



An Approach toward an Asia-Pacific Strategy 2012 to 2020

**Dr. Dale L. Hayden
Project Leader**

**Dr. John P. Geis II
Stephen J. Hagel
Dr. Kevin C. Holzammer
Jeffrey B. Hukill**



**Air Force Research Institute
Maxwell Air Force Base, Alabama**

June 2014



An Approach toward an Asia-Pacific Strategy 2012 to 2020

DR. DALE L. HAYDEN
Project Leader

DR. JOHN P. GEIS II

STEPHEN J. HAGEL

DR. KEVIN C. HOLZIMMER

JEFFREY B. HUKILL

**Air Force Research Institute
Maxwell Air Force Base, Alabama**

Research Team
Dr. Dale L. Hayden, Project Leader
Dr. John P. Geis II
Stephen J. Hagel
Dr. Kevin C. Holzammer
Jeffrey B. Hukill

Project Editors
Dr. Marvin Bassett
Dr. Ernest Rockwell

Cover Art, Book Design, and Illustrations
L. Susan Fair

Composition and Prepress Production
Nedra Looney

Print Preparation and Distribution
Diane Clark

AIR FORCE RESEARCH INSTITUTE

AIR UNIVERSITY PRESS

Director and Publisher
Allen G. Peck

Editor in Chief
Oreste M. Johnson

Managing Editor
Demorah Hayes

Design and Production Manager
Cheryl King

Air University Press
155 N. Twining St., Bldg. 693
Maxwell AFB, AL 36112-6026
afric.aupress@us.af.mil

<http://aupress.au.af.mil/>
<http://afri.au.af.mil/>

AFRI 
AIR FORCE RESEARCH INSTITUTE

Library of Congress Cataloging-in-Publication Data

Hayden, Dale L.

An approach toward an Asia-Pacific strategy, 2012 to 2020 /
Dr. Dale L. Hayden, project leader, Dr. John P. Geis II, Stephen J.
Hagel, Dr. Kevin C. Holzammer, Jeffrey B. Hukill.

pages cm

ISBN 978-1-58566-243-2

1. Military planning—United States. 2. Asia—Strategic aspects. 3. Pacific Area—Strategic aspects. 4. United States—Relations—Asia. 5. Asia—Relations—United States. 6. United States—Relations—Pacific Area. 7. Pacific Area—Relations—United States. 8. United States. Air Force—Planning. 9. United States—Military policy—Planning. I. Air University (U.S.). Air Force Research Institute. II. Title.

U153.H39 2014

358.4'030973—dc23

2014016844

Disclaimer

This study is a product of the Air Force Research Institute and represents an academic effort in response to a request from the chief of staff of the Air Force. The report's contents reflect the opinions of the authors and do not represent official Air Force views or policies of the the Air Force Research Institute, the Department of Defense, or the US government. It is cleared for public release, with unlimited distribution.

Comments or questions concerning this study or other research can be sent to

Air Force Research Institute
155 N. Twining St., Bldg. 693
Maxwell AFB, AL 36112-6026



Contents

<i>Chapter</i>		<i>Page</i>
	DISCLAIMER.....	<i>ii</i>
1	INTRODUCTION <i>Dr. Dale L. Hayden.....</i>	1
2	BEST CASE: PATH TOWARD A HARMONIOUS WORLD <i>Dr. John P. Geis II.....</i>	19
3	WORST CASE: NATIONS IN CONFLICT <i>Stephen J. Hagel</i>	37
4	MOST LIKELY CASE: A STRATEGY OF CONSTRUCTIVE COLLABORATION <i>Dr. Kevin C. Holzammer, Jeffrey B. Hukill, and Dr. Dale L. Hayden.....</i>	69
5	FINDINGS AND RECOMMENDATIONS: US AIR FORCE STRATEGY IN THE ASIA-PACIFIC TO 2020 <i>Air Force Research Institute.....</i>	81
<i>Appendix</i>		<i>Page</i>
A	Building Partnerships and Building Partnership Capacity in the Asia-Pacific Arena <i>John L. Conway III</i>	111
B	Chinese Soft Economic Warfare <i>Dr. Chad Dacus</i>	127
C	China and Japan: Partners in Innovation? <i>Dr. Chad Dacus</i>	133
D	Cyber Power in the Asia-Pacific <i>Dr. Panayotis A. Yannakogeorgos</i>	139
E	The Asia-Pacific and the High North in 2020 <i>John L. Conway III</i>	157
F	Airlift in the Asia-Pacific: 2020 and Beyond <i>Robert C. Owen</i>	175
G	North Korea's Military Capabilities and Strategy as the Kim Jong-il Era Ends: Looking Ahead to 2020 <i>Bruce E. Bechtol</i>	227

CONTENTS

H	Asia-Pacific-Related Futures Studies and War Games	
	<i>Dr. Karen W. Currie</i>	263
	Abbreviations	275

Chapter 1

Introduction

Dr. Dale L. Hayden

Research Tasking

On 17 November 2011, President Barack Obama announced before the Australian parliament that he had made a “deliberate and strategic decision—as a Pacific nation, the United States will play a larger and long-term role in shaping this region and its future, by upholding core principles and in close partnership with our allies and friends,” that the region is a “top priority” of US security policy, and that the United States is “here to stay.”¹ In concert with the president’s statements and appreciating the importance of the region to US national security, Gen Norton A. Schwartz, US Air Force chief of staff, directed the Air Force Research Institute (AFRI) to undertake a yearlong study that would focus on the role that airpower will play in achieving national strategic objectives in the Pacific region from the present to the year 2020. He additionally directed that the study provide options and make actionable recommendations for how Air Force leaders should organize, train, equip, and present forces for combatant commanders to accomplish the full range of missions that may emerge through the end of the decade.² Comprehending the complexity of the topic, the AFRI assembled a select team of researchers charged with establishing a sound methodological approach and then conducting a comprehensive review of the subject.

Study Definition

Some people may argue that without a national strategy, it is impossible to develop a coherent approach toward the Asia-Pacific region. Other than times of war, it might be said that only once in US history has a grand strategy existed—that being from 1953 to 1991. Although the lack of a grand strategy may make it more difficult, the nation will not wait if the US Air Force (USAF) simply chooses to stand by. Congress appropriates trillions of dollars for defense, and the American public expects a return on its investment. In this context, who better to advise the nation on the use of airpower than Airmen—and if not Airmen, then whom?

This regionally focused study is written at the strategic level to inform and guide USAF leadership over the next eight years. Further, the study is designed to provide an overarching strategy for the service as the nation rebalances from Europe and Southwest Asia to the Asia-Pacific region. In accordance with the direction from the chief of staff, the study’s time frame lies outside the Future Year Defense Program and does not address programmatic issues. Although it takes into account the USAF’s worldwide commitments, the study is not a global strategy. Neither is it solely about China. The research team recognized China’s significance but more broadly addresses the Asia-Pacific region from India to the Americas. Accordingly, the team focused on the major countries of Russia, China, and India, as well as

the lesser states of Japan, the Koreas, Singapore, Vietnam, the Philippines, Indonesia, Australia, Myanmar (Burma), and Thailand. As appropriate to the study, the research team considered other nations and regions, including Canada, Latin America, Pakistan, and Southwest Asia. Finally, the study is not based upon a containment strategy but upon engagement across the region.

Methodological Approach

During the last half of Pres. George W. Bush's second term, Michèle Flournoy and Shawn Brimley published in *Joint Force Quarterly* an article on strategic planning and national security, asserting that the United States "lacks a comprehensive interagency process . . . [and that] various institutions in the national security apparatus have attempted strategic planning."³ In proposing a structured approach to developing a comprehensive national strategy, they looked for inspiration to the Eisenhower-era Solarium Project, so termed because much of the ensuing discussion took place in the White House solarium.⁴ After the research team reviewed the strategic landscape, recognizing many of the similarities between the events of 1953 and those of 2012, it seemed appropriate to look to the Eisenhower-era process proposed by the authors to form the foundation for a study that would have the greatest likelihood of success for the nation and the USAF in the coming years. To better understand the process, it is helpful to have some background on the Solarium approach.

As Pres. Dwight D. Eisenhower took office in 1953, he was confronted with stark realities consuming the national debate. The nation found itself in recession with unemployment reaching a decade's high; a rising peer competitor had countered the military's global commitments; and a tired nation was engaged halfway across the globe in combat as the American public had grown war weary without a clear and decisive conclusion to the conflict. Looking to develop a strategy that would carry the nation successfully through the Cold War, President Eisenhower formed three teams to explore potential approaches. He trusted military advisers to the point that he appointed VADM Richard L. Conolly to head one team and USAF major general James McCormack to head a second. He asked George F. Kennan, former US ambassador to the Soviet Union, to lead the third team. The president then requested that each put together a team of specialists from the Department of State, the military services, and other national security agencies to review the broad implications of their recommendations. The overriding assumption was that the United States and the Soviet Union would not enter into nuclear exchange. This assumption did not preclude preparing for the possibility but drove the three teams to develop alternatives to ensure that World War III did not occur. In what would later be called Project Solarium, each team was assigned a specific strategy to study and propose:

- Team A would argue that maintaining enough American military force would help its allies build up their forces and deter further Soviet expansion without initiating a general war.
- Team B would argue in favor of drawing a line across Europe and telling the Soviet Union that any attempt to expand communist dominance beyond that line would constitute an act of war against the allies.

- Team C would propose a vigorous attempt to roll back the Soviet Union's empire, by military force if necessary, and liberate all of its satellite nations.⁵

Following a detailed outbriefing by each team, President Eisenhower selected the strategy proposed by Ambassador Kennan—that of containment. This strategy, with its many modifications, successfully saw the United States through the Cold War, arguably deterring the Soviet Union and simultaneously ensuring that nuclear Armageddon did not occur.

Having established the research methodology—a modified version of President Eisenhower's Solarium Project that employed a three-path approach (discussed in more detail later in this chapter)—the team next defined the research question. The latter was designed to guide the discovery process and ensure that the study remained true to the chief of staff's tasking. In its most basic form, the question is, what is the most effective use of airpower in the Asia-Pacific theater to the year 2020? In this context, *airpower* is defined as inclusive in the sense that it is not service specific and that it encompasses air, space, and cyber as part of the construct.

In answering the research question, the team turned to the foundational elements of the study, defining the enduring US national interests, assumptions, and trends that would drive the future strategic environment.⁶ On the one hand, the team understood that US national interests and assumptions would define the study's limits or form its boundaries. Trends, on the other hand, would inform the study since they could apply to a lesser or greater degree, based upon the situation, circumstance, time, and place relative to the future strategic environment. The team sourced enduring US national interests from those articulated in the May 2010 *National Security Strategy*, as driven through the *National Military Strategy* and informed by the January 2012 White House document *Sustaining US Global Leadership: Priorities for US 21st Century Defense*.⁷ In accordance with White House guidance, “each of these interests is inextricably linked to the others: no single interest can be pursued in isolation, but at the same time, positive action in one area will help advance all four.”⁸

National Interests

- *Security*: The security of the United States, its citizens, and US allies and partners
- *Prosperity*: A strong, innovative, and growing US economy in an open international economic system that promotes opportunity and prosperity
- *Values*: Respect for universal values at home and around the world
- *International order*: Advanced by US leadership that promotes peace, security, and opportunity through stronger cooperation to meet global challenges⁹

The team derived the study's assumptions from the 2011 and 2012 US National Intelligence Estimates. The following key assumptions bounded the study, although the research team recognized that additional assumptions found in the National Intelligence Estimates remain valid.

Assumptions

- Engagement in Southeast Asia through bilateral and multilateral relations is critical to regional stability and prosperity.
- North Korea and the Taiwan-China relationship will remain strategic concerns.
- The United States will remain a global power and have global responsibilities.
- The growth of antiaccess/area-denial (A2/AD) capabilities will challenge US force projection and forward military presence.
- The Department of Defense's (DOD) budgets will face political scrutiny and will come under pressure.
- Weapons of mass destruction and the proliferation of missile technology will remain important concerns.
- The nations of the Asia-Pacific region will remain vital US trading partners.
- Continued competition for natural resources in the South China Sea will lead to tensions.
- Natural disasters will take place, causing humanitarian crises.
- Open lines of communications will be necessary for economic growth.
- Globalization—growing interconnectedness as the result of expanded flows of information, technology, capital goods, services, and people throughout the world—will largely be irreversible and likely become less Westernized.
- Great-power conflict escalating into total war will be unlikely.
- Identity politics—centered on ideology, nationality, and religion—will pressure governance.

The research team determined trends in the Asia-Pacific region from the literature and prevailing thought. All trends—which were derived from the source materials referenced in this study—fall into 11 categories, from economic trends and population to governance and military spending (see attachment 1). The trends guided and informed the research but did not restrict the study. For example, military spending or urbanization might have a different connotation in relation to China and India than to Myanmar and Vietnam.

Recognizing that the study must withstand considerable scrutiny and remain creditable, the research team used a traditional approach in addressing the research question. First, extensive primary-source research provided a rich foundation for an understanding of the geographic landscape and the complexities of the issues.¹⁰ Second, once informed by the literature, the team conducted select interviews among US and foreign government officials, senior US and international military officers, and leading academics in the Asia-Pacific field of study.¹¹ Third, in support of the study, on 6 and 7 December 2011, the Air University and the AFRI hosted an Air Force Symposium Series conference designated the Asia-Pacific Century: The Emerging Challenges. Recognized experts from academe and the military gathered to discuss issues, present papers, and propose possible solutions to the region's strategic challenges. Additionally, almost 200 individuals representing all of the USAF's major commands and six of the seven continents—excluding Antarctica—attempted to answer a series of questions designed to feed the study's research efforts. The research team

presented the methodology and foundational pillars—national interests, assumptions, and trends—to the panel of experts for their review, comments, and modification. The panel members refined the methodology and validated the study's foundational pillars.

Strategic Environment in 2012

Similarities do exist between the environments in 1953 and 2012, but significant differences are evident as well. China is the rising near-peer competitor, not the Soviet Union. Rather than competing ideologies of democracy versus communism, this era reflects regional and global influence as expressed through economic and military power. The world is not divided into two armed camps with competing militaries stationed upon definable boarders, as was the case with the North Atlantic Treaty Organization (NATO) and the Warsaw Pact. In the world of 2012, the major competitors desire to play within a capitalist construct, within the existing world economic order. It is important to note that Europe and the United States wrote the rules within which China, Russia, and India, as well as the lesser states, desire to excel. This is more about a rise of economic power, enabled and reinforced by military power. There is no guarantee that the outcome will be peaceful, but unlike the situation in 1953, we have more time to influence the landscape. To further set the context for understanding the study, one should have an appreciation for the players or the nations that influenced the team's thinking. First, the nations—other than the United States—that dominate the Asia-Pacific region are Russia, India, and China.

Although not the Soviet Union, Russia remains a powerful nation—and not simply because of its nuclear arsenal. It may have limited capability to project power, but Russia retains some of the influence of the old Soviet Union, particularly in Southwest Asia. Because of the country's oil revenue, its military is once again modernizing. Further, Russian officials have made numerous public statements concerning their aspirations about dominating the High North—the region around and under the Arctic Circle. The fabled Northwest Passage is opening, ultimately to year-round navigation, making Russia—and Canada—key players in worldwide commerce.¹² The new trade route creates a dynamic whereby inexpensive Asian products flood European markets, increasing the flow of wealth toward Asia and further destabilizing the euro and the European Union. Within the study's time frame, though, Russia might best be described as "a troublemaker" in relation to US national interests. It does not have the power to challenge the United States but does retain enough influence and military might to slow or frustrate US actions. For an example, one need only turn to Russian involvement in Syria.

India, the world's second most populous nation and most populous democracy, has great potential constrained by significant challenges. Bordered by two nuclear powers—China and Pakistan—India struggles to project a relevant global and regional presence. Because India remains transfixed on a rising China and must keep an eye on Pakistan, its nationalism drives that country to make endeavors into space, possess nuclear weapons, and deploy its first nuclear-powered submarine. Given its designs on status as a world power, no consideration of the Asia-Pacific region can ignore India. Its economy is growing at a rate of between 5 and 7 percent per year, often favorably compared by many individuals to the Chinese economic growth rate.¹³ However, despite great potential, India will not be able to constrain or counter a rising China. It will enjoy the most success when projecting power into the Indian Ocean but not far beyond. India's ardent desire to remain unaligned; its nineteenth-

century, British-based bureaucratic system; and its crippling level of poverty and illiteracy make any alliance with New Delhi problematic.

The research team entered the study recognizing that the report could not confine itself to China. However, to ignore China would be foolhardy.¹⁴ That country's economy and military are clearly in ascendance. An average annual economic growth rate of more than 10 percent enabled China to obtain power and influence in an export market that it could have only dreamed about during the days of the Cultural Revolution.¹⁵ An economic system based principally on a capitalist model stretches across the globe, exploring new export markets and investing in new sources of raw material. Some economists predict that the Chinese gross domestic product (GDP) will surpass that of the United States by as early as 2018.¹⁶ From African oil to Australian iron ore to Latin American copper, Chinese firms seem to dominate where US firms once thrived. China's show of force in the South China Sea during the first decades of the twentieth century is not about restricting trade routes but about securing resources to feed both its growing population and its industrial machine.¹⁷ A growing Chinese navy and air force, coupled with a formidable A2/AD capability, present a complex challenge for the US military and US presence in the region. However, to understand the complexity of the region, this study attempts to place China in perspective.

China is not the Soviet Union 2.0. Unlike the Soviet Union, it has no strategic alliances, save that with North Korea, and has limited capability to defend its global quest for natural resources. China relies upon the United States to ensure that lines of communications remain open for transit, both on the sea and in the air. In contrast the United States has 50 strategic alliances and is capable of power projection across the globe. China might be characterized as its own worst enemy since its actions offer increased opportunities for the United States. Heavy-handed Chinese maneuvers within the region drive requests from Australia and the Philippines for closer US military ties; at the same time, Vietnam, Singapore, and Indonesia seek closer diplomatic relations to counter threatening Chinese actions. Even once-cool relations with India and Myanmar have significantly warmed in the wake of China's stern attempts to influence its neighbors.

Military conflict with China is not inevitable. It is not the enemy of the United States that the Soviet Union proclaimed to be. The challenge is not to see every action in a military context. For example, many people's concern over Chinese action in the Taiwan Strait assumes that the current strategy of peaceful integration is flawed and that the Chinese central government will change tactics. Military conflict between China and Taiwan does not benefit either side. The two have exceptionally close economic and cultural ties. The most logical outcome is one in which the two former adversaries unify, with Taiwan becoming a semiautonomous district, much as Hong Kong did some 15 years earlier. Further, Chinese military action against Taiwan would certainly garner worldwide condemnation and could risk direct confrontation with the United States—something China desires to avoid. Internal conditions in either nation could precipitate military action, but if that were to occur, the United States would find itself at a disadvantage, operating from external lines in a conflict that could result in nuclear exchange to ensure a successful US outcome. Additionally, from a USAF perspective, even though Chinese A2/AD assets are formidable, they present a threat mostly if conventional intrusion into Chinese airspace proves necessary. A complicating factor is that with the least miscalculation on either side, conventional action could turn nuclear very quickly. This is not to discount current USAF operational initiatives concerning Chinese A2/AD. It is critical that the United States assure allies and others in the

region that it takes the rise of Chinese nuclear and conventional military power seriously. If US policy were articulated as it was through NATO during the Cold War (the potential first use of nuclear weapons to halt conventional forces), it could unnecessarily heighten tensions in a region where nuclear weapons have been used before.

Chinese-US relations are proving considerably more complex than US-Soviet relations during the Cold War. With the Soviet Union, battle lines were drawn and sides chosen in a war of competing ideologies. In stark contrast, Chinese power derives from its economic success that is occurring within a global, free-market, capitalist economy. The rise of China is not an all-bad-news story. The growth of the Chinese economy has raised millions of people in the Asia-Pacific region out of poverty. Close US allies like Japan, Australia, and South Korea depend upon the Chinese economy to fuel their growth. The health of the US economy is improved by a stable China and will continue to benefit from the new markets that open due to increased affluence in the region. For example, the American automobile industry looks to China to counter the reduction of demand elsewhere—witness the fact that General Motors sells more Buicks in China than it does in the United States.¹⁸ Certainly, China wants to dictate the rules to dominate within this construct, but it does not desire to destroy the system and replace it with a different ideology, as the Soviet Union articulated during the Cold War.

It follows then, that a goal for the United States—enabled by the USAF—must be to encourage a peaceful rise of China into the global economic system. However, such a rise is not inevitable. Some individuals like John Mearsheimer at the University of Chicago have stated that “China cannot rise peacefully.”¹⁹ He postulates that one can expect China to try to push the United States out of the Asia-Pacific region, much as the United States did with European powers during the nineteenth century. A realistic approach ahead says that Chinese-US relations most likely will be characterized by periods of cooperation and competition. The Chinese government will cooperate when doing so is to its advantage and will compete when the situation so dictates. The competition will at times be friendly but may also be fierce with a military subtext. Chinese history dictates that the United States—specifically the USAF—should never enter the competition from a position of weakness.

As complex as Russia, India, and China make the region, the lesser nations add additional complexity. Japan, having one of the strongest economies in the region, will increasingly find itself battered between China—its close neighbor and major trade partner—and the United States, its close strategic ally since World War II. Lacking the natural resources that drive the rise of Russia, India, and China, Japan will continue to struggle to reshape its image in the region—one scarred during the first half of the twentieth century. Singapore is the economic crossroads in the region. Indonesia, the Philippines, Vietnam, and Myanmar are warming to the United States to varying degrees. Australia, a traditional ally, welcomes an increased US presence but looks to the future with some trepidation. It faces a large neighbor to the north that it fought in the late 1950s, increased Chinese rhetoric pointed at weakening US ties, and a concern over immigration that could alter the face of the nation during this century. Throughout Australia’s history, its major trading partner and strategic ally were one in the same—first Great Britain and then the United States. In 2012 Australia was forced to deal with the new dynamic of dual alliance—one in which China is its major trading partner and the United States is its strategic military partner. North Korea continues to act like a spoiled two-year-old, wanting attention at the least appropriate time, but this two-year-old has nuclear weapons. South Korea desires to continue its close ties to the

United States and to develop its economy but must remain vigilant toward its neighbor to the north, which it fought in the 1950s. Certainly, the South does not want to be drawn into a conflict with China. This has implications for positioning US forces as the United States attempts to deal with a rising China. As diverse as the region appears and as complex as relations may seem, one characteristic unites each of the lesser nations: a desire to ensure regional stability with a continuation of economic growth that virtually everyone has enjoyed over the past decade.

Three Alternative Paths

Just as Eisenhower's Solarium Project used three solution sets to establish policy toward the Soviet Union, so does this study employ three alternative paths as it looks to the Asia-Pacific region. Starting with established US national interests, the paths identify what would serve the best interests of the United States, what would serve its worst interests, and what will most likely occur. This study does not seek to establish a detailed prediction of the future; rather, it projects reality forward from 2012 and attempts to determine recommendations that give the USAF the greatest opportunity for success in the next decade. The three paths create a possible range of future events, realizing what will occur most likely exists between the extremes. Consequently, the three cases—best case, worst case, and most likely case—establish the construct for establishing actionable recommendations. In defining the boundaries, the research team looked at what might be the best, worst, and most likely cases at some distant, undefined future date. In this context, the best case would be a peaceful region operating under international laws and norms without the potential for violent conflict—a path that one could term *Pax Pacifica*. One could characterize the worst case as a region fraught with military conflict trending toward nuclear exchange—or Cold War II. The most likely case, again with an undefined future date, would be the emergence of regional powers that counter US influence and interests in the region.

Restricting these timelines to the year 2020, the limit of this study, causes a different picture for each path to emerge. The best case describes a region where nations are guided by international agreements and the rule of law. Conflict exists but falls short of direct military engagement. China, India, and Russia continue a peaceful rise, integrating more fully into the global economic order. The worst case describes a region rife with economic and military conflict, where free and open access to critical lines of communications is jeopardized and where protective tariffs restrict trade. Direct military engagement between the United States and one of the three rising powers is unlikely but could occur due to miscalculations. Military action remains possible between one of the three principal actors and one or more of the lesser nations, which could inadvertently draw the United States into direct military engagement with one of the rising powers. The most likely case for the region involves intense competition for natural resources and use of a “show of force” as a tool to obtain political gains—but falls short of hostile, aggressive actions leading to state-on-state warfare. International norms provide regional guidance, and the acquisition of arms continues as an “arms stroll” rather than the “arms race,” as occurred during the Cold War. Each case requires that the USAF be prepared to meet US national needs. The differences in each case, though, dictate how and through what means the specific capabilities are required.

By articulating three viable, alternative paths, the study recognizes that no single answer is possible. The future, even more than seven years hence, has not been written. Unforeseen

events could dramatically affect any projection or path. Nor is it viable to prepare only for the worst case. Making recommendations assuming hostilities could be a self-fulfilling prophecy, while at the same time being fiscally irresponsible. This is not to say that the USAF should not be prepared if hostilities erupt but that alternatives do exist. Two critical elements present in 2012 did not exist during the Eisenhower administration: time and a desire to operate within a capitalist economic construct. Time allows the United States to avoid unwittingly moving down a path that leads to a new Cold War, ultimately placing national sovereignty at risk. Playing within the capitalist global economic order means a wish for stable markets—something discouraged by military conflict. A critical element of each path becomes how to move worst case closer to most likely and most likely closer to best case.

