily* prevent a conventional conflict from escalating into a nuclear one may compound these dynamics.¹¹¹ That is, Chinese strategists

have tended to overestimate China's ability to effectively manage the escalation process, and underestimate the inherent risks of unintentional escalation.¹¹² Moreover, Chinese strategists have tacitly suggested that if the United States were to use nuclear capabilities to signal deterrence and resolve situations (e.g. nuclear-capable bombers), Beijing would likely escalate the situation with nuclear deterrence signaling, including missile tests, SSBN deployments, raising the alert status of Chinese nuclear forces, and ultimately adjusting China's nuclear policies.¹¹³

CONCLUSION

This study makes four overarching arguments. First, the existing literature that relates to Chinese approaches to nuclear deterrence paints an overly static and passive picture that understates the dynamic and integrated features of China's burgeoning cross-domain war-fighting tools. Thus, the characterization of China's nuclear posture by external observers (demonstrated by the continued lip service paid to minimum deterrence and NFU) risks misaligning the PLA's commingled capabilities and doctrines to support a *de facto* limited war-fighting posture.

Second, evidence from Chinese-language sources suggest that Chinese thinking on limited war-fighting, rather than being eschewed by Beijing in favor of a minimal deterrence (or assured destruction) posture, has continued to influence the evolution of China's nuclear modernization. Moreover, Chinese literature on nuclear thinking includes positions that favor a more flexible and robust nuclear posture than has yet been endorsed in official documents or reflected in China's formal doctrine, which indicates an underlying receptivity for innovation in this domain. Simply put, unimpeded by many of the constraints imposed on previous generations of Chinese strategists, and driven by the ongoing qualitative changes to the PLA's force structure, China's incongruous nuclear posture will likely be reconciled, aligning the PLA's nuclear forces with its offensive-dominant conventional stance for high-intensity, asymmetric (or 'asymmetric escalation'), and preemptive future warfare. Several unknowns and strategic uncertainties remain, however: How closely will China's nuclear and conventional domains be aligned, and at what levels? Could there be, for example, a greater degree of alignment at the theater level (the PLA possesses dual-capacity MRBMs and IRBMs), but less so at the strategic level (China's ICBMs are nuclear-armed)? In addition, how will hypersonic weapons and glide vehicles affect this dynamic, in particular, if deployed to enhance both conventional and nuclear missiles?

Third, Chinese evolving conceptualization of strategic deterrence reflects a multifaceted cross-domain version of deterrence, which lends itself to the blurring of traditional conventional–nuclear and offensive–defense lineation. This inexorable blurring, by shortening the decision-making time frame (during a crisis) and compressing the nuclear escalation ladder, will increase the incentives (on both sides) for preemptive tactics. Thus, even in the absence of radical changes to China's nuclear doctrine, technological advances to China's nuclear posture, combined with the integration of its nuclear capabilities with nonnuclear ones in offense-dominant domains, risk intensifying security dilemma dynamics with the United States, including in the nuclear domain itself. This interpretation of the thesis does not, however, contend that Beijing has adopted or will formally adopt an actual nuclear war-fighting doctrine, but rather that the trajectory of China's military modernization and integration is taking them to a place with many of the same potential risks and strategic implications.

Finally, several factors could lower the nuclear threshold and expedite the formalization of limited war-fighting nuclear posture, which in turn triggers a self-reinforcing spiral to an intense security dilemma in the strategic domain: (1) the convergence of China's expanding suite of war-fighting capabilities with Chinese strategists and analysts evolving thinking on 'strategic deterrence'; (2) the commingled nature of the PLA's nuclear and conventional forces and doctrines; (3) sanguine Chinese attitudes toward the risk of inadvertent and accidental nuclear conflict; (4) the opacity and ambiguity that surrounds China's nuclear posture and capabilities; and (5) heightened threat perceptions in Beijing caused by U.S. military policies and operations in the region.

Several implications and future research topics follow from the findings of this case study. First, research would be beneficial on how the Chinese security community views the United States–China relationship in the nuclear domain. In particular, who on the Chinese side is leading a fundamental rethink; is it being challenged; and, if so, in what ways and to what degrees of success? How are these views changing in response to U.S. military policies and posture in Asia? Finally, how will the PLA's 'new' capabilities likely affect the trajectory of Beijing's thinking about its nuclear options in future warfare?

Second, external analysts will need to closely monitor the development of China's commingled capabilities (e.g. space-based ISR), in particular, indications of changes to the PLA's operational doctrines prompted by

these developments. Third, it is too early to conclude whether the PLA will emerge from its recent major overhaul as a stronger and more coordinated joint war-fighting force. What, for example, will be the precise responsibilities of the new Rocket Force for China's overall nuclear assets, will the new service's command be confined to land-based missiles, or will they extend to China's sea- and air-based nuclear-capable missiles?

In the final analysis, on the future modern battlefield where the boundaries between war and peace (and conventional–nuclear and offense–defense) lines are increasingly blurred; where an aggressor is likely to resort to early and preemptive tactics to assert escalation dominance; and where states rapidly accumulate, synthesize, and diffuse progressively advanced war-fighting tools, interstate security dilemmas will become more frequent, intense, intractable, and destabilizing.

NOTES

1. China's nuclear deterrence posture has for decades been grounded by minimal deterrence; de-mated and de-alerted nuclear warheads; and a no-first-use (NFU) policy. In contrast, China's conventional deterrence posture is predicated on war-fighting, preemption, asymmetry; and the accumulation of offensive-dominant capabilities. Yao, Y. (2010). China's perspective on nuclear deterrence. *Air and Space Power Journal*, 24(1), 27–30; Li, B., & Zhao, T. (Eds.). (2016). *Understanding Chinese nuclear thinking*. Washington, DC: Carnegie Endowment for International Peace. For Western-centric studies that have emphasized continuity and restraint in China's nuclear posture, see Fravel, T.M., & Medeiros, E. (2010). China's search for assured retaliation: The evolution of Chinese nuclear strategy and force structure. *International Security*, 35(2), 48–87. Lewis, J. (2013). China's nuclear modernization: Surprise, restraint, and uncertainty. In A. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 67–96). Washington, DC: The National Bureau of Asian Research (NBR).
2. More recently, external analysts have begun to argue that China is no longer satisfied with a minimum deterrence posture—especially because of U.S. military policies in Asia. Several analysts have also discussed the implications of a shift in China's nuclear policies and strategic thinking. See Delpech, T. (2012). *Nuclear deterrence in the 21st century*. Washington,

- DC: RAND Corporation, 128–129; Cimbala, S.J. (2015). Chinese military modernization: Implications for strategic nuclear arms control. *Strategic Studies Quarterly*, (Summer), 11–19; Haynes, S.T. (2016). *Chinese nuclear proliferation: How global politics is transforming China's weapons build-up and transformation*. Lincoln, NE: Potomac Books.
3. From the 1980s, Chinese strategists began to distinguish between a 'minimum deterrence' and a 'limited deterrence' nuclear posture. 'Minimum deterrence' requires only a small amount of nuclear warheads for use in 'counter-value' (i.e. targeting of an adversary's cities and civilian populations) second strikes, necessary to *deter* an adversary from attacking—and is underwritten by an NFU policy. 'Limited deterrence' requires possessing enough capabilities to deter conventional, theater, and nuclear wars, and to control military escalation during a nuclear war—or escalation to de-escalate. This posture would require tactical (or theater) nuclear weapons to target 'counterforce' targets (i.e. targeting of an opponent's military forces and facilities), as well as other 'war-fighting' capabilities (e.g. missile defenses; antisatellite missiles; and space-based early-warning systems) to inflict sufficient damage on an enemy's military capabilities to *deny them victory*, and to perform (including preemptive) first-strike missions. A 'limited deterrence' posture shares similarities with Russia's post-Cold War nuclear doctrine. In 1993 Russia dropped its own NFU pledge; its revised doctrine reserves the right to authorize 'limited' nuclear retaliation in response to 'large-scale conventional aggression'. For this purpose, Russia conceptualizes limited tactical nuclear strikes to 'de-escalate' a conventional attack. Similarly, since 1995 the United States has retained the right to use 'limited' nuclear war (and tactical weapons) as part of a policy of deterrence aimed at states possessing weapons of mass destruction (WMD), notably Iran and North Korea. Zhang, B. (2015). *China's assertive nuclear posture: State security in an anarchic international order*. New York, NY: Routledge, 17–18; Colby, E. (2016). *Russia's evolving nuclear doctrine and its implications*. (No. 1). Washington, DC: Center for a New American Security.
 4. 'War-fighting' in the context of nuclear weapons has often been misinterpreted as meaning 'damage limitation' or pursuit of a disarming first-strike capability. For this discussion, the author defines the purpose of a 'war-fighting' doctrine as victory denial; military escalation control; and coercing an end to a conflict on acceptable terms—including the use of tactical theater weapons in preemptive tactics to achieve 'limited deterrence' objectives. During the Cold War era the lines between the nuclear and conventional domains was less ambiguous, owing to the indiscriminate nature of nuclear weapons between the United States and the Soviet Union.

5. Schelling, T.C. (1960). *The strategy of conflict*. Cambridge, MA; London: Harvard University, Chap. 8. From current open-source literature, the precise nature of the commingling of the Chinese conventional and nuclear forces is difficult to ascertain.
6. The U.S. DoD described ‘informatized’ conditions as a PLA concept characterized by a ‘system of systems operations [focus that] requires enhancing systems and weapons with information capabilities and linking geographically dispersed forces and capabilities into an integrated system capable of unified action’. Office of the Secretary of Defense, U.S. Department of Defense. (2014). *Quadrennial defense review report*. Washington, DC: U.S. Department of Defense, 9.
7. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214.
8. There is no universally agreed definition on what constitutes a ‘tactical’ (or nonstrategic) nuclear weapon. This chapter applies a broad definition of ‘tactical theater’ weapons defined as weapons with shorter-range (and often portable) delivery systems; with lower yield warheads (compared to ‘strategic warheads’); and usually used by troops or facilities on the battlefield for counterforce targeting, for example short-range missiles, gravity bombs, land mines, torpedoes, as well as MRBMs and IRBMs equipped with nuclear warheads. In the context of nuclear deterrence, ‘tactical’ nuclear weapons generally implies a ‘war-fighting’ doctrine, which goes beyond the *threat* of punishment that underpins a ‘minimum deterrence’ posture. Woolf, A.F. (2016). *Nonstrategic nuclear weapons*. Washington, DC: Congressional Research Service.
9. See Mearsheimer, J.J. (2001). *The tragedy of great power politics*. New York; London: Norton; Zhang, B. (2015). *China’s assertive nuclear posture: State security in an anarchic international order*. New York, NY: Routledge; Haynes, S.T. (2016). *Chinese nuclear proliferation: How global politics is transforming China’s weapons build-up and transformation*. Lincoln, NE: Potomac Books.
10. Christensen, T.J. (2002). The contemporary security dilemma: Detering a Taiwan conflict. *The Washington Quarterly*, 25(4), 7–21. Johnston, A.I. (2003). Is China a status quo power? *International Security*, 27(4), 5–56; Goldstein, A. (2005). *Rising to the challenge: China’s grand strategy and international security*. Stanford, CA: Stanford University Press.
11. Acton, J.M. (2013). *Silver bullet? Asking the right questions about conventional prompt global strike*. Washington, DC: Carnegie Endowment for International Peace, 121–123.
12. This paper refers to the U.S. ‘defense community’ to include analysts at the U.S. DoD, as well as U.S. defense-related think tanks and military and defense experts and scholars.

13. Most Chinese scholars believe that transparency about *intentions* is more important than transparency about capabilities. See Wu, R. (2016). How China practices and thinks about nuclear transparency. In B. Li, & Z. Tong (Eds.), *Understanding Chinese nuclear thinking* (pp. 219–251). Washington, DC: Carnegie Endowment for International Peace.
14. Cunningham, F.S., & Fravel, M.T. (2015). Assuring assured retaliation: China's nuclear posture and U.S.-China strategic stability. *40*(2), 7–50.
15. All translations of titles and other Chinese quotations in this case study, unless otherwise stated, are the authors'. The chapter has made extensive use of the Chinese-language academic journal database (CNKI); for much of the open-source mining, see www.cnki.net.
16. Johnston, A.I. (1995–1996). China's new 'old thinking': The concept of limited deterrence. *International Security*, *20*(3), 35.
17. Several Chinese scholars have argued that the development of nuclear weapon technologies does *not necessarily* imply these capabilities will be deployed or integrated into Chinese military doctrine. See Wu, R. (2016). How China practices and thinks about nuclear transparency. In B. Li, & Z. Tong (Eds.), *Understanding Chinese nuclear thinking* (pp. 219–251). Washington, DC: Carnegie Endowment for International Peace.
18. In this context, 'strategic stability' refers to situations where nuclear weapons are less likely to be used deliberately, accidentally, or in an unauthorized manner.
19. Lowering China's threshold in the use of nuclear weapons is *not necessarily* the same as adjusting or lowering its nuclear deterrence. Chinese military writings have tended to stress that the main utility of nuclear deterrence is to impose sufficient psychological fear on the enemy to deter conventional strikes. There has, however, been much debate (within and outside China) on what conditions Beijing may place on the use of nuclear weapons. See Heginbotham, (Eds.). (2015). *The U.S.-China military scorecard: Forces, geography, and the evolving balance of power 1996–2014*. Santa Monica, CA: RAND Corporation, 30–31.
20. See Kristensen, H.M., & Norris, R.S. (2016). Chinese nuclear forces, 2016. *Bulletin of the Atomic Scientists*, *72*(4), 205–211.
21. Chinese advocates of a significant buildup of nuclear forces for war-fighting include Yuwen, J., & Tang, L. (2013). Discussion and revelation of American 'Quick global attack' plan. *Journal of the Academy of Equipment Command & Technology*, *60*(3); Chu, S. (2014). Maximally increase nuclear deterrence to deal with the threat of U.S. and Japan. *People's Daily Online*, 4 June 2014. Available at: <http://connection.ebscohost.com/c/articles/98782526/tsinghua-professor-maximally-increase-nuclear-deterrence-deal-threat-u-s-japan> (Accessed: 10 July 2016).

22. Johnston, A.I. (1995–1996). China’s new ‘old thinking’: The concept of limited deterrence. *International Security*, 20(3), 5–42.
23. See Krepon, M. (2015). Nuclear postures. *Arms Control Wonk*, 25 February 2015. <http://www.armscontrolwonk.com/archive/404492/nuclear-postures/> (Accessed: 2 July 2016).
24. Xue, B. (2010). Study on the development of contemporary strategic warning system. *Military History Research*, 3(102); Yuwen, J., & Tang, L. (2013). Discussion and revelation of American ‘Quick global attack’ plan. *Journal of the Academy of Equipment Command & Technology*, 60(3).
25. For early Chinese debates on nuclear thinking, see Johnston, A.I. (1995–1996). China’s new ‘old thinking’: The concept of limited deterrence. *International Security*, 20(3), 5–42.
26. See Kristensen, H.M., Norris, R.S., & McKinzie, M.G. (2006). *Chinese nuclear forces and U.S. nuclear war planning*. (November). Washington, DC: The Federation of American Scientists & The Natural Resources Defense Council.
27. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 111.
28. Pollpeter, K. (2012). Space, cyber, and electronic warfare: Controlling the information domain. In A.J. Tellis, & T. Tanner (Eds.), *Strategic Asia 2012–13: China’s military challenge* (pp. 163–194). Seattle and Washington, DC: The National Bureau of Asian Research.
29. Zhao, X. (Ed.). (2005). *Coercive deterrence warfare: A comprehensive discussion on missile deterrence*. Beijing, China: National Defense University Press, 78.
30. Ministry of National Defense, The People’s Republic of China. (2015). *China’s military strategy, 2014*. Beijing, China: Information Office of the State Council.
31. For example, Lewis, J., & Litai, X. (1988). *China builds the bomb*. Stanford, CA: Stanford University Press, pp. 233–234; Zhang, B. (2015). *China’s assertive nuclear posture: State security in an anarchic international order*. Chap. 3. New York, NY: Routledge; Haynes, S.T. (2016). *Chinese nuclear proliferation: How global politics is transforming China’s weapons build-up and transformation*. Lincoln, NE: Potomac Books, 44–58.
32. The U.S. DoD reported in 2017 that China continues to develop a new MIRV-capable, road-mobile ICBM—the DF-41. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People’s Republic of China, 2017*. Washington, DC: U.S. Department of Defense, 31.
33. See Kristensen, H.M., Norris, R.S., & McKinzie, M.G. (2006). *Chinese nuclear forces and U.S. nuclear war planning*. (November). Washington, DC: The Federation of American Scientists & The Natural Resources Defense Council.

34. Chase, S.M., & Chan, A. (2016). *China's evolving approach to 'integrated strategic deterrence'*, RAND Corporation, Santa Monica, CA.
35. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 254. Chinese strategists have also explored the tactical value of using China's nuclear missiles in low earth orbit in an electromagnetic pulse attack against an adversary's satellites. China successfully tested a ground-based midcourse interceptor in 2010 and 2013. China began research on missile defense as early as the 1960s, and maintained these efforts even after the United States–Soviet ABM treaty in 1972. China still faces several technical challenges in deploying an effective BMD system, most notably space-based early-warning systems.
36. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214.
37. Gertz, B. (2016). China flight tests new multiple-warhead missile. *Freebeacon*, 19 April 2016. Available at: http://freebeacon.com/national-security/china-flight-tests-multiple-warhead-missile/?utm_source=Freedom%20Mail&utm_campaign=b3e952a4c7WFB_Morning_Beacon_04_19_164_18_2016&utm_medium=email&utm_term=0_b5e6e0e9ea-b3e952a4c7-46005157 (Accessed: 2 July 2016).
38. Roberts, B. (2015). *The case for U.S. nuclear weapons in the 21st century*. Stanford, CA: Stanford University Press, 141–176.
39. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*. Washington, DC: U.S. Department of Defense, 61.
40. Ministry of National Defense, The People's Republic of China. (2015). *China's military strategy, 2014*, Information Office of the State Council, Beijing, China.
41. See Xue Bingjie, "Study on the development of contemporary strategic warning system," *Military History Research*, no. 3 (2010), p. 102.
42. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press.
43. Ministry of National Defense, The People's Republic of China. (2015). *China's military strategy, 2014*, Information Office of the State Council, Beijing, China.
44. The U.S. DoD reported that China is developing a strategic bomber with a possible nuclear mission, which would 'provide China with its first credible nuclear "triad" of delivery systems', Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*. Washington, DC: U.S. Department of Defense, 61.
45. For Chinese discussion on the link between the use of tactical nuclear weapons and technological advancements, see Tsao Kuo-chung. (1999). Mainland can attack Taiwan with miniaturized nuclear warheads. *Tai*

- Yang Pao, 19 July 1999. Available at: <http://app1.chinadaily.com.cn/static/reportchina/990809/politics.htm> (Accessed: 12 December 2016).
46. Office of the Secretary of Defense, U.S. Department of Defense. (2017). *Military and security developments involving the People's Republic of China, 2017*. Washington, DC: U.S. Department of Defense, 31. For offense–defense theorizing and missile mobility, see Levy, J.S. (1984). The offensive/defensive balance of military technology: A theoretical and historical analysis. *International Studies Quarterly*, 28(2), 225.
 47. Analysts expect that China will shortly fit its new short-range submarine-launched ballistic missiles (SLBMs), the JL-2 and JL-3, with MIRVs—as well as its legacy single-warhead DF-31B ICBM. Gertz, B. (2016). China flight tests new multiple-warhead missile. *Freebeacon*, 19 April 2016. Available at: <http://freebeacon.com/national-security/china-flight-tests-multiple-warhead-missile/> (Accessed: 2 July 2016).
 48. Ibid.
 49. The U.S. DoD estimates that by 2020 China will possess 69–78 nuclear-powered submarines. See Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 24. Kristensen, H.M., & Norris, R.S. (2016). Chinese nuclear forces, 2016. *Bulletin of the Atomic Scientists*, 72(4), 205–211.
 50. In December 2015, U.S. DoD officials confirmed that China has commenced its first submarine (SSBMs) nuclear deterrence patrols, but they could not confirm whether these SSBMs were armed with nuclear payloads. Baker, B.D. (2015). China deploys first nuclear deterrence patrol. *The Diplomat*, 19 December 2015. Available at: <http://thediplomat.com/2015/12/china-deploys-first-nuclear-deterrence-patrol/>.
 51. Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 26. Other states actively developing SSBNs for nuclear deterrence include India, Pakistan, and North Korea.
 52. Ibid., 26 and 38.
 53. The experience of the United States' successful use of advanced avionics, long-range precision munitions, and antiaircraft systems during the 1991 Gulf War heavily influenced the importance Chinese strategists attached to the development of these capabilities in the upgrading of China's outdated bombers for nuclear deterrence missions.
 54. Reinsch, W.A., & Shea, D.C. (2015). *2015 report to congress of the U.S.-China economic and security review committee, 114th congress, 1st session, November 2015*. Washington, DC: U.S.-China Economic and Security Review Committee, 348.

55. Pollack, J.H. (2015). Boost-glide weapons and US-China strategic stability. *The Nonproliferation Review*, 22(2), 155–164.
56. U.S. National Air and Space Intelligence Center assessments concluded that the developments of Chinese hypersonic glide vehicles (HGVs) are closely associated with its nuclear modernization program. Also see Perrett, B., Sweetman, B., & Fabey, M. (2015). U.S. navy sees Chinese HGV as part of a wider threat. *Aviation Week*, 27 January 2015. Available at: <http://aviationweek.com/awin/us-navy-sees-chinese-hgv-part-wider-threat> (Accessed: 6 April 2016).
57. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 187.
58. Recent evidence suggests that Chinese strategists are concerned that China's lagging technological advancements in the nuclear domain could increase China's vulnerability and increase regional instability. China still appears willing to accept an ongoing quantitative inferior position in its nuclear arsenals vis-à-vis the United States and Russia (but less so India), as Beijing prioritizes building up its conventional forces, and making qualitative enhancements to its nuclear forces. For a recent discussion on these issues with Chinese analysts, see Li, B., & Zhao, T. (Eds.). (2016). *Understanding Chinese nuclear thinking*. Washington, DC: Carnegie Endowment for International Peace.
59. The PLA Second Artillery Force (PLASAF) was considered an independent branch and was treated (albeit nonofficially) as though it were a military 'service'. Significantly, the Commander of the PLASAF became a Central Military Commission (CMC) member in 2004—together with the respective PLA Navy and PLA Air force Commanders. An anonymous reviewer generously highlighted this point to the author.
60. Li, X. (2016). Xi Jinping confers military banners to army, rocket force, and strategic support force units of the people's liberation army and delivers speech. *Xinhua*, 1 January 2016. Available at: http://news.xinhuanet.com/politics/2016-01/01/c_1117646667.htm (Accessed: 2 March 2016).
61. Ibid.
62. Yang, Y. (2016). Senior Colonel Yang Yujun, spokesman for the Ministry of National Defense (MND) of the People's Republic of China, answers reporters' questions at a regular press conference. *Ministry of National Defense, The People's Republic of China*, 30 November 2016. Available at: http://eng.mod.gov.cn/DefenseNews/2016-12/01/content_4765258.htm (Accessed: 10 June 2016).
63. The author was unable to locate recent Chinese-language literature related to the operations or defense planning of China's strategic rocket forces—or the new Rocket Force.

64. All three of the PLA's services have responsibilities for China's deterrence capabilities.
65. The latest authorized doctrinal SMS published in 2013 placed a greater emphasis on the space and cyber military domains compared to earlier editions. The cyber and space military domains are believed to be controlled by the newly commissioned PLA Strategic Support Force (PLASSF).
66. Chase, S.M., & Chan, A. (2016). *China's evolving approach to 'integrated strategic deterrence'*. Santa Monica, CA: RAND Corporation, 50–52.
67. Kang, H. (2013). "Meijun shinian zhanzheng qijian de wuqi zhuangbei fazhan" (the development of U.S. military combat capabilities over the next ten years). *Foreign Military Studies Journal*, 6, 30–33.
68. Zhang, H. (2010). China's perspective on a nuclear-free world. *The Washington Quarterly*, 33(2), 147.
69. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 233–234; Yao, Y. (2010). China's perspective on nuclear deterrence. *Air and Space Power Journal*, 24(1), 27–30.
70. The Chinese 'lean and effective concept' differs from the English or French concepts in that it does not require specific threshold levels of destruction to populations or industrial capacity of adversaries. Rather, China's conceptualization is more subjective and implies a lower threshold, derived in part from the related concept of 'mutual fragility'. See Heginbotham, (Eds.). (2015). *The U.S.-China military scorecard: Forces, geography, and the evolving balance of power 1996–2014*. Santa Monica, CA: RAND Corporation.
71. Li, B., & Zhao, T. (Eds.). (2016). *Understanding Chinese nuclear thinking*. Washington, DC: Carnegie Endowment for International Peace, 13.
72. See Yuwen, J., & Tang, L. (2013). Discussion and revelation of American 'Quick global attack' plan. *Journal of the Academy of Equipment Command & Technology*, 60(3); Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press; Peng Guangqian, & Yao Youzhi (Eds.). (2005). *The science of military strategy* (English Edition ed.). Beijing, China: Military Science Press, 222.
73. Yu, X. (Ed.). (2004). *The science of second artillery campaigns*. Beijing, China: People's Liberation Army Press, 298–299.
74. Christensen, T.J. (2012). The meaning of the nuclear evolution: China's strategic modernization and US-China security relations. *Journal of Strategic Studies*, 35(4), 450–453.
75. China modified and subsequently dropped its position on banning antisatellite weapons (ASATs) in response to the U.S. weaponization (or 'counterspace operations') of space and Washington's pursuit of space-based missile defense systems—following its withdrawal from the antiballistic missile treaty in 2002.

76. Fravel, T.M., & Medeiros, E. (2010). China's search for assured retaliation: The evolution of Chinese nuclear strategy and force structure. *International Security*, 35(2), 48–87.
77. Zhao, X. (Ed.). (2005). *Coercive deterrence warfare: A comprehensive discussion on missile deterrence*. Beijing, China: National Defense University Press, 173; Yu, R., & Guangqian, P. (2009). Nuclear no-first-use revisited. *China Security*, 5(1), 81–90.
78. Zhao, X. (Ed.). (2005). *Coercive deterrence warfare: A comprehensive discussion on missile deterrence*. Beijing, China: National Defense University Press. This approach shares similarities with Russia's post-Cold War nuclear doctrine.
79. For Chinese views on U.S. missile defense systems, see Li, B. (2012). *China and the new U.S. missile defense in East Asia*. Washington, DC: Carnegie Endowment for International Peace.
80. Yao, Y. (2010). China's perspective on nuclear deterrence. *Air and Space Power Journal*, 24(1), 27–30; Sun, X. (2016). The development of nuclear weapons in China. In B. Li, & T. Zhao (Eds.), *Understanding Chinese nuclear thinking* (pp. 79–103). Washington, DC: Carnegie Endowment for International Peace.
81. From a Chinese perspective, this position could be squared if Beijing maintains its NFU policy, but signals that it would respond to a first strike with limited nuclear war-fighting tactics.
82. Schelling, T.C. (1966). *Arms and influence*. London; New Haven: Yale University Press, 69–78; see Zhao, X. (Ed.). (2005). *Coercive deterrence warfare: A comprehensive discussion on missile deterrence*. Beijing, China: National Defense University Press, 178. Chinese strategists have generally conceptualized 'weishe' as combining the accumulation of weapons, a demonstration of the willingness to use these weapons, and a tactical preference for military signaling.
83. Li, B., & Zhao, T. (Eds.). (2016). *Understanding Chinese nuclear thinking*. Washington, DC: Carnegie Endowment for International Peace, 10.
84. Chinese strategists frequently cited Henry Kissinger's conceptualization of deterrence based on three key elements. However, ambiguity has continued to surround Chinese views on what deters nuclear conflict in the first place, and how Beijing would likely communicate or signal its credible deterrent during wartime.
85. For recent views from Chinese scholarship on the evolution of Chinese nuclear thinking, see Li, B., & Zhao, T. (Eds.). (2016). *Understanding Chinese nuclear thinking*. Washington, DC: Carnegie Endowment for International Peace.
86. Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 4.

87. Former U.S. President Reagan frequently cited the U.S. 'peace through strength' concept during the Cold War era, and it was associated with realpolitik IR theories.
88. Peng Guangqian, & Yao Youzhi (Eds.). (2005). *The science of military strategy* (English Edition ed.). Beijing, China: Military Science Press, 222.
89. Glaser, B.S., & Funaiolo, M.P. (2016). *China power: Does China have an effective sea-based nuclear deterrent?* Washington, DC: Center for Strategic and International Studies.
90. Kristensen, H.M., & Norris, R.S. (2016). Chinese nuclear forces, 2016. *Bulletin of the Atomic Scientists*, 72(4), 205–211.
91. Lewis, J., & Litai, X. (1994). *China's strategic sea-power*. Stanford, CA: Stanford University Press, 234–235.
92. Zhao, X. (Ed.). (2005). *Coercive deterrence warfare: A comprehensive discussion on missile deterrence*. Beijing, China: National Defense University Press, 17.
93. External analysts have been unable to verify conclusively whether China has produced tactical nuclear warheads, but many concur that it has significantly improved the various capabilities required to develop nuclear-capable cruise and ballistic missiles, for example the dual-payload IRBM DF-26 that recently entered into the PLA's forces. Additionally, the U.S. Air Force Intelligence lists China's ground-launched DH-10 land-attack cruise missile and its CJ-20 air-launched land-attack missile as dual-capable, but it is unclear whether these findings originate from a coordinated U.S. intelligence assessment.
94. Chinese strategists have historically referred to these military (or soft) targets as 'key-point counterstrikes' and 'close defense'. See Yu, X. (Ed.). (2004). *The science of second artillery campaigns*. Beijing, China: People's Liberation Army Press, 145 and 147.
95. Wilson, J. (2016). *China's expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission.
96. Zhao, X. (Ed.). (2005). *Coercive deterrence warfare: A comprehensive discussion on missile deterrence*. Beijing, China: National Defense University Press; Office of the Secretary of Defense, U.S. Department of Defense. (2016). *Military and security developments involving the People's Republic of China, 2016*. Washington, DC: U.S. Department of Defense, 17; Liu, C. (2016). The relationship between nuclear weapons and conventional military conflicts. In B. Li, & T. Zhao (Eds.), *Understanding Chinese nuclear thinking* (pp. 149–171). Washington, DC: Carnegie Endowment for International Peace.
97. *Ibid.*, 17–18.

98. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 79–81; Liu, C. (2016). The relationship between nuclear weapons and conventional military conflicts. In B. Li, & T. Zhao (Eds.), *Understanding Chinese nuclear thinking* (pp. 149–171). Washington, DC: Carnegie Endowment for International Peace.
99. Kazianis, H.J. (2015). Why China fears US missile defenses. *The National Interest*, 28 April 2015. Available at: <http://nationalinterest.org/feature/why-china-fears-us-missile-defenses-12449/> (Accessed: 8 July 2016). It is difficult to ascertain from open sources whether these developments were specific reactions to THAAD, or if they were envisaged before THAAD was announced.
100. Sun, X. (2013). *Strategic choices of the nuclear era: Research on issues in China's nuclear strategy*. Beijing, China: Institute of Engineering Physics Research Center, 104.
101. Chinese strategists still consider the risk of a war over Taiwan's unification as 'relatively high' and future conflict would likely be high-intensity 'against the background of nuclear deterrence'. See Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 99–100.
102. In large part, China's expanding deterrence nuclear and conventional capabilities contributed to U.S. efforts to buttress its nuclear triad. For Chinese scholarly views related to weapons opacity and deterrence, see Yao, Y. (2010). China's perspective on nuclear deterrence. *Air and Space Power Journal*, 24(1), 27–30; Wu, R. (2016). How China practices and thinks about nuclear transparency. In B. Li, & Z. Tong (Eds.), *Understanding Chinese nuclear thinking* (pp. 219–251). Washington, DC: Carnegie Endowment for International Peace.
103. Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 79.
104. Sun, X. (2013). *Strategic choices of the nuclear era: Research on issues in China's nuclear strategy*. Beijing, China: Institute of Engineering Physics Research Center, 104.
105. According to IR theorists, the security dilemma is both conditional and unintentional. One of the main preconditions for the existence of a 'genuine' security dilemma between states is that *both* sides harbor nonmalign (or 'security-seeking') intentions. See Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.
106. Butterfield, H. (1951). *History and human relations*. London: Collins, 21.
107. Jervis, R. (1976). *Perception and misperception in international politics*. Princeton: Princeton University Press, 58–117.

108. Kazianis, H.J. (2015). Why China fears US missile defenses. *The National Interest*, 28 April 2015. Available at: <http://nationalinterest.org/feature/why-china-fears-us-missile-defenses-12449> (Accessed: 8 July 2016). It is difficult to ascertain from open sources whether these developments were specific reactions to THAAD, or if they were envisaged before THAAD was announced. For Chinese views on these programs, see Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 79–81; Liu, C. (2016). The relationship between nuclear weapons and conventional military conflicts. In B. Li, & T. Zhao (Eds.), *Understanding Chinese nuclear thinking* (pp. 149–171). Washington, DC: Carnegie Endowment for International Peace. For the Third Offset Strategy, see Work, R. (2015). The Third Offset Strategy and its implications for partners and allies. *U.S. Department of Defense*. Washington, DC, 28 January 2015. Available at: <http://www.defense.gov/News/Speeches/Speech-View/Article/606641/the-third-us-offset-strategy-and-its-implications-for-partners-and-allies> (Accessed: 20 March 2016).
109. Erickson, A.S. (2015). Showtime: China reveals two ‘carrier-killer’ missiles. *The National Interest*, September 2015. Available at: <http://nationalinterest.org/feature/showtime-china-reveals-two-carrier-killer-missiles-13769> (Accessed: 16 June 2016).
110. Posen, B.R. (1992). *Inadvertent escalation: Conventional war and nuclear risks*. Ithaca, NY: Cornell University Press; Krepon, M., & Thompson, J. (Eds.). (2013). *The stability-instability paradox, misperception and escalation control in south East Asia*. Washington, DC: The Stimson Center, 16.
111. Goldstein, A. (2013). First things first: The pressing danger of crisis instability in U.S.-China relations. *International Security*, 37(4), 49–89.
112. Chinese strategists do not appear to share the concerns of several Western defense analysts that ASB could risk a conflict escalating to cross the nuclear threshold. See Shou, X. (Ed.). (2013). *The science of military strategy*. Beijing, China: Military Science Press, 101; Friedberg, A.L. (2014). Aaron L. Friedberg: Launch of the beyond air-sea battle—Shangri-La voices from the 14th IISS Asia security summit. *International Institute for Strategic Studies (IISS)*, 29 May 2014. Available at: <https://www.iiss.org/en/shangri-la%20voices/blogsections/2014-363a/launch-of-beyond-air-sea-battle-0ac5> (Accessed: 26 June 2015).
113. Yu, X. (Ed.). (2004). *The science of second artillery campaigns*. Beijing, China: People’s Liberation Army Press, 282–296.