The following three chapters address each path independently, analyzing each one from a diplomatic, informational, military, and economic (DIME) perspective. A synthesis chapter offers analysis of the commonalities of all three and details recommendations that address the preferred mix of USAF capabilities needed to assure the most success in the near terms and midterms to the year 2020. Since major changes are unlikely within the next eight years, the synthesis chapter begins with recommendations from the most likely path and moves toward best case and worst case. The study defines capabilities as derived from the USAF's foundational ideas of Global Reach, Global Power, and Global Vigilance and as operationalized by its enduring contributions to national security and the service's core functions. Recommendations will address the preferred mix that exploits the speed, range, persistence, and payload of service capability to attain the desired strategic outcome.²⁰

Concluding the study are annexes designed to provide additional context and background for the reader. They address such areas as the USAF's foundational concepts for strategy development, emerging trade routes, the effect of the Japanese tsunami in 2011, and additional ongoing Asia-Pacific studies.

The following chapters attempt to articulate a strategy of engagement rather than the Cold War policy of containment. The end state of an engagement strategy would entail a peaceful rise of China, India, and Russia successfully integrated into the global economic order. It is not simply repetitive to emphasize that what exists in 2012 did not in 1953: time to shape the future. Coming out of World War II, the ideological battle lines were already drawn. The postwar world truly faced the possibility of nuclear exchange. Today we may see lines forming, but we have time to shape them. The challenge lies in ensuring that actions do not blindly lead us down a path to Armageddon. Intentions on all sides must be very clear. A strategy designed to reassure allies that the United States is not leaving the region remains central to our existence as a global power, but some could see it as an attempt to contain one or more of the rising powers—a perspective reflecting the complex environment in which the United States and the USAF must operate. Actions that one person sees as leading to constructive collaboration, another views as a prelude to military action. The following chapters attempt to display a continuum of future possibilities, each path firmly planted in today's realities to help the USAF navigate the uncertain future.

Attachment 1

Trends

Economic Trends

“The Asia and Pacific region accounts for almost one third of global GDP measured in purchasing power parity (PPP) terms. Many economies in the region have made substantial increases in their per capita GDP measured in PPP since the beginning of this century. GDP growth rates in constant prices in 2009 were down in most economies of the region, but despite the current global crisis, quite healthy growth was recorded by some of the larger economies. Export markets weakened in 2009 and the shares of exports in GDP were lower in almost all economies compared with their precrisis levels.”²¹

Transport, Electricity, and Communications

“The People’s Republic of China and Japan have more than half of all the motor vehicles in use in the Asia and Pacific region. Road networks are expanding in almost all economies and unpaved roads are being upgraded to hard surface. Industrialization and household electrification have led to massive increases in electricity production throughout the region, mostly still generated by coal and other carbon fuels. There are less than 20 personal computers per 100 persons in most economies of the region—well short of the 50-plus typical of developed economies.”²²

Population

“The Asia and Pacific region accounts for about 56% of the world’s population, with about 37% living in the two most populous economies, People’s Republic of China (PRC) and India. Population growth rates in the developing economies of the region had fallen to less than 1.1% by 2009 compared with 1.7% two decades earlier. Urbanization is increasing throughout the region. In most economies women, who already have longer life expectancies than men, have also achieved the largest increases in life expectancy since 1990.”²³

Money, Finance, and Prices

“Inflation rates fell sharply throughout the region in 2009 although food prices rose faster than other consumer items. Since 2000 many Asian currencies have strengthened against the US dollar, but in 2009 dollar exchange rates of almost all Asian economies fell sharply. Growth of the money supply accelerated in most economies as governments implemented stimulus packages. Asian stock markets, with the exception of India, continued to decline in 2009, though more slowly than in 2008.”²⁴

Consumer Consumption in the People's Republic of China

“Household consumption has grown rapidly in China over the past two decades, averaging around 8 per cent a year and rising to around 10 per cent in the past few years. This is well above the pace recorded in most other countries, with China’s real annual household consumption growth on average 3 percentage points higher than other emerging economies in Asia and 6 percentage points higher than in the G7 advanced countries. Despite this strong growth, the share of household consumption in China’s total expenditure has declined. For many years this trend was fairly gradual, with the household consumption ratio falling from 52 per cent of GDP in the early 1980s to 46 per cent of GDP by the end of the 1990s. However, the pace of the decline picked up noticeably in the 2000s, with the household consumption ratio falling a further 11 percentage points, to be 35 per cent of GDP in 2008. In contrast, consumption ratios in other emerging Asian economies have typically remained around 55–60 per cent of GDP over recent decades.”²⁵

“The Chinese used to see individualism as a word with bad connotations, applicable to people who only cared about themselves but not others. However, the Chinese of today have come to see individualism as something to be pursued and developed.”²⁶

Globalization

“The largest part of Asia’s external trade is within the region, while trade with Europe and North and Central America accounts for smaller shares of both imports and exports. The global economic crisis caused a sharp fall in merchandise exports from Asia and Pacific economies in 2009. International tourism has suffered from the crisis; tourist arrivals and receipts in popular destinations mostly fell in 2009. Migrant workers’ remittances were expected to fall victim to the global crisis but they held up relatively well except in Central and West Asia. Net FDI [foreign direct investment] inflows as a percentage of GDP are sharply down compared with pre-crisis years.”²⁷

Energy and Environment

“The Asia and Pacific region produces just under 32% of the world’s energy, with the People’s Republic of China (PRC) producing almost half of the total energy in the region. Most Asian economies rely on imports to meet their energy needs. Measured by GDP per unit of energy use, most Asian economies are becoming more energy-efficient.”²⁸ The PRC’s oil consumption will continue to grow, as will its oil production. However, the PRC’s domestic oil production will not be sufficient to keep up with demand. Between 2009 and 2011, the PRC’s thirst for oil increased by 9.6 million barrels of oil per day while internal oil production has been forecast to reach 4.5 million gallons per day.²⁹

Government and Governance

“The global crisis has increased fiscal deficits in most economies and reduced tax revenues, but government expenditures on education and on social security and welfare have been sustained in most cases. As a measure of the ‘ease of doing business,’ days taken to

register a new business have been falling in most economies but still range from 1 to 100 days. The Asia and Pacific region is perceived as having some of the least corrupt and some of the most corrupt economies in the world; unfortunately, perceived corruption is getting worse in most economies.”³⁰

Asian-Pacific Opinions of the United States of America

Although the United States of America has vast reserves of “soft power,” many nations in the Asia-Pacific region have unfavorable and skeptical views of the United States and its intentions. In particular, the populations of many states believe that America promotes international law to inhibit the actions of other nations but hypocritically does not follow these rules.³¹ At the same time, many key nations have a favorable view of the PRC.³²

Urbanization

In the 10 years between 2005 and 2015, the urban populations in the Asia-Pacific region will grow by approximately 352 million people.³³ This large population movement is creating key environmental challenges such as deteriorating air and water quality, persistent noise pollution, and the mismanagement of municipal, industrial, and hazardous waste. Furthermore, the trends indicate that a vast proportion of people in urban centers lack access to clean water and proper sanitation while living in slums.³⁴

Military Spending

The United States continues to spend more on defense than any other nation, but countries in the Asia-Pacific have increased their military budgets. In particular, the PRC, India, and Brazil “also made large increases, reflecting their continued economic growth and aspirations for global and regional influence.”³⁵ The PRC’s spending efforts are largely directed at two key initiatives: improving pay and training as well as modernizing and “informationizing” the armed forces.³⁶

China

Although China’s military leadership appears to be developing a range of options for all levels of warfare, the People’s Liberation Army (PLA) is most disposed toward a denial strategy that emphasizes operational paralysis as a means of defense or duress to compel an adversary to heed Beijing’s will. In support of this strategy, the PLA is rapidly advancing its capacity to apply air, space, and cyber power in order to defend against threats to national sovereignty and territorial integrity. Constrained by a relatively underdeveloped aviation establishment, the PLA is investing in air and space capabilities that may offset shortcomings in the face of a more technologically advanced adversary. Most significant is the expansion of, and growing reliance on, conventional ballistic and ground-launched cruise missiles as the centerpiece of the PRC’s political and military strategy.³⁷

North Korea

North Korea's continued development of ballistic missiles that can deliver nuclear warheads has changed the threat dynamic in the region.

Poverty

Although some countries have made significant progress in reducing the numbers of individuals who live in poverty, approximately one-quarter of Asian and Pacific people remain impoverished. Since 1990 the poverty rate has fallen dramatically, from 1.6 billion to 0.8 billion.³⁸

Education

According to the United Nations, “Asia and the Pacific is home to the largest number of illiterate adults worldwide and educational improvements have hardly been able to keep up with population growth across the region—only marginal progress in literacy has occurred in the last decade, with 518 million illiterate adults in 2008 down from the 527 million of 10 years ago.”³⁹ Furthermore, attempts to keep children enrolled in secondary education have met with little success. Only six of 10 secondary-school-aged children were enrolled in secondary education.⁴⁰ Perhaps more notable is the expected duration of education in measuring a nation’s appreciation and acceptance of its value. The expected duration of education is the number of years a child of school-entrance age is expected to spend in school through university. At the top, Australia and New Zealand expect their children to receive 20.4 and 18.5 years, respectively. On the other hand, the PRC had expectations of 11.2; India, 10.4 (2007); and Indonesia, 12.7.⁴¹

Natural Sciences and Engineering Doctoral Degrees

Approximately 17,500 US citizens earned doctorates in the natural sciences and engineering in 1993. This figure had risen to about 22,000 by 2006. By comparison, the citizens of the PRC earned about 2,000 doctorates in 1993, rising considerably to about 21,000 in 2006. The PRC now produces as many terminally degreed scientists and engineers as the United States. Meanwhile, the number of individuals earning the same degrees in the other major countries in the Asia-Pacific region—India, Japan, and South Korea—rose only modestly.⁴²

China’s Outward Foreign Direct Investment

The PRC’s position as an originator of outward foreign direct investment has risen dramatically in recent years to the fifth largest. Despite the impressive growth trends, however, Chinese outward direct investment (ODI) remains relatively small: China, including Hong Kong and Macau, accounts for just 6 percent of global ODI stock today.⁴³

Social Attitudes in India

According to a public opinion poll in 2006, “In terms of the social aspects of life, Indians do express a level of concern. Six in ten (58%) believe India’s security is ‘more in danger from other Indians than from foreigners,’ and majorities (55%) believe that the ‘caste system is a barrier to social harmony.’ These views are common among age, income and religious groups.” Furthermore, while 65 percent believe that India should be “a country whose economic success is seen as vital to that of the rest of the world,” 47 percent acknowledge that “corruption is just a fact of life which we should accept.”⁴⁴

Food, Diet, and Agriculture in the People’s Republic of China

“For a country with nearly 1.3 billion consumers and limited natural resources, China’s level of food imports is surprisingly low. China is nearly self-sufficient in food and is a major net exporter of many food products, including manufactured food and beverages, animal products, vegetables, fish and seafood, tea, and fruits. China’s agricultural exports go primarily to neighboring Asian countries, including Japan and South Korea, which are also among the top markets for U.S. agricultural products. Overall, China is a net importer of bulk commodities, primarily wheat. In some years, China has been a major importer of corn and cotton, and in other years, it has been a major exporter of those commodities.”⁴⁵ However, “in 2003 and 2004, imports exploded, more than doubling to \$25 billion in 2004 and 2005. China is now the fourth-largest agricultural importer in the world (after the EU [European Union], United States, and Japan) and the fourth-largest market for U.S. agricultural exports (after Canada, Mexico, and Japan). U.S. ag[ricultural] exports to China reached \$5.5 billion in calendar year 2004.”⁴⁶

“As China has over one-fifth of the world’s consumers and an economy growing at 7–8 percent annually, the country’s rising consumption of food has the potential to significantly impact world food demand. In past decades, policymakers in China were concerned primarily with supplying enough grain to meet basic nutritional needs of China’s huge population. Now, however, the emphasis is shifting from quantity of food demanded to the changing composition of food demand. Strong income growth and rapid urbanization are diversifying the Chinese diet and creating demands for high-value and specialty food products.”⁴⁷

New Entrepreneurial Hot Spots

“For example, whenever women become an important part of the workforce, or additional political or economic freedoms are introduced, entrepreneurial activity grows up quickly. That’s why we now see counterintuitive trends: a booming art market in China. The fact that Vietnam is a leading hotbed of entrepreneurship.”⁴⁸ The rise in entrepreneurial activity is reshaping the corporate landscape, and Asian firms are displacing long-dominant US firms in the *Fortune* 500. This, in turn, is attracting more American talent overseas.⁴⁹

Cyber Conflict

The use of computers and the Internet in conducting warfare in cyberspace has the potential to disrupt key services, utilities, government operations, and communication channels. Cyber warfare can also expose classified intellectual property, resulting in the loss of advanced commercial and military technology to foreign competitors. As early as 1996, a Chinese general noted that vulnerable computer networks could be exploited as a new form of warfare, stating that the cyber domain might “make the enemy’s command centers not work by changing their data system . . . [to] cause the enemy’s headquarters to make incorrect judgment by sending disinformation . . . [and to] dominate the enemy’s banking system and even its entire social order.”⁵⁰

Notes

1. Pres. Barack Obama (remarks before the Australian Parliament, 17 November 2011), <http://www.whitehouse.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament>.
2. Gen Norton A. Schwartz, chief of staff, US Air Force, to the Air Force Research Institute, letter, 20 October 2011.
3. Michèle A. Flournoy and Shawn W. Brimley, “Strategic Planning for National Security: A New Project Solarium,” *Joint Force Quarterly* 41 (2nd Quarter 2006): 80.
4. *Ibid.*, 81.
5. “Project Solarium,” Dwight D. Eisenhower Memorial, accessed 6 March 2012, <http://www.eisenhowermemorial.org/stories/Project-Solarium.htm>.
6. See attachment 1 for trends.
7. Office of the President of the United States of America, *National Security Strategy* (Washington, DC: Office of the President of the United States of America, May 2010); Chairman of the Joint Chiefs of Staff, *National Military Strategy of the United States of America* (Washington, DC: Chairman of the Joint Chiefs of Staff, 8 February 2011); and Office of the President of the United States of America, *Sustaining US Global Leadership: Priorities for US 21st Century Defense* (Washington, DC: Office of the President of the United States of America, 5 January 2012).
8. Office of the President of the United States of America, *National Security Strategy*, 7.
9. *Ibid.*, 17.
10. See bibliography.
11. All interviews were conducted under a policy of nonattribution.
12. See appendix “High North and Northwest Passage” analysis.
13. Chris Barth, “Why India Won’t Be the Next China . . . and That’s Bullish,” *Forbes*, 25 June 2012, <http://www.forbes.com/sites/chrisbarth/2012/06/06/why-india-wont-be-the-next-china-and-thats-bullish/>.
14. See “China” appendix.
15. Barth, “Why India Won’t Be the Next China.”
16. “The Dating Game,” *Economist*, 27 December 2011, http://www.economist.com/blogs/dailychart/2010/12/save_date, 9 August 2012.
17. Patrick M. Cronin, *Congressional Testimony before U.S.-China Economic and Security Review Commission*, 112th Cong., 2nd sess., 26 January 2012.
18. “GM Sells 3 Millionth Buick in China, More Important Than U.S.,” *USA Today*, 1 May 2011, <http://content.usatoday.com/communities/driveon/post/2011/05/gm-sells-3-millionth-buick-in-china/1>.
19. John J. Mearsheimer, “The Gathering Storm: China’s Challenge to US Power in Asia,” *Chinese Journal of International Politics* 3 (Fall 2010): 382, 389.
20. See the synthesis chapter of this report for a detailed description of the foundational ideas of Global Reach, Global Power, and Global Vigilance; the USAF’s enduring contributions of domain control, responsive and full-spectrum intelligence, surveillance, and reconnaissance, and rapid global transport and influence; and the 12 service core functions.
21. Asian Development Bank, *Key Indicators for Asia and the Pacific*, 2010, 41st ed. (Manila, Philippines: Asian Development Bank, 2010), 152.

22. Ibid., 234.
23. Ibid., 125.
24. Ibid., 181.
25. Mark Baker and David Orsmond, "Household Consumption Trends in China," *Reserve Bank of Australia Bulletin*, March Quarter 2010, accessed 18 January 2012, <http://www.rba.gov.au/publications/bulletin/2010/mar/3.html>.
26. This study is conducted by a leading media agency that performed a trend analysis of Chinese consumers. The previous study downplayed individualism, but in the 2012 forecast analysis, Chinese individualism was *the* number-one trend. Jin Wu and Theresa Loo, "Consumption Trends, China 2012," PowerPoint presentation, slide 6, MEC China, accessed 18 January 2012, <http://www.slideshare.net/mandywj/consumption-trends-china-2012>.
27. Ibid.
28. Ibid.
29. "China," US Energy Information Administration, revised 22 April 2013, accessed 22 May 2013, <http://www.eia.gov/countries/cab.cfm?fips=CH>.
30. Asia Development Bank, *Key Indicators*, 255.
31. Thomas Lum et al., *Comparing Global Influence: China's and U.S. Diplomacy, Foreign Aid, Trade, and Investment in the Developing World*, CRS Report for Congress RL34620 (Washington, DC: Congressional Research Service, 15 August 2008). The data suggesting that the populations of the states in the Asia-Pacific region believe that the United States has a double standard in applying international law come from "Opinion of the United States," Key Indicators Database, Pew Global Attitudes Project, accessed 10 January 2012, <http://pewglobal.org/database/?indicator=1&group=7>; and Steven Kull et al., "America's Global Image in the Obama Era," *WorldPublicOpinion.org*, 7 July 2009, http://www.worldpublicopinion.org/pipa/pdf/jul09/WPO_USObama_Jul09_packet.pdf.
32. We reached this conclusion via the sources cited in endnote 8.
33. Economic and Social Commission for Asia and the Pacific, United Nations, *State of the Environment in Asia and the Pacific, 2005: Synthesis*, 10, accessed 11 January 2012, <http://www.unescap.org/esd/environment/soe/2005>.
34. Ibid., 23. For trends on these issues, see not only the most recent state-of-the-environment report but also the previous one, published in 2000.
35. Sam Perlo-Freeman, Olawale Ismail, and Carina Solmirano, *SIPRI Yearbook 2010: Armaments, Disarmament and International Security* (Solna, Sweden: Stockholm International Peace Research Institute, 2010), chap. 5, "Military Expenditures," 177.
36. Sam Perlo-Freeman et al., *SIPRI Yearbook 2011: Armaments, Disarmament and International Security* (Solna, Sweden: Stockholm International Peace Research Institute, n.d.), chap. 4, "Military Expenditures," accessed 12 January 2012, <http://www.sipriyearbook.org/view/9780199695522/sipri-9780199695522-chapter-5.xml>. For trends in defense spending of all of the nations in the Asia-Pacific region, see *Defence Economic Trends in the Asia-Pacific, 2010* (Canberra, Australia: Defence Intelligence Organization, 2009).
37. Multiple sources, including primarily, Mark A. Stokes and Ian Easton, "Evolving Aerospace Trends in the Asia-Pacific Region" (Arlington, VA: Project 2049 Institute, 27 May 2010).
38. United Nations Economic and Social Commission for Asia and the Pacific, *Statistical Yearbook for Asia and the Pacific, 2011* (New York: United Nations Publications, 2011), 61–63.
39. Ibid., 49.
40. Ibid., 43.
41. Ibid., 43–46 and 174.
42. National Science Board, *Science and Engineering Indicators, 2010*, 2–35, accessed 12 January 2012, <http://www.nsf.gov/statistics/seind10/c/cs1.htm>.
43. This is almost a direct quotation from Nargiza Salidjanova, *Going Out: An Overview of China's Outward Foreign Direct Investment*, US-China Economic and Security Review Commission, 1, accessed 12 January 2012, <http://www.uscc.gov/researchpapers/2011/GoingOut.pdf>.
44. "Indians Proud of Country but Worried Caste System Is Holding Country Back," BBC Poll, accessed 19 January 2012, http://www.globescan.com/news_archives/bbc_india/bbcindia.pdf.
45. Fred Gale, "China at a Glance: A Statistical Overview of China's Food and Agriculture," Economic Research Service, US Department of Agriculture, 2002, accessed 19 January 2012, <http://www.ers.usda.gov/publications/aib775/aib775e.pdf>.

46. Fred Gale, "Trends in Chinese Food Demand and Trade Patterns," Economic Research Service, US Department of Agriculture, 2006, accessed 19 January 2012, http://www.usda.gov/oce/forum/2006_Speeches/PDF%20speech%20docs/Gale2906.pdf.
47. Hsin-Hui Hsu, Wen S. Chen, and Fred Gale, "How Will Rising Income Affect the Structure of Food Demand?," Economic Research Service, US Department of Agriculture, 2002, accessed 19 January 2012, <http://www.ers.usda.gov/publications/aib775/aib775f.pdf>.
48. Terry Waghorn, "The Latest on Microtrends: An interview with Mark Penn, CEO of Burson-Marsteller," *Forbes*, 7 May 2009, <http://www.forbes.com/2009/05/07/mark-penn-microtrends-leadership-managing-interview.html>.
49. Hannah Seligson, "American Graduates Finding Jobs in China," *New York Times*, 11 August 2009, <http://www.nytimes.com/2009/08/11/business/economy/11expats.html?bl&ex=1250136000&en=370e4670dc148005&ei=5087%0A>.
50. Mary Beth Guard and L. Michael Guard, "Physical and Digital Threats to Financial Institutions in the Wake of the Terrorist Attacks," *Security BankersOnline.com*, 2001, accessed 19 January 2012, <http://www.bankersonline.com/security/cyberthreats.html>.

Chapter 2

Best Case

Path toward a Harmonious World

Dr. John P. Geis II

“Shift Happens.”¹ In 1900 Great Britain was the richest country in the world. Boasting the planet’s largest military, Britain was the center of global business, information, finance, and commerce. The country enjoyed an educational system second to none, and its currency was the world’s benchmark. In fact, a standard dictionary definition of *sterling* as having fine quality derives from the intrinsic trust that the world placed in the British pound as recently as 80 years ago.² In the early part of the twentieth century, the British Empire, known as “the Empire on which the sun never sets,” covered one-fifth of the earth’s land area and included a quarter of the world’s people.³ Yet, in only a few decades, this empire crumbled, and the era in which Britain ruled the seas gave way to what historians would call “the American Century.”⁴

A shift occurred as America emerged from the two world wars with the world’s largest economy, gold reserves of more than 20,000 metric tons, and the world’s most advanced commercial infrastructure. The US economy grew nearly 50 percent during the 1940s, and for a brief time America was the world’s only nuclear superpower.⁵ For the remainder of the twentieth century, the United States was *the* preeminent nation-state—and, as of this writing, remains so.

Yet, a new shift is under way, first noticed in the 1960s. Even then, Asian demographics portended a major shift in economic might that would create a new geopolitical landscape on the planet.⁶ In the last 15 years, many other forward-looking studies have come to the same conclusion. Among the possible outcomes that might take place before 2030, the *Air Force 2025* study pointed to the rise of an Asian colossus that would become “the largest economic power the world has ever known.”⁷ More recently, economists at the International Monetary Fund projected that the crossing point between China’s economy and that of the United States will occur in 2016.⁸ According to their prediction, by the end of this decade, the United States will have fallen to the world’s *third* largest economy—behind the European Union and China.

The fundamental question is not whether such a shift will occur but how, given the fact that the “American Century” is giving way to the “Asian Millennium.”⁹ This chapter seeks to paint the “best case” alternative future for this transition between now and 2020. It is a path that will lead eventually to peaceful cooperation among global powers and the states of the Asia-Pacific region, but fully attaining such a high level of cooperation remains unlikely within this decade. Thus, this picture depicts an incomplete journey. It is a path toward an outcome China has called a “harmonious society” and a “harmonious world” but a route only partially traveled.¹⁰ Because we are not likely to arrive at the destination—the next global equilibrium—until well into the 2030s or beyond, this essay depicts a waypoint along that path and the challenges for the United States as it navigates toward a future where Asia has the predominant role.

This best-case path is based on two pillars. The first is the idea that China will continue to move in the direction of increased cooperation. The second holds that the United States continues to shift toward a more Asian-centric view of its interests. This scenario explores the environment in Asia to discern what must occur to create this set of conditions. The reader should note that other sets of assumptions yield different scenarios and that this volume explores two somewhat “darker” potential outcomes. This chapter, however, addresses a peaceful rise of Asia—one that begins with the concept of harmony.

Harmonious Society and Harmonious World

For the past 30 years, China has followed a strategic course of cumulative addition to past success. This path began under Deng Xiaoping, who argued that “to be rich is glorious” and then put China on a strategic course often called the “24-Character Strategy”:¹¹

“冷静观察，站稳脚跟，沉着应付，韬光养晦，善于守拙，绝不当头。”

This strategy translates to “Observe calmly; secure our position; cope with affairs calmly; hide our capabilities and bide our time; be good at maintaining a low profile; and never claim leadership.”¹²

The loosening of restrictions to corporate growth combined with China’s new external philosophy to create the onset of more than 30 years of spectacular economic development. China’s gross domestic product (GDP) in 1970 was a mere \$130 per person, totaling only a little more than \$130 billion.¹³ Today, although estimates vary, China is widely recognized as the second largest economy in the world, its GDP now believed to exceed \$12 trillion with a growth rate of about 7.5–8 percent per year.¹⁴

Other East Asian nations saw their economies rise in lockstep with that of the Asian colossus. From 1960 to 1995, Japan, Hong Kong, South Korea, Singapore, Taiwan, Indonesia, Malaysia, and Thailand all maintained growth rates at least double that of the rest of East Asia.¹⁵ By 2000 Asia boasted a greater GDP than that of North America, and by 2005 the GDP of East Asia alone amounted to \$12.8 trillion—outstripping North America’s \$12.7 trillion.¹⁶ Collectively, the Asian continent’s current GDP is not quite double that of North America and is more than 50 percent larger than the combined economies of the nations of Europe.