Concluding Remarks

The security dilemma concept can assist both scholars and policy-makers to rationalize how two predominantly security-seeking states can, without harboring malign intentions toward each other, formulate policies and strategies, and accumulate weapons that nonetheless reduce the security for *both*. As Chap. 2 described, the existence of a security dilemma between states is both a *conditional* and *unintentional* phenomenon. That is, it can only exist between states that both desire (or seek) security, without the *intention* of threatening others.

A key theme running through this book is the fundamental inability of state actors to see ‘into the minds of others’. Moreover, even if other states ‘*currently* harbor no aggressive designs there is *nothing to guarantee* that they will not later develop them’.¹ As a corollary, and irrespective of the actual nature of Beijing’s strategic intentions vis-à-vis the United States, the Obama administration could not completely exclude the possibility that as China’s power projection capacity in the Asia-Pacific increased, so its future strategic intentions could become more expansionist and aggressive in nature. To be sure, if U.S. policy-makers believed Beijing was intent on pursuing a revisionist foreign policy, then Washington would likely perceive Beijing’s words and deeds as more threatening than they otherwise might be.

This final chapter proceeds as follows. First, it summarizes and appraises the book’s overarching arguments and the implications of these findings for United States–China and regional strategic stability, and future warfare.

Second, grounded in the experience of the case studies chapters, it contextualizes the book's main findings and themes including the danger of conflating states' military capabilities and strategic intentions; an integrative analytical approach to viewing several military domains; and conceptualizing the idea of 'weapons ambiguity' (especially dual-use capabilities) with the United States–China security dilemma. Next, it reflects on the ramifications of the diffusion and synthesis of emerging technologies into broader war-fighting capabilities and the prospects for preventing a Sino–American technology-driven arms race. Finally, it closes with some thoughts on the future trajectory of United States–China security relations and the strategic environment in the Asia-Pacific under the new Trump administration.

KEY ARGUMENTS, FINDINGS, AND THEMES

This book, by extending the empirical base that has applied the security dilemma to elucidate contemporary United States–China security relations and addressing several key conceptual gaps in the existing literature, makes an important contribution to the scholarly discourse. Specifically, it affirms the continued relevance of the dilemma concept to explain the deterioration of United States–China security relations during the Obama presidency. The book validates and corroborates the presence of a security dilemma in the formulation of Washington's military policies and postures vis-à-vis Beijing in the Asia-Pacific.

Chapter 3 found that defense analysts frequently conflated Chinese anti-access/area denial (A2/AD) capabilities with the operational prerequisites considered (by the United States) necessary to construct, and effectively integrate, a military strategy. Furthermore, the critical assumptions—extrapolated from Chinese A2/AD capabilities—underlying U.S. assessments were invariably determined before gaining sufficient equivalence with Chinese military doctrine and operational preferences. As a result, analysts often identified specific military capabilities as *explicit proof* of the existence of a coherent and homogeneous strategic canon underpinning these capabilities.

The case study identified two factors that complicated U.S. assessments of China's A2/AD capabilities, which reinforced the propensity for capacity-based methodologies, exacerbated strategic ambiguities, and gave misperceptions and cognitive biases space to grow. First, the long lead times associated with the development of new and technologically

advanced capabilities created a propensity for ‘mirror-imaging’. Second, China’s poor military transparency (especially dual-use capabilities) reinforced analysts’ penchant to place an undue emphasis on purely material capabilities. Finally, in prescribing air–sea battle (ASB) to address the A2/AD ‘military problem set’ Washington implicitly cast China as a revisionist power, which led to action–reaction policies and spirals of mistrust and arms racing—closely associated with an intense and intractable security dilemma. In future warfare in the Pacific, these dynamics will likely reduce the incentives for United States–China cooperation, and increase the dangers of misperceptions and military miscalculation.

Chapter 4 contextualized China’s command, control, communications, computers, intelligence, surveillance, and reconnaissance systems (C4ISR) ‘system of systems’ with its cyber, space, and electronic warfare (EW) capabilities and made the following arguments. First, Beijing’s pursuit of C4ISR is best understood as part of a broader Chinese national security narrative, which links the development of C4ISR into Beijing’s broader strategic thinking. For example, China’s aspiration to become the first ‘quantum power’ clearly demonstrated the intersection of Beijing’s national security goals and the prioritization of innovation in military-use technologies, above all, to counter U.S. military superiority and shift the regional military balance in China’s favor. Second, it found that Washington’s main concern was that once various technical and organizational limitations were overcome, a fully networked war-fighting force would afford Beijing new options in the use of the military’s expanding offensive weapons for preemptive and coercive cross-domain operations—putting at risk U.S. carrier strike groups and bases in the Western Pacific. Moreover, the possession of these capabilities might embolden Beijing to behave more assertively and aggressively to defend and secure its expanding regional interests and unresolved sovereignty claims.

In sum, the United States considered Chinese C4ISR-enabled and enhanced A2/AD capabilities as *collectively* far more threatening compared to the sum of its parts. Third, U.S. threat perceptions were compounded by the vital role China’s dual-use space technologies played in completing the complex kill-chain sequencing associated with long-range conventional precision munitions. As Sino–American mutual vulnerabilities to C4ISR capabilities increase, the incentives to strike first and preemptively rise, dangerous ‘use-or-lose’ situations are more likely to emerge, and, ultimately, the threshold for future conflict may be lowered. Precisely how this emerging military-technological paradigm (especially

quantum technologies, cyber warfare, space-based ISR, directed energy weapons, and artificial intelligence [A.I.] will affect the future character of war and the military balance in Asia, where traditional boundaries between war and peace, and lines between conventional and nuclear and offense and defense are increasingly blurred, remains to be seen.

Chapter 5 found that notwithstanding the actual operational feasibility of China's antiship missiles (ASMs), the *mere possibility* that these asymmetric weapons could be used by China as part of preemptive multi-axis strikes against U.S. military assets in the Pacific amplified U.S. threat perceptions. Moreover, China's maturing precision-strike regime might presage a new military-technological paradigm shift, which could fundamentally alter the military balance in Asia and increase the risks of regional arms racing and conflict. Second, Chinese doctrinal preference in the use of ASMs for both precision strikes and military signaling purposes could have deleterious implications for future military escalation and (conventional and nuclear) deterrence in the Western Pacific. Third, by prioritizing investments in military systems designed to counter emerging missile salvo competition with China, the United States risks generating highly escalatory 'use or lose' situations. Finally, the chapter highlighted several aspects of China's long-range precision-strike missile (PSM) program that could worsen regional crisis stability, complicate escalation management, and increase the chances of misperceptions and military miscalculations. Above all, it emphasized the warhead and targeting ambiguities associated with ASMs, and the increasing comingling of the People's Liberation Army's (PLA's) conventional and nuclear capabilities, strategies, and operating doctrines.

Chapter 6 argued that the literature pertaining to Chinese thinking on nuclear deterrence is overly static, passive, and isolated, and understated the increasingly dynamic and integrated features of the PLA's rapidly maturing cross-domain war-fighting tools. As a corollary, the continued lip service paid by analysts to minimum deterrence and no-first-use (NFU) risks misaligning China's commingled capabilities and doctrines, to support a *de facto* 'limited war-fighting' posture. Second, it found that Chinese views on limited war-fighting have continued to influence and shape Beijing's nuclear modernization efforts. Unimpeded by the constraints imposed on previous generations of Chinese strategists, China's nuclear posture will likely be more closely aligned with its offensive-dominant conventional stance for high-intensity, asymmetric, and preemptive future warfare. Third, Beijing's evolving conceptualization of 'strategic

deterrence’ (or ‘integrated strategic deterrence’) reflects a distinctly multifaceted cross-domain version of deterrence, which lends itself to the blurring of traditional conventional–nuclear and offensive–defensive lines.

Under crisis conditions, this blurring, by shortening the decision-making timeframe and compressing the nuclear escalation ladder (especially if China adopts a launch-on-warning posture), could increase the incentives on both sides to strike preemptively, and worsen United States–China and regional strategic stability. Several unknowns remain, however, in the development of Chinese commingled war-fighting capabilities: How might ‘new’ capabilities affect Beijing’s thinking about its nuclear options in future warfare? Will the PLA emerge from its recent major overhaul as a stronger and more coordinated joint war-fighting force? Finally, will the promotion of the new PLA Rocket Force, tasked with enhancing China’s strategic deterrence, expedite the transition toward the formal adoption of a war-fighting posture? The next section, firmly grounded in the experience of the four case studies, revisits and contextualizes the books’ main findings and themes; without merely repeating them.

The Danger of Conflating States’ Military Capabilities and Strategic Intentions

A central finding from the four studies is the proclivity of U.S. analysts in their assessment of Chinese military capabilities to conflate an operational capability as explicit proof of the existence of a homogeneous underlining strategic intention, that is the intended *purpose* of a particular military capability. This book makes an important contribution to the literature in the following ways. First, it extends the existing empirical base that relates to the nature and key drivers of Beijing’s strategic intention vis-à-vis Washington in the Asia-Pacific, which in turn validates the presence of an intense security dilemma. Second, it contextualizes these findings with relevant sources to highlight the incidence of U.S. misunderstandings and misperceptions in the presence of a security dilemma. Third, it considers the implications for future United States–China security relations of the failure to treat the distinction between a state’s capabilities and intentions with the requisite attention.

Chapters 3, 4, 5, and 6 found that analysts’ capacity-based assessment of Chinese A2/AD capabilities directly fed Washington’s threat perceptions, making policy-makers predisposed to viewing America’s

words and deeds as fundamentally benign and defensive, and China's, axiomatically malign and offensive. Specifically, the Pentagon's assessments of Chinese capabilities and intentions often overlooked or neglected important (or new) information that did not fit in with their preexisting beliefs. In turn, information was often cherry-picked from a small set of Chinese sources and used where expedient to fill in U.S. knowledge gaps of Chinese military affairs. Moreover, in reconciling these knowledge gaps, analysts frequently applied inferences and deductions derived from preexisting (and familiar) U.S. analytical frameworks to determine the trajectory of Beijing's intentions—or the problem of 'mirror-imaging'. Defense analysts seldom used Chinese sources to corroborate their capacity-based inferences. This kind of reverse engineering did not necessarily invalidate the conclusions reached by U.S. defense analysts, many of which appeared reasonable and empirically sound. Rather, the problem lies with the critical assumptions, extrapolated from Chinese A2/AD capabilities, and used to determine Beijing's strategic objectives. This analytical approach, and in particular the assumptions underlying these assessments exacerbated strategic ambiguities, allowed misperceptions and cognitive biases to grow, and intensified the United States–China security dilemma.

By the end of the Obama presidency, China had undoubtedly acquired (or was in the process of developing) the requisite military capabilities to accomplish A2/AD missions in the Asia-Pacific. The evidence suggests, however, that the Chinese military lacked a sufficiently mature military doctrine to effectively integrate and guide the type of coherent and homogeneous strategic framework (or Chinese 'grand strategy') inferred by U.S. analysts. The historical record has shown that in the absence of a mature operational doctrine to maximize military power, inferences derived from military capabilities alone say very little about states' intentions.²

*The United States–China Security Dilemma and an Integrative
Analytical Approach to View Military Domains*

A major finding of this book is that in approaching the *causality* and *intensity* of the United States–China security dilemma an integrative (or cross-domain) comparative analytical approach yielded a particular set of dynamics that may not have otherwise existed, in particular, the impact of these dynamics upon Washington's assessments of Beijing's capabilities and intentions.

The case studies compared and contrasted the individual and combined effects of several Chinese military domains upon U.S. threat perceptions, and found that the *collective* impact of these domains intensified the security dilemma in ways that independent assessments did not. For example, the collective impact of U.S. assessments of the Chinese A2/AD ‘military problem set’ significantly influenced the development of ASB by the Pentagon. To be sure, the emphasis ASB placed on enhancing U.S. naval and air force interoperability, and the subsequent reallocation of U.S. military resources to support this concept, clearly demonstrated the outsized impact Chinese A2/AD had upon Washington’s strategic calculations in the Asia-Pacific region.

Chapters 4 and 5 examined the interplay of two individual military domains (C4ISR systems and ASMs) with deteriorating United States–China security relations under the Obama administration. The research found that in cases where defense analysts contextualized individual military domains with China’s broader A2/AD capabilities (in multi/cross-domain integrated joint combat operations), threat perceptions and strategic ambiguity noticeably increased. Analysts’ conceptualized Chinese C4ISR as a critical means to augment the PLA’s rapidly expanding suite of offensive-dominant advanced weapons—especially long-range precision-strike munitions. To be sure, analysts arguably *only* considered China’s C4ISR capabilities as threatening *in conjunction* with the various advanced weapons these systems could enable and enhance, and not independent of them. Similarly, ASMs deployed in conjunction with China’s mutually reinforcing A2/AD capabilities (cruise missiles, submarines fleets, and cyber weapons) could create synergies on the future networked battlefield, which presented new strategic challenges to U.S. carrier strike groups and military bases in the Western Pacific.

‘Weapons Ambiguity’ and the United States–China Security Dilemma

As Chap. 2 described, the security dilemma is more intense in situations where the offense–defense line is blurred, the offensive is (or is perceived to be) more dominant, and especially in situations where *new and technologically advanced* weapons are involved.³ Chapter 2 identified the ambiguous nature of military force (for coercion and self-defense), and, in particular, the *types* of weapons used for this purpose as a central feature of

the security dilemma. Therefore, just as Washington cannot be certain that China's dual-use *Beidou* navigation satellites will not be integrated into the PLA's missile guidance systems, Beijing cannot be adequately assured that in future warfare the United States will not use its missile defense capabilities to destroy Chinese satellites, or threaten its nuclear retaliatory capability. Chapters 3, 4, 5, and 6 found that under the Obama administration United States–China security relations were characterized by a particular interplay of strategic, tactical, and operational features, which exacerbated strategic ambiguities and uncertainties for defense planners on *both* sides.

- The development of a range of offensive-dominant technologically advanced weapons, guided by preemptive and early-use operating doctrines
- The intrinsic dual-use features of several emerging military technologies, for example, space, cyber security, A.I., quantum computing, and autonomous systems
- The accumulation of dual-payload strike munitions that obscured traditional conventional–nuclear delineations
- A Chinese propensity for secrecy, selective transparency, and (deliberate) strategic ambiguity in the development of offensive weapons, concepts, and deterrence policy

Chapter 4 found that strategic ambiguities associated with the inherent dual-use features of Chinese space technologies amplified U.S. threat perceptions and complicated the challenge for analysts in determining (1) the intended use of the PLA's expanding suite of offensive counter-space capabilities; (2) how these offensive capabilities will be integrated into the PLA's operational doctrines; (3) the nature and likely trajectory of Chinese military–civilian integration (or 'civil–military fusion') in the development and control of China's expanding space assets, in particular, its space-based ISR satellites; and finally, (4) the opacity surrounding Beijing's strategic objectives in this increasingly strategically competitive and contested domain. The research found that although 'dual-use' features of China's space industry (as powerful force multipliers of China's counter-space capabilities) were *not exclusive* to this domain, they were particularly pronounced and entrenched, and thus more identifiable as an intensifier of the United States–China security dilemma during this period.⁴

Chapter 5 found that Chinese evolving approaches to ‘strategic deterrence’ increased the ambiguity and alacrity in Washington surrounding Beijing’s pursuit of a long-range precision-strike capability, above all, the potential asymmetric threats posed to U.S. missile defenses, carrier strike groups, and strategic hubs in the Pacific.⁵ The research found that the perceived asymmetric threats posed by China’s rapidly maturing PSM regime could portend, *in extremis*, a military-technological paradigm in the Asia-Pacific that could haringer a dangerous qualitative and multipolar arms race in PSMs.

In the case of Chinese ASMs, two additional features amplified these security dilemma dynamics. First, the warhead and targeting ambiguities associated with antiship ballistic missiles (ASBMs) could trigger a dangerous escalatory spiral that might lead to inadvertent or accidental conflict.⁶ Second, the recent development by China of ‘dual-payload’ ballistic and cruise missiles (e.g. the *Dong-Feng 26* IRBM) could exacerbate the dangers associated with ASMs, especially if these missiles are augmented with hypersonic boost-glide variants, stored in close proximity with the PLA’s broader conventional arsenals, and mated with nuclear warheads and delivery systems—for tactical missions.⁷ These risks would become starker if Beijing shifted from a ‘de-alerted’ nuclear posture to a launch-on-warning one, which was found to be a distinct possibility in Chap. 6—for formally promulgated or otherwise. As a corollary, the increasingly commingled and overlapping features of Chinese (conventional and nuclear) missile capabilities, force structure, deterrence posture, and doctrine has increased the risk that a conventional missile strike targeting Chinese conventional structures (as envisioned by ASB) is misinterpreted by Beijing as a first strike against its nuclear deterrent.

Chapter 6 found that the strategic ambiguities and opacity surrounding China’s nuclear posture and force structure reinforced Washington’s reliance on worst-case scenario defense planning. Above all, there is the fear that Beijing could place conditions on its long-held NFU pledge to enhance its deterrence, and the increasing convergence of China’s conventional and nuclear missile forces—predicated on asymmetry, preemption. These dynamics in a future crisis or conflict could compound United States–China misperceptions, lower the nuclear threshold, risk deterrence failure, and ultimately make the formalization by China of a nuclear war-fighting posture a self-fulfilling prophecy.