Asia came to this outcome through cooperation, a concept not lost on the generations of Chinese leaders who followed Deng Xiaoping. For the past 10 years, Hu Jintao has articulated a dual philosophy of harmonious society for affairs inside China and of harmonious world relations to describe China’s desired objective with regard to foreign affairs.¹⁷ In concert with this philosophy, the XXIX Olympiad in Beijing adopted the theme “One World, One Dream.”¹⁸

Discord among the Harmony

In spite of China’s desires for cooperative and constructive relations with its neighbors and the world, there are a few stumbling blocks that may get in the way. Uncertainty regarding economic growth, ongoing border disputes, and issues concerning rights to the South China Sea all represent potential challenges toward constructive and harmonious relations among Asian states. Although this scenario examines the entire Asia-Pacific region, most of

these stumbling blocks share a common element—China. Further, successfully achieving a stable path toward cooperation requires overcoming each of these stumbling blocks.

The Economy

China's internal governing philosophy has as its primary goal the survival of the Chinese Communist Party (CCP). In fact, the principal loyalty of the People's Liberation Army (PLA) is not to the state but to the party.¹⁹ This notion that all stability depends upon the party's continued grasp on national power contains within it the idea of stability of the populace. This, in turn, requires sustained economic growth to provide the central government the resources to build a better life for its people, enhancing the CCP's legitimacy. Linking these ideas more plainly, the principal political goal of the CCP's survival is a function of continued significant economic development, which is not certain.

Disparate predictions exist for China's economy over the next 10 years. In *Barron's* cover article, "Falling Star," Jon Laing argues that the Chinese economy will fall soon and land hard.²⁰ In marked contrast, Robert Fogel's piece in *Foreign Policy* maintains that China's economy is headed for a GDP of \$123 trillion before 2040 and that nothing will stop it from becoming several times the size of the US economy.²¹

China's growth rate is important because anything less than about 7 percent risks political instability.²² Slower advancement would result in less wealth distribution by the CCP to its poor areas, exacerbating the disparity between China's rich and poor. Should this inequality rise to critical levels, unrest and internal instability could ensue, and the PLA—the guardian of the party—would find itself playing a major role in maintaining China's stability. This situation could have ramifications both internal and external to China, depending upon the cause of the slow growth.

Thus, China's economy is a key element in regional stability. Major slowdowns in economic expansion could precipitate a crisis for China. Remaining on a best-case path toward the future, therefore, depends upon an environment in Asia conducive to mutual prosperity—one in which the Chinese economy can continue to lift its population out of poverty.

Land Border Disputes

As the major rising state in Asia, China has not always enjoyed peaceful relations with its neighbors. Since World War II, China has engaged in active disputes over its land borders with Russia, Bhutan, India, and Vietnam, some of which remain active.

In 1969 Russia and China exchanged fire over three islands at the confluence of the Aigun, Amur, and Ussuri rivers. The Treaty of Aigun in 1858 should have resolved a long-standing dispute, but the Chinese unilaterally determined in the 1960s that the previously agreed-to borders were unfair. Fighting broke out in the region in 1969, and even though the battle did not spread to the heart of either country, the final borders remained unresolved until 1997, when Russia and China settled a border disagreement that had lasted more than three centuries.²³

China's relations with Bhutan have been cold, both countries contesting the jurisdiction of numerous enclaves in Tibet as well as the mountain of Kula Kangri.²⁴ Consequently, no formal diplomatic relations exist between Bhutan and China, and interaction between the two countries remains terse, Bhutan not having responded to recent offers by Beijing to reopen negotiations.²⁵

Regarding territory along the Himalayas, China has engaged in several border disputes with India involving the regions of Arunachal Pradesh, Aksai Chin, and Jaamu and Kashmir. The state of Arunachal Pradesh was ceded to India in the Simla Accords of 1913–14, negotiated by representatives of China, Tibet, and Britain while India was still a British colony.²⁶ Before conclusion of the accords, the Chinese withdrew on principle because they objected to Tibet's having a voice in drawing the treaty border lines.

Britain, India, and Tibet finalized the treaty, which established a boundary known as the McMahon Line, placing the 32,000-square-mile region of Arunachal Pradesh inside India. In the war of 1962, China conquered the entire state, claimed it as its own, and then withdrew its forces to the McMahon Line, restoring the ground situation to the status quo ante-bellum. Nonetheless, to this day, China claims the state, while India administers its 1.4 million English-speaking inhabitants.²⁷

War has occurred over the Indian region of Aksai Chin as well. The border between India and China was drawn in 1865 based upon W. H. Johnson's survey of India. Since China did not control the border region of Xinjiang at the time, the 1865 border became the de facto international boundary and remained so for nearly a century. In the 1950s, China infringed upon this territory in an effort to build a highway connecting Xinjiang and western Tibet, which ran through the middle of Aksai Chin. Initially the Indian government had no knowledge of this infringement since Aksai Chin is high in the Himalayas and difficult to access from the Indian side. Upon discovering the Chinese incursion, India took military action to regain control of its territory, anticipating no response. The two countries, however, went to war over the region in 1962–63, fighting in Aksai Chin and later in Arunachal Pradesh.²⁸

The Aksai Chin area borders the province of Ladakh in the state of Jammu and Kashmir, where China also stakes a claim. The state of Jammu and Kashmir was ceded to India by the Maharajah Hari Singh in 1947 by the Instrument of Accession.²⁹ For the most part, this province has mostly been the site of militarized disputes between India and Pakistan, but China has not renounced its claims to the region.

These ongoing disputes threaten to ignite nationalist sentiments on both sides of each border, which is why China has moved to settle many of its other differences in recent years. The boundary disputes along China's southwestern flank, however, seem more intractable than those already adjudicated.

Among the issues underlying these disputes in modern times is that of the spiritual leadership of the Tibetan Buddhists. The Chinese government appears concerned about the succession to the Dalai Lama. In Tibetan Buddhist tradition, succession occurs via the process of reincarnation, and the Dalai Lamas have served as the spiritual and temporal rulers of Tibet since the 1500s. Evidently, China wishes to control the territory in which the new Dalai Lama will be born. Because the determination of whether a particular infant is in fact the reincarnation of the previous Dalai Lama takes time, often years, and because the region in which this child may be born is vast, China has attempted to lay claim to the entire area from which such a successor might emerge.³⁰ Meanwhile, the Dalai Lama himself has attempted to take partial control of his succession by proclaiming that his successor cannot and will not be born in any territory held by China.³¹

Creation of a stable path forward for the Asia-Pacific region demands peaceful resolution of this dissension over land. Because religion and Tibetan spiritual leadership underlie the disputes in Bhutan and the northern Indian provinces, any solution should preserve the

core interests of the claimants in this area. Even so, a set of waterborne arguments also threatens the stability of the region.

Ocean/Sea Disputes

Multiple incidents in recent years have escalated to shows of force at various levels. These include boundary disputes in the waters off the Korean Peninsula, disagreement between China and Japan over the Senkaku Islands, and a multilateral debate about the waters of the South China Sea.³²

The dispute related to the Korean Peninsula has its roots in the 1953 armistice and subsequent changes in international law regarding maritime boundaries. The armistice between the United Nations (UN) Command, North Korea, and China did specify that the UN would retain control over a set of islands off the western coast of Korea generally along and south of the 38th parallel.³³ The prevailing assumption at the time was that maritime boundaries extended only three nautical miles off the coast of a mainland. Several of these islands were more than three miles but less than 12 miles from North Korea's Ongjin Peninsula. As more nations have adopted the 12-mile rule, the status of these islands under international law has become less clear, and as early as 1973, the US Department of State began to question the legitimacy of the border arrangement. Simultaneously, North Korea began to challenge this demarcation line with freedom-of-navigation exercises.³⁴

For years, the diplomatic rhetoric remained irrelevant because North Korea lacked a meaningful navy. As the North Korean navy developed, the boundary originally purposed to keep the South from moving north also prevented the new navy of the North from moving south. Additionally, the waters off the coast of Korea are rich in sea life and harbor a commercial fishing industry, creating a set of economic interests that overlay the border and security situation.

In 1999 North Korea redefined its interpretation of the demarcation line (also known as the northern limit line), resulting in the first of a series of violent disputes.³⁵ The North Koreans had been pushing for a change in the demarcation line in accordance with the 12-nautical-mile territorial limit considered the norm in the UN. When these efforts failed to achieve the desired ends, North Korea crossed the demarcation line with torpedo and patrol vessels on 15 June. South Korea immediately repelled the attack, and the North Koreans lost nearly three dozen personnel. On 2 September 1999, they announced establishment of the "Chosun West Sea Demarcation Line," which encroached significantly into territory under control of the UN Command, as agreed to in the armistice. Backed by the United States, the UN Command immediately protested this declaration.

The boundary dispute has remained heated, with incursions by North Korean military vessels occurring in 2002, 2004, 2009, and 2010. The most recent of these involved North Korean shelling of the South Korean island of Yeonpyeong, which damaged businesses and homes, killed four civilians, and wounded 10 more before South Korea responded by shelling North Korea's mortar positions.³⁶

This conflict has adversely affected North and South Korea, both of which have lost property, military equipment, and lives. Moreover, they have not been able to use their fisheries and crabbing grounds—a robust economic resource—to the fullest extent.

A second area of contention concerns the island chain that the Japanese call the Senkakus and the Chinese refer to as the Diaoyu Islands. This archipelago contains five small islands in the East China Sea, the largest of which is a little over four square kilometers. The arguments

of ownership on both sides are complex. In short, the Chinese claim the islands based on their having been recorded in ancient Chinese maps and other documents since their discovery in 1372.³⁷ The islands continue to appear in logbooks and other records in the 1530s and across the Ming and Qing dynasties.³⁸ The Chinese acknowledge ceding the islands in 1895 but argue that their declaration of war against Japan in 1941 reversed this action and that they have belonged to China ever since.

Japan claims that the islands were unsettled and unclaimed as of 1895, when China ceded Formosa and all islands appertaining or belonging to Formosa in the Treaty of Shimonoseki, which ended the first Sino-Japanese War.³⁹ Whereas China views this war as nullifying the Treaty of Shimonoseki, Japan argues that it never agreed to cede the Senkaku Islands or the prefecture of Okinawa, of which the Senkakus are a part. The San Francisco Peace Treaty, which formally ended the war, contains no such provision.⁴⁰ Further, Japan holds that the islands came under its purview in the Okinawa reversion of 1971, when the United States transferred control of Okinawa to the Japanese. Adding to its claim, a Japanese citizen has developed the islands, and the Japanese government purchased them in a legal real estate transaction for 2 billion yen.⁴¹

In recent years, the dispute over these islands, which may sit near an oil and gas field, has become more heated. China began to conduct military exercises near the islands in 2006. During 2010 in contested waters near the islands, a Chinese fishing vessel collided with two Japanese coast guard vessels, and the Japanese coast guard arrested the crew.⁴² In the wake of these incidents, anti-Chinese protests occurred in Japan, and diplomatic relations with China became strained. In March 2012, China moved two maritime patrol boats toward the Senkaku Islands, accompanying the Chinese foreign minister's announcement of China's "indisputable sovereignty over the Diaoyu Islands." These vessels did not enter the disputed waters, but on 7 July, three other Chinese vessels did. After a series of protests in and around the islands by both nations, anti-Japanese demonstrations flared in several Chinese cities, and relations between the two nations have become further strained.⁴³

As with the Korean imbroglio mentioned above, the Senkaku/Diaoyu dispute serves neither to create peaceful relations between the two largest economies in Asia nor to enhance economic growth. Unless and until the parties resolve this problem, resources in and around the islands cannot be developed, holding back the regional economy.

The most intricate dispute in the region lies in the South China Sea, including the Paracel and Spratly Islands, the latter representing the more complex of the two claims. Although some of these claims are long-standing, they have come to the forefront in recent years due to the prospect of significant fossil-fuel resources underlying this region.

China has claimed a vast tract of territory, including almost the entire sea, in its published "nine-line map" of the South China Sea (fig. 2.1). This term alludes to the nine dashes that demarcate China's territorial waters shown on government-produced maps used in Chinese schools today (see the red line in fig. 2.1). This line encompasses a territory that includes both the Paracel and Spratly Islands; covers more than 80 percent of the South China Sea; and hugs the coast of Malaysia, Brunei, the Philippines, Vietnam, and Indonesia.

The disputed region encompassing the Spratly Islands lies within the claimed exclusive economic zone of China, the Philippines, Brunei, Vietnam, and Malaysia (fig. 2.2). All five

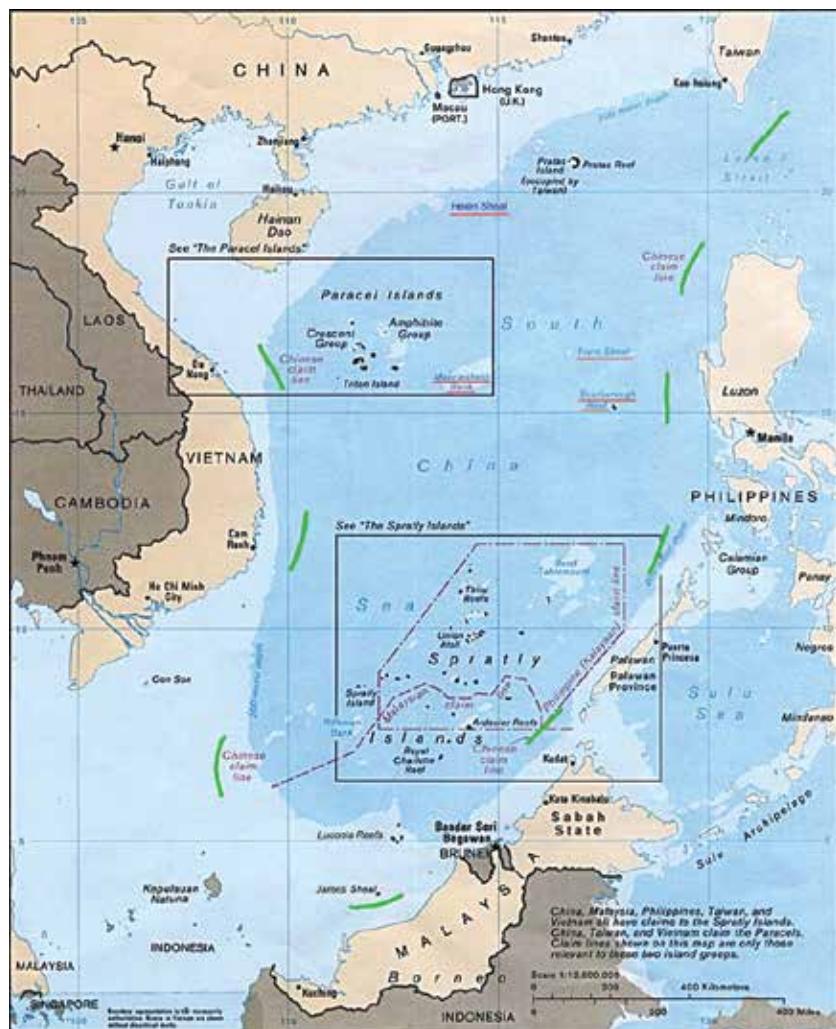


Figure 2.1. Nine-line map of the South China Sea. (Courtesy of the University of Texas Libraries, the University of Texas at Austin, accessed 23 May 2013, http://www.lib.utexas.edu/maps/middle_east_and_asia/schina_sea_88.jpg.)

nations actually claim only a very small portion of the islands, but the entire region of the Spratlys has at least three claimants.

China and the Philippines are engaged in two disagreements related to the South China Sea. The government in Manila sought to open new tracts of the seabed near Scarborough Shoal for exploration earlier this year, a process to which China formally objected. China declares that some of the Spratly Islands—many of them small, rocky outcroppings of land visible only at low tide—are humanly habitable and thus seeks to extend its 200-mile economic exclusion zone around these islands and into the region where Manila wants to drill.⁴⁴ Within the Chinese claim is Pag-asa Island, one of the largest in the group, on which the Philippines currently maintains a small village. Pag-asa is also near the location where Manila wishes to drill for oil. Economic development remains impossible until the countries settle this dispute.⁴⁵

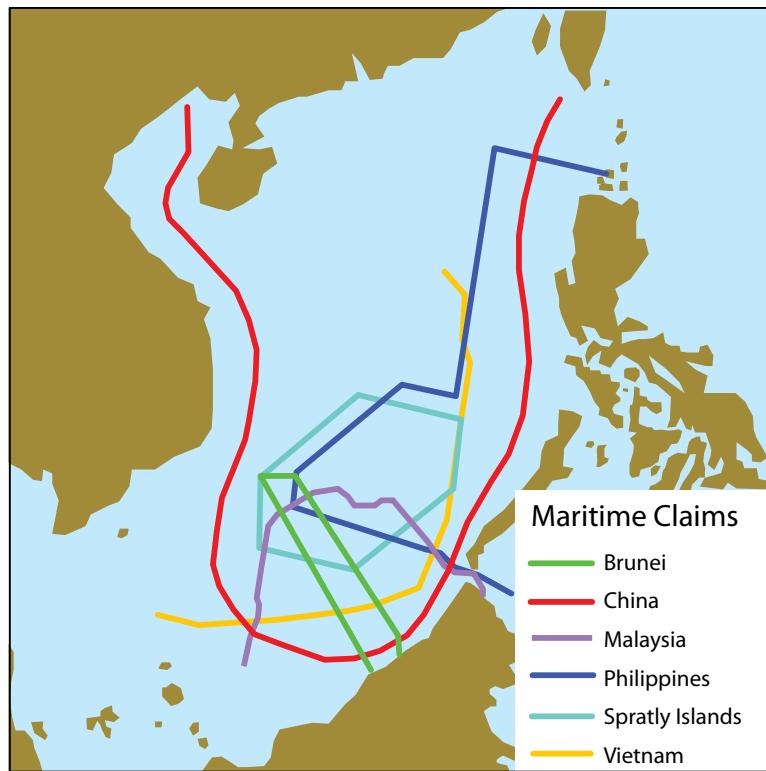


Figure 2.2. Maritime claims of the Spratly Islands. (Adapted from “Relief Map of South China Sea,” Wikimedia Commons, http://en.wikipedia.org/wiki/File:Relief_Map_of_South_China_Sea.png. Used by permission of the author under the Creative Commons license.)

More recently, the region was the location of a military standoff between China and the Philippines. The incident began when several Chinese fishing vessels entered waters in and around the Scarborough Shoal on 8 April 2012. Filipino sailors responded by attempting to arrest the Chinese fishermen for poaching.⁴⁶ China sent coast guard vessels to the region, which were met by vessels of the Philippine navy. This “tit-for-tat” response escalated the show of force throughout April and May until China had 97 vessels, including some of its most advanced military ships, arrayed against a much smaller Philippine fleet.⁴⁷ The standoff lasted for weeks, adversely affecting the Philippine economy, which suffered large-scale losses of Chinese tourism because travel agencies in China were forced to cancel numerous vacation tours.⁴⁸ Additionally, China stopped fruit imports from the Philippines, causing a significant loss to the Filipino farming industry.⁴⁹

Even though no shots were fired, at the height of the conflict, the Chinese government-controlled media warned of war.⁵⁰ In the end, the two nations pulled back from the brink, but diplomatic relations are strained, the area’s resources remain undeveloped, and the Philippines has lost significant trade and tourism dollars in the dispute.

Clearly, these border problems indicate that East Asia is anything but harmonious. The ongoing disputes, most of which involve China or its allies, continue to drain the Asian

economy and produce tension in the region, leading to military buildups—sometimes in unexpected places.

Rather than move toward cooperation, countries in Asia and Oceania have increased their defense spending, surpassing that of Europe. China, Japan, India, South Korea, and Australia are the key drivers of such expenditures in the region but not the only ones. Indonesia raised spending in 2012 by 35 percent in an effort to modernize its military as a deterrent to terrorism and to overcome “potential military aggression,” according to Pres. Susilo Bambang Yudhoyono. This buildup includes a \$1.1 billion contract for at least 10 new submarines for the Indonesian navy. Similarly, Singapore’s military spending, at 4.5 percent of GDP, is one of the highest—per capita—in the world. Totaling over \$7 billion in 2012, its military expenditure exceeds that of its neighbors Malaysia (\$5 billion) and Indonesia (\$4 billion) but reflects Singapore’s realist view of international relations and the importance of Southeast Asian geography.

China’s defense spending also continues to grow rapidly—a trend under way for approximately 20 years. In 1993 China’s outlays showed a real decrease of about 2 percent. Since that time, increases of 9 percent per year in real terms (over 30 percent in 1994) have been consistent. Recent upturns in Asian defense spending (fig. 2.3) indicate that the upward trend continues on an exponential path across the region.

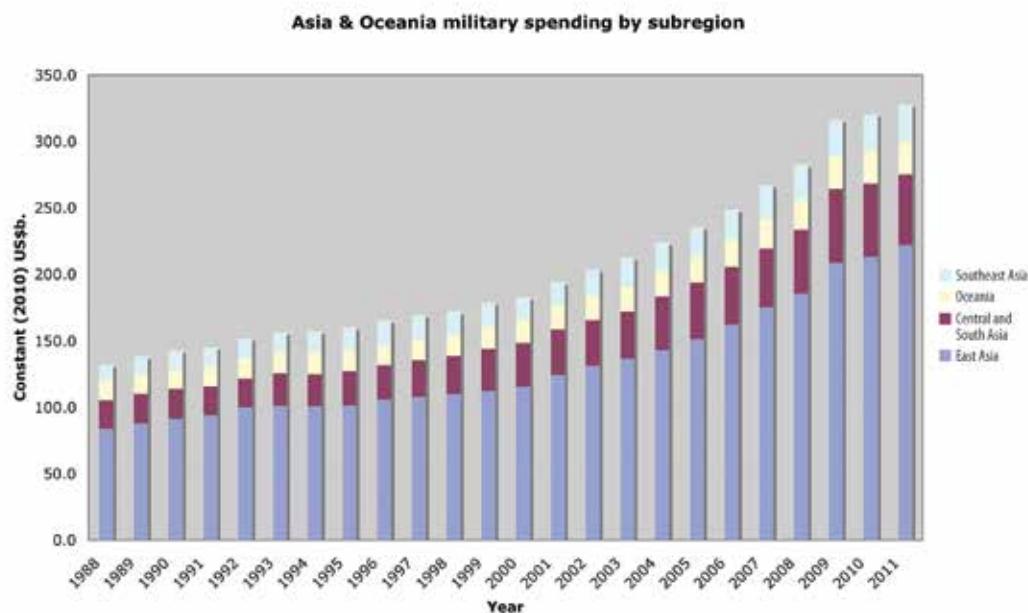


Figure 2.3. Military-expenditure trends—Asia and Oceania, 1988–2011. (Reprinted from “Asia and Oceania: Military Expenditure in Asia and Oceania by Subregion, 1988–2011,” Stockholm International Peace Institute Database and Graphics Archives, 2011, http://www.sipri.org/research/armaments/milex/resultoutput/regional/Milex_asia_ocean.)

Looking outward over the next 10–20 years, we expect no decrease in Asian defense spending by the major nations across the region. Rather, it should remain on an exponential curve, with China likely becoming the predominant ascendant military power in the area.

Indeed, it is possible that in the next 20 years, China may emerge as a peer or near peer to the United States in the region, both on the ground and in the air. Meanwhile, India will invest heavily in procurement to protect its interests in the region, spending perhaps as much as \$100 billion over the next 10 years alone.

These elevated outlays in Asia will not necessarily lead to war. Indeed, many scenarios suggest that armed conflict need not occur. Yet, the navies, armies, and air forces in the region are receiving large investments because territorial disputes and access to economically lucrative resources may hang in the balance. Asia may be in the midst of its own arms race—a contest occurring not as fast as its predecessor during the Cold War but one moving apace nonetheless. The question, however, becomes “a race to where?” Such contention seems counterproductive to realizing a harmonious or cooperative outcome.

The Road to Pax Pacifica

The above discussion makes two things clear. First, harmonious relations in the region depend directly upon the stability of the Chinese economy. If it collapses or its growth rate slows to a level not conducive to internal stability, then fully peaceful integration and cooperation will elude the Asia-Pacific region. Second, internal conflict in the region is antithetical to maintaining optimum economic growth. Existing boundary disputes have cost all sides economically, and as long as they remain unresolved, they will continue to do so.

Logically, this means that the path to full cooperation in this region is contingent upon stabilizing the Asian economies and upon finding either permanent resolution of the territorial disputes or, at minimum, agreements to jointly develop and share the resources in those territories claimed by multiple states. To encourage this level of cooperation, the United States and its Department of Defense must follow a road that builds mutual trust, increases regional interdependence, and bolsters the prospects for economic growth, including that inside China itself. Such activities would require trust-building measures that entail finding a way for the US military and the region’s armed forces to work together in environments relatively free of the risk of conflict. Ideally, America would enhance its posture for humanitarian and disaster-relief efforts, thus cultivating peacetime diplomatic and economic relations with the major actors in the region, including China, India, Indonesia, the other states of the Association of Southeast Asian Nations (ASEAN), Japan, and Australia.