MITIGATING A UNITED STATES–CHINA TECHNOLOGY-DRIVEN ARMS RACE

As Chap. 2 described, international relations (IR) theorists of various types generally agree that the security dilemma is an inescapable condition in world politics, which and at best can only be ameliorated or mitigated.⁸ Broadly defined, defensive-realist IR scholars posit that a variety of ‘material regulators’ can reduce the intensity of the dilemma, which may improve the prospects for cooperation (i.e. arms control measures and moderate military policies) and strategic stability between states. The ‘material regulators’ most relevant to conceptualize the emerging weapons technologies and systems analyzed in this book (i.e. cyber warfare, EW, PSMs, counter-space, and C4ISR systems) include the offense–defense balance, and, in particular, sharpening the delineation between offensive and defensive capabilities and doctrines; the prevailing military balance; and, closely related, the *asymmetric* distribution of military power.⁹ The research surveyed in Chaps. 3, 4, 5, and 6 demonstrated that the prospects for mitigating the emerging United States–China technologically driven arms race appear bleak for the following reasons.

First, the offense–defense line in cyberspace is inherently obscured. Network intrusions (or hacking), for example, are equally useful for defensive as for offense operations. Thus, a cyber espionage could be interpreted (accurately or otherwise) as a precursor for an offensive preemptive cyberattack.¹⁰ As the former head of the U.S. National Security Agency, General Michael Hayden, opined that ‘operationally and technologically cyber espionage is *not distinguishable* from cyberattack’.¹¹ Chapter 3 explained that in cases where the offense–defense line is blurred, states’ intentions are harder to fathom, creating space for misperceptions and worst-case scenario defense planning, which worsens the security dilemma. In the cyber domain, the prevailing conventional wisdom is that the offense has the advantage—or is offensive-dominant. That is, it is much easier and cheaper to create malicious codes than to develop effective counters, which reinforces the doctrinal preference for preemptive and first strikes, and increases the risks of cross-domain (and possibly inadvertent) military escalation.¹² To be sure, there is little agreement between states on what is the *appropriate balance* between offensive and defensive cyber capabilities.

Second, and closely related, the opacity surrounding U.S. and Chinese cyber (offensive and defensive) capabilities and related technologies has

proven particularly difficult to verify, thus complicating further the ability of policy-makers to determine the others' intention. Furthermore, given the diverse range of actors (state and nonstate) involved in cyberspace, the absence of well-defined international norms governing cyberspace (and 'cyber warfare'), the increasing sophisticated and integrated nature of C4ISR military systems, and the implications of emerging technologies for the survivability of states' nuclear weapons (i.e. hardening and concealment), the risks of arms racing increase.¹³

Third, as C4ISR systems become further integrated with U.S. and Chinese war-fighting capabilities, and as *both* sides' vulnerabilities to these systems increase, these risks will be amplified. In future conflicts, a nonkinetic cyberattack may be used in conjunction with kinetic (conventional or nuclear) military force: for example, C4ISR-enabled precision-guided munitions or a blinding denial of service cyberattack on U.S. communication satellites as a precursor to an antisatellite missile (ASAT) strike. Chinese analysts at the National Defense University (NDU) recently reported that even though U.S. military satellites operate independently of the wider Internet infrastructure advancements in network, intrusion technology (i.e. quantum computing) means that EW capabilities can be used as a 'springboard' to attack hitherto secure U.S. military command and control networks.¹⁴

In sum, the diffusion and synthesis of emerging technologies into broader war-fighting capabilities, together with the challenges posed by cross-domain (or 'multidomain') warfare to traditional—war and intra-war—deterrence models, and the proliferation of C4ISR-dependent weapons which continues to shift the asymmetric distribution of military power (or the 'information center of gravity') in China's favor will likely further reduce the chances of successfully restraining a United States–China technology-driven arms race, and intractable security dilemma. To be sure, if the present trajectory in several strategic defense innovations holds, China will soon challenge the U.S. lead in several emerging military-technological strategic fields (e.g. A.I. and quantum computing).¹⁵ That, in turn, will likely accelerate the Pentagon's drive to innovate offsetting initiatives and concepts, and reduce the prospects for finding solutions to restrain a technologically driven arms race triggered by 'great power competition'.¹⁶

Finally, in the case of the rapidly maturing PSM regime in the Western Pacific, Chap. 5 found that the emerging arms-racing dynamics in this domain are multipolar and qualitative in nature, and characterized by

prominent and potentially problematic domestic-political considerations. Moreover, the absence of a broader multilateral framework for conventional (or nuclear) arms control in the Asia-Pacific (such as an INF or START regime) will likely accelerate the proliferation of PSMs. To be sure, how the new Trump administration conceptualizes and approaches the strategic challenges posed by this domain will have significant implications for future regional arms control, strategic stability, and, more broadly, the credibility of U.S. regional extended deterrence commitments.

UNITED STATES—CHINA SECURITY RELATIONS AT A DANGEROUS CROSSROADS

During its initial months, the new Trump administration's approach to China reflected the new President's unpredictable, uncertain, and erratic approach to American foreign policy. Donald Trump's 'American First' slogan prompted vigorous debate about Washington's benevolent oversight of the post-1945 'liberal world order', suggesting an experiment in retrenchment-based realism, an insular shift in U.S. grand strategy, and a radical shift away from America's decades-old security commitments; *in extremis*, it was a fundamental reallocation of global security burdens and power to other states—notably Russia and China.¹⁷ At the time of writing, however, these early fears have been assuaged by an apparent volte-face in Trump's foreign policy stance, which suggested continuity rather than a radical shift in U.S. grand strategy, evinced by the reaffirmation of U.S. security commitments and strategic assurances to its allies—including those in Asia.¹⁸ Observers noted that despite Trump's firebrand campaign rhetoric (e.g. threatening to label China a currency manipulator, to dismantle U.S. alliance structures, tolerate nuclear proliferation, make strategic concessions to Russia, and welcome the North Korean leader to the United States), the new administration's approach proved surprisingly orthodox and conventional in substance, if not capricious in style.¹⁹

Illustrative of the capricious (and transactional) nature of Trump's statecraft, the pendulum of United States—China relations has already swung to the extremes. Early on, observers feared that a more hawkish posture toward Beijing over trade policy, Taiwan, and the South China Seas would cause increased tensions in the region, unsettle U.S. allies, and decrease strategic stability. During his confirmation hearing, U.S. Secretary of State Rex Tillerson even implied that the United States could

countenance military force to deny (or block) Chinese access to the artificial islands it has built in the disputed Spratlys. This hawkishness, however, quickly reverted to a more traditional stance. For example, Trump embraced the ‘One China’ policy, demurred from declaring China a currency manipulator, and in an apparent *quid pro quo* to secure Beijing’s support in tackling the North Korea crisis, reports indicated that the White House refused to give the green light to the U.S. Pacific Command’s request to conduct further freedom of navigation operation (FONOP) in the South China Seas.²⁰

The brief honeymoon in United States–China relations culminated in a display of bromance between Presidents Trump and Xi Jinping at Mar-a-Lago in April 2017, which, despite the shadow of U.S. military strikes in Syria, struck a pragmatic tone (in a similar vein to their predecessors), and emphasized the importance of the multifaceted bilateral relationship in regional and global affairs.²¹ Shortly after this meeting, however, the pendulum swung sharply in the opposite direction. Evidence of this shift included the resumption of U.S. naval FONOPs in the South China Sea, criticism of Beijing for its perceived reluctance to restrain Pyongyang’s nuclear ambitions, the approval of new sanctions on Chinese banks conducting business with North Korea, and, much to Beijing’s chagrin, a new arms package for Taiwan.

Notwithstanding the brief lull in tensions in the South China Seas after the historic arbitral ruling at The Hague in 2016, to date, U.S. policies and opposition to China’s excessive maritime claims and militarization of artificial islands have remained broadly unchanged. In his keynote speech at the 2017 Shangri-La Dialogue, Defense Secretary Jim Mattis underscored continuity in America’s most fundamental security commitments in the Asia-Pacific. Mattis’s speech was carefully calibrated to reassure U.S. regional allies and deter China from unilaterally challenging the status quo; he reaffirmed Washington’s ‘enduring commitment’ to the security of the region, and condemned China for its ‘disregard for international law, its contempt for other nations’ interests, and its efforts to dismiss non-adversarial resolution of issues’.²²

Though it is too early to talk of a ‘Trump Asia Strategy’, the new administration’s reaffirmation of U.S. strategic commitments, together with a more hawkish approach to Beijing, suggests that in the near-term Washington’s ‘China Policy’ will unlikely undergo a radical overhaul.²³ Rather, early evidence suggests a shift toward orthodoxy in managing

United States–China security relation, and thus more continuity than change from the balance that the Obama administration sought to strike through its ‘pivot’ policy (see Chap. 1). That is, it will combine *engagement* with Beijing and a continued emphasis on U.S. military preeminence in Asia, to simultaneously *reassure* U.S. allies and *deter* China. However, then as now, the effective assertion of U.S. preeminence in Asia requires a clear reaffirmation of America’s *willingness* (not merely its ability) to use force in the region to defend its strategic interests.

Whether regional consternation caused by Trump’s capriciousness prompts states to engage in ‘self-help’ strategies (i.e. hedging, bandwagoning, and balancing) will ultimately depend on how states’ *perceive* the resilience of America’s long-term orchestration of power and commitments to the region, and, juxtaposed to this, the existential threat posed by a rising China—poised to fill any vacuum caused by a U.S. strategic deficit.²⁴ Given the logic of the ‘Hobbesian trap’, the danger exists that states fearful of becoming outnumbered, abandoned, or encircled by a rising power (i.e. China) might forge alliances and accumulate weapons to contain the growing menace.²⁵ Unfortunately, the nonbinding (and vague) framework for a Code of Conduct (CoC) agreed by the Association of Southeast Asian Nations (ASEAN) and China in May 2017 will unlikely provide a basis for resolving future tensions in the South China Seas.²⁶ Recent unilateral actions taken by several ASEAN states to safeguard their respective claims in the South China Seas suggest that these dynamics have already begun to shape regional geopolitical realities.²⁷ To be sure, if both Washington and Beijing do not carefully manage these sources of anxiety they will likely create self-fulfilling spirals of mistrust and arms racing, in a strategic environment highly susceptible to instability and security dilemmas.²⁸

NOTES

1. Jervis, R. (1976). *Perception and misperception international politics*. Princeton, NJ: Princeton University Press, 62.
2. Biddle, S. (2005). *Military power: Explaining victory and defeat in modern war*. Princeton, NY: Princeton University Press.
3. Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214; Lynn-Jones, S.M. (1995). Offense-defense theory and its critics. *Security Studies*, 4(4), 660–691.

4. ‘Dual-use’ features are also associated with several other related Chinese technologically advanced military capabilities analyzed in this book including cyberspace; EW; missile defense, ASATs; and long-range precision-guided cruise and ballistic missiles.
5. The Chinese concept of ‘strategic deterrence’ describes a broader and multifaceted version of deterrence that includes nuclear and conventional, as well as cyber, space, and EW domains. See Chase S.M., & Chan, A. (2016). *China’s evolving approach to ‘integrated strategic deterrence’*. Santa Monica, CA: RAND Corporation.
6. These warhead and targeting ambiguities could equally apply to other medium- and long-range ballistic and cruise missile systems fielded by China.
7. As Chap. 6 noted, to date no clear evidence has emerged to corroborate reports that China has deployed (or mated) tactical nuclear warheads with delivery vehicles.
8. Neoliberal IR scholars argue that the existence of democratic political structures can sustain peace between states precisely *because* they are able to alleviate the security dilemma. See Weinberger, S. (2003). Institutional signaling and the origins of the cold war. *Security Studies*, 12(4), 80–115.
 However, signaling (resolve or benign strategic intentions) is more credible between democratic states; by contrast, nondemocratic states (such as China) tend to have less transparent decision-making processes, and this opacity is more likely to worsen the security dilemma. See Kydd, A. (1997). Sheep in sheep’s clothing: Why security seekers do not fight each other. *Security Studies*, 7(1), 114–155.
9. Acharya, S. (2007). Security dilemmas in Asia. *International Studies*, 44(1), 57–72.
 Johnson, J.S. (2017). China’s vision of the future networked battlefield: Cyber, space and electronic warfare challenges to the US in the Western Pacific. *The Diplomat*, 27 April 2017. Available at: <http://thediplomat.com/2017/04/chinas-vision-of-the-future-networked-battlefield/>.
10. Sebenius, A. (2017, June 28). Writing the rules of cyber-war. *The Atlantic*, 28 June 2017. Available at: <https://www.theatlantic.com/international/archive/2017/06/cyberattack-russia-ukraine-hack/531957/> (Accessed: 28 June 2017).
11. Hayden, M. (2017). Cutting cyber command’s umbilical cord to the NSA. *The Cipher Brief*. Available at: <https://www.thecipherbrief.com/article/tech/cutting-cyber-commands-umbilical-cord-nsa-1092> (Accessed: 20 June 2017).
12. For example, an Israeli war game conducted in 2013 demonstrated how the use and threat of cyberattacks might very quickly escalate a crisis, in this case bringing the United States and Russia to the brink of conflict in a pos-

- sible Middle East war. Opals-Rome, B. (2013, November 14). Israeli cyber game drags U.S., Russia to brink of mid-east war. *Defense News*, 14 November 2013. Available at: <http://www.defensenews.com/article/20131115/C4ISRNET07/311150020/Israeli-Cyber-Game-Drags-US-Russia-Brink-Mideast-War> (Accessed: 10 June 2017).
13. Chinese analysts seldom distinguish between peacetime and wartime uses of ‘cyber weapons’ or ‘cyber warfare’—others have advocated a ‘state of perpetual mobilization’. See Zheng, Y. (2013). *Lectures on the science of information operations (in Chinese)*, Beijing: Military Science Press, 53.
 - Lieber, K.A., & Press, D.G. (2017). The new era of counterforce: Technological change and the future of nuclear deterrence. *International Security*, 41(4), 9–49.
 14. Xiao, W., & Li, Y. (2007). Computer networks and future warfare. *Jiangsu Aviation*, 1.
 15. Zen, S. (2016). China to lead the world in A.I., says top Microsoft executive. *South China Morning Post*, 12 April 2016. Available at: <http://www.scmp.com/tech/enterprises/article/1935579/china-lead-world-artificial-intelligence-says-top-microsoft> (Accessed: 10 June 2017).
 16. Cai, J. (2016). The impact of disruptive technologies in great power competition, and on the future battlefield. *PLA Daily*, 7 May 2016. Available at: http://www.81.cn/jwgz/2016-05/07/content_7036499.htm (Accessed: 10 June 2017).
 17. Drezner, D.W. (2016). So when will realists endorse Donald Trump? *The Washington Post*, 1 February 2016. Available at: https://www.washingtonpost.com/posteverything/wp/2016/02/01/so-when-will-realists-endorse-donald-trump/?utm_term=.67f18cf8fe1d (Accessed: 19 June 2017); Rieff, D. (2016). Will the next president restore US primacy?, *The National Interest*, 11 September 2016. Available at: <http://nationalinterest.org/feature/will-the-next-president-restore-us-primacy-17651> (Accessed: 19 June 2017). Blackwill, R.D., & Tellis, A.J. (2015). *Revising U.S. grand strategy towards China*. (No. 72). New York, NY: Council on Foreign Relations Press.
 18. Stokes, B. (2016). American isolationism, with a very, very big stick. *Foreign Policy*, 17 May 2017. Available at: <http://foreignpolicy.com/2016/05/17/american-isolationism-with-a-very-very-big-stick-trump-clinton-election/> (Accessed: 1 June 2017); U.S. Department of Defense, Press Office. (2017). Remarks by secretary Mattis at Shangri-la dialogue: Secretary of defense Jim Mattis; John Chipman, IISS director-general and chief executive. 3 June 2017. Available at: <https://www.defense.gov/News/Transcripts/Transcript-View/Article/1201780/remarks-by-secretary-mattis-at-shangri-la-dialogue/> (Accessed: 10 June 2017).

19. Porter, P. (2017). Even Donald can't defeat the blob. *The National Interest*, 12 July 2017. Available at: <http://nationalinterest.org/feature/even-donald-trump-cant-defeat-the-blob-21515?page=show> (Accessed: 13 July 2017).
20. Prior to Donald Trump's inauguration in January 2017, the last major FONOP was authorized by the Obama administration in October 2016. Storey, I. (2017). Choppier waters ahead in the South China Sea? *China-US Focus*, 12 June 2017. Available at: <http://www.chinausfocus.com/peace-security/choppier-waters-ahead-in-the-south-china-sea> (Accessed: 1 June 2017).
21. Gupta, S. (2017). Xi and Trump's message from Mar-a-Lago: Yes we can. *South China Morning Post*, 8 April 2017. Available at: <http://www.scmp.com/week-asia/geopolitics/article/2086052/xi-and-trumps-message-mar-lago-yes-we-can> (Accessed: 10 June 2017).
22. U.S. Department of Defense, Press Office. (2017). Remarks by secretary Mattis at Shangri-La dialogue: Secretary of defense Jim Mattis; John Chipman, IISS director-general and chief executive. 3 June 2017. Available at: <https://www.defense.gov/News/Transcripts/Transcript-View/Article/1201780/remarks-by-secretary-mattis-at-shangri-la-dialogue/> (Accessed: 10 June 2017).
23. Zhang, F. (2017). Can China take advantage of America's strategic deficit? *The Strategist, Australian Strategic Policy Institute*. 15 June 2017. Available at: <https://www.aspistrategist.org.au/can-china-take-advantage-america-strategic-deficit-asia-mind/> (Accessed: 16 June 2017).
24. Schweller, R.L. (1994). Bandwagoning for profit: Bringing the revisionist state back in. *International Security*, 19(1), 72–107; Art, R.J. (2010). The United States and the rise of China: Implications for the long haul. *Political Science Quarterly*, 125(3), 359–391; Gray, C.S. (2010). *The strategy bridge: Theory and practice*. Oxford: Oxford University Press; Schelling, T.C. (1960). *The strategy of conflict*. Cambridge, MA; London: Harvard University.
25. Recent evidence suggests that the relentless modernization of China's military forces has prompted Japan and South Korea to develop an offensive strike (or 'counterstrike') capability. See Lyon, R. (2017). The growth of offensive strike capabilities in Northeast Asia. *The Strategist—Australian Strategic Policy Institute*, 24 July 2017. Available at: <https://www.aspistrategist.org.au/growth-offensive-strike-capabilities-northeast-asia/> (Accessed: 25 July 2017).
26. Chong, K.P. (2017). Progress on maritime code for South China Sea. *The Straits Times*, 23 May 2017. Available at: <http://www.straitstimes.com/asia/east-asia/progress-on-maritime-code> (Accessed: 10 June 2017).