Military-to-Military: Expanding the Humanitarian-Relief Posture

To cultivate trust and relationships in the region on a road toward Pax Pacifica, the United States should use its basing rights there to position itself to conduct humanitarian-relief operations in response to the frequent natural disasters common to the Asia-Pacific. On the one hand, such a force posture would maintain US presence with the most crucial systems for reacting to crises (airlift). On the other hand, it would create conditions for deep engagement with the regional actors in a way that enhances communication and builds trust.

Asia routinely experiences natural disasters caused by both geological and meteorological phenomena.⁵¹ Every year, numerous tropical cyclones and typhoons as well as earthquakes occur, the larger quakes accompanied by devastating tsunamis. These events almost certainly will persist over the next 10–20 years. US posturing in a manner to assist with humanitarian-relief operations would give the United States the opportunity to partner

with regional militaries, including China's, while offering services to the region that enhance US popularity and bolster the area's economic interdependence and stability.

Typhoons in the Pacific Basin are so numerous that the World Meteorological Organization uses a different standard for naming storms in this part of the world. In the Atlantic Basin, a single alphabetical list suffices for each season, and every year the name of the first storm begins with an "A." In the Pacific, however, the naming of storms merely continues where the last storm left off, with new lists started as needed—often multiple times per year. In May 2008, Cyclone Nargis hit Myanmar (Burma), peaking as a category-four storm on the Saffir-Simpson Scale for tropical systems despite its depiction as a category-two storm (fig. 2.4). Nargis made landfall on 2 May 2008, killing a minimum of 80,000 people; 54,000 more were never found.⁵² Unfortunately, such effects are not unique—major storms routinely displace thousands in the region. In December 2011, for example, tropical storm Washi produced heavy rains that eradicated villages and caused tens of thousands to flee their homes.⁵³



Figure 2.4. Cyclone Nargis on 2 May 2008. (Reprinted from "Earth Observatory," National Aeronautics and Space Administration, accessed 4 October 2012, <http://earthobservatory.nasa.gov/IOTD/view.php?id=8711>.)

Nargis and Washi are not the worst storms to hit the region. On 29 April 1991, a category-four cyclone struck Bangladesh, killing an estimated 138,000 people—a death toll held down by the building of storm shelters in the wake of an earlier cyclone that killed half a million people in Bangladesh in the 1970s.⁵⁴ In the case of these cyclones and storms, flooding—which can also occur in conjunction with the annual monsoon—caused most of the deaths and destruction.⁵⁵

In addition to monsoonal flooding and major tropical storms, Asia is frequently the site of major earthquakes, some of which trigger tsunamis. Located on the western edge of the “Ring of Fire,” the heart of the Asia-Pacific region is highly prone to unstable geologic activity. Figure 2.5 shows a selected set of earthquakes in the Pacific Basin from 4 September to 3 October 2012. Using a US Geological Survey tool, the author plotted 7,029 earthquakes that occurred during these 30 days, each with a magnitude greater than 2.5 on the Richter scale. The Ring of Fire follows the tectonic plates, delineated by the figure’s red lines, from the west coast of North America, around the southern coast of Alaska, down the Japanese archipelago, and then into Indonesia and the Philippines. The color of the plot indicates how recently the earthquake occurred: red in the past hour; orange, the past day; and the various shades of yellow, weeks. The size of the square represents earthquake intensity.

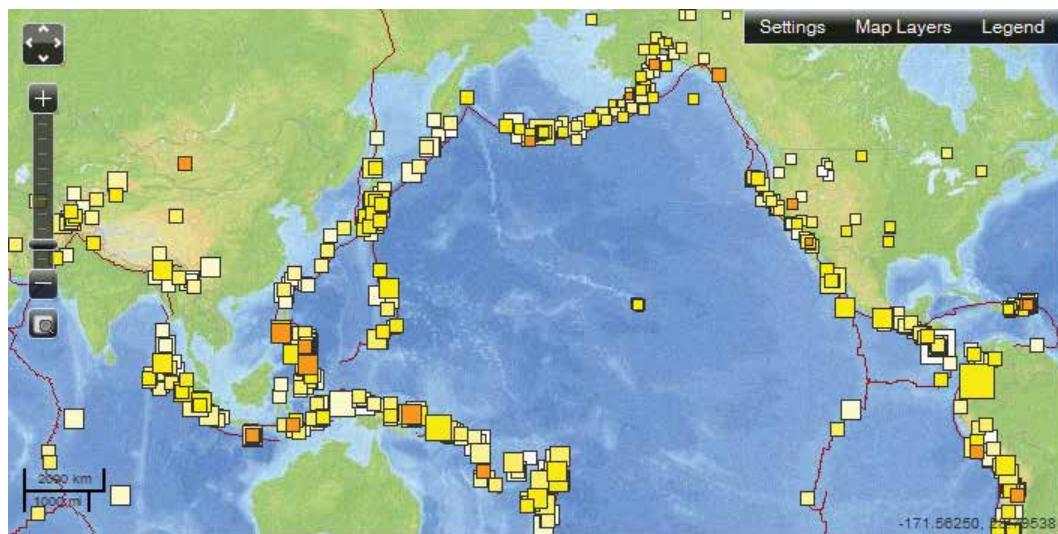


Figure 2.5. Map of earthquakes in the Asia-Pacific region from 4 September to 3 October 2012. (Map and data from “Earthquake Hazards Program,” US Geological Survey, accessed 4 October 2012, <http://earthquake.usgs.gov/>.)

While many of these tremors are small, the Asia-Pacific basin frequently experiences catastrophic earthquakes. Since 1 January 2011, 32 major earthquakes of magnitude 7.0 or greater have occurred within the region. Among these were five near Vanuatu; three, including a magnitude 8.6 and a magnitude 8.2 off the coast of northern Sumatra; three just north of New Zealand; two in the Aleutians and in the Sea of Okhotsk; two near New Guinea; one in Fiji; and five on or near the east coast of Honshu Island, Japan, including the catastrophic 9.0-magnitude quake and its first aftershock of magnitude 7.9, both on 11 March 2011.⁵⁶

Although several areas of Asia have become accustomed to the shaking earth, the larger earthquakes play havoc with both the regional and global economy. For example, damage caused by the Japanese earthquake of 2011 continues to create economic challenges in Japan and across the world. The earthquake generated tsunami waves as high as 38 meters (124.7 feet), killed over 15,000 people, and destroyed the Fukushima nuclear power plant, resulting in the evacuation of more than 300,000 people.⁵⁷ Initially, millions were left in darkness and without water, and numerous manufacturers closed as a result of shortages of electricity and/or parts.⁵⁸ This event rippled through the global economy and reverberates today as nuclear plants are now being shut down worldwide out of concern for their vulnerabilities. The World Bank estimates the global impact at over \$230 billion.⁵⁹

Most nations of the Asia-Pacific region cannot cope effectively with disasters of this magnitude, yet they remain part of the tapestry of the region. Therefore, those countries have welcomed and will likely continue to welcome a US force posture capable of assisting them in recovering from these events. In the wake of the earthquake and tsunami in Indonesia, the US government sent \$950 million in direct humanitarian assistance to the people of that nation.⁶⁰ Much of this assistance arrived by US Air Force (USAF) aircraft and a Navy carrier battle group. The Indonesian people have not forgotten. Popular opinion polling suggests that relief provided in the wake of these disasters completely altered the attitude of most Indonesians about the United States during US operations in the wars in both Afghanistan and Iraq. This transformation is remarkable in light of the fact that many Indonesians are Muslim, some of whom consider the US wars in the Middle East an attack on their faith.

Such change in opinion was partly driven by the press. Indonesia's weekly news magazine *Tempo* called the assistance by Western nations "heartwarming"; moreover, the goodwill spilled over into negotiations between the government and rebels in the Aceh province, leading to a peace agreement in 2005.⁶¹ In 2004, 66 percent of Indonesians viewed the United States unfavorably. A poll taken in 2006 indicated that for the first time since the war on terrorism began, a majority of Indonesians looked favorably upon America. Sixty-three percent of Indonesians had changed their views, laudatory opinions tripling since the earthquake and tsunami.⁶²

Equally important, this goodwill manifested itself even in places removed from the disaster. In Pakistan, 78.3 percent of respondents had a more favorable view of the United States because of the relief efforts. The poll also showed that 81.3 percent of Pakistanis who responded felt that American assistance was either very important (40.9 percent) or somewhat important (40.3 percent) in shaping this changed opinion.⁶³

By being a "good neighbor," the United States can not only open doors to bases and access but also develop a working relationship with other militaries, including those of the major ASEAN states and China. Relief efforts build goodwill. Further, these types of activities can help cultivate trust and cooperation within Asia as well as ensure that the United States retains access to and a presence in the region.

The US Department of Defense can play yet one more role in an effort to better integrate itself into a tapestry of relations that becomes Pax Pacifica: assist with issues of piracy, a constant irritant in parts of the South China Sea and in areas of the Strait of Malacca. Many episodes amount to petty theft, insofar as pirates board and raid an anchored vessel awaiting an entry slot into a harbor in the middle of the night, making off with valuable cargo and/or personal items from the crew.⁶⁴ Even though cooperation and the sharing of data on ship location among the major states in the region have rendered major incidents infrequent,

some still occur.⁶⁵ US cooperation in the area of surveillance may assist in ensuring even freer navigation of the seas. Further, such integration of data and communication systems that increases ASEAN's fidelity of shipping information would enhance interconnectivity and resolve issues with communications compatibility in peacetime, producing benefits should any crisis ever occur.

No Conflict Anywhere?

In the narrative that leads to Pax Pacifica, one might point to Taiwan and its relations with China as the proverbial elephant in the room. Predictions of wars between the island of Formosa and the mainland have circulated for decades and continue even today. However, little evidence suggests that the two remaining disputants in the Chinese civil war of the 1940s will necessarily resume taking up arms against each other. Although such a scenario is certainly possible, recent events indicate that the two entities may well be on a path—albeit a very lengthy one—toward some form of peaceful reconciliation.

It is important to note that China's threshold for the onset of conflict over Taiwan is rather high. Set in the "Anti-Secession Law of 2005" under the current Chinese leadership, the triggers for war with Taiwan include (1) events leading to the "separation" of Taiwan from China in any name or (2) a major event precipitating Taiwan's separation from China, or (3) loss of all possibility of peaceful unification. One should note that, under mainland Chinese law, the existence of some possibility of peaceful accommodation at an undefined point in the future would obviate the triggers for conflict. Only a unilateral declaration by Taiwan of its permanent independence—an act far more reckless than anything contemplated, even by its most nationalistic parties—would engage the triggers.

In fact, the most nationalistic party in Taiwan is moving in the direction of reconciliation. In early October 2012, former Taiwan premier Frank Hsieh—now the head of the nationalist Democratic Progressive Party (DPP)—embarked on a tour of mainland China, marking the first-ever visit by such a senior member of the party to the mainland. The trip sought to "build mutual trust" and show that the DPP is as capable as its rivals of managing relations between business firms in Taiwan and mainland China.⁶⁶ Having lost the last two national elections to its rival, the Kuomintang Party, the DPP is now rethinking its approach to China because Taiwan is benefiting from less strained relations with Beijing. Therefore, the probability that Taiwan will cross any of the thresholds that would trigger armed conflict across the strait seems lower now than at any time in the recent past.

Although other hot spots remain, including the boundary disputes mentioned above, if the United States can become a partner in the region, other nations will look to it to assist in mediating disputes or finding a neutral party that can. The road to Pax Pacifica may contain potholes, but it is not necessarily a dead end.

Discord or Harmonious World?

Shift has happened.⁶⁷ Asia has a larger GDP than North America's; indeed, even the East Asian crescent has a larger GDP than that of the United States, Canada, and Mexico combined.⁶⁸ It is a new world.

As with all places and all times, the future has many possibilities. If we desire a peaceful Asia-Pacific Basin, then such an outcome hinges on the maintenance of economic growth

and stability in the region. This, in turn, requires not only strengthening diplomatic and economic ties, a subject that lies outside the scope of this study, but also building trust in the military and informational realms. Here, the United States and its Air Force can play significant roles as America “pivots toward Asia.” Using our resources to assist the Asian region in rapid recovery from the ever-present string of natural catastrophes will strengthen that area’s economy and, by extension, interdependence and trade, thus enhancing the probability of peace.⁶⁹

Efforts to position airlift assets as well as those that can help rescue and provide for victims of disasters will enable the USAF to develop working relationships with potential and future partners in the region, including China. Doing so will give the United States access to basing and ensure pre-positioning of the very assets most crucial at the onset of crisis, should another future become more likely. Such a path enables the United States to work for peace and simultaneously hedge its bets.

Yet, other routes are possible—discord among them. Toward that end, this study explores a path leading to a far darker future—a direction more likely than the peaceful one painted here. To analyze the capabilities that we will most likely need to confront all of the future scenarios, we must consider these other possibilities.

Notes

1. Karl Fisch and Scott McLeod, *Shift Happens* [also known as *Did You Know?*], videos, versions 2, 3, 4, 5, and 6 (January 2012), accessed 30 July 2012, <http://shifthappens.wikispaces.com/>.
2. Douglas Harper, *Online Etymology Dictionary*, s.v. “sterling” http://www.etymonline.com/index.php?allowed_in_frame=0&search=sterling&searchmode=none.
3. John Wilson, “Noctes Ambrosiana No. 42,” *Blackwood’s Edinburgh Magazine* 25 (April 1829): 527.
4. The British Empire is usually said to have crumbled in the wake of the Suez crisis of 1956. Historian Corelli Barnett discusses this matter at length in his book *The Collapse of British Power* (London: Morrow, 1972). Henry Luce was the first to use the term *American Century*. See his article “The American Century,” *Life Magazine* 10, no. 7 (17 February 1941): 61–65.
5. The US gross domestic product (GDP) rose from approximately \$200 billion in 1940 to \$300 billion in 1950. Christopher Conte and Albert R. Karr, *An Outline of the U.S. Economy* (Washington, DC: US Department of State, 2001), chap. 3. The United States’ monopoly on nuclear weapons was short lived, ending in August 1949 with the Soviet Union’s test of *Первая молния* or Pervaya Molniya (First Lightning). See Martin Zuberi, “Stalin and the Bomb,” *Strategic Analysis* 23, no. 7 (October 1999): 1133–53; and Joseph A. Angelo, *The Facts on File Space and Astronomy Handbook* (New York: Infobase, 2008), 243.
6. Wilhelm Fucks, *Formeln zur Macht* [Formulas for power] (Stuttgart, West Germany: Deutsche Verlags-Anstalt, 1965).
7. This colossus, known as “King Khan,” was one of six alternative futures that underpinned the *Air Force 2025* study. Col Joseph A. Engelbrecht Jr. et al., *Alternate Futures for 2025: Security Planning to Avoid Surprise* (Maxwell AFB, AL: 2025 Support Office, Air University, September 1996), 82, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA319867&Location=U2&doc=GetTRDoc.pdf>.
8. International Monetary Fund, *World Economic Outlook, April 2011: Tensions from the Two-Speed Recovery; Unemployment, Commodities, and Capital Flows*, occasional paper (Washington, DC: International Monetary Fund, 2011).
9. The term *Asian Millennium* comes from Engelbrecht et al., *Alternate Futures for 2025*, 70.
10. John P. Geis II et al., *Discord or “Harmonious Society”? China in 2030*, Occasional Paper no. 68 (Maxwell AFB, AL: Center for Strategy and Technology, Air University, February 2011), 37–38, <http://www.au.af.mil/au/awc/awcgate/cst/csat68.pdf>.
11. John P. Geis II and Blaine Holt, “正义与和谐社会: ‘Harmonious Society’; Rise of the New China,” *Strategic Studies Quarterly* 3, no. 4 (Winter 2009): 75–94, <http://www.au.af.mil/au/ssq/2009/Winter/geis-holt.pdf>.

12. Office of the Secretary of Defense, *Annual Report to Congress: Military Power of the People's Republic of China, 2007* (Washington, DC: Department of Defense, 2007), 6, <http://www.defense.gov/pubs/pdfs/070523-China-Military-Power-final.pdf>.
13. R. Ren and Kai Chen, "An Expenditure-Based Bilateral Comparison of Gross Domestic Product between China and the United States," *Review of Income and Wealth* 40, no. 1 (1994): 377–94.
14. International Monetary Fund, *World Economic Outlook Database*, accessed 30 July 2012, <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/weoselgr.aspx>.
15. Hong Kong was still a British protectorate during this period. See Robert Garran, *Tigers Tamed: The End of the Asian Miracle* (Honolulu, HI: University of Hawaii Press, 1998), 1–5.
16. "Global Population Statistics," GeoHive, accessed 23 May 2013, <http://www.geohive.com/default.aspx>.
17. John Pomfret, *Chinese Lessons: Five Classmates and the Story of the New China* (New York: Henry Holt Publishing, 2006), 128; and Geis and Holt, "Rise of the New China," 81–85.
18. Official Website of the Beijing 2008 Olympic Games, accessed 13 January 2013, <http://en.beijing2008.cn/75/66/article211996675.shtml>.
19. The People's Liberation Army is often referred to as a "party-army." See Michael Kiselycznyk and Phillip C. Saunders, *Civil-Military Relations in China: Assessing the PLA's Role in Elite Politics* (Washington, DC: Center for Strategic Research, Institute for National Strategic Studies, National Defense University Press, 2010), 1–14, <http://www.ndu.edu/inss/docuploaded/China%20Strategic%20Perspectives%202.pdf>.
20. Jonathan R. Laing, "Falling Star," *Barron's*, 2 July 2012, 20–23.
21. Robert Fogel, "123,000,000,000,000: China's Estimated Economy by the Year 2040; Be Warned," *Foreign Policy* 177 (January/February 2010): 1, http://www.foreignpolicy.com/articles/2010/01/04/123000000000000?hide_comments=yes.
22. Rosa Trieu, "China's GDP Hits Three-Year Low, Asian Markets Edge Higher," *Forbes*, 13 July 2012, <http://www.forbes.com/sites/rosatrieu/2012/07/13/chinas-gdp-hits-three-year-low-asian-markets-edge-higher/>. Trieu points out that Chinese leader Wen Jiabao has set a growth target of between 7 and 8 percent for China to maintain stability.
23. "Russia and China End 300 Year Old Border Dispute," *BBC News*, 10 November 1997, <http://news.bbc.co.uk/2/hi/world/analysis/29263.stm>.
24. "South Asia: Bhutan," *The World Factbook*, Central Intelligence Agency, 7 May 2013, <https://www.cia.gov/library/publications/the-world-factbook/geos/bt.html>.
25. Indrani Bagchi, "China's Coziness with Bhutan Rings Security Alarm for India," *Times of India*, 23 June 2012, http://articles.timesofindia.indiatimes.com/2012-06-23/india/32381541_1_sino-bhutanese-jigme-y-thinley-thimphu.
26. For the full text of the accord, see "Legal Materials on Tibet: Treaties and Conventions Relating to Tibet; Convention between Great Britain, China, and Tibet, Simla (1914) [400]," Tibet Justice Center, accessed 1 August 2012, <http://tibetjustice.org/materials/treaties/treaties16.html>.
27. Bill Emmott, *Rivals: How the Power Struggle between China, India and Japan Will Shape Our Next Decade* (Boston: Mariner Books, 2009), 225–29.
28. *Ibid.*, 222–29.
29. This instrument ceded the dominion of the state to India and agreed to abide by the Indian constitution. For the full text, see "Instrument of Accession Executed by Maharajah Hari Singh on October 26, 1947," accessed 1 August 2012, http://www.jammu-kashmir.com/documents/instrument_of_accession.html.
30. This is further complicated by the role played by the Panchen Lama in the verification of the reincarnation of the Dalai Lama. After the Panchen Lama died in 1989, two separate Panchen Lamas have been named—one by the Dalai Lama's committee and the other by China. The struggle for legitimacy of the Buddhist spiritual leadership continues today. See Isabel Hilton, *The Search for the Panchen Lama* (London: Viking Books, 1999).
31. Emmott, *Rivals*, 224–31.
32. Other disputes, such as that over the Hibernia Reef between Australia and Indonesia, have remained un militarized and do not appear to substantively affect international relations at present.
33. "Agreement between the Commander-in-Chief, United Nations Command, on the One Hand, and the Supreme Commander of the Korean People's Army and the Commander of the Chinese People's Volunteers, on the Other Hand, Concerning a Military Armistice in Korea," Panmunjom, Korea, 27 July 1953, signed by Generals Nam Il and William Harrison, National Archives, <http://www.archives.gov/historical-docs/todays-doc/index.html?dod-date=727>. The agreement specified that the island groups of Hwanghae-do and Kyonggi-do would be kept by the North, whereas Paengyong-do, Taechong-do, Sochong-do, Yonpyong-do, and U-do would all remain under control of the United Nations (South).

34. Francis Underhill, US ambassador to Korea, sent a then-classified cable to Washington on 18 December 1973 stating that “the ROK and the U.S. might appear in the eyes of a significant number of other countries to be in the wrong,” with reference to the status of the islands. See also Daniel Ten Kate and Peter S. Green, “Defending Korea Line Seen Contrary to Law by Kissinger, Remains U.S. Policy,” *Bloomberg*, 17 December 2010, <http://www.bloomberg.com/news/2010-12-16/defending-korea-line-seen-contrary-to-law-by-kissinger-remains-u-s-policy.html>.

35. Moo Bong Ryoo, “The Korean Armistice and the Islands” (master’s thesis, Army War College, Carlisle, PA, 11 March 2009), 1, 11, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA500904&Location=U2&doc=GetTRDoc.pdf>.

36. “Smoke with Fire,” *Economist*, 23 November 2010, http://www.economist.com/blogs/newsbook/2010/11/north_korea_shells_south.

37. Seokwoo Lee, “Territorial Disputes among Japan, China, and Taiwan Concerning the Senkaku Islands,” *Boundary and Territory Briefing*, ed. Shelagh Furness and Clive Schofield, vol. 3, no. 7 (Durham, UK: International Boundaries Research Unit, Department of Geography, University of Durham, 2002), 12.

38. *Ibid.*, 12–14.

39. Specifically, Formosa is ceded in Article 2 of the treaty. See “Treaty of Shimonoseki,” accessed 7 September 2012, <http://www.taiwandocuments.org/shimonoseki01.htm>.

40. Satoru Sato, press secretary, Japanese Ministry of Foreign Affairs, “Clarifying the Senkaku Islands Dispute,” letter to the editor, *Wall Street Journal*, 21 September 2010, <http://online.wsj.com/article/SB10001424052748704129204575505141368553952.html>.

41. “Government Offering Senkakus Owner ¥2 Billion for Contested Isles,” *Japanese Times*, 27 August 2012.

42. “High-Seas Collisions Trigger Japan-China Spat,” *Agence France-Presse*, 7 September 2010, <http://www.google.com/hostednews/afp/article/ALeqM5gfux6suEvEhsCmNJgxMYAYK68ZIQ>.

43. “Japanese Activists Land, Raise Flags on Disputed Island, Provoking Chinese Protests,” *Washington Post*, 18 August 2012.

44. Some of the Spratly Islands are large enough to maintain small settlements. Pag-asa Island, currently controlled by the Philippines and consisting of a small town and a staff of two officers, is large enough to host a small gravel airstrip. It is one of the four largest islands in the Spratly “Archipelago.”

45. Robert Beckman, “The China-Philippines Dispute in the South China Sea: Does Beijing Have a Legitimate Claim?,” S. Rajaratnam School of International Studies, Commentary Paper no. 36/2012, 7 March 2012, <http://cil.nus.edu.sg/wp/wp-content/uploads/2010/12/ProfBeckman-RSIS-China-PhilippinesDisputeinSCS-7Mar2012.pdf>.

46. Josephine Cuneta and James Hookway, “China Dispute Threatens Philippine Industries,” *Wall Street Journal*, 16 May 2012, <http://online.wsj.com/article/SB10001424052702303879604577407730408858666.html>.

47. On 23 May, the BBC reported that China had five government (naval) vessels, 76 utility boats (patrol or coast-guard-like vessels), and 16 fishing vessels in the disputed territory. See “Philippines: China ‘Increasing Ships at Disputed Shoal,’” *BBC News*, 23 May 2012, <http://www.bbc.co.uk/news/world-asia-18171009>. The Chinese naval vessels included two guided-missile destroyers, two frigates, and an amphibious landing ship. See Damien McElroy, “Chinese Media Warns of War with Philippines,” *Telegraph*, 10 May 2012, <http://www.telegraph.co.uk/news/worldnews/asia/philippines/9258225/Chinese-media-warns-of-war-with-Philippines.html>.

48. Cuneta and Hookway, “China Dispute.”

49. Jane Perlez, “Dispute between China and Philippines over Island Becomes More Heated,” *New York Times*, 10 May 2012, <http://www.nytimes.com/2012/05/11/world/asia/china-philippines-dispute-over-island-gets-more-heated.html>.

50. McElroy, “Chinese Media.”

51. Parts of this section also appear in John P. Geis II, “Why Asia Matters,” in *The Asia-Pacific Century: Challenges and Opportunities*, ed. Dr. Adam Lowther (Maxwell AFB, AL: Air University Press, May 2013).

52. “In Myanmar, Loss, Grief and, for Some, Resignation,” *New York Times*, 27 May 2008, http://www.nytimes.com/2008/05/27/world/asia/27scene.html?_r=1&ref=cyclonenargis.

53. The Philippines alone averages nearly 20 typhoons per year. See “Philippines Storm Kills Hundreds in Mindanao Floods,” *BBC News*, 17 December 2011, <http://www.bbc.co.uk/news/world-asia-pacific-16229394>.

54. *India Weather Review 1970, Annual Summary, Part C: Storms and Depressions*, Indian Weather Agency, February 2000, http://docs.lib.noaa.gov/rescue/cd024_pdf/005ED281.pdf#page=10.

55. Monsoonal rains are seasonal events associated with a band of concentrated moisture that moves seasonally with the sun in and around the equator. The autumn 2011 Bangkok floods were caused by heavy monsoonal rains. These

floods submerged the Bangkok airport and parts of its downtown district, caused a 2 percent reduction in Thailand's GDP for the year, killed more than 600 people, and affected more than 13 million others. This event is considered one of the five most expensive disasters in human history. See Bo Zhang, "Top 5 Most Expensive Natural Disasters in History," Accuweather.com, 30 March 2011, <http://www.accuweather.com/en/weather-news/top-5-most-expensive-natural-d/47459>; and World Bank, "The World Bank Supports Thailand's Post-Floods Recovery Effort," 13 December 2011, accessed 4 October 2012, <http://www.worldbank.org/th/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/THAILANDEXTN/0,,contentMDK:23067443~pagePK:141137~piPK:141127~theSitePK:333296,00.html>.

56. "2011 Significant Earthquake and News Headlines Archive," United States Geological Survey, accessed 4 October 2012, <http://earthquake.usgs.gov/earthquakes/eqinthenews/2011/>; and "2012 Significant Earthquake and News Headlines Archive," United States Geological Survey, accessed 4 October 2012, <http://earthquake.usgs.gov/earthquakes/eqinthenews/2012/>.

57. According to numerous reports from eyewitnesses as well as survey teams, wave heights in the Iwate Prefecture reached approximately 38 meters. Among these are the 4 April 2011 editions of the *Japan Times* and the 3 April 2011 edition of the *Kyodo News*.

58. "Millions of Stricken Japanese Lack Water, Food, Heat," *National Public Radio*, 14 March 2011, <http://www.npr.org/2011/03/18/134527591/millions-of-stricken-japanese-lack-water-food-heat>. NPR and its wire-service news providers estimated that 1.5 million households were without water.

59. Victoria Kim, "Japan Damage Could Reach \$235 Billion, World Bank Estimates," *Los Angeles Times*, 21 March 2011, <http://www.latimes.com/business/la-fgw-japan-quake-world-bank-20110322,0,3799976.story>.

60. By some accounts, Australia may have contributed as much as \$1.2 billion (US) in assistance, making it the top contributor of disaster aid to the region.

61. Michael Kugelman, ed., *One Year after the Tsunami: Policy and Public Perceptions*, Special Report (Washington, DC: Woodrow Wilson International Center for Scholars, Asia Program, May 2006), 2, http://www.wilsoncenter.org/sites/default/files/FinalAsiaReport_130.pdf.

62. Ibid.; and "2006 Poll: Humanitarian Relief Sustains Change in Muslim Public Opinion," *Terror Free Tomorrow*, accessed 4 October 2012, <http://www.terrorfreetomorrow.org/articlenav.php?id=82>.

63. "2006 Poll: Humanitarian Relief."

64. Conclusion derived from several "off the record" interviews with various government officials and academics from across ASEAN during an international conference in Singapore in March 2012.

65. "Drastic Drop in Piracy in Malacca Straits," *MaritimeSecurity.Asia*, 21 April 2011, <http://maritimessecurity.asia/free-2/piracy-2/drastic-drop-in-piracy-in-malacca-straits/>.

66. "Taiwan Ex-PM Heads to China on Landmark Visit," *Sino Daily*, 4 October 2012, http://www.sinodaily.com/reports/Taiwan_ex-PM_heads_to_China_on_landmark_visit_999.html.

67. The title of this section is based on a larger work on alternative futures for China. See Geis et al., *Discord or "Harmonious Society"?*

68. "Global Population Statistics."

69. Bruce M. Russett, *Peace, War, and Numbers* (London: Sage Publications, 1972).

Chapter 3

Worst Case

Nations in Conflict

Stephen J. Hagel

It is as likely as not that ten or twenty years into the twenty-first century, the leading polity for the West will be contending at least in cold war with another worthy superstate foe, possibly a selectively modernized China. Whether the future holds a Chinese or a resurgent Russia as such a foe, the story-line of strategic history is probably the same.

—Colin Gray
Modern Strategy

Making pronouncements about the future state of affairs is prone to error, oversimplification, and criticism—none of which this author expects to avoid. We must, however, consider that future. Since we tend not to engage in the wars we expect to fight, failure to think about uncertainties—even though none of them may materialize—leaves a nation vulnerable to risk, surprise, and, potentially, defeat.¹ The United States must think through ambiguous possibilities and ready itself for them.

In less than a decade, the United States could find itself in a cold or even a hot war in the Pacific with a nuclear-capable adversary such as North Korea, Russia, or China—perhaps all of them. In March 2013, the director of national intelligence noted that North Korea's nuclear and ballistic missile programs pose a serious threat to the nation and that Russia and China “remain the most capable and persistent intelligence threats and are aggressive practitioners of economic espionage against the United States.”² North Korea is a known unknown—provocative and unpredictable. A realist view of regional politics suggests that major powers, or those that see themselves as such, will seek to secure their interests in the Asia-Pacific region while diminishing the leverage of states that might oppose those interests.³ Countries such as North Korea, China, or even Russia all have vital interests in this region; they also have the means—whether military, economic, or diplomatic—with which to attempt to perpetuate them. This situation will likely produce conflict at the expense of neighboring countries and possibly the United States. What form that conflict will take is uncertain.

Discord is almost always present, even among friends and allies. A widely used definition for *conflict* describes it as “the perceived divergence of interest, or a belief that the parties’ current aspirations cannot be achieved simultaneously.”⁴ In short, conflict is a form of disagreement. For example, tariffs among the closest allies may trigger strife if one nation considers trading unfair, but this type of conflict does not lead to war.

Unfulfilled aspirations do not have to bring about fighting. Yet, as history shows, many different factors can come together to escalate conflict until war breaks out. In the worst-case scenario presented below, war is not inevitable. Yet, without preparation and planning, conflict among great powers could culminate in war. Nations in this scenario engage in

economic and territorial dissension, which a limited dispute could inadvertently escalate with undertones of military force. How that might manifest itself and what role the US USAF (USAF) needs to fill in the region are my focus in this chapter as I examine airpower's role in the Asia-Pacific region at the end of this decade. Now is the time to plan and prepare.

The Asia-Pacific Region

The Asia-Pacific region is home to the four most populous countries in the world, five nuclear countries, five of the world's six largest economies, 15 of its 20 largest ports (nine of which are in China), more than 50 percent of the planet's population, six of its largest militaries (China, the United States, India, North Korea, Russia, and South Korea), and five nations allied with the United States through mutual defense treaties (the Philippines, Thailand, Japan, Australia, and South Korea).⁵ Home to diverse ethnic groups, religions, economies, ideologies, and history, the Asia-Pacific region has seen many wars—big and small—often over resources.⁶ Such clashes, as well as disputes regarding boundaries and lands taken in previous conflicts, are common.⁷ Ancient animosities between nations still erupt over past injustices and atrocities.⁸

Military and economic muscle flexing persists as nations strive to protect and advance their status in the region and in the world.⁹ A recent assertive action—the national purchase of the Senkaku Islands by the Japanese government—stirred up a wave of nationalistic fervor in both China and Japan.¹⁰ Whether these nationalistic demonstrations were merely in commemoration of the end of World War II, political maneuvering to divert attention from other issues in these countries, or something greater remains to be seen. However, the frequency of this type of militant nationalism across the region appears on the increase as countries express their claims to territory.

Compelling nations in the region to resolve these matters is no easy task. No international institution in Asia holds any enforceable power that will/can pressure countries to act outside their own national interest. Even the United Nations is only as powerful as the members of the Security Council allow it to be, and US-led efforts are often blocked by other members of the council, particularly China and Russia.¹¹ Although US policy indicates that we will not choose sides in these debates about regional claims, it is precisely this type of muscle-flexing incident that could lead to US military action.¹²

Economic events during the last decade have affected the region in different ways. Arguably, developed countries like Japan, the United States, and much of Europe suffered most in the global recession, and their growth rates probably will remain low. The decline in US economic power revealed a crack in America's armor, giving pause to some nations and prompting them to rethink their positions.

Unlike its impact on developed economies, the global recession arguably affected expanding ones less severely, and they recovered more rapidly. Most regional economies continued to grow, albeit at a slower rate than in the early 2000s. The economic fate of some, such as Russia, was tied to fluctuations in the price of hydrocarbons, bringing times of significant prosperity when the price per barrel topped \$140 as well as times of contraction when the cost of European Brent crude dipped to under \$34 per barrel.¹³

Asian trade is on track to pass that of other regions, including the European Union. For developing Asia-Pacific economies as a whole, the World Bank notes that those economies grew at a 7.5 percent rate in 2012 and predicts 7.8 percent growth for 2013.¹⁴ Trade between

the United States and the Asia-Pacific economies is estimated in excess of \$1 trillion annually, but America's share is diminishing. The declining US portion of economic markets in the region has been absorbed by China, which boasts the world's second-largest economy. China's economy propelled it to an influential position as the largest trading partner of Japan, India, Taiwan, Australia, and South Korea—all allies or partners of the United States. In fact, nearly every country in the Asia-Pacific region has China as its number-one or -two trading partner, making East Asia an economic powerhouse with China as the main player.¹⁵

China not only is a key trade partner but also finances world consumption, having the United States as its greatest market.¹⁶ China continues to hold a large and growing portion of US debt (and that of other nations as well). The two countries accuse each other of protectionist economic policies such as imposing limitations on foreign direct investment and import/export quotas or manipulating currency (in the case of the renminbi). Issues with trade sanctions between China and the United States as well as China's holdings of American bonds restrict or potentially harm both economies, creating additional opportunity for conflict.

Economics plays a significant role in this worst case, but recent and upcoming leadership changes are expected to influence events as well. Examining some of these changes in the next decade adds another dynamic to the uncertainty of the Asia-Pacific in 2020. The United States will have had at least one change in presidential administrations. Other leadership in the Asia-Pacific region will have changed as well—consider Russia's selection of Vladimir Putin to lead that nation once again; China's turning its leadership over to Xi Jinping, one of its young princes; India's shift in government in 2014; the emergence of conservative, nationalistic Prime Minister Shinzo Abe in Japan; South Korea's choice of President Park Geun-hye, its first female and a pragmatic conservative; and the recent handoff of power in North Korea to Kim Jong Un, to name a few. Each change brings an adjustment of national focus and, in some cases such as Pyongyang's, a virtually unknown course.

Much has changed over the last decade. Europe's importance has waned in the eyes of some, and many nations now focus on the Asia-Pacific. The recession, which affected much of the globe, stimulated the rise of some nations and the decline of others—especially the goods-consuming Western nations. The influence of rising (and declining) oil prices on national economies has energized a renewed quest for hydrocarbons to power growing nations and to keep economies stable. The goods-producing economies in much of Asia continued their rise—especially China's economy, which has become the second largest in the world. For the United States, a host of factors converged (economic decline, debt crisis, reduction in military forces, decline of the dollar, and the perceived decrease of America's worldwide influence), creating an opportunity for other nations to fill the void.

Across the region, one encounters concern about the rise (or resurgence) of new regional/global powers and what that might mean in terms of a potential shift in the regional balance. Accelerating competition for resources—particularly hydrocarbons, minerals, water, and food—is driving conflict in the region and a growth in military spending by many nations. The proliferation of cyber and other advanced technologies has caused apprehension about the threat of commercial attack, high-tech conflict, or even the possibility of a nuclear-state failure. The future is indeed uncertain.

A Possible Future

Dr. T. X. Hammes suggests that we are in a strategic pause of a decade before any near-peer competitor truly rises. He suggests that only China is close and that Russia will require over a decade to rebuild its forces to anything capable of challenging the United States.¹⁷ Although they are strong countries, both must contend with issues at home, including the suppression of domestic terrorists, development of critical infrastructure and markets for domestically produced goods, and the securing of needed resources for the well-being of the population and economic growth. In China's case, the growing population, falling revenues, and an expanding middle class are all concerns. Russia must contend with a declining population, a sluggish economy, and a weak Far East. Some of these issues may actually require cooperation with the United States rather than conflict, affording it the opportunity to help shape the uncertain future and avoid confrontation. If indeed we are in a strategic pause, however, now is the time to prepare.

This worst case does not reflect China exclusively; rather, it could unfold with a number of countries in the region. As we benchmark our capabilities for a worst-case scenario, though, we cannot ignore a rising nation with 1.3 billion people and a growing military—especially one that has displayed tendencies to use coercive economic and military force upon its neighbors. To discount China and swallow the peaceful rise and harmonious rhetoric spouted by its leaders and academics would be tantamount to stupidity. One 2011 study noted that “since 1989, official Chinese defense spending has increased by nearly 13% annually. This has occurred despite the fact that all major powers in the 1990s were cutting defense budgets and China itself faced no serious security threat from any of its neighbors.”¹⁸ Advertised expenditure on defense amounts to more than \$79 billion; however, guesstimates range from double to triple that figure. Furthermore, rather than spend across the globe, China maintains a very regional concentration.¹⁹ More recently, Beijing announced that the country’s defense budget would increase 10.7 percent to \$114 billion although US estimates of China’s actual total expenditures fall between \$135 and \$215 billion.²⁰ Whether spending continues at that rate is uncertain, some experts suggesting that China’s growth rate will decrease, preventing the country from surpassing the United States for some time.²¹ Yet, although America’s Pacific pivot concentrates on China, it does not exclude other concerns in the region that the United States must also consider as it examines worst-case scenarios.

As indicated earlier, the growing aggressiveness regarding territory in a region potentially rich in oil and gas involves many countries, not just China. As developing nations develop and expand their economies, competition for resources emerges—oil to drive the economy, water for agriculture, and rights to fishing waters. Great economic competition often generates heightened economic conflict with protective policies that restrict free trade. In these cases, conflict resolution bogs down, distrust of other nations’ intentions prompts military modernization, and the likelihood of a smaller skirmish within the region escalates into a major power struggle between nuclear-capable nations. As balancing in the region progresses, an alliance of convenience among Russia, China, and North Korea—three nuclear-capable states—forms on one side. In fact, others have addressed this possibility. Former secretary of defense Robert Gates, former secretary of state Hillary Clinton, and others have spoken of the threat that China, Russia, North Korea, and Iran pose to the United States, accusing them of being the greatest threat to the nation, based upon their

nuclear ambitions, the proliferation of weapons of mass destruction (WMD), their growing attempts at exerting influence in the Western Hemisphere, and their pursuit of modernized, high-tech military weapons.²² In fact, China and the Democratic People's Republic of Korea (DPRK) are suppliers to Iran. The actions of China and the DPRK have created collective concern among many smaller nations in the Asia-Pacific region—along with Australia, Japan, South Korea, the Philippines, and Singapore—and they are looking to the United States to act as the “balancer of last resort.”²³

Russia

With Germany fully in control as the economic hegemon in Europe, Russia will have influence in Europe but not the kind it might like to have. Economically, Russia is not doing well, largely because two of its main industries—armaments and hydrocarbons—are subject to substantial export fluctuations. Russia will continue to use its energy resources as leverage with other countries, particularly those in the former Eastern Bloc; moreover, as the number-two arms exporter in the world, it will persist in selling arms where the West will not—Venezuela, Iran, and Syria. Russia was hit hard by the global recession and the downturn in its oil revenue—perhaps more so than most developed countries. To remedy that situation, it has designated economic growth as its principal goal, but Moscow would like to reach that objective on the back of a more diversified and balanced economy rather than on the volatile hydrocarbon markets. That said, the country's energy strategy calls for significant growth in this area, in part from expanding exports to China via the East Siberian oil pipeline. Russia has recently attempted to create a Eurasian Union to counter the European Union, seeking to expand its influence once again to the West as well as to former Soviet states. However, Russia's success in this effort is slow in coming, insofar as some of the former republics are looking for opportunities elsewhere.

Russia is also launching its own “pivot to the Pacific.” In light of ongoing increases in the level of trade along the Pacific Rim and the now-seasonal opening of the northern sea lanes, the country has both incentive and opportunity to reinvigorate the Russian Far East and export its natural resources to Japan, China, and South Korea—neighbors in great need of coal, minerals, oil, and natural gas. Moreover, those nations are only a couple of hours away from the Russian seaport of Vladivostok.²⁴ Russia's population in the Far East is considerably smaller than that of the Chinese Northeast, so opening up this region may also spur Russian migration as economic opportunities arise. Russia has signaled that its intentions are also directed at the Korean Peninsula by forgiving a \$10 billion debt and investing \$1 billion in energy, infrastructure, health care, and education projects in North Korea.²⁵ During the Soviet era, Russia's economic impact in the region was quite small, so the nation exerted its military power. Today, even though Russia's military remains the second-most powerful in the world, those military resources have dwindled, prompting the country to emphasize economic influence. However, that is not to discount the \$650 billion in Russian military modernization and expansion that will include fifth-generation fighters and attack helicopters.

Moscow's post-“Russian reset” rhetoric does not favor the United States (e.g., America's failure to secure Russian support of a Syrian initiative and nonrenewal of the Nunn-Lugar Cooperative Threat Reduction program on dismantling nuclear and chemical weapons), but its relations with China are improving.²⁶ Russia's distrust for the United States, its concern over encirclement by Western nations in Eastern Europe and Central Asia (even into countries of its former Soviet Bloc), and its desire to reclaim respect as a great nation are

moving it toward a “Eurasia vision” of a common economic space by 2015. According to this vision, Russia will play a key role, balancing the United States–European Union alignment and serving as a hedge against the influence of China in Asia.²⁷ Moscow’s bargaining chips are its coal, gas, and oil resources; its military technology; and its still-formidable military.

Russia’s military, although not what it was in the days of the Cold War, remains the fourth largest in the world, possessing more nuclear weapons than any other country. Its hardware and forces, however, are atrophying. President Putin would like to stem that trend by modernizing the Russian force. Indeed, the military is working on and fielding new concepts and capabilities for its tactical and strategic nuclear arsenal, seemingly ignoring the New Strategic Arms Reduction Treaty (START). Those fielded systems would include the Yars-M intercontinental ballistic missile (ICBM) with 10 independently targetable warheads. Also in development with expected fielding in 2020 is a new strategic bomber as well as a rail-mobile ICBM (prohibited under the early treaties but not in New START).²⁸ In 2012 Russian military expenditures rose by 16 percent with expected increases for the next several years as the military upgrade proceeds.²⁹ However, given the state of its economy, this increase may well place additional financial stress on the already-burdened economy.

Despite issues of mistrust between the two powers as well as matters of competition, Russia and China have much in common, such as a long border and weak neighbors surrounding them on land. Both would like to keep their peripheries stable and their less-populated regions under control. Additionally, both have a vision for regional power and a desire to keep the United States neutralized in what they consider their neighborhood.

Both nations believe that US development of its ballistic missile defense system poses a threat to the current strategic-deterrence balance. Providing that capability to other countries in the region—such as Japan to defend against North Korean missiles—has not set well with either country. Like Russia, China considers the United States its greatest national security threat and, like Moscow, Beijing has come to believe that America is practicing a strategy of containment. The expanding US influence in the region only reinforces this view. Recent announcements regarding the United States’ pivot to the Asia-Pacific caused some concerns in the region, perhaps the greatest from China. The Chinese and the Russians feel constrained by US forces positioned in Central Asia, Japan, and South Korea; the announcements of potential US commitments with Australia, the Philippines, and Indonesia; and even some Department of State visits to Myanmar—all of which they assess as containment.³⁰ Efforts to convince them otherwise have not been well received.

China

China has found itself in an enviable position over the last two decades, its success resting at least in part on its double-digit economic growth. Experts do not believe that such growth will continue, but some feel that before 2020 China will surpass the United States as the world’s largest economy, exceeding the US gross domestic product (purchasing power parity) by 2017.³¹ Others are less certain and suggest that its growth rate will decrease and not surpass the US economy for some time. Whether China’s economic rise proceeds on the present course or whether its double-digit growth stops for a few years is nearly a moot point. It has become the world’s second-largest economy and is the regional powerhouse in the Asia-Pacific—proximity has its advantages. This success has also helped maintain a level of regional stability. Yet, if China is to sustain its economy and maintain internal stability, some have opined that it will need at least a 7 percent growth rate.³² The country must create

25 million jobs a year in order to sustain economic growth for the next generation and therefore preserve the Communist Party.³³ Chinese spending on internal security is growing yearly. In 2010 it surpassed military expenditures, and the trend continued with a rise of 11.5 percent in 2011 to \$111 billion—to suppress an estimated 90,000 mass incidents reported by the Chinese government.³⁴

In addition to internal issues, China has border disputes with its neighbors. Although it has settled many of them in the last 15 years, several border conflicts or disagreements concerning land persist, causing stress in the region. Among those ongoing border issues is dissension with India over Tibet and Kashmir, with numbers of violations and incursions on the rise. More often in the US news, however, are disputes over the various islands off the coast of China, including the Diaoyu Islands (the Chinese term) or the Senkakus (the Japanese designation) in the East China Sea and the Paracel and Spratly islands in the South China Sea. Diplomatically, the contested territories may be a matter of national pride and have been leveraged in that way to garner domestic support. Economically, ownership of those islands and subsequent expansion of the exclusive economic zone around them may also produce needed food from the tremendous fishing in the waters and wealth in the form of hydrocarbons. Obvious concerns about China include internal strife and unrest, changing of the guard, border issues, and economic decline. As the nations of the region continue to worry about China's intentions, they will abide in their hedging position—aligning with the United States as the protector of choice.

China's economic prosperity has generated an internal consumer market and an expanding need for petroleum. Although it is the fourth-largest producer of oil, China is also the most prolific consumer of petroleum, importing a significant percentage of its needs. About half of its oil comes from the Persian Gulf via the Strait of Malacca although the opening of several pipelines from Russia (supplying about 10 percent of China's petroleum) and Central Asian countries into China has slightly offset reliance on the strait.³⁵ China would prefer to eliminate its dependence on any one avenue or source of oil. The United States has become less reliant on oil imports from outside its hemisphere, but China, along with India, has more than absorbed that amount. Oil prices, which began rising in 2010, have continued to increase, benefiting oil-producing countries significantly. As the world's second-largest producer, Russia arguably has benefited the most. China's expanding needs for oil to help fuel its economy and Russia's abundance in petroleum and natural gas resources make this an economic union of mutual advantage, helping to keep both countries' domestic politics and populaces stable. The confluence of Russian resources and the Chinese need for those resources and plenty of money to pay for them produces a convenient alliance.³⁶

This relationship is not a reinvention of the Cold War's Sino-Soviet axis of power but an alliance of convenience precipitated by increasing energy needs, economic and trade issues, restlessness among a growing middle class, rebalancing from the United States' pivot to the Pacific, and a perceived decline in US influence abroad. We have reasons to expect that Russia may lean more toward a rising China and the burgeoning economies of the region rather than toward powers in perceived decline—Europe and the United States. The mutually advantageous binding of needs between the two most formidable nations in the region—China and Russia—will be more economic than military in nature.

Some may argue that an alliance of convenience between Russia and China is unlikely. Rather, they believe that Russia is more likely to choose to align itself with the West—with Europe, as it has tried to do in years past, or perhaps with the United States, as have other

Pacific nations to offset China's growth. Yet, other indications suggest a different path for Russia. For example, at the Asia-Pacific Economic Cooperation (APEC) meeting in Vladivostok, President Putin selected then-Chinese president Hu Jintao as the opening speaker. Perhaps significantly, president Hu and premier Wen Jiabao made their last visit to Moscow, and president Xi Jinping made his first official visit there. In addition, the new Russian defense minister visited China first, in November 2012, developing a preliminary agreement for more military cooperation as well as potential sales of 24 Russian Sukhoi-35 Flanker-E fighters and other military hardware.³⁷ Further, as the United States strengthens its ties with India and continues to work its bases in the former Soviet republics, which sit on the southern flank of Russia and on the western flank of China, both Russia and China will suspect the United States of surrounding, encircling, or perhaps containing them. This containment, as it may be viewed, is an issue that both China and Russia would agree upon, considering neutralization of America in the region a possible solution.

Although its strategy for growth would indicate that China will keep a low profile and make steady, calculated moves, it has a significant military presence in terms of both manpower and hardware.³⁸ Much discussion has rightly addressed the Taiwan Strait, but China is not limiting itself to the near term. Instead, that country is expanding its reach through investment and development in power-projection assets to complement its fighter and short-range missile capabilities. Strategically, China holds impressive cyber capabilities and is expanding its space program. The Chinese blue-water-capable navy is in its early stages of development and has deployed. Ballistic missile development continues as well, with China refining its DF-21D antiship missile, which has a range of at least 1,500 kilometers. It is also exploring acquisition or development of heavy-lift transport aircraft, a strategic asset that China sorely lacks. Given its sizeable military budget, China's strategic and tactical capabilities will only improve.

For Beijing, flexing of its economic might and growing military capabilities in diplomatic situations is causing concern among its neighbors. China is working oil and gas agreements with Moscow, but it continues to take action to insulate itself from dependence on Russian oil by padding its resources from the greater Middle East, Africa, and South America and by pursuing options in coastal waters in the South China and East China Seas. This latter exploration remains a contentious issue with many of the countries that also hold "claim" to these waters. Although the Association of Southeast Asian Nations (ASEAN) and APEC are fine diplomatic bodies, they have neither military forces nor directive authority to enforce any decisions. Fewer incidents of conflict occurred than in previous years; however, negotiations to resolve the disputes continue to bog down. The combined failure of these discussions and of the pertinent multinational organizations to resolve these disputes has pushed the smaller states, sometimes reluctantly, toward the United States as a counter. This move is opening channels of communication and opportunities for the United States to enhance its partnering within the region, both economically and militarily.