27. In July 2017, for example, Indonesia renamed a resource-rich section of the North Natuna Islands, which overlaps with China's 'nine-dash line' in the South China Seas. Additionally, Malaysia took on a more hawkish line against maritime encroachments in the South China Seas, particularly vis-à-vis China, despite its active engagement with Beijing on the 'one belt, one road' initiative. Parameswaran, P. (2017). Beware of the illusion of South China Sea calm. *The Diplomat*, 21 July 2017. Available at: <http://thediplomat.com/2017/07/beware-the-illusion-of-south-china-sea-calm/> (Accessed: 24 July 2017).
28. The IISS Shangri-La Dialogue (2017). Key Note Address: Malcolm Turnbull, prime minister of Australia. *IISS—The Asia Security Summit*, 2 June 2017. Available at: <https://www.iiss.org/en/events/shangri-la-dialogue/archive/shangri-la-dialogue-2017-4f77/opening-remarks-and-keynote-address-fc1a/keynote-address---malcolm-turnbull-4bbe> (Accessed: 10 July 2017).

FURTHER READING

The following section lists selective (though by no means complete) general books and journals in the following categories: debates and recent discussions on the ‘pivot’ to Asia (or rebalance) policy; treatment by scholars of international relations theories related to the security dilemma concept (especially contextualized with United States–China security relations); analysis of China’s anti-access/area denial capabilities; and finally, relevant and useful works on the military domains examined in the case study chapters of this book, including cyberspace (and related technologies); precision-strike munitions; and nuclear weapons. The bulk of the historical and nonacademic materials included in the notes in each chapter are not mentioned here.

The ‘Pivot’ (or Rebalance) to Asia Policy

- Bader, J. (2013). *Obama and China’s rise: An insider’s account of America’s Asia strategy*. Brookings Institution Press.
- Biddle, S., & Oelrich, I. (2016). Future of warfare in the Western Pacific: Chinese antiaccess, area denial, U.S. air sea battle, and command of the commons in East Asia. *International Security*, 41(1), 7–48.
- Bitzinger, R. A. (2016). *Alliance requirements roadmap series: Third offset strategy and Chinese A2/AD capabilities*. Washington, DC: Center for a New American Security.
- Brooks, S. G., Ikenberry, J., & Wohlforth, W. C. (2013). Lean forward: In defense of American engagement. *Foreign Affairs*, 92(1), 130–142.

- Campbell, K. M. (2016). *The pivot – The future of American statecraft in Asia*. New York, NY: Hachette Book Group.
- Campbell, K. M., & Ratner, E. (2014). Far Eastern promises: Why Washington should focus on Asia. *Foreign Affairs*, 93(3), 106–116.
- Chengxin, P. (2004). The “China threat” in American self-imagination: The discursive construction of other as power politics. *Alternatives: Global, Local, Political*, 29(3), 305–331.
- Clinton, H. (2010a). *Remarks on the Obama administration’s national security strategy*. Washington, DC: The Brookings Institute.
- Clinton, H. (2010b). Leading through civilian power. *Foreign Affairs*, 89(6), 13–24.
- Dale, C., & Towell, P. (2013, August 13). *In brief: Assessing the January 2012 Defense Strategic Guidance (DSG)*. Washington, DC: Congressional Research Service (CRS).
- Forbes, R. (2012). Rebalancing the rhetoric. *U.S. Naval Institute*, 138(10), 1316.
- Gavin, F. J. (2015). Strategies of inhibition: U.S. grand strategy, the nuclear revolution, and nonproliferation. *International Security*, 40(1), 9–46.
- Green, M., & Cooper, Z. (2014). Revitalizing the rebalance: How to keep U.S. focus on Asia. *The Washington Quarterly*, 37(4), 25–46.
- Harold, S. W. (2015). Is the pivot doomed? The resilience of America’s strategic ‘rebalance’. *The Washington Quarterly*, 37(4), 85–99.
- Indyk, M., Lieberthal, K., & O’Hanlon, M. (2012). *Scoring Obama’s foreign policy: A progressive pragmatist tries to bend history*. New York, NY: Council on Foreign Relations.
- Klingner, B., & Cheng, D. (2012, August 7). America’s security commitment to Asia needs more forces. *The Heritage Foundation*, 2715, 1–16.
- Krepinevich, A. J. (2015). How to deter China: The case for archipelagic defense. *Foreign Affairs*, 94(2), 1–10.
- Lawrence, S. (2013, August 1). *U.S.-China relations: An overview of policy issues*. Washington, DC: Congressional Research Service (CRS).
- Liff, A., & Ikenberry, J. (2014). Racing toward tragedy?: China’s rise, military competition in the Asia-Pacific, and the security dilemma. *International Security*, 39(2), 52–91.
- Lynn, W. I. (2010). Defending a new domain. *Foreign Affairs*, 89(5), 97–108.
- O’Rourke, R., Manyin, M., Daggett, S., Dolven, B., Lawrence, S., Martin, M., & Vaughn, B. (2012). *Pivot to the Pacific? The Obama administration’s “balancing” toward Asia*. (No. March). Washington, DC: Congressional Research Service.
- Parmar, I., Miller, L., & Ledwidge, M. (2014). *Obama and the world: New directions in US foreign policy* (2nd ed.). Routledge.
- Quinn, A. (2014). Realism and US foreign policy. In I. Parmar, L. Miller, & M. Ledwidge (Eds.), *Obama and the world: New directions in US foreign policy* (2nd ed., pp. 3–14). Routledge.

- Rapp-Hooper, M., Cronin, P. M., & Krejsa, H. (2016). *Counterbalance: Red teaming the rebalance in the Asia-Pacific*. Washington, DC: Center for a New American Security.
- Ross, R. S. (2012). The problem with the pivot: Obama's new Asia policy is unnecessary and counterproductive. *Foreign Affairs*, 91(6), 70–82.
- Silove, N. (2016). The pivot before the pivot: U.S. strategy to preserve the power balance in Asia. *International Security*, 40(4), 45–88.
- Stokes, D., & Whitman, R. (2013). Transatlantic triage? European and UK 'grand strategy' after the US rebalance to Asia. *International Affairs*, 89(5), 1087–1107.

Security Dilemma Theorizing

- Acharya, S. (2007). Security dilemmas in Asia. *International Studies*, 44(1), 57–72.
- Arreguin-Toft, I. M. (2005). *How the weak win wars: A theory of asymmetric conflict*. New York, NY: Cambridge University Press.
- Booth, K., & Wheeler, N. J. (2008). *The security dilemma: Fear, cooperation, and trust in world politics*. London: Palgrave Macmillan.
- Butterfield, H. (1951). *History and human relations*. London: Collins.
- Butterfield, H. (1953). *Christianity, diplomacy and war*. London: Epworth Press.
- Buzan, B., Jones, C. A., & Little, R. (1993). *The logic of anarchy: Neorealism to structural realism*. Chichester; New York: Columbia University Press.
- Christensen, T. J. (1999). China, the U.S.-Japan alliance, and the security dilemma in East Asia. *International Security*, 23(4), 49–80.
- Christensen, T. J. (2002). The contemporary security dilemma: Deterring a Taiwan conflict. *The Washington Quarterly*, 25(4), 7–21.
- Glaser, C. (1992). Political consequences of military strategy: Expanding and refining the spiral and deterrence models. *World Politics*, 44(4), 497–538.
- Glaser, C. (1997). The security dilemma revisited. *World Politics*, 50(1), 171–201.
- Gompert, D. C., & Saunders, P. (2011). *The paradox of power: Sino-American strategic restraint in the age of vulnerability*. Washington, DC: National Defense University Press.
- Herz, J. H. (1950). Idealist internationalism and the security dilemma. *World Politics*, 2(2), 157–180.
- Herz, J. H. (1951). *Political realism and political idealism: A study in theories and realities*. Chicago: University of Chicago Press.
- Herz, J. H. (1962). *International politics in the atomic age*. New York; London: Columbia University Press.
- Jervis, R. (1976). *Perception and misperception in international politics*. Princeton, NJ: Princeton University Press.

- Jervis, R. (1978). Cooperation under the security dilemma. *World Politics*, 30(2), 167–214.
- Jervis, R. (1999). Realism, neoliberalism, and cooperation: Understanding the debate. *International Security*, 24(1), 42–63.
- Johnston, A. I. (2003). Is China a status quo power? *International Security*, 27(4), 54.
- Johnston, A. I. (2013). How new and assertive is China's new assertiveness? *International Security*, 37(4), 7–48.
- Kydd, A. (1997). Sheep in sheep's clothing: Why security seekers do not fight each other. *Security Studies*, 7(1), 114–155.
- Lebow, R. N., & Stein, J. G. (Eds.). (1989). *Psychology and deterrence*. Baltimore: Johns Hopkins University Press.
- Lieber, K. (2000). Grasping the technological peace: The offense-defense balance and international security. *International Security*, 25(1), 71–104.
- Mearsheimer, J. J. (1990). Back to the future: Instability in Europe after the cold war. *International Security*, 15(1), 5–56.
- Mearsheimer, J. J. (2001). *The tragedy of great power politics*. New York; London: Norton.
- Montgomery, E. B. (2006). Breaking out of the security dilemma: Realism, reassurance, and the problem of uncertainty. *International Security*, 31(2), 151–185.
- Montgomery, E. B. (2014). Contested primacy in the Western Pacific: China's rise and the future of U.S. power projection. *International Security*, 38(4), 115–149.
- Posen, B. R. (1993). The security dilemma and ethnic conflict. *Survival*, 35(1), 22–47.
- Schelling, T. C. (1966). *Arms and influence*. London; New Haven: Yale University Press.
- Snyder, G. H. (1984). The security dilemma in alliance politics. *World Politics*, 36(4), 461–495.
- Tang, S. (2009). The security dilemma: A conceptual analysis. *Security Studies*, 18(3), 587–623.
- Trachtenberg, M. (1995). Melvyn Leffler and the origins of the cold war. *Orbis*, 39(3), 439–455.
- Van Evera, S. (1999). *Causes of war*. Ithaca, NY: Cornell University Press.
- Waltz, K. N. (1979). *Theory of international politics*. Boston, MA: McGraw-Hill.
- Wheeler, N. J. (2014). Interview with Robert Jervis. *International Relations*, 28(4), 479–504.

Chinese Anti-access Area Denial (A2/AD) Capabilities

- Blasko, D. J. (2014). The evolution of core concepts: People's war, active defense, and offshore defense. In R. Kamphausen, D. Lai, & T. Tanner (Eds.), *Assessing the people's liberation army in the Hu Jintao era* (pp. 81–128). Carlisle, PA: Strategic Studies Institute and the U.S. Army War College Press.
- Blumenthal, D. (2012). The U.S. response to China's modernization. In A. Tellis & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 309–340). Washington, DC: The National Bureau of Asian Research (NBR).
- Chase, M. S., Engstorm, J., Cheung, T. M., Gunness, K. A., Harold, S. W., Puska, S., & Berkowitz, S. K. (February 2015). *China's incomplete military transformation: Assessing the weaknesses of the People's Liberation Army (PLA)* (pp. 1–33). Santa Monica, CA: RAND.
- Cheng, D. (2011). Sea power and the Chinese state: China's maritime ambitions. *Heritage Foundation Backgrounders*, 2576, 1–12.
- Cliff, R., Burtles, M., Chase, S. M., Eaton, D., & Pollpeter, K. (2007). *Entering the dragon's lair: Chinese antiaccess strategies and their implications for the United States*. Santa Monica, CA: RAND Corporation.
- Cortez, C. (January 2011). *Joint anti-access operations: China's "system-of-systems" approach, testimony presented before the U.S.-China economic and security review commission*. Santa Monica, CA: RAND Corporation.
- Cropsey, S., McGrath, B. G., & Walton, T. A. (2015). *Sharpening the spear: The carrier, the joint force, and the high-end conflict*. Washington, DC: Hudson Institute.
- Erickson, A. S. (2012). China's modernization of its naval and air power capabilities. In A. Tellis & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 61–125). Washington, DC: The National Bureau of Asian Research (NBR).
- Erickson, A. S. (2014). Rising tide, dispersing waves: Opportunities and challenges for Chinese seapower development. *Journal of Strategic Studies*, 37(3), 372.
- Erickson, A. S., & Chase, M. S. (2011). Informatization and the people's liberation army navy. In P. Saunders, C. Yung, M. Swaine, & A. En-Dzu Yang (Eds.), *The Chinese navy: Expanding capabilities, evolving roles* (pp. 247–287). Washington, DC: National Defense University Press.
- Erickson, A. S., & Goldstein, L. J. (Eds.). (2011). *Chinese aerospace power: Evolving maritime roles*. Washington, DC: Naval Institute Press.
- Erickson, A. S., & Wuthnow, J. (2016). Barriers, springboards and benchmarks: China conceptualizes the Pacific 'Island Chains'. *The China Quarterly*, 225, 3–4.

- Erickson, A. S., & Yang, D. (2009). On the verge of a game-changer. *U.S. Naval Institute*, 135(5), 1275.
- Finkelstein, D. M. (2007). China's national military strategy: An overview of the "military strategic guidelines". In R. Kamphausen & A. Scobell (Eds.), *Right sizing the people's liberation army: Exploring the contours of China's military* (pp. 69–140). Washington, DC: National Defense University Press.
- Fravel, T. M. (2016). *China's changing approach to military strategy: The science of military strategy from 2001 and 2013*. (No. 2016-15). Cambridge, MA: MIT, Political Science Department.
- Glosny, M., Saunders, P., & Ross, R. S. (2010). Debating China's naval nationalism [with reply]. *International Security*, 35(2), 161–175.
- Goldstein, A. (2013). *China's real and present danger: Now is the time for Washington to worry*. New York, NY: Council on Foreign Relations, Inc.
- Heginbotham, E., Nixon, M., Morgan, F. E., Heim, J. L., Hagan, J., & Li, S. (Eds.). (2015). *The U.S.-China military scorecard: Forces, geography, and the evolving balance of power 1996–2014*. Santa Monica, CA: RAND Corporation.
- Hoyler, M. (2010). China's 'anti-access' ballistic missiles and U.S. active defense. *Naval War College Review*, 63(4), 84–104.
- Johnson, J. S. (2017). Washington's perceptions and misperceptions of Beijing's anti-access area-denial (A2-AD) 'strategy': Implications for military escalation control and strategic stability. *The Pacific Review*, 30(3), 271–288.
- Manicom, J. (2014). China and American seapower in East Asia: Is accommodation possible? *Journal of Strategic Studies*, 37(3), 1–27.
- McDevitt, M. (2011). The PLA navy's antiaccess role in a Taiwan contingency. In P. Saunders, C. Yung, M. Swaine, & A. En-Dzu Yang (Eds.), *The Chinese navy: Expanding capabilities, evolving roles* (pp. 191–214). Washington, DC: National Defense University Press.
- McReynolds, J. (Ed.). (2016). *China's evolving military strategy*. Washington, DC: Jamestown Foundation.
- Nan, L. (2012). The evolution of China's naval strategy and capabilities: From 'near coast' and 'near seas' to 'far seas'. In P. Saunders, C. Yung, M. Swaine, & A. En-Dzu Yang (Eds.), *The Chinese navy: Expanding capabilities, evolving roles* (pp. 109–141). Washington, DC: NDU Press publications.
- O'Rourke, R. (2016). *China naval modernization: Implications for U.S. navy capabilities: Background and issues for congress*. Washington, DC: Congressional Research Service.
- Ross, R. S. (2009). China's naval nationalism: Sources, prospects, and the U.S. response. *International Security*, 34(2), 46–81.
- Saunders, P., Yung, C., Swaine, M., & En-Dzu Yang, A. (Eds.). (2011). *The Chinese navy: Expanding capabilities, evolving roles*. Washington, DC: National Defense University Press.

- Sayler, K. (2016). *Red alert: The growing threat to U.S. aircraft carriers*. Washington, DC: Center for a New American Security.
- Twomey, C. P. (2014). What's in a name: Building anti-access, area denial capabilities without anti-access, area denial doctrine. In R. Kamphausen, D. Lai, & T. Tanner (Eds.), *Assessing the people's liberation army in the Hu Jintao era* (pp. 129–170). Carlisle, PA: Strategic Studies Institute and the U.S. Army War College Press.
- Van Tol, J. (2010). *Air-Sea battle: A point-of-departure operational concept*. Washington, DC: Center for Strategic and Budgetary Assessments.
- Wilson, J. (2016). *China's expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission.
- Yoshihara, T. (2011). Chinese views of sea-based ballistic missiles defense. In A. S. Erickson & L. J. Goldstein (Eds.), *Chinese aerospace power: Evolving maritime roles* (pp. 343–359). Washington, DC: Naval Institute Press.