North Korea

The DPRK, or the Hermit Kingdom as some call it, is in a class of its own. The nation has an abundance of minerals, including uranium, which it mines and enriches for export or its own use. North Korea has a sparse economy, few friends, but a large military with nuclear weapons. The commander of US Pacific Command pointed out that the Asia-Pacific suffers adverse effects produced by North Korea's nuclear weapons and missile capabilities, its

proliferation of WMDs, its selling of associated WMD technologies, its conventional threat to South Korea and Japan, and its potential instability.³⁹ The DPRK's willingness to employ aggressive measures in the region makes it a significant threat. Having attacked South Korea in the West Sea three times in the last decade, the DPRK most recently (2010) launched a torpedo strike on the *Cheonan*, killing 46 South Korean sailors and shelled Yeonpyeong, resulting in four deaths.⁴⁰ In light of the transition of power to Kim Jong Un and some demotions or purging in the military ranks, one does not quite know how to view this reclusive nation.

As a politically and economically isolated nation, North Korea uses the tools at its disposal to keep the world and region off balance and its people under control. The nation wishes to be seen as legitimate and coequal with others in the region. Since it has little to offer, the DPRK resorts to aggressive behavior in the form of limited military actions and nuclear saber rattling. Additionally, to keep its people in line, the propaganda machine takes a "them against us" stance, but its internal stability remains questionable. Regime survival and protection, whether from within or without, are one of Pyongyang's main goals, and opposition from groups within the country remains the DPRK's greatest security concern.⁴¹ Although many would like to see a reunification of the peninsula, few would want it to erupt into the chaos of cross-border conflict in South Korea and China, accompanied by a mass exodus of refugees.

One of North Korea's main exports is military-related equipment and technology. Certainly, much of its military equipment is old but may still be useful to other nations, particularly those on the US enemies list, such as Iran, Pakistan, Libya, and Syria. Besides hardware exchanges, Pyongyang also exports technologies and materials, including the nuclear variety. Although it is divesting some of the old equipment, the DPRK is upgrading its conventional capabilities—witness the country's space or missile launches. Not as capable as either Russia's or China's, North Korea's cyber assets are nonetheless fairly robust, as reflected by their denial-of-service attacks and computer exploitations aimed at South Korea.

North Korea does not have an alliance with China, but many expect that China will come to Pyongyang's aid diplomatically, economically, and, possibly, militarily. Over time, it has become obvious that threats and sanctions do not discourage the North Korean leadership.⁴² China and Russia will persevere in keeping the North Korean people fed and the military machine gassed and oiled. The DPRK has made some movement toward economic change (or at least engaged in rhetoric regarding the matter) that, one might hope, would open the door for others to enter North Korea's marketplace. This in turn would reduce its dependence upon China and, to a lesser extent, Russia. Expanding the economy might also help reduce some of the food shortages that have plagued this backward nation. Both China and Russia have a vested interest in North Korea's internal stability yet allow Pyongyang to keep the rest of Northeast Asia off balance with its military provocations. China's and Russia's inability to "control" their troublesome nuclear client state has continued to heighten tensions in the northern portions of the region.

Some early progress in the direction of reform seemed to occur in early February 2012, but the younger Kim pressed ahead with a "satellite" (not a missile) launch in April 2012. Although it failed, this action irritated North Korea's regional neighbors and the United States, placing the region in a higher state of readiness and stalling progress once again. In previous years, rocket launches were followed within weeks by a nuclear test. The testing of a nuclear device would have had serious effects on the peace process and regional balance

of power. This time that nuclear test did not take place, perhaps indicating a more restrained and cooperative North Korea—one more interested in peace and progress.⁴³ That hope proved short-lived when in December 2012, Pyongyang again conducted a space launch, using its Taepo Dong 2 missile as before—this time successfully. Recovery of portions of the rocket has led experts to believe that North Korea does indeed have the capability to miniaturize components sufficiently to create a nuclear warhead and launch it. Following this launch, as has been its pattern, in February 2013 the DPRK conducted its third nuclear test, once again violating United Nations Security Council resolutions.

North Korea is known for using “bait and switch” tactics as part of its diplomacy. In years past, Pyongyang would “play nice” until it received food, money, or some other relief and then walk away from the peace process or provoke an incident with one of its neighbors, such as the shelling of the South Korean island of Yeonpyeong, mentioned earlier. Some experts believe that these provocations are designed to maintain control in North Korea; others are less sure.⁴⁴ Participants in the Six-Party Talks have also disengaged from this bad actor, only to find that such a policy neither curbs tensions nor advances the peace process. Since economic isolation and disengagement seemingly are not working, perhaps the better approach toward normalization with North Korea would call for expanding the engagement to include military-to-military talks. For 60 years, an armistice—not a peace treaty—has governed the peninsula. Pyongyang has indicated that it wants such a treaty, one that could lessen the opportunities for military conflict and perhaps open relations more fully with South Korea and the United States. Without a peace treaty, North Korea will wish to protect its soil and maintain its deterrent forces to counter its adversaries.⁴⁵

Other Nations

These economic and territorial conflicts have spurred security concerns for many nations. Militaries in the region have grown as Asia-Pacific countries attempt to protect their developing economies and defend themselves from potential adversaries. Apprehension about their defense and the role that the United States might play are also troubling. The rising US national debt and Congress’s calls for defense cutbacks raise concern among allies and friends in the region. Will America be willing to continue providing that umbrella of world security to its partners? Aging hardware and infrastructure also prompt similar worries regarding the ability of the United States to meet its “commitments” worldwide. Finally, the perception of America as a nation in decline may embolden others to push the security envelope.

With those issues in the mix, accompanied by regional economic and territorial conflicts, nations in the region—especially those with evolving economies—are modernizing their militaries. For example, Vietnam has ordered combat aircraft and six *Kilo*-class submarines from Russia; additionally, South Korea is doubling its purchases of Aegis combat systems over the next decade and more than doubling its submarine fleet.⁴⁶ South Korea also has a new missile agreement with the United States that extends the range of its missiles to 500 miles and increases the payload of shorter-range missiles.⁴⁷ Indonesia is buying coastal radar systems and submarines from South Korea.⁴⁸ Japan appears to be drawing even closer to the United States, but at the same time it is improving its own military capabilities. Having elevated its military spending, that nation is in the process of strengthening ties to Indonesia, Thailand, and Vietnam. Japan is adjusting its Self-Defense Forces to become more responsive and capable of projecting power.⁴⁹ Further, it is considering a revision of the security alliance with the United States regarding the contested islands. Finally,

Japan is expanding its military defenses by agreeing to install a second X-band radar in the southern part of the country.⁵⁰ Even Singapore is purchasing additional weapons. Many nations in the region are acquiring dual-use technologies, submarines, and advanced missiles, keeping a concerned eye on Chinese expansion. To offset Beijing's rise, the United States has received invitations to participate in many regional venues.

United States

America remains the unmatched global military power. Regional turmoil—spurred by economic issues, steered by the alignment of nations and current US commitments, and facilitated by growth in regional military capabilities—ensures that the United States must maintain a significant military capability to respond. Further, in light of the fact that Russia, China, North Korea, Pakistan, and India hold nuclear capabilities and that the ability of two or more of those nations to secure their nuclear assets is in question, the ample deterrent umbrella provided by the United States for its allies in the region must remain in effect.

In the last two years, America has shifted its attention to Asia, reinvigorated the US-Philippines military agreement, reopened military contacts with Vietnam, stepped up dialogue with India, sold fighters to Taiwan, negotiated extended access with Kyrgyzstan for use of the airport in Manas, and opened discussions with Uzbekistan and Myanmar. Each of these actions might give pause to both the Chinese and Russian governments. In 2012 Secretary of State Hillary Clinton and Secretary of Defense Leon Panetta visited China, assuring its government that the United States is not attempting to contain China but to engage it and expand its role in the region in a manner beneficial to both countries. The secretaries assured the Chinese that the missile defense system agreement with Japan concerns North Korea and its missile arsenals; they used a similar approach with Russia vis-à-vis Iran.

Whereas the United States is cutting back military budgets and end strength, China is expected to continue double-digit increases in its military budget—up at least 11 percent in 2012 to an estimated \$106–150 billion—still one-fourth of what the United States spends on defense. China is expanding its force projection and antiaccess/area-denial (A2/AD) capabilities with anticarrier missiles, stealth, antisatellite systems, submarines, and naval carriers. Yet, China is years, if not decades, behind in capacity and capability. Even as US systems age, America still holds a substantial edge over any challenger—except in cyberspace.

To counteract the aligning of North Korea, China, and Russia and the influence wielded by this triumvirate in the region, the United States, in concert with partners there, must examine its response—specifically, to support US national interests and those of its partners, particularly the economy, energy security, deterrence, freedom of action across lines of communications (LOC), and regional stability. Certainly, all of these are important, but regional stability helps promote each one. The economy and energy are significant drivers. The nuclear umbrella offered by the United States curtailed proliferation for many years. Moreover, freedom of action across all LOCs—sea, space, cyber, and air—is a significant issue in the region, but its application to space and cyberspace is of especial concern.

The USAF's Role in the Asia-Pacific Region

Having provided a backdrop to the worst case, we now consider the challenge of determining how the United States should prepare for this uncertainty and what specific role it should play in attaining national strategic objectives. Any strategy that includes the USAF begins with the broad concepts established by law, reflected in the national security documents—the National Security Strategy (NSS), the National Defense Strategy (NDS), and the National Military Strategy (NMS)—that eventually drive the creation of war plans.⁵¹ These broad documents lead toward the desired ends as established by the nation’s leadership, identifying a whole-of-government (whole-of-nation) approach that includes the services, agencies, and regional partners. Employing this “ends-ways-means” approach ensures that the USAF provides the necessary ways and means to create the effects needed to support the conditions to meet those objectives in the Asia-Pacific region. The USAF does not have a stand-alone strategy; instead, it supports the needs of the nation.

US National Interests

The *raison d'être* for the military in general and the USAF specifically is to serve and support the needs of the nation. The president codified those needs in the NSS in 2010, and while that document differs from other strategies that preceded it, much of the essence remains the same. The broad national interests reflected in the NSS are as follows:

- Security: The security of the United States as well as its citizens, allies, and partners
- Prosperity: A strong, innovative, and growing US economy in an open international economic system that promotes opportunity and prosperity
- Values: Respect for universal values at home and around the world
- International Order: An international order advanced by US leadership that promotes peace, security, and opportunity through stronger cooperation to meet global challenges⁵²

The NSS is a diplomatic or political document designed to inform the nation, other nations, and the military. It places significant emphasis on soft power backed by America as the “global security underwriter,” both economically and militarily. Although the nation will be the guarantor, it expects to share the burden with larger entities and individual countries that shoulder their part of the responsibilities. The NSS includes expanding partnerships with historical allies like Australia, nurturing partnerships with others such as India and Indonesia, and supporting regional alliances such as ASEAN. These allies and partners enhance the nation’s resilient forward posture and facilities and could expand forward deterrence with capabilities such as missile defense. Further emphasis on soft power includes garnering cooperation with China and Russia.

These four broad themes then direct the guidance established in the NDS, the *Quadrennial Defense Review Report*, and the NMS, which sets the ends or objectives for the military.⁵³ According to the 2012 NDS, which contains the blueprint for the joint force in 2020, the objectives include the following:

- Counter Terrorism and Irregular Warfare
- Deter and Defeat Aggression

- Project Power in Areas Where US Access and Freedom to Operate Are Challenged
- Counter Weapons of Mass Destruction
- Operate Effectively in Cyberspace and Space
- Maintain a Safe, Secure, and Effective Nuclear Deterrent
- Defend the Homeland and Provide Support to Civil Authorities
- Provide a Stabilizing Presence
- Conduct Stability and Counterinsurgency Operations
- Conduct Humanitarian, Disaster Relief, and Other Operations⁵⁴

Based upon these 10 objectives, the worst-case path's strategy of peace through projected strength and engagement leads to regional and economic stability as a desired end state for the Asia-Pacific.

As reflected by the objectives above, the "rebalance" to the Asia-Pacific theater mentioned in the NDS includes thwarting adversarial attempts at regional control (specifically regarding China). It also discusses collaboration with other nations in the region to expand trade and secure access to LOCs with traditional allies such as Australia, Japan, and South Korea as well as expanding to other Indo-Pacific nations such as Myanmar and India, where the nation is "investing in a long-term strategic partnership."⁵⁵

In light of current fiscal realities, the new guidance is not a call to do less with less but a "different mix of future challenges with a distinctly different mix and application of capabilities." This guidance underscores the need in a fiscally constrained environment for "innovative, low-cost, and small-footprint" approaches.⁵⁶ It assumes a greater risk to accomplish simultaneous missions.⁵⁷ As in the NSS, this strategic guidance places greater reliance on burden sharing by leveraging allies and partners to meet regional needs. Of course this raises the question, will the allies and partners have the capacity, capability, and will to supply those gaps to fill our risks?

Evidence from Europe indicates that they do not. Sixteen months after Secretary Gates's speech on European nations pulling their fair share in NATO and taking on spending to maintain their national defense, their defense budgets declined, personnel decreased, equipment went into mothballs, and orders for new equipment terminated or restructured. Since 2008 France's military budget has fallen 4 percent; Germany's, 1.4 percent, and the United Kingdom's, less than 1 percent, with more cuts planned for the coming years. In the Asia-Pacific, "military spending rose by 2.4 per cent, due mostly to a 6.7 percent (\$8.2 billion) increase by China. India's military budget fell by 3.9 percent or \$1.9 billion in real terms, with high inflation cancelling out a nominal increase."⁵⁸ Russia increased its spending by more than 9 percent in 2011 and is expected to raise that figure to 59 percent by 2015.⁵⁹ It appears that the only countries raising their defense budgets are those that the United States might consider threats. From the 10 objectives contained in the NDS, the combatant commanders and the services begin their respective planning and preparation processes, the theater commanders concentrating on the war-fighting aspect and the services on the "organize, train, and equip" functions to show the "how" or the ways they will meet the objectives.

USAF Roles—Enduring Purposes

The USAF's role, purposes, and functions support the security needs of the nation. As with the national security documents, the USAF's strategy for the Asia-Pacific region should be guided by its governing directives and by the unique characteristics airpower possesses. Although we believe that strategy should come first, we must acknowledge another consideration. That is, the strategy must also be guided by realistically available resources—forces and funding. First, the USAF receives its direction from law, and according to Department of Defense Directive 5100.01, *Functions of the Department of Defense and Its Major Components*,

the USAF is the Nation's principal air and space force, and is responsible for the preparation of forces necessary for the effective prosecution of war. The Department of the USAF shall organize, train, equip, and provide air, space, and cyberspace forces for the conduct of prompt and sustained combat operations, military engagement, and security cooperation in defense of the Nation, and to support the other Military Services and joint forces. The USAF will provide the Nation with *global vigilance, global reach, and global power* in the form of in-place, forward-based, and expeditionary forces possessing the capacity to deter aggression and violence by state, non-state, and individual actors to prevent conflict, and, should deterrence fail, prosecute the full range of military operations in support of U.S. national interests.⁶⁰ (emphasis added)

The Department of Defense (DOD) has among its tasks the recruiting, organizing, training, maintaining, and equipping of its forces. The nature of those forces may be driven by the combatant commanders as they conduct their war-fighting planning functions. Generally speaking, however, the services are the experts in their respective domains and in the art of the possible.

The second guiding factor is the unique characteristics inherent in airpower. As a strategic service, the USAF achieves global reach, global power, and global vigilance through airpower's fundamental elements—speed, range, flexibility, precision, and lethality.⁶¹ More recently, these elements now include persistence and stealth.⁶² The USAF blends these fundamental elements to bring effects quickly, globally, timely, accurately, and with measured power.

The USAF has been assigned the responsibility of providing not only air-minded options for the control of air, space, and cyberspace but also the roles of precision strike and rapid mobility, together with airborne and spaceborne intelligence, surveillance, and reconnaissance (ISR). The role of building influence has been added as well, based upon the NSS's emphasis on sharing global burdens and a need for partnering. One finds some of these same air-minded concepts in the USAF's 12 core functions:

- Nuclear Deterrence Operations
- Air Superiority
- Space Superiority
- Cyberspace Superiority
- Command and Control
- Global Integrated ISR
- Global Precision Attack
- Special Operations

- Rapid Global Mobility
- Personnel Recovery
- Agile Combat Support
- Building Partnerships⁶³

What Do We Have?

This study looks less than a decade into the future, a fairly short time horizon that is especially brief when one considers forces and funding—the realistically available resources mentioned earlier as a third consideration. Given the expected stagnant-to-decreasing military budget over the Future Years Defense Program (plus two for this study), the opportunity to increase personnel and recapitalize equipment or acquire new systems remains unlikely. Even if it were not a remote possibility, realistically acquiring new weapon systems takes 15 years or more.⁶⁴ Consequently, unless the USAF has been working a new system for 10 years, we will probably not see the fruit of that effort until this study's time frame has lapsed. To say that the United States might well have the USAF of 2020 in place right now is likely no exaggeration.⁶⁵ As former secretary of defense Donald Rumsfeld opined, “You go to war with the army you have, not the army you might want or wish to have at a later time.”⁶⁶ Because the USAF has experienced false starts with systems and delays in others, it may already be too late for the service to provide new systems or platforms for the DOD strategy to 2020. In effect, the USAF of 2020 will not differ significantly from the one of today. Table 3.1 depicts both the numbers for 2011 and those for expected aircraft in 2020.

Table 3.1. USAF resources

As of Sep 2011	USAF Military Personnel	Civilian Personnel	Ready Reserve	Total USAF Personnel	USAF Budget Auth (TOA)	Major US Bases	Major Foreign Bases
	332,800	185,974	178,100	696,874	162,520,000,000	70	13
Bombers	Tankers	Fighters	ISR/BM/C3	Transport	Total USAF Aircraft	ICBMs	Satellites
162/162	508/476	2,026/1,833	473/732	823/793	5,484/5,502	450	63

Source: “The USAF in Facts and Figures,” *USAF Magazine* 95, no. 5 (May 2012): 39–48; and “Guide to USAF Installations Worldwide,” *ibid.*, 72–81.

No other USAF in the world can match the USAF, and few have challenged it since 1990. Coupled with the best training for its pilots, maintenance crews, and other logistical support, the speed, stealth, precision, and range of the service make it a formidable force. One could go so far as to state that the USAF is a deterrent force. Yet, considering the looming budget issues and calls to curb spending and cut programs, the figures in table 3.1 may be very close to the truth for 2020 since the trend line on personnel and most platforms remains on a downward slope and aircraft age and support costs are projected to rise. Hiding behind those numbers is more telling of the story.

Personnel. Total personnel numbers have continued to drop and are expected to slide even further in 2013, in keeping with the DOD's requirement to become a “smaller and

leaner—but agile, flexible, ready, and technologically advanced force.”⁶⁷ It is safe to say that the “smaller and leaner” portion of that statement depends heavily upon the technology portion. Continued focus on the balancing of reserve component and active duty forces as well as the mix of civilians and contractors will be important as the USAF attempts to keep its core missions on sound footing in light of fiscal austerity. But keeping those core missions solvent undoubtedly will require some trade-offs between programs and people.

Reductions in force, affecting either the military or civilian rosters, take their toll. It takes time to produce subject-matter experts, highly qualified operators, and skilled tradesmen, as acquisition and other fields have discovered. In addition, the synergistic effects of reduced expertise, accompanied by aged systems and equipment, will likely extend the time necessary to repair our aircraft. Further, on the civilian side, a considerable number of these seasoned professionals are approaching the retirement gate. The questions are, how much more will each decline over the next eight years, and will too few people, insufficient logistics support, or antiquated platforms result in a hollow force?

Basing. This new chapter, as the USAF Posture Statement calls it, will depend heavily on a lower-cost, lighter-footprint USAF—this is especially true, given the greater focus on the Asia-Pacific region and not forgetting about other regions or other national security challenges.⁶⁸ America’s large-footprint bases can exert domestic pressures on host nations and present regional issues for their governments.⁶⁹ Decreasing the number of the USAF’s fixed overseas bases and reducing its footprint will give the service a flexible force that maintains maximum freedom of action.⁷⁰ The goal is to have the minimum expeditionary combat-support force and increase the velocity of support forward in order to reduce the footprint.⁷¹

As the nation rebalances its forces and focus, it will need to reexamine basing with an eye toward global reach, power projection, and engagement. The decline in overseas presence poses challenges for the USAF. Despite the problems associated with overseas basing (e.g., host-nation political issues and cost), it affords the nation a launching platform in a crisis event. The balance between overseas bases and those in the continental United States (CONUS), as well as potential realignment of those bases, will be important in the coming decade. Basing issues should not present an “us or them” dilemma for a host-nation. Other host-nation considerations are also noteworthy. For example, as large as China’s trade is with America, its Pacific trade with Japan, Taiwan, and South Korea is even greater, potentially creating future conflicts of interest and concerns about basing access in the Pacific region.

Certainly, permanent presence brings advantages such as immediate availability of war-fighting resources, a location from which to launch operations, expanding military capabilities and sortie rates, and perhaps a heightened level of commitment. It also allows for opportunities to train and operate with other militaries, enhancing interoperability and establishing personal relationships. Rotational bases, used on a less-permanent scale, have these same advantages and, at least for the host country, may carry less baggage regarding the “foreign occupier” mentality. However, many years of experience indicate that having a permanent or rotational base does not mean that the United States will be able to use it for kinetic operations. Host countries place restrictions on use of their sovereign territory; thus, relying on foreign bases is fraught with the risk of limited or denied use. Such is not the case with basing on US territory.

The main operating (or forward operating) base in Guam will remain a tremendous asset during this period because it will support USAF power projection into the western Pacific

region (fig. 3.1). However, Joint Region Marianas (Navy Base Guam and Andersen AFB) cannot hold all of the assets required for major operations in the region. Other facilities, such as the base at Kadena with long-term ally Japan, will provide additional operating effects. However, in light of current discussions, the US agreement with Japan will probably change the basing structure at Kadena over time. Anticipating reductions in other locations, such as the 60-year occupation of Korea, the USAF should strongly consider alternative locations in the western Pacific, preferably former US outposts or protectorates like the Philippines or the Marianas, to avoid some of the forward-basing issues of access. One of the great concerns with the Asia-Pacific is the A2/AD capabilities resident in the region. To mitigate that capability, the United States must either find locations well inside the adversary's threat ring or rely more on long-range assets.

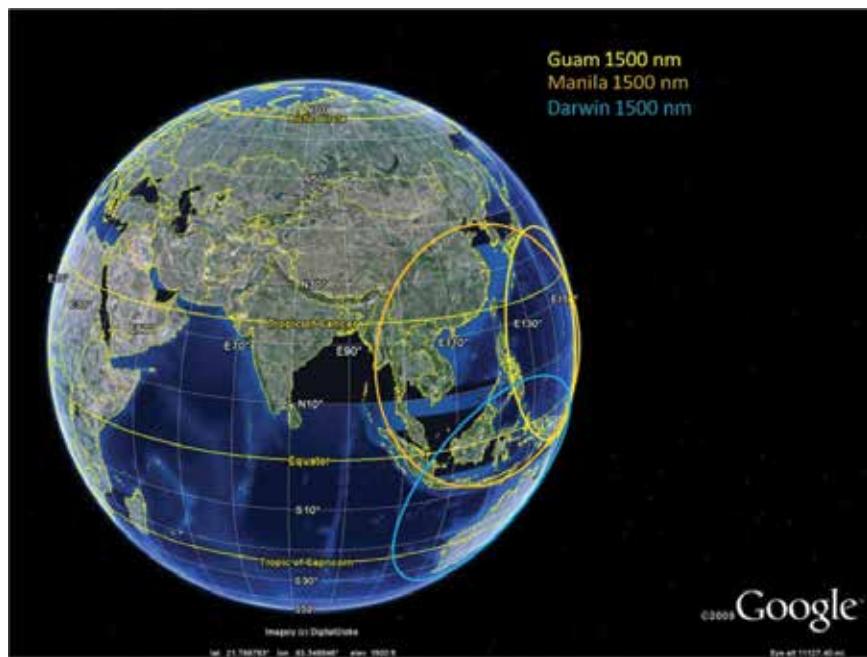


Figure 3.1. 1,500 nautical mile distances from potential Asia-Pacific operating locations (Map data: Google, DigitalGlobe)

Studies on capacity and distance should receive consideration during basing selection.⁷² Certainly, our basing choice should account for the probability of major disasters, including typhoons, earthquakes, floods, and tsunamis; however, proximity to China, the Strait of Malacca, and the region's oil resources is also desirable. Securing forward-support locations along the rim of India or Southeast Asia places the United States in a strategic shipping and economic location. Complicating the adversary's strategy by spreading the threat (and the risk) across multiple bases also has a wisdom of its own. Nonetheless, we must consider the sunk costs associated with infrastructure and personnel. Although not necessarily in the Asia-Pacific as most might think about it, various locations currently in use in Central Asia afford the United States opportunities for partnership building or bases for offensive operations against Russia, China, or other potential adversaries. Giving consideration to leasing some of the bases from Operations Enduring Freedom and Iraqi Freedom in "warm status"

is worthwhile. The distances to strategic targets in some cases may be less from these locations than from positions along the Second Island chain (fig. 3.2).