Cyberspace and Related Emerging Technologies

- Ball, D. (2011). China's cyber warfare capabilities. *Security Challenges*, 7(2), 81–103.
- Baylon, C. (2014). *Research paper: Challenges at the intersection of cyber security and space security*. London: Chatham House, The Royal Institute of International Affairs.
- Chang, A. (2014). *Warring state – China's cybersecurity strategy*. Washington, DC: Center for a New American Security.
- Cheng, D. (2009). Prospects for China's military space efforts. In R. Kamphausen, A. Scobell, & D. Lai (Eds.), *Beyond the strait: PLA missions other than Taiwan* (pp. 211–252). Washington, DC: Strategic Studies Institute (SSI).
- Clark, D. D., & Landau, S. (2011). Untangling attribution. *Harvard National Security Journal*, 2(2), 25–40.
- Clarke, R. A. (2010). *Cyber war*. London: HarperCollins.
- Costello, J. (2016). The strategic support force: Update and overview. *China Brief*, 16(19), 1–14.
- Costello, J., & Kania, E. (2016a). Quantum leap (part 1): China's advances in quantum information science. *China Brief*, 16(18), 11–16.
- Costello, J., & Kania, E. (2016b). Quantum leap (part 2): The strategic implications of quantum technologies. *China Brief*, 16(19), 22–27.
- Ding, A. S. (2008). China's revolution in military affairs: An uphill endeavour. *Security Challenges*, 4(4), 81–99.
- Gartzke, E. (2013). The myth of cyberwar: Bringing war in cyberspace back down to earth. *International Security*, 38(2), 41–73.

- Gartzke, E., & Lindsay, J. R. (2015). Weaving tangled webs: Offense, defense, and deception in cyberspace. *Security Studies*, 24(2), 316–348.
- Gompert, D. C., & Libicki, M. (2014). Cyber warfare and Sino-American crisis instability. *Survival*, 54(7), 7–22.
- Gompert, D. C., Libicki, M., & Cavaioia, L. J. (2015). Cyber house rules: On war, retaliation and escalation. *Survival*, 57(1), 81–104.
- Gray, C. S. (2013). *Making strategic sense of cyber power: Why the sky is not falling*. Carlisle, PA: Strategic Studies Institute, U.S. Army War College.
- Hagt, E. (2006). Mutually assured vulnerabilities in space. *World Security Institute (WSI) China Security*, 2(1), 84–106.
- Johnson-Freese, J. (2007). *Space as a strategic asset*. New York, NY: Columbia University Press.
- Johnson-Freese, J., & Hitchens, T. (2016). *Toward a new national security space strategy*. (No. 5). Washington, DC: Atlantic Council.
- Junio, T. (2013). How probable is cyber war? Bringing IR theory back in to the cyber conflict debate. *Journal of Strategic Studies*, 36(1), 125–133.
- Kello, L. (2013). The meaning of the cyber revolution: Perils to theory and statecraft. *International Security*, 38(2), 7–40.
- Krekel, B., Adams, P., & Bakos, G. (2012). *Occupying the information high ground: Chinese capabilities for computer network operations and cyber espionage—Prepared for the U.S.-China economic and security review commission*. Washington, DC: Northrop Grumman.
- Lewis, J., & Kulacki, G. (2008). Understanding China's antisatellite test. *The Nonproliferation Review*, 15(2), 335–347.
- Libicki, M. (2012). *Crisis and escalation in cyberspace – RAND project airforce*. Santa Monica, CA: Rand Corporation.
- Lieberthal, K., & Singer, P. (2012). *Cybersecurity and U.S.-China relations*. Washington, DC: 21st Century Defense Initiative at Brookings.
- Lindsay, J. R. (2013). Reinventing the revolution: Technological visions, counter-insurgent criticism, and the rise of special operations. *Journal of Strategic Studies*, 36(3), 422–453.
- Lindsay, J. R. (2015). The impact of China on cybersecurity: Fiction and friction. *International Security*, 39(3), 7–47.
- Lindsay, J. R., & Kello, L. (2014). Correspondence: A cyber disagreement. *International Security*, 39(2), 181–192.
- Lindsay, J. R., & Reveron, D. S. (2015). Conclusions: The rise of China and the future of cybersecurity. In J. R. Lindsay, T. M. Cheung, & D. S. Reveron (Eds.), *China and cybersecurity: Espionage, strategy and politics in the digital domain* (pp. 333–355). Oxford: Oxford University Press.
- Lindsay, J. R., Cheung, T. M., & Reveron, D. S. (Eds.). (2015). *China and cybersecurity: Espionage, strategy and politics in the digital domain*. Oxford: Oxford University Press.

- Manzo, V. (2011). Deterrence and escalation in cross-domain operations: Where do space and cyberspace fit? *Institute for National Strategic Studies, National Defense University*, 272, 1–8.
- Medeiros, E. S., Cliff, R., Crane, K., & Mulvenon, J. (2005). *A new direction for China's defense industry*. Santa Monica, CA: RAND Corporation.
- Morgan, P. (2010). Applicability of traditional deterrence concepts and theory to the cyber realm. In National Research Council (U.S.). Division on Engineering and Physical Sciences (Ed.), *Proceedings of a workshop on deterring cyberattacks: Informing strategies and developing options for U.S. policy* (pp. 55–76). Washington, DC: National Academies Press.
- Mulvenon, J. (1999). The PLA and information warfare. In J. Mulvenon & R. Yang (Eds.), *The people's liberation army in the information age* (pp. 175–186). Santa Monica, CA: RAND Corporation.
- Mulvenon, J. (2009). PLA computer network operations: Scenarios, doctrine, organizations and capacity. In R. Kamphausen, A. Scobell, & D. Lai (Eds.), *Beyond the strait: PLA missions other than Taiwan* (pp. 253–285). Washington, DC: Strategic Studies Institute (SSI).
- Nye, J. J. (2017). Deterrence and dissuasion in cyberspace. *International Security*, 41(3), 44–71.
- Pollpeter, K. (2012). Space, cyber, and electronic warfare: Controlling the information domain. In A. J. Tellis & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 163–194). Seattle and Washington, DC: The National Bureau of Asian Research.
- Pollpeter, K. L. (2015). Chinese writings on cybersecurity and coercion. In J. R. Lindsay, T. M. Cheung, & D. S. Reveron (Eds.), *China and cybersecurity: Espionage, strategy and politics in the digital domain* (pp. 138–163). Oxford: Oxford University Press.
- Rid, T. (2012). Cyber war will not take place. *Journal of Strategic Studies*, 35(1), 5–32.
- Rid, T., & Buchanan, B. (2014). Attributing cyber attacks. *Journal of Strategic Studies*, 1–34.
- Saltzman, I. (2013). Cyber posturing and the offense-defense balance. *Contemporary Security Policy*, 34(1), 40–63.
- Stokes, M. (2015). The Chinese people's liberation army computer network operations. In J. R. Lindsay, T. M. Cheung, & D. S. Reveron (Eds.), *China and cybersecurity: Espionage, strategy and politics in the digital domain* (pp. 163–188). Oxford: Oxford University Press.
- Stokes, M., Lin, J., & Hsiao, R. (2011). *The Chinese people's liberation army signals intelligence and cyber reconnaissance infrastructure*. Washington, DC: Project 2049 Institute.

- Wortzel, L. (March 2010). *China's approach to cyber operations: Implications for the United States—Testimony before the foreign affairs house of representatives*. Washington, DC: U.S.-China Economic and Security Review Commission.
- Wortzel, L. M. (2013). *The dragon extends its reach: Chinese military power goes global*. Washington, DC: Potomac Books.
- Zheng, Y. (2013). *Lectures on the science of information operations*. Beijing, China: Military Science Press.

Antiship and Precision-Strike Munitions (PSMs)

- Acton, J. M. (2013). *Silver bullet? Asking the right questions about conventional prompt global strike*. Washington, DC: Carnegie Endowment for International Peace.
- Bruzdzinski, J. E. (2004). Demystifying the ‘shashoujian’: China’s “assassin’s mace” concept. In A. Scobell & L. Wortzel (Eds.), *Civil-military changes in China: Elites, institutes, and ideas after the 16th party congress* (pp. 309–363). Carlisle, PA: U.S. Army War College Strategic Institute.
- Chase, M. S. (2014). Second artillery in the Hu Jintao era: Doctrine and capabilities. In R. Kamphausen, D. Lai, & T. Tanner (Eds.), *Assessing the people’s liberation army in the Hu Jintao era* (pp. 301–353). Carlisle, PA: Strategic Studies Institute and the U.S. Army War College Press.
- Cote, O. R. (2012). Assessing the undersea balance between the U.S. and China. In T. G. Mahnken (Ed.), *Competitive strategies for the 21st century—Theory, history, practice* (pp. 184–206). Stanford, CA: Stanford University Press.
- Erickson, A. S. (2013). *Chinese Anti-Ship Ballistic Missile (ASBM) development: Drivers, trajectories and strategic implications*. Washington, DC: The Jamestown Foundation.
- Erickson, A. S., & Yang, D. (2009). On the verge of a game-changer. *U.S. Naval Institute*, 135(5), 53–86.
- Friedberg, A. L. (2014). *A contest for supremacy: China, America, and the struggle for mastery in Asia*. W. W. Norton & Company.
- Ghoshal, D. (2016). China and the INF treaty. *Comparative Strategy*, 35(5), 363–370.
- Gromley, D. M., Erickson, A. S., & Yuan, J. (2014). *A low-visibility force multiplier: Assessing China’s cruise missile ambitions*. Washington, DC: National Defense University Press.
- Hagt, E., & Durnin, M. (2009). China’s anti-ship ballistic missile: Developments and missing links. *Naval War College Review*, 62(4), 87.
- Johnston, A. I. (2016). The evolution of interstate security crisis-management theory and practice in China. *Naval War College Review*, 69(1), 29–72.
- Lawrence, S., Rinehart, I., & Hildreth, S. (2013). *Ballistic missile defense in the Asia-Pacific region: Co-operation and opposition*. Washington, DC: Congressional Research Service.

- Mahnken, T. G. (2005). *The cruise missile challenge*. Washington, DC: Center for Strategic and Budgetary Assessments.
- Manzo, V. A., & Bunn, E. M. (2014). *Conventional prompt global strike: Strategic asset or unusable liability?* (No. 263). Washington, DC: Institute for National Strategic Studies, National Defence University.
- Mearsheimer, J. J. (1983). *Conventional deterrence*. Ithaca, NY: Cornell University Press.
- Pollack, J. (2009). Emerging strategic dilemma in U.S.-China relations. *Bulletin of the Atomic Scientists*, 65(4), 53–63.
- Pollack, J. (2015). Boost-glide weapons and US-China strategic stability. *The Nonproliferation Review*, 22(2), 155–164.
- Solem, E., & Montague, K. (2016). Chinese hypersonic weapons development. *China Brief*, 16(7), 6–10.
- Stokes, M. (2012). *Missile forces: The second artillery force and the future of long-range precision strike*. Washington, DC: The National Bureau of Asian Research.
- Wilkening, D. (2000). *Ballistic-missile defence and strategic stability*. (No. 334). Oxford: Oxford University Press.
- Wilson, J. (2016). *China's expanding ability to conduct conventional missile strikes on Guam*. Washington, DC: U.S.-China Economic and Security Review Commission.
- Yoshihara, T. (2011). Chinese views of sea-based ballistic missiles defense. In A. S. Erickson & L. J. Goldstein (Eds.), *Chinese aerospace power: Evolving maritime roles* (pp. 343–359). Washington, DC: Naval Institute Press.

Nuclear Weapons and Chinese Nuclear 'War-Fighting'

- Acton, J. M. (2015). *China's offensive missile forces: Testimony to the U.S.-China economic and security review committee, April 2015*. Washington, DC: U.S.-China Economic and Security Review Committee.
- Bernstein, P. I. (Ed.). (2014). *The emerging nuclear landscape*. Stanford, CA: Stanford University Press.
- Blair, B. G. (1985). *Strategic command and control: Refining the nuclear threat*. Washington, DC: Brookings Institution Press.
- Brooks, L., & Rapp-Hooper, M. (2013). Extended deterrence, assurance, and reassurance in the Pacific during the second nuclear age. In A. Tellis & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 267–303). Washington, DC: The National Bureau of Asian Research (NBR).
- Chang, A., & Dotson, J. (2012). *Indigenous weapons development in China's military modernization, U.S.-China economic and security review commission staff research report*. Washington, DC: U.S.-China Economic and Security Review Commission.

- Chase, M. S., Erickson, A. S., & Yeaw, C. (2009). Chinese theater and strategic missile force modernization and its implications for the United States. *Journal of Strategic Studies*, 32(1), 67–114.
- Christensen, T. J. (2012). The meaning of the nuclear evolution: China's strategic modernization and US-China security relations. *Journal of Strategic Studies*, 35(4), 447–487.
- Cimbala, S. J. (2015). Chinese military modernization: Implications for strategic nuclear arms control. *Strategic Studies Quarterly*, (Summer), 11–19.
- Colby, E. (2013). *Nuclear weapons and U.S.-China relations – A way forward*. Washington, DC: Center for Strategic & International Studies.
- Colby, E., & Riqiang, W. (2016). Seeking strategic stability for U.S.-China relations in the nuclear domain. In T. Tanner & D. Wang (Eds.), *U.S.-China relations in strategic domains* (pp. 63–83). Washington, DC: The National Bureau of Asian Research.
- Cunningham, F. S., & Fravel, M. T. (2015). Assuring assured retaliation: China's nuclear posture and U.S.-China strategic stability. *International Security*, 40(2), 7–50.
- Erickson, A. S. (2005). Chinese BMD countermeasures: Breaching America's great wall in space? In L. Goldstein & A. Erickson (Eds.), *China's nuclear force modernization* (pp. 65–91). Washington, DC: Naval War College Newport Paper No. 22.
- Erickson, A. S., Chase, M. S., & Yeaw, C. (2012). The future of Chinese nuclear policy and strategy. In J. R. Holmes & T. Yoshihara (Eds.), *Strategy in the second nuclear age: Power, ambition, and the ultimate weapon* (pp. 53–81). Washington, DC: Georgetown University Press.
- Fravel, T. M., & Medeiros, E. (2010). China's search for assured retaliation: The evolution of Chinese nuclear strategy and force structure. *International Security*, 35(2), 48–87.
- Freedman, L. (2003). *The evolution of nuclear strategy*. New York, NY: Palgrave Macmillan.
- Futter, A., & Zala, B. (2015). Coordinating the arm swing with the pivot: Nuclear deterrence, stability and the U.S. strategy in the Asia-Pacific. *The Pacific Review*, 28(3), 367–390.
- Glaser, C., & Fetter, S. (2001). National missile defense and the future of U.S. nuclear weapons policy. *International Security*, 26(1), 40.
- Glaser, C., & Fetter, S. (2016). Should the United States reject MAD? Damage limitation and US nuclear strategy toward China. *International Security*, 41(1), 49–98.
- Grossman, E. M. (2007, March 14). Cartwright: US needs multifold response to China's ASAT test. *Inside Missile Defense*.
- Haynes, S. T. (2016). *Chinese nuclear proliferation: How global politics is transforming China's weapons build-up and transformation*. Lincoln, NE: Potomac Books.

- Horsburgh, N. N. (2015). *China and global nuclear order*. Oxford: Oxford University Press.
- Jervis, R. (1986). The nuclear revolution and the common defense. *Political Science Quarterly*, 101(5), 689–703.
- Johnston, A. I. (1995–1996). China's new 'old thinking': The concept of limited deterrence. *International Security*, 20(3), 5–42.
- Koblentz, G. D. (2014). *Council special report: Strategic stability in the second nuclear age*. (No. 71). New York, NY: Council on Foreign Relations Press.
- Krepinevich, A. J., & Cohn, J. (2016). *Rethinking Armageddon: Scenario planning and the second nuclear age*. (No. 5). Washington, DC: Center for Strategic and Budgetary Assessments.
- Krepon, M., Wheeler, T., & Mason, S. (2016). *The lure and pitfalls of MIRVs from the first to the second nuclear age*. Washington, DC: Stimson.
- Kristensen, H. M., & Norris, R. S. (2016). Chinese nuclear forces, 2016. *Bulletin of the Atomic Scientists*, 72(4), 205–211.
- Kristensen, H. M., Norris, R. S., & McKinzie, M. G. (2006). *Chinese nuclear forces and U.S. nuclear war planning*. (No. November). Washington, DC: The Federation of American Scientists & The Natural Resources Defense Council.
- Lewis, J. (2007). *The minimum means of reprisal: China's search for security in the nuclear age*. Cambridge, MA: MIT Press.
- Lewis, J. (2013). China's nuclear modernization: Surprise, restraint, and uncertainty. In A. Tellis & T. Tanner (Eds.), *Strategic Asia 2012–13: China's military challenge* (pp. 67–96). Washington, DC: The National Bureau of Asian Research (NBR).
- Lewis, J. (2014). *Paper tiger's: China's nuclear posture*. Washington, DC: The International Institute for Strategic Studies (IISS).
- Lewis, J., & Litai, X. (1988). *China builds the bomb*. Stanford, CA: Stanford University Press.
- Lewis, J., & Litai, X. (1994). *China's strategic seapower*. Stanford, CA: Stanford University Press.
- Lewis, J., & Xue, L. (1992). China's ballistic missile programs: Technologies, strategies, goals. *International Security*, 17(2), 5–36.
- Li, B. (2012). *China and the new U.S. missile defense in East Asia*. Washington, DC: Carnegie Endowment for International Peace.
- Li, B. (2013). *What China's missile intercept test means*. Washington, DC: Carnegie Endowment for International Peace.
- Li, B., & Zhao, T. (Eds.). (2016). *Understanding Chinese nuclear thinking*. Washington, DC: Carnegie Endowment for International Peace.
- Lieber, K., & Press, D. (2006). The end of MAD? The nuclear dimension of U.S. primacy. *International Security*, 30(6), 7–47.
- Lieber, K. A., & Press, D. G. (2009). The nukes we need: Preserving the American deterrent. *Foreign Affairs*, 88(6), 40–51.

- Lieber, K. A., & Press, D. G. (2017). The new era of counterforce: Technological change and the future of nuclear deterrence. *International Security*, 41(4), 9–49.
- Liu, C. (2016). The relationship between nuclear weapons and conventional military conflicts. In B. Li & T. Zhao (Eds.), *Understanding Chinese nuclear thinking* (pp. 149–171). Washington, DC: Carnegie Endowment for International Peace.
- Lyon, R. (2016). *A shifting Asian nuclear order*. Barton, Australia: Australian Strategic Policy Institute.
- Macdonald, B. W., & Ferguson, C. D. (2015). *Understanding the dragon shield: Likelihood and implications of Chinese strategic ballistic missile defense*. (September). Federation of American Scientists.
- Nie, H. (2012). Comparing nuclear pledges and practise: The view from China. In L. Saalman (Ed.), *The China-India nuclear crossroads* (pp. 35–47). Washington, DC: The Carnegie Endowment for International Peace.
- Norris, R. S., & Kristensen, H. M. (2013). Chinese nuclear forces, 2013. *The Bulletin of the Atomic Scientists*, 69(6).
- Posen, B. R. (1992). *Inadvertent escalation: Conventional war and nuclear risks*. Ithaca, NY: Cornell University Press.
- Roberts, B. (2015). *The case for U.S. nuclear weapons in the 21st century*. Stanford, CA: Stanford University Press.
- Sagan, S. D. (1985). Nuclear alerts and crisis management. *International Security*, 9(4), 99–139.
- Schneider, M. (2009). The nuclear doctrine and forces of the people's republic of China. *Comparative Strategy*, 28(3), 244–270.
- Snyder, G. H. (1961). *Deterrence and defense: Towards a theory of national security*. Princeton, NJ: Princeton University Press.
- Stokes, M. (2010). *China's nuclear warhead storage and handling system*. Washington, DC: Project 2049 Institute.
- Sun, X. (2013). *Strategic choices of the nuclear era: Research on issues in China's nuclear strategy*. Beijing, China: Institute of Engineering Physics Research Center.
- Sun, X. (2016). The development of nuclear weapons in China. In B. Li & T. Zhao (Eds.), *Understanding Chinese nuclear thinking* (pp. 79–103). Washington, DC: Carnegie Endowment for International Peace.
- Twomey, C. P. (Ed.). (2008). *Perspectives on Sino-American nuclear issues*. New York, NY: Palgrave Macmillan.
- Woolf, A. F. (2016). *Nonstrategic nuclear weapons*. Washington, DC: Congressional Research Service.
- Yeaw, C., Chase, S. M., & Erickson, A. S. (2009). Chinese theater and strategic missile force modernization and its implications for the United States. *Journal of Strategic Studies*, 32(1), 67–114.

- Yoshihara, T., & Holmes, J. R. (2012). *Strategy in the second nuclear age: Power, ambition, and the ultimate weapon*. Washington, DC: Georgetown University Press.
- Yu, R., & Guangqian, P. (2009). Nuclear no-first-use revisited. *China Security*, 5(1), 81–90.
- Yuwen, J., & Tang, L. (2013). Discussion and revelation of American ‘Quick global attack’ plan. *Journal of the Academy of Equipment Command & Technology*, 60(3).
- Zhang, B. (2007). The modernization of Chinese nuclear forces and its impact on Sino-U.S. relations. *Asian Affairs: An American Review*, 34(2), 87–100.
- Zhang, B. (2015). *China’s assertive nuclear posture: State security in an anarchic international order*. New York, NY: Routledge.
- Zhao, X. (Ed.). (2005). *Coercive deterrence warfare: A comprehensive discussion on missile deterrence*. Beijing, China: National Defense University Press.

INDEX¹

A

A2/AD

C4ISR integration, 65–80, 81n1, 88n62, 91n87, 106, 155, 159
capacity-based assessment, xii, 8, 44–50, 157
China’s ‘active defense’ and strategic ambiguities, 39, 41–44, 97, 108, 122
and China’s ASMs, 96, 98, 102, 103, 106, 108, 114n38, 114n44, 116n52, 159
and China’s military expansion, 2, 22, 38, 46, 62n61, 65
China’s operational doctrine, 38, 43–45
China’s transparency, 40, 47, 54, 155
escalation control implications, 39, 44, 50–53, 79, 90n75, 106
intensity of the U.S.-China security dilemma, 22, 23, 37, 38, 40, 46, 48, 52, 54, 134, 157

lead times, 46, 54, 154
and pre-emption, 39, 43, 44, 50, 51, 106, 108, 155
prompting U.S. strategic initiatives, xii, 2, 8
security dilemma theory, 22, 23, 134
transparency, 40, 47, 54
U.S. Air-sea battle, 6, 38, 39, 50–52, 55–56n6, 91n87, 155, 159
U.S. military response, 37, 38, 44–50
U.S. mirror-imaging, 39, 48, 53, 54, 155, 158
Washington’s threat perceptions, 40–42
Accidental and inadvertent conflict
ASBMs, 96, 161
Chinese Belgrade Embassy, 82n10
military signaling, 53, 106, 109, 128

¹Note: Page numbers followed by ‘n’ refer to notes.

- Accidental and inadvertent conflict (*cont.*)
 in the military-technological paradigm, 78
 nuclear weapons, 24, 139, 143n18
 security dilemma theory, 25
- Action-reaction dynamics, xi, 2, 38, 104, 109, 155
- Active defense strategy, 39, 41–44, 58n22, 97, 108, 122, 133
- Aegis* ballistic missile defense, 98, 103, 115n48, 116n52, 117n59
- Afghanistan, 2, 11n10, 83n19
- Air-sea battle (ASB)
 and China's A2/AD program, 6, 38, 39, 50–52, 54, 55–56n6, 91n87, 134, 155, 159
 and China's C4ISR systems, 9, 91n87, 96
 and China's nuclear policies, 161
 and the nuclear threshold, 152n112
 and pre-emption, 155
 response to Chinese ASBMs, 100
 and Third Offset Strategy, 13n29, 55n6, 56n6
 and U.S. C4ISRs, 6
- Anarchy, 16, 17, 20, 24, 27n8, 28n9, 28n14, 28n17, 29n27, 141n3, 142n9
- Anti-satellite missiles (ASATs)
 as an 'assassin's mace', 41, 72, 82n10, 98, 111n19
 and China's C4ISR development, 66, 70, 88n62
 China's dual-use space technology, 75, 167n4
 China's nuclear posture, 141n3
 China's Strategic Support Force (SSF), 80, 84n28
 testing of, 75, 90n77, 112n29
 U.S. countermeasures, 73
- Anti-ship ballistic missiles (ASBM)
 asymmetry, 41, 96–98, 102
 C4ISR support, 110n8
 China's operational doctrine, 41, 107, 161
 Chinese national pride, 99
 compared to U.S. missiles, 102
 crisis stability, 105–107
 strategic driver, 97
 U.S. response, 102
 variants of, 96
- Anti-ship cruise missiles (ASCMs), 103, 111n19, 113n35, 116n53, 116n54, 116n55, 116n56
- Anti-ship missiles (ASMs)
 asymmetry of, 103, 105, 106, 108, 111n13, 156
 C4ISR systems, 96, 106, 109, 159
 China's strategic drivers, 97
 conflict escalation, 106, 109, 161
 and Guam, 96
 operational doctrine, 99
 presaging a new military-technological paradigm, 108, 156
 risks of, 99, 104
 'salvo competition,' 99, 108, 156
 security dilemma, 104, 161
 signaling, 99, 105, 107–109, 156
 and tactical nuclear weapons, 105, 106, 109
 and the U.S.–China balance of power in the Asia-Pacific region, 104
 U.S. responses, 97
 U.S. threat perceptions, 97, 98, 104
- Arms control, x, xii, 25, 97, 108, 109, 121, 123, 131–133, 140n2, 162, 164
- See also* Intermediate-range Nuclear Force (INF) treaty

- Arms racing dynamic
 ASB-A2/AD dynamic, 52
 in the Asia-Pacific region, 104
 mitigating, 162–164
 nuclear weapons, 163
 and precision strike missile regimes, 97
 security dilemma dynamics, 24
 strategic ambiguities, 162, 163
 U.S.–China security dilemma, 1, 22, 154
- Artificial Intelligence (A.I.), x, 68, 71, 80, 85n40, 85n42, 87n50, 94n111, 156, 160, 163, 168n15
- ASB, *see* Air-sea battle
- ASEAN, *see* Association of Southeast Asian Nations
- ASMs, *see* Anti-ship missiles
- Association of Southeast Asian Nations (ASEAN), 3, 12n15, 166
- Australia, 3–5, 10n1
- B**
- Ballistic missile defenses (BMD)
 and China's ASMs, 104
 China's nuclear strategy, 132, 133
- Ballistic missiles
 arms control treaties, 131–133
 China's nuclear capability, 122, 124, 130
 Chinese potential to disable U.S. Guam base, 41, 96, 99, 135
 U.S. *Pershing* missiles, 111n12
 warhead ambiguity, 104, 105
See also Anti-ship ballistic missiles (ASBM)
- BCA (U.S., 2011), *see* Budget Control Act
- Beidou* navigation satellite system, 75, 160
- Belgrade embassy bombing, 67
- 'BJH Formulation, The,' 23–24
- Biddle, Stephen, 31n40, 34n61, 36n73, 45, 56n8, 59n31, 60n39, 88n55, 91n86, 166n2
- Blumenthal, Dan, 51, 57n12, 62n56, 62n60, 62n67
- BMD, *see* Ballistic missile defenses
- Booth, Ken, 20, 27n6, 30n35
- Budget Control Act (U.S., BCA, 2011), 5, 14n36
- Burgess, Ronald, Jr., 73, 89n64
- Bush-era policies (George W.), 4
- Butterfield, Hubert, 16, 17, 23, 28n12, 151n106
- C**
- C4ISR systems, *see* Command, control, communications, computers, intelligence, surveillance and reconnaissance
- Capability-intention conflation, X, 2, 8, 154, 157–158
- Carrier strike groups (CSGs)
 and China's ASBMs, 96, 102
 deployment in Taiwan Crisis (1996), 78
 Guam, 100
 ISR technology, 66, 96
 missile ambiguity, 100, 105
 Preemption and escalation, 103, 106, 108
- Carter, Ash, 128
- Cartwright, James, 75
- Chinese Communist Party (CCP), 98
- CJ-20, 116n56, 129, 150n93
- Cliff, Roger, 55n3, 56n9, 61n50, 63n69, 63n71, 102, 115n48, 119n79
- Clinton, Hilary, 2, 3, 10n3, 11n6
- 'Close defense,' 150n94

- Cold War, 29n26, 29n27, 40, 52, 56n7, 91n82, 109, 129, 135, 137, 141n4, 150n87, 167n8
- Command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) systems
- China's nuclear capabilities, 109
- crisis instability, 137
- 'dual-use' technologies as a force multiplier, 65, 73–76
- enhancing ASMs, 100, 105, 159
- future research topics, 139
- integrated strategic deterrence, 122, 126, 127, 131
- U.S. vulnerability of, 6, 9, 79, 155, 163
- Comprehensive Test Ban Treaty (CTBT), 131
- Cote, Owen, 90n74, 107, 113n31, 119n86
- Cruise missiles, 52, 74, 103, 104, 107, 110n5, 111n11, 116n52, 116n56, 119n88, 134–137, 159, 161, 167n6
- CSGs, *see* Carrier strike groups
- CTBT, *see* Comprehensive Test Ban Treaty
- Cyber domain
- and China's A2/AD weapons, xii, 159
 - China's ASM strategy, 97, 98, 159
 - and China's C4ISR systems, 8, 69, 70, 78, 155, 162, 163
 - China's response to U.S. ASBs, 51
 - Chinese attacks on U.S. THAAD system, 136
 - Chinese concept of 'strategic deterrence,' 124, 126, 127, 167n5
 - Chinese nuclear strategy, 121
 - Chinese opacity, 162
 - and electronic warfare, 8, 36n72, 41, 81n7, 119n77, 126, 155
 - escalation and war threshold, 80, 155
 - military-civilian development (in China), 71
 - military organization, 84n27
 - and the offense–defense line, 162
 - quantum technology, 72
 - U.S.–China dialogue, 159, 162
 - U.S. third offset strategy, 66, 72
 - U.S. vulnerability, 6, 9, 72, 79
 - and the U.S.–China security dilemma, 159
- CyberPAC, 73
- D**
- Defense Innovation Initiative (DII), 56n6, 77, 115n44
- Defensive realists, 19, 162
- DEWs, *see* Directed energy weapons
- DF-21, 49, 96, 97, 102, 103, 111n12, 120n91, 135
- DF-26, 57n13, 96, 107, 110n6, 110n9, 110n10, 119n77, 127, 134, 135, 150n93
- DF-31, 128, 146n47
- DF-41, 128, 144n32
- DH-10, 150n93
- DII, *see* Defense Innovation Initiative
- Directed energy weapons (DEWs), 80, 88n62, 103, 156
- Disarmament dialogue, 131
- Donilon, Tom, 3
- 'Dual-payload' ballistic missiles, 57n13, 105, 127, 150n93, 161
- 'Dual-use' technologies
- Chinese military opacity and strategic ambiguity, 47, 160
 - and the Chinese nuclear deterrent, 161
 - commercial reliance, 70
 - as a force multiplier, 73–76, 160

- PLA Strategic Support Force (SSF), 69
 and the U.S.–China security dilemma, 76, 79, 154, 155, 160
 Duan Xiaoxian, 98
- E**
- Early-warning systems, 69, 89n66, 103, 125, 127, 128, 141n3
 East Asian Summit (EAS), 3, 12n15
 Economic and trade policies, 2–5, 7, 16, 18, 21, 25, 26n1, 38, 47, 51, 66, 104, 164, 166
 Electromagnetic pulse (EMP) attacks, 98, 105, 118n69, 145n35
 Electromagnetic rail-guns (EMRG), 66, 77, 103, 115n45
 Electronic warfare (EW)
 China's C4ISR architecture, 8, 9, 65–70, 72–74, 79, 81n1, 82n10, 82n12, 83n20, 88–89n62, 89n68, 91n87, 106, 109, 110n8, 112n19, 129, 155, 159, 162, 163
 China's 'integrated strategic deterrence,' 41, 63n71, 97, 99, 105, 106, 119n77, 121, 122, 124, 126, 127, 130, 132–137, 139, 157, 161, 167n4
 defined, 81n7
 increased incentives for pre-emptive strike, 43, 50
 and the offense–defense line, 19, 80, 140, 159, 162
 unintended consequences, 78
See also Electromagnetic pulse (EMP) attacks; Electromagnetic rail-guns (EMRG)
 EMP attack, *see* Electromagnetic pulse (EMP) attacks
- EMRG, *see* Electromagnetic rail-guns
 Erickson, Andrew S., 57n12, 57n13, 57n16, 61n51, 61n52, 100, 110n4, 110n5, 110n9, 111n14, 112n19, 113n30, 114n42, 119n84, 152n109
- Escalation
 and the ASB–A2/AD dynamic, 39, 50–52
 C4ISR systems, 76, 78, 105
 China's nuclear deterrence strategy, 52, 84n29, 106, 121–125, 128, 129, 137, 138, 141n3
 and Chinese ASMs, 96, 100, 104–108, 156
 competition for escalation dominance, 73, 79, 108, 125, 140
 cross-domain capabilities, 78, 79, 131, 139, 162
 cyber domain, 52, 77, 78
 and poorly defined escalation ladders, 44, 78, 124, 134, 139, 157
 signaling, 50, 52, 53, 77, 96, 105–109, 128, 138, 156
 strategic ambiguity, 50–53, 117n68
 'use-or-lose' dynamics, 51, 80, 104, 108, 128, 155, 156
 warhead and targeting ambiguity, 104, 105, 109, 156, 161, 167n6
- EW, *see* Electronic warfare
- F**
- F-35C fighter jets, 103
 FELS, *see* Free electron lasers
 Fisher, Rick, 116n56, 128
 Fissile Material Cut-Off Treaty (FMCT), 131
 FONOPs exercises, *see* Freedom of Navigation (FONOPs) exercises

France, 129
 Freedman, Lawrence, 25, 35n69
 Freedom of Navigation (FONOPs)
 exercises, 22
 Free electron lasers (FELs), 115n45

G

Gaofen-4 satellite, 74
 Gaoyue Fan, 51
 Greenert, Jonathan, 102, 115n45
 Guam
 Chinese strike capability, 99, 100,
 104, 127
 U.S. forces, 41, 100
 Gulf War (1990–1991), 67

H

H-6K bombers, 116n56, 129
 Hacking, 88n58, 162
 Haddick, Robert, 103, 116n55
 ‘Hard-kill’ measures, 102, 115n45
 Harris, Harry, 22
 Hayden, Michael, 162, 167n11
 Herz, John H., 16, 17, 23, 28n10,
 28n11, 28n12
 HK-6K, 129
 Hypersonic weapons, 102, 105, 109,
 111n18, 118n70, 129, 136,
 138, 161
 Hyten, John, 72–73