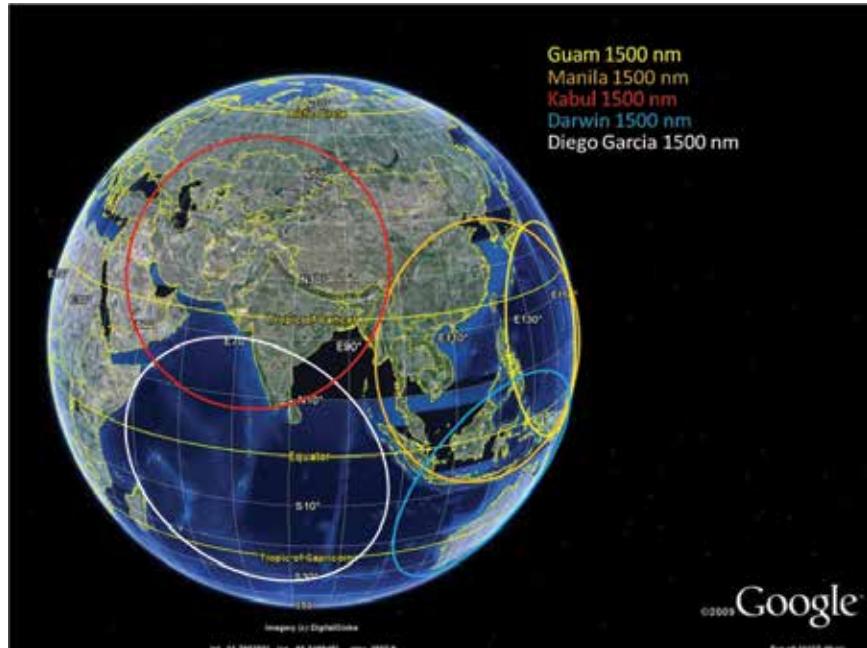


Figure 3.2. 1,500 nautical mile distances in the Indo-Asia-Pacific (Map data: Google, DigitalGlobe)

Regardless of where the USAF might base in the region, it needs to address infrastructure and logistics. Our adversaries are not opposed to attacking the logistics, transportation, and support functions both in forward areas and rear areas. They know that our high-tech systems demand complex logistics support to sustain them and that attacking those logistics nodes will cripple US war efforts.⁷³ The bases will need hardening against attack from kinetic and cyber weapons, especially at critical nodes for operations. The Indo-Pacific region must have collocated operating bases or forward operating bases from which to launch, support, and sustain forces. Depending on the austerity of the forward operating location, ramp space, lodging, fuels, facilities, and air traffic control are potential issues. Stocking of certain equipment items and spares may require pre-positioning some materiel or relying upon reachback. If the USAF cannot access critical parts over the long distances in this theater, then we will not be able to sustain the force well. The USAF's selection of a location to base its forces may also hinge on our systems, platforms, weapons, and technology.

Satellites. Reliance on space—communications, navigation, and timing—for commerce and defense is unquestioned; furthermore, the potential weaponization of space will make this reliance even more important. Concerns over space programs and intentions in space have intensified as more countries have acquired capabilities. Dependence on space assets has increased, as has the number of satellites. From the ever-critical Global Positioning System (GPS) constellation of 30 satellites, missile early warning via the space-based infrared system, space situational awareness, weather, communications, and intelligence assets, these resources are one of two linchpins to the USAF's war-fighting prowess. Unfortunately, these resources are not quick-turn platforms, either in development or in launching into

orbit; rapid beddown in space is still a myth. Other nations have increased their “domestic” launches, and the United States relies on them for some of its space capacity. America has signed agreements with several allies and partners, such as Australia, Canada, and New Zealand, to share space assets and information.⁷⁴

Further, both China and the United States have demonstrated antisatellite capabilities that stress space assets’ vulnerability to attack. Directed-energy and laser systems pose a significant threat to the United States more than other nations due to greater reliance on space access.

To meet the space challenge, America must find a way to replace its vulnerable satellites rapidly. The *National Security Space Launch Report* concluded that the nation can meet lift needs to space through 2020, but one wonders what lies beyond.⁷⁵ Has the increased use of commercial firms and partnerships with other nations to launch US payloads had an adverse effect on homegrown expertise? Additionally, in light of the fact that other nations are building their own GPS-like constellations (e.g., China’s system, scheduled for completion before 2020), one wonders about their intentions and whether the United States will become more reliant on others for its space needs.

Intercontinental Ballistic Missiles. Nuclear weapons are the most destructive in the world; therefore, for this theater in particular, nuclear deterrence is the most important capability provided by the USAF. Although the probability of nuclear conflict may seem remote today, there is no guarantee that it will not increase in the future. Indeed, the expectation that the number of nuclear-weapons states will rise by 2020 adds to the likelihood. The presence of six nuclear-capable countries in the region, two of them not very stable, and others that desire to possess that capability lends significance to the United States’ umbrella of extended deterrence for countries in the region as a means of preventing confrontations and reducing the proliferation of nuclear technologies.

The nation must always keep in mind the risk of a miscalculation by nuclear-capable countries in the region as it examines strategies for the Asia-Pacific. Escalation of conflicts needs to be factored into the strategies for the region. Although one hopes never to resort to nuclear weapons, the presence of that option gives tremendous incentive to avoid conflict altogether. However, if friends and foes believe that the US extended umbrella is failing or if they question America’s resolve to use it, then foes may exploit the opportunity to exert influence over the region. Friends may also change their decision calculus regarding alignments in the region or pursue their own nuclear programs. Each of these may run contrary to the desires of the United States.

Some suggest that America should reduce the numbers of nuclear warheads in the inventory. Although that argument sounds plausible, the realities of the situation remain—specifically, foes in the Asia-Pacific are not decreasing their numbers but wish to add to an existing arsenal or develop a capability. As the number of American nuclear weapons decreases, more countries are coming closer to parity with the United States. The possibility of other nations entering the nuclear club or of those that possess them currently adding to their number of weapons may stretch the need for nuclear capability. To counter that possibility, the USAF must maintain a credible and survivable nuclear-delivery capability. Nuclear weapons offer the great advantage of deterrent capability, and without any acquisition activities in progress to replace the warheads and delivery platforms, we should not lightly consider reductions in either our capability or capacity.⁷⁶

The ICBM force, one leg of the triad, includes aged keepers of the peace nearing the end of their service life unless we make significant investment in the system as a whole. The last Minuteman III entered service in 1978, and with major life-extension programs, we expect the 450 Minuteman IIIs to remain viable beyond 2020. According to Lt Gen James Kowalski, commander of USAF Global Strike Command, Congress has mandated viability beyond 2030.⁷⁷ The number of ICBMs has remained stable for the last few years, but cost, diplomatic decisions, and future viability keep the ICBM force in play for cuts. Regarding ICBMs and the other two legs of the triad, some invariably raise the question of how many nuclear-deterrence forces the nation needs to meet a strategic-deterrent force structure and comply with the New START. That treaty calls for no more than 1,550 nuclear warheads, 700 deployed launchers, and 800 total launchers by 2018.⁷⁸ Further reductions are under consideration.

Aircraft. The terms “war-worn” and “timeworn” best describe USAF aircraft. The inventory does include some newer models, but many of the heavy war-fighting or support aircraft are long in the tooth. Age and use have combined to produce lower reliability rates, fostering a need to generate, for example, 12 airframes to fly six. For many of these time-worn systems, updates to onboard technologies have extended their usefulness, and continual service life extension programs have bought them additional years—but at a cost.

Bombers. Bombers serve multiple roles, both conventional and nuclear, in defense of the nation. The second USAF leg of the triad includes 20 B-2 and 76 B-52H nuclear-capable aircraft. Regardless of concerns about the survivability and penetrability of these aircraft, discussed below, they will provide a deterrent force through 2020.

The last B-52H entered service in 1962; thus, the average fleet age is 50 years—a significant fact. More amazingly, the USAF expects the H model to remain in the inventory until 2040. Although it is still very capable as a result of many upgrades to its avionics and offensive and defensive capabilities as well as modifications to the missions it performs, this nonstealth, relatively slow bomber remains vulnerable to A2/AD threats in the Asia-Pacific. The non-nuclear B-1, though half the age and faster than the B-52H, also suffers from age-related difficulties. The USAF has recommended nearly \$250 million (at a minimum) for planned sustainment and modernization measures for the B-1, intending to keep the 63 platforms in service to 2040.⁷⁹ However, B-52Hs and B-1s can neither penetrate and persist in high-threat A2/AD environments nor strike relocatable targets, placing them at risk in a conflict.⁸⁰

Even the low-observable B-2 is no longer a young system. By 2020 this aircraft will have an average age of nearly 30 years. The 1980s-era stealth technologies used in the B-2 will become stretched as the aircraft meets adversaries and their technologies in 2020.⁸¹ According to some, by 2018 a B-2 without upgrades will no longer have the advantage of stealth, losing its ability as a penetrator to attack targets in an A2/AD environment.⁸² Because only 20 stealth bombers operate at long distances in antiaccess environments, sortie production will remain low; however, until another long-range-strike platform comes online, the B-2 offers the best option to hold targets at risk for this theater. Despite considerable talk regarding a follow-on long-range-strike family of systems, this capability most likely will not emerge by the 2020 time frame.

Fighters. Even though some of the newest aircraft in the inventory reside in the fighter community, this force is also well worn. The USAF plans to keep its F-15s, currently 20–25 years old, in service to 2025 with active electronically scanned array upgrades, assuming favorable results from the fatigue study. Service life extension programs on structure and a programmed avionics extension are scheduled to keep the 22-year-old F-16 going strong, but

the 30-year-old A-10s are scheduled for retirement. The five-year-old F-22, boasting stealth and supercruise, is the unmatched fifth-generation strike fighter. Its advanced capabilities will allow it to penetrate the anticipated A2/AD environment in the Asia-Pacific. Of concern, however, are the small numbers of this very capable aircraft, which, along with the long distances in the Asia-Pacific, may limit sortie production. Once fielded, the F-35 will also be a most capable system, sporting stealth, advanced avionics, and sensors. The phrase “once fielded” is key, insofar as the program has suffered multiple delays and breaches in its acquisition program, which is crucial not only for the United States but also for our allies. Providing a smaller footprint and needing less infrastructure, and sustainment material, the F-35 will be interoperable with our allies’ aircraft.

Unfortunately for the fighter-heavy USAF, aircraft with longer ranges will play the larger role in the Asia-Pacific—at least initially. However, to operate in this theater, the USAF, the other services, and allies will likely be mated with 50-year-old KC-135 and 27-year-old KC-10 tankers.

Tankers. According to Gen T. Michael Moseley, former chief of staff, “The single point of failure for an air bridge, the single point of failure for global ISR, and the single point of failure for global strike is the tanker. And this is not just an USAF issue—it is a joint and coalition force issue as well.”⁸³ Without USAF air refueling, much of the global reach and strike capability does not exist. These aging KC-135s are slated to remain in service until 2040, when they will be 80 years old. The younger and more capable KC-10 is expected to remain in service until 2045, but both airframes are becoming more costly to maintain.⁸⁴ In 2009 Gen Arthur Lichte noted that maintenance may need seven hours for every hour the KC-135 is in flight. He also observed that by 2020, the cost to maintain those airframes will be upwards of \$6 billion, and as it approaches its 2040 date, \$17.8 billion.⁸⁵ Much of this expense is tied to fuselage skin and wiring checks as well as corrosion issues.

Even with those limitations, we do not have enough tanker aircraft to meet requirements. The *Report on Aerial Refueling Requirements* concluded that 500–600 KC-135 equivalents would meet worldwide air-refueling needs (for 2005).⁸⁶ Including the 59 KC-10s in the calculations, the USAF still fell short of that number. In 2012, under a planning scenario in the *Mobility Capabilities and Requirements Study 2016 (MCRS)*, a lesser tanker inventory of 474 (415 KC-135s and 59 KC-10s) and 79 Marine Corps KC-130s did not satisfy peak demand in two of the three scenarios—in one case exceeding the requirement by 20 percent. The explanation is that a modernized fleet would need fewer aircraft to meet the same demand (because they require less depot time and have greater capability).⁸⁷ Complicating the matter further, the KC-46—once fielded—is not a one-to-one swap with the tankers it replaces. Yet, as the USAF plans for the uncertain future, it should ask itself whether a weapon system so critical that it is a single point of failure for deployment and employment is worth the risk.

ISR platforms. ISR missions, one of the few expected to expand, may have done so even more rapidly if cost overruns—due primarily to immature technologies and increases in the delivered number of platforms—had not created acquisition problems. Nonetheless, the desire for more ISR persists, boosting the stated requirement from 50 continuous orbits a few years ago to 65 and eventually extending to 85.⁸⁸ Besides the very capable MC-12 and U-2, a large percentage of air-breathing reconnaissance assets are of the remotely piloted variety, and that trend is expected to continue. Providing valuable intercepted data to intelligence centers, local commanders, and troops in the field are the MQ-1 Predator, having a range of 770 miles and flying at a maximum altitude of 25,000 feet for over 40 hours; the

follow-on MQ-9 Reaper, with a range of more than 3,600 miles, flying at 50,000 feet for over 27 hours; and the Global Hawk, having a range of 10,000 miles, flying at 60,000 feet for 32 hours.⁸⁹ One can fuse the data gathered by these platforms with information from other sources to offer a better intelligence assessment. Cancellation of the Global Hawk Block 30 aside, these assets give combatant commanders the desired field picture. Unfortunately, we lack not only airframes but also analysts to turn the data into intelligence.⁹⁰

Transport aircraft—strategic lift. USAF airlift has provided the necessary payload and strategic reach to execute actions supporting major combat operations and humanitarian missions. The capacity and reach of strategic airlift platforms have been more than adequate to create and sustain effects throughout disparate theaters, but the airframes are wearing out. The 18-pallet-position C-17 continues to perform well at an operations tempo much greater than planned. Although the C-17 is much newer than the C-5, the USAF may have to replace it sooner than expected because of heavy usage. The 30-year-old C-5s with their 36 pallet positions are scheduled for the Reliability Enhancement and Reengineering Program but will not be available until 2016 at the earliest. Even then, less than half of the C-5 fleet will receive the upgrade, leaving sustainment costs to the aircraft at a high level.

Even as they age, these essential mobility platforms are meeting the stated requirement for lift. The MCRS determined that the peak demand for strategic lift occurs during the deployment phase of a major war, and for the cases used in the study, the DOD's capacity exceeds the peak demand in each of them. The 223 C-17s and 111 C-5s yield 35.9 million ton-miles per day (MTM/D) against a modeled strategic airlift demand of 32.7 MTM/D.⁹¹ Interestingly, the earlier requirement applied to a strategic lift capacity of 33.95 MTM/D, which, according to the Joint Requirements Oversight Council, would not be met. Gen Duncan McNabb's testimony before the Senate Armed Services Committee on 13 July 2011 pointed out that the current "222 C-17s, 52 C-5Ms, and 27 C-5As are far more modern and capable than any strategic airlift fleet in our history," providing 32.7 MTM/D capacity with only 300 aircraft—much greater than the 350 aircraft and 26 MTM/D of 1999.⁹² After release of the Defense Guidance in January 2012, the USAF recommended retiring 27 of the 52 C-5s, leading one to assume that without those aircraft, the nation could still meet the required capacity.⁹³

Transport aircraft—theater lift. Peak demand for theater lift occurs once the forces have been deployed and surge airdrop/airland operations begin. This allows the C-17s to perform theater duties alongside the C-130 as well as respond to strategic missions. According to the MCRS, the 401 C-130s exceed the peak requirement of 335 aircraft for the most demanding scenario. However, the study also noted that "based on current total force planning objectives, the C-130 crew force structure cannot sustain steady state operations in combination with a long duration irregular warfare campaign."⁹⁴ Dispersed operations planned for the Asia-Pacific as well as the distances in that theater may make it difficult to find suitable airfields near war fighters.

Building influence. As discussed earlier, the USAF has been assigned several roles, and emphasis on sharing global burdens and partnering has led to the addition of building partnerships to the service's core functions. In view of declining resources, both budgetary and forces, building partnerships based on mutual benefit reflects smart defense. The establishment of US influence in the Asia-Pacific region is akin to both basing and access. One builds influence through military engagement, security cooperation activities, and foreign humanitarian assistance as the nation interacts not only with military forces but also with

government at various levels—and with businesses and the populace. Working partnerships ensure interoperability and integration of military forces, thus benefiting regional security. They may also reduce the need for the United States to respond to crises. However, as we have observed in operations such as Libya, reliance on support is not always a wise decision, nor is European “smart defense” necessarily compatible with our needs.⁹⁵

The number of negotiated international agreements is growing. Of particular note is the promise of the economic trilateral agreement among China, Japan, and South Korea, signed in May 2012. Although this agreement focuses on economic and financial relationships among these three economic powerhouses, it shows pragmatism in its stance that some old historical issues, such as the Japan’s 35-year occupation of Korea can be muted in order to benefit all parties involved. This type of accord, as well as the bilateral agreements of each of these nations with ASEAN, may lead to further easement of territorial disputes in the East Asia region. Other agreements, such as that with India, Japan, and the United States and that with China, India, and the United States, reflect additional opportunities for growth in the region.⁹⁶ Other trilateral accords with Japan, South Korea, and the United States and with Australia, Japan, and the United States also prove useful, since interoperability exists among those nations.

One can also build influence through military exercises and military-to-military contacts. At varying levels, this is already taking place in the Asia-Pacific. Each year more than 170 bilateral, trilateral, or multilateral exercises occur, including Talisman Saber with Australia, Cobra Gold with Thailand, Keen Sword/Keen Edge with Japan, or Rim of the Pacific (RIMPAC) with more than 20 nations.⁹⁷ An invitation has been extended to China to participate in the 2014 RIMPAC along with the other nations. In addition, as a way of creating ties that better uphold security, commanders at varying levels meet with their counterparts to build understanding and trust; for example, the United States continues to meet with senior Chinese and Russian leaders. Good military-to-military relations are crucial to establishing a favorable relationship and avoiding miscalculations that may lead to conflict.

Cyber. A final capability not included in table 3.1 deserves mention. Earlier, this chapter referred to space as one of two linchpins for the USAF—cyber is the other. The newest domain is pervasive across all other domains and ubiquitous in day-to-day activities. Dependence on cyber networks grows not only for commerce but also for defense. The nation and the USAF are dangerously vulnerable to cyberspace events. Cyber warfare in the financial, commercial, industrial, and military arenas grows steadily more prevalent. China continues as the most prolific cyber attacker, followed closely by Russia. Cyber espionage as well as cyber theft has escalated, and cyber security concerns from industry and banking sectors are creating diplomatic issues for all nations, including the loss of valuable data, intellectual property, critical technologies, and government and commercial trade secrets. Indeed, the Asia-Pacific region is a cyber powerhouse fueled by world-leading high-performance computers.⁹⁸ Chinese corporations are shaping the future of next-generation networks, and if the trend continues, China will become the market driver in other sectors such as telecommunications.⁹⁹ Eventually, the infrastructure and supply chain on which the USAF’s digital force multipliers rely will be manufactured abroad, creating vulnerabilities in the physical layer of cyberspace.¹⁰⁰ As of this writing, no adequate method exists for measuring or determining the success or failure of cyber activities. Yet, without cyber capabilities from

the low end to the highest order of use, other military capabilities and perhaps the military itself will founder.

Attacks on the nation's cyber-insecure industrial control systems (those that operate power, water, pipelines, military systems, medical systems, and the like) are on the rise, especially after the Stuxnet attack through the Siemens PCS7 controller.¹⁰¹ Espionage access to defense firms has also increased. Indeed, the cyberspace threat is pervasive. China, Russia, North Korea, and India have significant proficiency in this domain.¹⁰² Experts believe that China has the world's premier denial-of-service capability.¹⁰³ As evidenced in Estonia and Georgia, Russian capability is formidable as well. Yet, the cyber concern goes beyond governments. These anonymous, instantaneous, and remotely launched denial-of-service attacks are propagated by insurgents and criminal organizations alike.¹⁰⁴ Keeping up with cyberspace will remain a challenge since countless individuals have the competence to conduct disruptive cyber operations. The USAF's cyberspace tools in its kill chain of weapons, platforms, and command and control need defensive protections from within and without.

What Do We Need?

As we plan and prepare for an uncertain future, we must once again consider realistically available resources—forces and funding. Because we expect the budget to decrease in relative terms over the time frame addressed by this study, the USAF must either make trade-offs among systems, missions, readiness, and people or find innovative ways to carry out most of its assigned missions. To meet theater needs and attain the desired end state of regional and economic stability, the strategy must align with the nation's priorities.

First and foremost, the NSS and NDS consider *homeland defense* of vital concern to the USAF. Despite the focus on the Asia-Pacific, we must not neglect the other theaters—including North America. The USAF must help secure the homeland and maintain its defense capabilities to protect US citizens and the nation's borders as well as North American allies. Further, the United States should not assume that all the activity will take place within the first or second island chain. Russian and Chinese influence peddling in the Western Hemisphere and many “investments” in Central and Latin America have occurred, perhaps in an attempt to upset the US balance in the region. Beyond influence peddling, we have observed more overt actions, such as a Russian submarine surfacing in the Gulf of Mexico after having been there for an undetermined number of days. Russian bombers regularly violate US airspace over Alaska. Recently, potential Chinese naval exercises near Hawaii have caused agitation. Increasing Chinese economic and military cooperation with Cuba, similar perhaps to US activities with Taiwan, should also raise the nation's concern.¹⁰⁵ We should expect to see more of these incursions in our uncertain future.

Second, America needs a robust, *viable nuclear deterrent* force, able to meet the needs of today and those of an uncertain future. US nuclear forces have the advantage over the nearest competitor but not over all of the competition. We should give strong consideration to the levels and types of weapons we wish to reduce. Further, the USAF's two legs of the triad need an overhaul. Trade-offs for a new long-range penetrating bomber and upgraded ICBMs deserve consideration although neither will approach operational capability by 2020.

Third, *tanker* aircraft—a limiting factor in the MCRS 2016 study and the single point of failure for deployment and employment of US forces—are quite vulnerable. Some adversaries may be so bold as to target the tanker in our early deployment stages to severely cripple US force projection and access to forward-deployed locations. The KC-46 must experience no

more delays. Further, although the KC-46 is more capable than the KC-135 it will replace, 179 aircraft cannot necessarily meet the same number of receivers at distant locations as 350 less-capable tankers. Additionally, to replace all the KC-135s will take nearly 30 years, so as we field the KC-46 on time, we must prepare for what comes next in our uncertain future. We should consider such alternatives as refurbishing or modifying commercial jets, contractor refueling options in the CONUS, and the possibility of remotely piloted refueling.

Fourth, the USAF must *develop a long-range-strike* aircraft as a follow-on to the B-2 in both manned and remotely piloted variants. Mark Gunzinger writes that “the vast distances involved in operating in some potential theaters of operation, the growing missile threat to US forward bases, and an increasingly challenging target set will require land-based strike platforms with the capability of flying 4,000–5,000 nautical miles (nm) between aerial refuelings and persisting over target areas located in contested environments characterized by dense, modern air defense networks.”¹⁰⁶

As part of that long-range-strike package, the USAF should focus on the effects it desires, not just platforms. Force projection may become less about the platform and more about the weapons on the platform—smaller, long-range penetrability at a fraction of platform cost. High-speed, long-range, stealthy, standoff weapons may offer an effective option to an expensive platform. The AGM-129 advanced cruise missile had a 2,000-mile range at sub-sonic speeds. The AGM-86 (conventional) air launched cruise missile had a range in excess of 1,500 miles at 550 miles per hour. However, according to one study, standoff weapons lack the ability to strike targets that are increasingly mobile, relocatable, time-critical, hardened, or deeply buried.¹⁰⁷ Therefore, some modifications may be necessary.

Fifth, we must continue to *field the F-35*, an essential system not only for the United States but also for several allies. In view of the Asia-Pacific theater and the shorter legs on this aircraft, perhaps we could reexamine the planned numbers as potential trade space. Nonetheless, the F-35 is a must-have complement to the inventory for the United States, Australia, and Japan.

Sixth, we should continue and expand current building-influence measures across the region. Expanding military relations will reduce the risk of miscalculations and confrontations in the future.¹⁰⁸ Gen Norton Schwartz acknowledged that the USAF must integrate its capabilities in the joint and interagency realm. The former chief of staff stated that the USAF needs a greater presence in building partnership capacity with other air forces around the world, beyond just fighter pilots.¹⁰⁹

Establishing influence holds great potential. Obviously, we should strengthen our strongest alliances—those with Australia, the Philippines, Thailand, Japan, and South Korea—but open up the aperture, as we recently initiated with Myanmar. With allies that have equipment in common, we should consider extending programs such as the RC-135 Rivet Joint shared operations to other nations, sharing air frames as well as knowledge. This initiative could include C-17 and F-35 operations as well. Where practical, we should help nations like Vietnam and Malaysia develop military skills useful to operations in their region, such as humanitarian operations and search and rescue, while learning their best practices. We should conduct expanded military-to-military visits with nations, touring training facilities, defense installations, and perhaps command and control facilities. As with China, we should continue to engage with Russia in military training exchanges and exercises—especially those involving humanitarian assistance or disaster operations—in matters along shared borders, or protection of LOCs and piracy operations. Finally, since current

practices with the DPRK have not worked well, we should open military-to-military engagement with North Korea at senior-officer levels to begin the process of normalizing relations and reducing unwanted actions.