I

ICBMs, *see* Intercontinental ballistic
 missiles
 Inadvertent and accidental conflict,
 see Accidental and inadvertent
 conflict
 India, 3, 4, 6, 84n34, 119n88, 129,
 146n51, 147n58

Indonesia, 3, 4, 6, 170n27
 INEW, *see* Integrated Network
 Electronic Warfare
 Informatized warfare, 69, 80, 124,
 126, 136, 142n6
 INF treaty, *see* Intermediate-range
 nuclear force (INF) treaty
 Integrated Network Electronic
 Warfare (INEW), 68
 Intensity
 security dilemma theory, x, xi,
 17–19, 24, 26
 U.S.–China security dilemma, x, 19,
 158–161
 See also Material regulators
 Intercontinental ballistic missiles
 (ICBMs), 74, 128, 138, 144n32,
 146n47
 Intermediate range ballistic missile
 (IRBM), 57n13, 96, 113n36,
 127, 134, 135, 138, 142n8,
 150n93, 161
 Intermediate-range nuclear force
 (INF) treaty, 97, 107, 111n11,
 111n12, 119n87, 119n88,
 120n89, 120n93
 Iran, 7, 14n33, 54n1, 104, 109n2,
 119n88, 141n3
 Iraq, 2, 83n19
 IRBM, *see* Intermediate range
 ballistic missile
 Israel, 119n88, 167n12, 168n12

J

JAM-GC, *see* Joint Concept for Access
 and Maneuver in the Global
 Commons
 Japan, 3, 4, 10n1, 14n37, 32n43,
 34n59, 50, 70, 84n34,
 89n63, 107, 115n49,
 143n21, 169n25

Jervis, Robert, 17, 18, 23, 28n9,
 28n14, 28n15, 28n16, 28n17,
 28n19, 29n21, 29n23, 29n24,
 29n25, 30n29, 30n32, 30n33,
 30n36, 34n57, 35n66, 46, 48,
 55n2, 55n5, 60n38, 60n41,
 60n43, 60n45, 61n49, 62n54,
 62n66, 63n73, 77, 78, 90n73,
 92n94, 94n107, 117n66, 127,
 129, 142n7, 145n36, 147n57,
 151n107, 166n1, 166n3

Jiang Zemin, 82n10

JL-1, 128

JL-2, 128, 146n47

JL-3, 146n47

JOAC, *see* Joint Operational Access
 Concept

Johnston, Alastair Iain, 13n25, 23,
 31n39, 31n40, 32n44, 33n47,
 33n50, 33n52, 33n53, 34n56,
 34n58, 55n2, 63n72, 112n22,
 125, 142n10, 143n16, 143n22,
 144n25

Joint Concept for Access and Maneuver
 in the Global Commons
 (JAM-GC), 38, 55n6, 134
See also Air-sea battle

Joint Operational Access Concept
 (JOAC), 55n6

K

‘Key-point counterstrikes,’ 150n94

‘Kill-chain’ sequencing, 79, 89n62,
 105, 107, 109, 110n7, 155

Kitty Hawk submarine, 45

L

Lasers, 75, 80, 90n76

Li Bin, 132

Long Range Strike Bomber (LRS-B),
 118n76

M

Material regulators, 19, 29n28,
 35n71, 162
See also Offense–defense boundaries

Mattis, Jim, 165, 168n18, 169n22

McVadon, Eric, 59n29, 95

Mearsheimer, John J., 21, 30n29,
 31n40, 32n42, 55n2, 114n37,
 142n9

Medium-range ballistic missiles
 (MRBM), 82n16, 96, 120n91,
 135, 138, 142n8

Micius satellite, 71

Middle East, 3, 7, 168n12

‘Mirror imaging,’ 39, 48, 53, 54,
 155, 158

MIRVed, *see* Multiple independent
 targetable re-entry vehicle warheads

MRBM, *see* Medium-range ballistic
 missiles

Multiple independent targetable
 re-entry vehicle warheads
 (MIRVed), 127, 133

Myanmar, 3

N

NASA, *see* National Aeronautics and
 Space Administration

National Aeronautics and Space
 Administration (NASA), 47, 75,
 88n58, 91n81

Network intrusion technologies,
 162, 163

New Zealand, 6

NIPRNET, *see* Non-Secure Internet
 Protocol Router Network

Non-Proliferation Treaty (NPT),
 123, 131

Non-Secure Internet Protocol Router
 Network (NIPRNET), 73

North Korea, 7, 14n33, 104, 119n88,
 141n3, 146n51, 165

- NPT, *see* Non-Proliferation Treaty
- Nuclear weapons
- China's conventional-nuclear convergence strategies, 50, 80, 139, 140, 157, 160
 - and China's DF-26 (Guam Express), 96, 107, 110n6, 110n10, 119n77, 127, 134, 135, 150n93
 - China's doctrine-capabilities gap, 9, 121
 - China's minimum deterrence and 'no first use' (NFU) commitment, 121, 140n1, 156
 - China's opacity, 9, 52, 123, 151n102
 - future research topics, 80, 139
 - North Korea, 141n3
 - post-Soviet Russia, 129, 131, 132, 141n3, 147n58, 164
 - security dilemma concept, 25, 153
 - in space, 93n106, 141n3
 - submarines, 45, 103, 129, 159
 - U.S. nuclear deterrent, 52
 - warhead ambiguity, 104, 105
 - See also* Intermediate-range Nuclear Force (INF) treaty
- O**
- Obama, Barack
- ABMD program, 117n59
 - Sunnylands 'shirtsleeves' summit, 4
 - on U.S. pivot policy, 3, 166
 - visits to Myanmar, 3
- Offense–defense boundaries, 18
- China's 'active defense' strategy, 41, 43, 97, 122
 - and Chinese nuclear posture, 121, 127, 138, 139, 156
 - Chinese offensive-dominant capabilities, 31n39, 50, 122
 - (*see also* A2/AD; Anti-ship missiles (ASMs); C4ISR systems)
 - and security dilemma intensity, 18
 - security dilemma mitigation, 19
 - strategic ambiguity and dual use weapons, 50
 - U.S. third offset strategy, 55–56n6, 66, 72, 77, 81n5, 97, 115n44, 137
- Office of Science and Technology Policy (OSTP), 47, 75
- Opacity
- China's A2/ADs, 8
 - China's nuclear program, 10, 118n71, 123, 124, 136, 139, 161
 - cyber capabilities, 162
 - dual-use technology, 47
 - leading to 'mirror-imaging,' 48
 - non-democratic states, 167n8
- Operational doctrine (China)
- A2/AD capability, 38, 39, 41, 45, 154
 - anti-ship missiles (ASMs), 9, 96–101, 103–109, 111n13, 113n30, 156, 159, 161
 - China's tactical-theater nuclear weapons, 141n3
 - minimum deterrence and 'no first use' (NFU) commitment, 121, 127, 138, 156
 - nuclear doctrine-capabilities gap reconciliation, 123
- Operation Desert Storm*, 67
- OSTP, *see* Office of Science and Technology Policy
- P**
- Pakistan, 89n63, 119n88, 146n51
- Panetta, Leon, 5, 12n21
- People's Liberation Army Rocket Force (PLARF), 84n28, 130

- People's Liberation Army's Second Artillery Force (PLASAF), 84n28, 130, 147n59
- People's Liberation Army Strategic Support Force (PLASSF), 148n65
- Pershing II ballistic missiles, 111n12
- Philippines, 3, 4, 32n43, 57n16, 70, 84n34
- Pilotless airplanes, 110n5
- Pivot policy, 3, 166
- PLARF, *see* People's Liberation Army Rocket Force
- PLASAF, *see* People's Liberation Army's Second Artillery Force
- PLASSF, *see* People's Liberation Army Strategic Support Force
- Precision strike missiles (PSMs)
- A2/AD strategy, 40, 54n1
 - arms racing dynamic, 23, 52, 81n6, 94n108, 97, 104, 132, 161
 - and C4ISR systems, 69, 79, 162
 - and China's nuclear capability, 156
 - People's Liberation Army Rocket Force (PLARF), 130
 - pre-emptive capability, 50
 - reach, 41, 50
 - U.S. countervails, 66, 77, 104
 - U.S. space-based ISR, 74, 88–89n62
- See also* Anti-ship missiles (ASMs)
- Pre-emptive strikes
- China's 'active defense' strategy, 39, 43, 44, 122
 - China's NFU (nuclear) policy, 122, 141n3
 - China's nuclear-conventional integrated strategy, 122, 124, 126, 127
 - cyber and space domains, 162
 - escalation dominance, 73, 79, 108, 140
 - escalation ladder definition and compression, 44, 139, 157
 - offense-dominance capabilities, 73, 106, 108, 140
 - symmetrical U.S.–China conflict, 80
 - U.S. ASBs, 51, 91n87
 - worse-case scenario planning, 9, 157, 162
- Psychological regulators, 17, 19, 24
- Pumroy, Kyle, 76
- Q**
- Quantum technology, 71, 72, 85n36, 87n48, 87n52, 156
- R**
- Rail-guns, 66, 77, 90n76, 103
- Rebalance, *see* Pivot policy
- Regulators, 17, 19, 23, 25, 26, 27n5
- See also* Material regulators; Psychological regulators
- Revisionism, 2, 5, 7, 15, 21, 22, 27n3, 38, 54, 123, 153, 155
- Richard, Charles, 74
- Rocket Force, *see* People's Liberation Army Rocket Force (PLARF)
- Rogers, Michael, 73, 88n59
- Roughead, Gary, 102
- S**
- Satellites
- and ASM operability, 111n13
 - Beidou* navigation satellite system, 69, 75, 91n79, 160
 - China's dual-use technology, 48, 66, 69, 73–76, 79, 89n66, 160
 - China's nuclear capability, 145n35, 160
 - China's nuclear capacity, 93n106
 - hacking, 88n58
 - Micius* satellite, 71

- Satellites (*cont.*)
 number of, 88n55
 pre-emptive strikes, 75
 quantum technology, 71
See also Anti-satellite missiles
Science of Military Strategy, The (SMS),
 41, 43, 44, 52, 58n17, 69,
 90n79, 128, 134, 148n65
*Science of Second Artillery Campaigns,
 The* (SSAC), 98, 132
- Security dilemma theory
 amelioration and mitigation,
 19, 79, 104
 and the ‘China rise’ discourse, xii, 8,
 17, 20, 21
 China’s nuclear deterrent, 10,
 121–140
 deterioration of U.S.–China security
 relations, xi, 37, 54, 75, 76,
 124, 139, 159–161
 deterioration of U.S.–China
 relations, 15–26
 dual-use technology, 24, 47, 75, 154
 essential features, 24
 gaps in the existing literature, 25–26
 key findings, 154–161
 limitations, 24–25
 offense–defense boundaries, 80,
 140, 162
 security dilemma sensitivity, 17–19,
 38, 40, 46, 52, 153
 signaling, 17, 18, 22, 25, 46,
 77, 102
 theoretical overview, 17–19
 and the U.S. pivot policy, 6–7
See also Arms racing dynamic;
 Intensity
- S&ED, *see* Strategic and Economic
 Dialogue
- Senkaku Islands, 3, 32n43, 34n59
- Ship, Submersible, Ballistic, Nuclear
 (submarine, SSBN), 128, 138,
 146n51
- Signaling
 ASM operation, 98, 99,
 105–109, 156
 conflict escalation, 39, 54, 138
 nuclear-armed submarine (SSBNs)
 deterrence patrols, 128, 138,
 146n51
 nuclear conflict, 52, 137, 149n84
 security dilemma theory, 17, 18, 22,
 25, 46, 77, 102
weishe, 133, 149n82
- Singapore, 4, 5
- SLBMs, *see* Submarine-launched
 ballistic missile
- SM-3 missile, 75, 115n45, 115n48
- SMS, *see Science of Military Strategy, The*
- Snowden, Edward, 86n42
- ‘Soft-kill’ measures, 102, 115n45
- Solid state lasers (SSLs), 115n45
- South China Seas
 Bush-era policies, 4
 C4ISR implications, 70
 China’s alleged militarization, 22
 disputed islands, 14n37, 23, 78,
 113n35
 rising U.S.–China tensions (2016),
 32n43, 98, 128
 Trump administration, 74, 164, 165
 U.S. allies, 3, 6
 U.S.–China cooperation, 7
 U.S. Freedom of Navigation
 (FONOPs) exercises, 165
- South Korea, 3, 4, 12n16, 32n43, 70,
 135, 169n25
- Soviet Union, 56n7, 141n4
- Space technology
 C4ISR military paradigm, 9, 65–70,
 72–74, 76, 78, 79, 81n1,
 82n10, 82n12, 83n20,
 88–89n62, 89n68, 91n87, 100,
 102, 105, 106, 109, 110n8,
 112n19, 113n34, 118n69,
 129, 155, 159, 162, 163

- China's integrated strategic
deterrence, 41, 63n71, 97, 99,
105, 106, 119n77, 121, 122,
124, 126, 127, 130, 132,
134–137, 139, 157, 167n4
- China's military organization and
multi-domain strategy, 80, 163
- Chinese overconfidence,
52, 78, 106
- civilian–military cooperation
(China), 71, 160
- extending China's military reach,
74, 81n4
- pre-emptive capabilities, 9, 66, 72,
73, 91n87, 103, 105, 106,
108, 155, 156
- strategic ambiguity, 8, 37–44, 46,
48, 50, 51, 99, 117n68,
158, 159
- U.S. reliance and vulnerability, 6, 9,
72, 95
- U.S.–China cooperation, 66, 73–76,
155, 160
- See also* Satellites
- SSAC, *see* *Science of Second Artillery
Campaigns, The*
- SSBN, *see* Ship, Submersible, Ballistic,
Nuclear (submarine)
- SSF, *see* Strategic Support Force
- SSLs, *see* Solid state lasers
- 'Stability-instability paradox,' 52
- Strategic ambiguity
'active defense' strategy, 39, 41–44,
97, 108, 122, 133
- arms-racing dynamics, 163
- China's crisis management
processes, 53
- China's nuclear posture, 52, 121,
124, 126, 127, 139, 161
- 'dual-use' technologies, 24, 47,
73–76, 154, 155
- and escalation, 39, 50, 52, 53,
117n68
- and first strike possibility, 105, 122,
141n4, 161
- lead-times, 46, 54, 154
- offense-defense boundaries, 18, 46,
51, 156, 162
- space technology, 8, 37–40, 46, 48,
51, 99, 158, 159
- See also* Warhead ambiguity
- Strategic and Economic Dialogue
(S&ED), 4, 117n65
- Strategic support force (SSF),
see People's Liberation Army
Strategic Support Force
(PLASSF)
- Structural anarchy, 16, 17, 20, 24
- Structural realism, 35n65
- Submarine-launched ballistic missiles
(SLBMs), 128, 146n47
- Submarines, 45, 70, 98, 99, 103,
117n68, 128, 129, 146n49,
146n50
- Sunnylands 'shirtsleeves' Summit
(2013), 4
- T**
- Taiwan
China's A2/AD strategy, 23, 40
- China's ASMs, 97–101
- China's C4ISR, 67, 69, 70, 74, 77,
90n72
- China's nuclear weapons, 145n45,
151n101
- Trump administration,
74, 164, 165
- U.S. arms sales, 32n43
- as a U.S.–China flashpoint, 23,
117n60
- Taiwan Straits, 23, 40, 67, 74, 98
- Terminal High Altitude Area Defense
(THAAD), 32n43, 32n44, 104,
112n24, 116n52, 135, 136,
151n99, 152n108

THAAD, *see* Terminal High Altitude Area Defense
 Thailand, 3
 ‘Third Offset Strategy,’ 13n29, 55–56n6, 66, 72, 77, 81n5, 97, 115n44, 137, 152n108
 Tillerson, Rex, 164
 TPP, *see* Trans-Pacific Partnership
 Trade and economic policies, 2–4, 11n8, 27n3, 32n43, 164
 Trans-Pacific Partnership (TPP), 3, 4, 11n8
 Transparency, *see* Opacity
Trident missiles, 117n68
 Trump administration, xiii, 10, 109, 154, 164
 Turkey, 119n88

U

Unmanned aerial vehicles (UAVs), 52, 78, 82n16
 ‘Use-or-lose’ dynamics, 67, 80, 104, 108, 155, 156
 U.S. pivot policy, *see* Pivot policy
 USS *Stennis*, 128
 U.S. treaty allies, 3

V

Van Buskirk, Scott R., 102
 Victory Day parade (2015), 41, 63n71, 96, 134
 Vietnam, 3, 4, 6, 32n43, 70, 84n34

W

Warhead ambiguity, 104, 105, 117n68
See also Accidental and inadvertent conflict
 War, likelihood of, 33n48, 48, 76, 100, 107
Weisbe, 133, 149n82
 Wheeler, Nicholas, 20
 Willard, Robert F., 46, 60n36
 Wishik, Anton Lee, 44, 59n26
 Wolfers, Arnold, 20
 Work, Robert, 13n29, 56n6, 77, 92n90, 100
 Worst-case scenario planning, 10, 23, 38, 39, 46, 53, 124, 136, 161, 162

X

Xi Jinping, 11n8, 21, 67, 71, 82n14, 82n15, 86n45, 130, 147n60, 165

Y

Yao Yunzhu, 132
 Yin Zhuo, 69
 YJ-12, 116n54, 116n56
 Yoshihara, Toshi, 103
Yuanwang tracking ships, 74

Z

Zhang Ling, 67
 Zhang Qinsheng, 41
 Zhao Xijun, 126, 135