Seventh, *forward basing* in this region is critical to operations, from building partnership capacity to kinetic operations. The tyranny of distance associated with overseas basing complicates operations. Although distances for Enduring Freedom and Iraqi Freedom were significant, equally daunting are those from some of our main operating locations, such as Guam, Kadena, and Diego Garcia, and to potential adversarial locations, such as North Korea (1,800 nm from Guam, 800 nm from Kadena). Some Asian theater adversaries present distances nearly twice that of Enduring Freedom and Iraqi Freedom. Adding to the distance dimension, the expanding antiaccess capabilities of some possible adversaries—the SA-10, SA-12, and SA-20, as well as antisub, antiair, and antisurface systems—increase the risk of operating close-in to our adversary and deny the United States the opportunity to deploy to locations where short-distance aircraft require too many tankers and too much logistical support to make them effective. Long-range global strike with standoff munitions beyond the GBU-39/B capability of 60 nm abates antiaccess strategies. Improved munitions, as discussed in the long-range-strike recommendation, provide a risk-avoiding option with a significant degree of precision and will continue to dominate the A2/AD environment.

In addition, to meet potential challenges and afford multiaxis attack options, we should consider leasing some of the bases from Enduring Freedom and Iraqi Freedom in warm status for exercises and building partnership activities. Doing so will also keep two potential adversaries mindful of their southern and western flanks.

Eighth, because complexity is the antithesis of new systems, we should *develop simple, lower-end, lower-cost systems* for our use and that of our less advanced partners—not every system needs to communicate with *all* other systems. Similarly, we should explore further use of remotely piloted aircraft and lighter-than-air vehicles for air-distribution needs. The Marines have remotely piloted distribution in Afghanistan—the USAF should as well.

Ninth, *cyber systems*, like so many of the USAF's electronic mechanisms, are subject to attack or disruption. Because of the speed of potential attack, we need more automation to respond instantly to threat indications. Using machine-to-machine interface rather than consulting multiple levels of human decision makers for these timely assessments makes sense. We need to implement cyber countermeasures and harden our systems.

Tenth, *personnel* types and numbers demand a serious look. Automation offers some relief, but it is not the sole answer to the USAF's manpower needs. As the number of platforms decreases in the next few years, one expects a corresponding decline in personnel as well. The question is, should it? Has automation reduced the requirement, or has it merely shifted it? Further, how many skills or missions should the USAF pass off to civilian contractors? Or, based upon the number of contractors used in our recent conflicts, have we already exceeded that figure, giving us a false sense of what is necessary to support today's military?

Moreover, based upon the 2012–13 battle over the roles and missions of the reserve component, one puzzles over whether the Air National Guard and USAF Reserve are in the same United States Air Force. Therefore, while the issue is already in motion, we should enjoin negotiations with Congress in earnest and once again address the roles and missions of the reserve component.

Summary

To prevent the worst case from becoming reality, the United States must reassert its leadership role in the world and, more specifically, in the Asia-Pacific region. Doing so, especially in these years of financial austerity, will require that all of the tools in our national kit work in unison. Only through the nation's integrated strength will it be able to project power and maintain its regional position. Through its enduring capabilities of speed, range, flexibility, precision, lethality, and persistence, the USAF affords the nation the ability to thwart aggression should it occur and deter military conflict from vast distance in a timely fashion with tremendous force.

However, to carry out that mission more effectively, the USAF must modernize its equipment and prepare for future uncertainties. It will have to make some trade-offs in order to project power forward more effectively. Further, the USAF will need the help of other nations to maintain regional stability. Through partnership building, the service can create conditions conducive to a more likely regional peace. Continued military-to-military engagements, education and training opportunities, military exercises, and support of regional needs during humanitarian crisis will build confidence and trust. Establishing those partnerships will assist the United States in securing temporary facilities as well, in the event conflict occurs. By fully planning for and employing these capabilities, the USAF can provide the ways and means to meet the ends of an uncertain future.

Notes

1. Andrew F. Krepinevich, *7 Deadly Scenarios* (New York: Bantam Books, 2009).
2. Senate, *Statement for the Record, Worldwide Threat Assessment of the US Intelligence Community, Senate Select Committee on Intelligence, James R. Clapper, Director of National Intelligence*, 113th Cong., 1st sess., 12 March 2013, 7–8, <http://www.intelligence.senate.gov/130312/clapper.pdf>.
3. Many individuals are proponents of realist theory. For a seminal discussion, see Hans J. Morgenthau, *Politics among Nations: The Struggle for Power and Peace*, 5th ed. (New York: Alfred A. Knopf, 1973). For a history of the discussion of realist theory, see Brian C. Schmidt, “On the History and Historiography of International Relations,” in *Handbook of International Relations*, ed. Walter Carlsnaes, Thomas Risse, and Beth Simmons (London: Sage Publications, 2002), 3–22.
4. J. Z. Rubin, D. G. Pruitt, and S. H. Kim, *Social Conflict: Escalation, Stalemate, and Settlement* (New York: McGraw-Hill, 1994), 5n7.
5. China, India, the United States, and Indonesia are the world's most populous countries. US Census Bureau, “U.S. Projected to Remain World's Third Most Populous Country through 2050, Census Bureau Reports,” press release, accessed 24 May 2013, http://www.census.gov/newsroom/releases/archives/international_population/cb11-116.html. The five nuclear countries include the United States, Russia, North Korea, China, and India. If one stretches the boundaries a bit, the list could include Pakistan. The United States, China, India, Japan, Germany, and Russia have the world's largest economies. See International Monetary Fund (IMF), *World Economic Outlook: Growth Resuming, Dangers Remain* (Washington, DC: IMF, April 2012), 179, <http://www.imf.org/external/pubs/ft/weo/2012/01/index.htm>. See also World Shipping Council, “Top 50 World Container Ports,” accessed 24 May 2013, <http://www.worldshipping.org/about-the-industry/global-trade/top-50-world-container-ports>; Headquarters, US Pacific Command (USPACOM), “USPACOM Facts,” accessed 24 May 2013, <http://www.pacom.mil/about-uspacom/facts.shtml>; and “Active Duty Uniformed Troop Strength,” GlobalSecurity.org, accessed 24 May 2013, <http://www.globalsecurity.org/military/world/active-force.htm>.
6. For an interesting discussion of the trade and tribute system in East Asia with the focus on the historic four main countries of China, Japan, Korea, and Vietnam, see David C. Kang, *East Asia before the West* (New York: Columbia University Press, 2010).

7. Islands taken and territories annexed in various conquests over the past 100 years that remain contentious issues in the region include Takeshima/Dokdo (Japan/South Korea), Senkaku/Diaoyu Islands (Japan/China), Paracel Islands (claimed by China, Taiwan, and Vietnam), Spratly Islands (claimed by Brunei, China, Malaysia, Philippines, Taiwan, and Vietnam), Sakhalin and Kuril Islands (Russia and Japan). Tibet border incursions (Arunachal Pradesh, Aksai Chin, Jaamu, and Kashmir) between China and India.

8. One example is the taking of Korean women as sex slaves—or “comfort women,” as they were known—for Japanese soldiers, which remains an issue between the two nations. Another is the Nanking massacre or “rape of Nanking,” during which an estimated 40,000 to 300,000 Chinese were raped, murdered, and mutilated by the Japanese Imperial Army.

9. Some examples over the last few years include standoffs between China and the Philippines, North Korea’s attempted launch of a missile and shelling of islands, Russian military exercises in its Far East, China’s continued manipulation of its currency relative to the dollar, and Japan’s intentions to purchase three of the five Senkaku Islands.

10. Euan Graham, “China-Japan Tensions: Heading for the Rocks?” *RSIS Commentaries* (S. Rajaratnam School of International Studies), no. 173/2012 (13 September 2012), <http://www.rsis.edu.sg/publications/Perspective/RSIS1732012.pdf>.

11. Permanent members of the Security Council include China, France, the Russian Federation, the United Kingdom, and the United States. Nonpermanent members elected for two years presently include Azerbaijan, Guatemala, Morocco, Pakistan, and Togo (terms expiring in 2013) and Argentina, Australia, Luxembourg, the Republic of Korea, and Rwanda (terms expiring in 2014). UN Security Council, “Current Members,” accessed 24 May 2013, <http://www.un.org/en/sc/members/>.

12. The United States does have an agreed-upon commitment to defend Japan in the event that a dispute of this nature goes kinetic.

13. Having risen to \$143.95 per barrel on Thursday, 3 July 2008, it declined to \$33.73 on 26 December 2008. It is \$102.88 as of 29 April 2013. US Energy Information Administration, “Europe Brent Spot Price FOB,” accessed 24 May 2013, <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RB RTE&f=D>.

14. World Bank, “Strong Domestic Demand Drives Increasing Growth in East Asia Pacific,” press release, 15 April 2013, <http://www.worldbank.org/en/news/press-release/2013/04/15/strong-domestic-demand-drives-increasing-growth-in-east-asia-pacific>.

15. The author’s analysis, based upon the CIA’s *World Factbook* pages for the region—specifically, the “Economy” section and the list of export and import partners—as well as the US Census Bureau’s Foreign Trade Statistics, “Top Trading Partners” section. For the links, see <https://www.cia.gov/library/publications/the-world-factbook> and <http://www.census.gov/foreign-trade/statistics/highlights/top/top1201yr.html>, respectively.

16. Peter Zeihan, “China: Crunch Time,” STRATFOR, 30 March 2010, http://www.stratfor.com/weekly/20100329_china_crunch_time.

17. T. X. Hammes, “The Future of U.S. Ground and Special Operations Forces: One Proposal,” in *Economics and Security: Resourcing National Priorities*, ed. Richmond M. Lloyd, William B. Ruger Chair of National Security Economics Papers, no. 5 (Newport, RI: Naval War College, 2010), 155.

18. Center for Defense Studies, *China’s Military Build-up: Implications for U.S. Defense Spending*, Defending Defense project (Washington, DC: American Enterprise Institute, Heritage Foundation, and Foreign Policy Initiative, March 2011), <http://www.defensestudies.org/wp-content/uploads/2011/03/DefendingDefenseChina1.pdf>.

19. *Defending Defense: China’s Military Build-Up; Implications for U.S. Defense Spending*, a joint project of the American Enterprise Institute, the Heritage Foundation, and the Foreign Policy Initiative, March 2011, 2, <http://www.foreignpolicyi.org/files/uploads/images/DefendingDefenseChina.pdf>.

20. Office of the Secretary of Defense, *Military and Security Developments Involving the People’s Republic of China 2013*, Annual Report to Congress (Washington, DC: Office of the Secretary of Defense, 2013), 45, http://www.defense.gov/pubs/2013_china_report_final.pdf.

21. “The Military Balance: When Will China Overtake America in Defence Spending?” *Economist.com*, 18 March 2013, <http://www.economist.com/blogs/graphicdetail/2013/03/daily-chart-11>.

22. “Putin Warns against One World Order as US-China Military Tensions Grow,” *European Union Times*, 25 January 2010, <http://www.eutimes.net/2010/01/putin-warns-against-one-world-order-as-us-china-military-tensions-grow>.

23. John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: W. W. Norton, 2001), 141.

24. Ariel Cohen, “Russia’s Pivot to Asia?,” *National Interest*, 11 September 2012, <http://nationalinterest.org/commentary/russias-pivot-asia-7454>.

25. Miriam Elder, "Russia Writes Off \$10bn of North Korean Debt," *Guardian*, 18 September 2012, <http://www.guardian.co.uk/business/2012/sep/18/russia-writes-off-north-korea-debt>.

26. Andrew C. Kuchins, "The End of the 'Reset': Why Putin's Re-election Means Turbulence Ahead," *Foreign Affairs*, 1 March 2012, <http://www.foreignaffairs.com/articles/137308/andrew-c-kuchins/the-end-of-the-reset>.

27. Nikolas K. Gvosdev, "The New Russian Empire," *National Interest*, 16 April 2012, <http://nationalinterest.org/commentary/the-new-ussr-6783>.

28. Bill Gertz, "Inside the Ring: Russia Builds Up, U.S. Down," *Washington Times*, 1 May 2013.

29. Stockholm International Peace Research Institute (SIPRI), "15 April: World Military Spending Falls, but China, Russia's Spending Rises, Says SIPRI," press release, 15 April 2013, http://www.sipri.org/media/press-releases/2013/milex_launch.

30. The Collective Security Treaty Organization (CSTO) is comprised of representatives from Kyrgyzstan, Armenia, Belarus, Kazakhstan, Tajikistan, Uzbekistan, and Russia. One of the major purposes of the CSTO is to constrain US presence in Eurasia.

31. Charles Grant, *Russia, China and Global Governance* (London: Centre for European Reform, February 2012), 2. This is on a purchasing-power-parity basis, with China expected to have a 2030 gross domestic product near \$47,440 billion and the United States at nearly \$35,950 billion. See also IMF, *World Economic Outlook*, 2012, <http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/index.aspx>.

32. Rosa Trieu, "China's GDP Hits Three-Year Low, Asian Markets Edge Higher," *Forbes.com*, 13 July 2012, <http://www.forbes.com/sites/rosatrieu/2012/07/13/chinas-gdp-hits-three-year-low-asian-markets-edge-higher/>.

33. Jonathan Levine, "China's Uncertain Path," *National Interest*, 12 October 2012, <http://www.nationalinterest.org/commentary/chinas-uncertain-path-7583?page=1> 12 Oct 2012.

34. Chris Buckley, "China Domestic Security Spending Rises to \$111 Billion," *Reuters*, 5 March 2012, <http://www.reuters.com/article/2012/03/05/us-china-parliament-security-idUSTRE82403J20120305>.

35. US Energy Information Administration, Country Analysis Briefs, accessed 12 March 2012, <http://www.eia.gov/countries/index.cfm>.

36. Benjamin Pauker, "\$200 Oil and the Moscow-Beijing Alliance," *Foreign Policy*, 9 March 2012, http://www.foreignpolicy.com/articles/2012/03/09/200_oil_roubini_bremmer.

37. Yu Bin, "China-Russia Relations: Tales of Different 'Pivots,'" *Comparative Connections*, January 2013, http://csis.org/files/publication/1203qchina_russia.pdf.

38. Office of the Secretary of Defense, *Military and Security Developments [China]*.

39. Senate, *Admiral Robert F. Willard, Statement before the Senate Armed Services Committee on U.S. Pacific Command Posture*, 112th Cong., 2nd sess., 28 February 2012.

40. Kongdan Oh and Ralph Hassig, "Military Confrontation on the Korean Peninsula," *Joint Force Quarterly* 64 (First Quarter 2012): 82–90.

41. Office of the Secretary of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea*, Annual Report to Congress (Washington, DC: Office of the Secretary of Defense, 2 May 2013).

42. Oh and Hassig, "Military Confrontation," 82–90.

43. Leon V. Sigal, "North Korea: The Dog That Hasn't Barked," *National Interest*, 11 October 2012, <http://nationalinterest.org/commentary/north-korea-the-dog-hasnt-barked-7563>.

44. Leon V. Sigal, "Using the Carrot in Korea," *National Interest*, 18 August 2011, <http://nationalinterest.org/commentary/using-the-carrot-korea-5777>.

45. *Ibid.*

46. Gabe Collins and Andrew Erickson, "U.S. Navy Take Notice: China Is Becoming a World-Class Military Shipbuilder," *Diplomat*, 1 November 2012, <http://thediplomat.com/2012/11/01/u-s-navy-take-notice-china-is-becoming-a-world-class-military-shipbuilder/>.

47. J. Michael Cole, "More Missiles for Asia," *Flashpoints* (blog), *Diplomat*, 8 October 2012, <http://thediplomat.com/flashpoints-blog/2012/10/08/south-korea-and-a-new-asian-missile-game/>.

48. Greg Scoblete, "Asia Not Knuckling Under to China," *Compass* (blog), *Real Clear World*, 8 October 2012, http://www.realclearworld.com/blog/2012/10/arms_sales_in_asia_rising.html.

49. Douglas John MacIntyre, "Emerging from behind the U.S. Shield: Japan's Strategy of Dynamic Deterrence and Defense Forces," *Joint Force Quarterly* 65 (Second Quarter 2012): 81–89.

50. Yogesh Joshi, "With East Asian Missile Defense, U.S. Sends a Clear Message to China," *World Politics Review*, 26 September 2012, <http://www.worldpoliticsreview.com/articles/12371/with-east-asian-missile-defense-u-s-sends-a-clear-message-to-china>.

51. President of the United States, *National Security Strategy* (Washington, DC: White House, May 2010), http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf; Department of Defense (DOD), *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Department of Defense, January 2012), http://www.defense.gov/news/Defense_Strategic_Guidance.pdf; and Joint Chiefs of Staff, *The National Military Strategy of the United States of America* (Washington, DC: Joint Chiefs of Staff, February 2011), http://www.jcs.mil/content/files/2011-02/020811084800_2011_NMS_-_08_FEB_2011.pdf.

52. President of the United States, *National Security Strategy*, 7.

53. DOD, *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, February 2010), http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf.

54. DOD, *Sustaining U.S. Global Leadership*, 4–6, http://www.defense.gov/news/Defense_Strategic_Guidance.pdf.

55. *Ibid.*, 3.

56. *Ibid.*

57. Catherine Dale and Pat Towell, *In Brief: Assessing DOD's New Strategic Guidance*, CRS Report for Congress R42146 (Washington, DC: Congressional Research Service, 12 January 2012), 5–6, <http://www.fas.org/sgp/crs/natsec/R42146.pdf>.

58. SIPRI, “17 April 2012: World Military Spending Levels Out after 13 Years of Increases, Says SIPRI,” press release, 17 April 2012, <http://www.sipri.org/media/pressreleases/2012/17-april-2012-world-military-spending-levels-out-after-13-years-of-increases-says-sipri>.

59. Jorge Benitez, “Russia to Boost Defense Spending 59% by 2015,” *NATOsource* (Alliance news blog), 17 October 2012, <http://www.acus.org/natosource/russia-boost-defense-spending-59-2015>.

60. DOD Directive 5100.01, *Functions of the Department of Defense and Its Major Components*, 21 December 2010, “Enclosure 6,” 33–34, <http://www.dtic.mil/whs/directives/corres/pdf/510001p.pdf>.

61. Department of the USAF, *The USAF and U.S. National Security: Global Reach–Global Power*, white paper (Washington, DC: Department of the USAF, June 1990), 5, http://www.afa.org/edop/2012/GRGP_Rice_1990.pdf; and House, *Department of the USAF, Presentation to the Committee on Armed Services, United States House of Representatives, Fiscal Year 2014 USAF Posture Statement, Statement of the Honorable Michael B. Donley, Secretary of the USAF and General Mark A. Welsh III, Chief of Staff, United States USAF*, 113th Cong., 1st sess., 12 April 2013, 2, <http://www.afa.org/grl/PDFs/2013/Welsh-Donley%20HASC%20Opening%20Statement%20FY14.pdf>. Hereafter *USAF Posture Statement 2013*.

62. The debate about stealth as a fundamental element is ongoing.

63. USAF Doctrine Document (AFDD) 1, *USAF Basic Doctrine, Organization, and Command*, 14 October 2011, 43–53.

64. President’s Blue Ribbon Commission on Defense Management, *A Formula for Action: A Report to the President on Defense Acquisition*, April 1986, 5–9, <http://www.ndu.edu/library/pbrc/36ac7c2.pdf>; and Business Executives for National Security, *Getting to Best: Reforming the Defense Acquisition Enterprise*, task force report, July 2009, 1, <http://www.bens.org/document.doc?id=44>.

65. According to a study by the USAF chief scientist, “Owing to the 10 years or so that it typically takes to transition technology readiness level (TRL) 6 technologies into fielded capabilities, this means that the underlying date to which technologies must be projected is 2020. That, in turn, allows a determination of the technology investments that need to be under way today to enable these USAF capabilities in 2030.” The study goes on to say that the time for cyber-related technology is half that time—five years. Office of the US USAF Chief Scientist, *Technology Horizons: A Vision for USAF Science and Technology 2010–30* (Maxwell AFB, AL: Air University Press, 2011), 7–9.

66. Eric Schmitt, “Iraq-Bound Troops Confront Rumsfeld over Lack of Armor,” *New York Times*, 8 December 2004.

67. House, *Department of the USAF, Presentation to the Committee on Armed Services, United States House of Representatives, Fiscal Year 2013 USAF Posture Statement, Statement of the Honorable Michael B. Donley, Secretary of the USAF, and General Norton A. Schwartz, Chief of Staff, United States USAF*, 112th Cong., 2nd sess., 28 February 2012, 2.

68. *Ibid.*

69. Kent E. Calder, *Embattled Garrisons: Comparative Base Politics and American Globalism* (Princeton, NJ: Princeton University Press, 2007); and Alexander Cooley, *Base Politics: Democratic Change and the U.S. Military Overseas* (Ithaca, NY: Cornell University Press, 2008).

70. Frank Hoffman, “Towards a Balanced and Sustainable Defense,” *Orbis* 53, no. 3 (March 2009): 385–404.

71. AFDD 4-0, *Combat Support*, 23 March 2005 (incorporating change 2, 28 July 2011), 2.

72. RAND has several studies examining throughput capacity, distance calculations, and other operational and logistics considerations involved in laying out a forward basing structure. The Center for Strategic and Budgetary Assessments, although less detailed in its analysis, also examines potential locations in its “Long Haul” series and other products.

73. Roger Cliff et al., *Entering the Dragon’s Lair: Chinese Antiaccess Strategies and Their Implications for the United States*, RAND Project USAF (Santa Monica, CA: RAND, 2007), 61.

74. *USAF Posture Statement 2013*, 8.

75. Congressionally Mandated National Security Space Launch Requirements Panel, *National Security Space Launch Report*, RAND report (Santa Monica, CA: RAND, 2006), “Executive Summary,” xvi.

76. Arie Church, “The Abiding Strength of Nuclear Peace,” *USAF Magazine*, 19 September 2012, <http://www.airforce-magazine.com/DRArchive/Pages/2012/September%202012/September%2019%202012/TheAbidingStrengthofNuclearPeace.aspx>.

77. Joe Pappalardo, “U.S. Global Strike Commander on the State of Nuclear Deterrence,” interview of Lt Gen James M. Kowalski, *Popular Mechanics*, 4 September 2012, <http://www.popularmechanics.com/technology/military/missile-defense/us-global-strike-commander-on-the-state-of-nuclear-deterrence-12370030>.

78. Department of State, “New START,” accessed 28 May 2013, <http://www.state.gov/t/avc/newstart/index.htm>.

79. Michael A. Miller, *U.S. USAF Bomber Sustainment and Modernization: Background and Issues for Congress*, CRS Report for Congress 43049 (Washington, DC: Congressional Research Service, 23 April 2013), 52, <http://www.fas.org/sgp/crs/weapons/R43049.pdf>.

80. Mark A. Gunzinger, *Sustaining America’s Strategic Advantage in Long-Range Strike* (Washington, DC: Center for Strategic and Budgetary Assessments, 2010), xi–xii.

81. Jeff Schogol, “Schwartz Defends Cost of USAF’s Next-Gen Bomber,” *Defense News*, 29 February 2012, <http://www.defensenews.com/article/20120229/DEFREG02/302290005/Schwartz-Defends-Cost-USAF-8217s-Next-Gen-Bomber>.

82. Gunzinger, *Sustaining America’s Strategic Advantage*, 56–57.

83. “Key Messages This Month,” *US Air Force Highlights*, July 2007, [1], <http://www.afoutreach.af.mil/shared/media/document/AFD-071004-048.pdf>.

84. Ibid.

85. Marc V. Schanz, “Out Year Tanker Costs to Spike, Lichte Says,” *USAF Magazine Online*, 15 September 2009, <http://www.airforcemag.com/Features/modernization/Pages/Box091509tankers.aspx>.

86. DOD, *Defense Science Board Task Force Report on Aerial Refueling Requirements* (Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, May 2004), 27, <http://www.fas.org/irp/agency/dod/dsb/aerial.pdf>.

87. DOD, “MCRS-16 [Mobility Capabilities and Requirements Study 2016] Executive Summary,” 26 February 2010, http://www.roa.org/site/DocServer/MCRS-2016_exec-summary.pdf?docID=28383.

88. Michael Donley, Secretary of the USAF, “USAF Reserve: Integral to the Total Force” (remarks, 2012 USAF Reserve Senior Leader Conference, National Harbor, MD, 26–27 March 2012), <http://www.af.mil/information/speeches/speech.asp?id=702>.

89. “Gallery of USAF Weapons,” *USAF Magazine*, May 2013, 89–92; General Atomics, “Aircraft Platforms,” accessed 28 May 2013, <http://www.ga-asi.com/products/aircraft/>; and Northrop Grumman, “Global Hawk,” accessed 28 May 2013, <http://www.northropgrumman.com/Capabilities/GlobalHawk/Pages/default.aspx>.

90. John A. Shaud, *USAF Strategy Study 2020–2030* (Maxwell AFB, AL: Air University Press, 2011).

91. DOD, “MCRS-16 Executive Summary.”

92. Senate, *Statement of General Duncan J. McNabb, USAF, Commander, United States Transportation Command, before the Senate Armed Services Committee, Subcommittee on Seapower, on the Strategic Airlift Fleet*, 112th Cong., 1st sess., 13 July 2011, <http://www.armed-services.senate.gov/statemnt/2011/07%20July/McNabb%2007-13-11.pdf>.

93. US Government Accountability Office, *Mobility Capabilities: DOD’s Mobility Study Limitations and Newly Issued Strategic Guidance Raise Questions about Air Mobility Requirements; Statement of Cary Russell, Acting Director, Defense Capabilities and Management* (Washington, DC: Government Accountability Office [GAO], 7 March 2012), 4, 6, <http://www.gao.gov/assets/590/589094.pdf>.

94. DOD, “MCRS-16 Executive Summary,” 6.

95. “Smart defense” is a term applied to the sharing of assets in the European community so that each country should not need to have an independent and complete defense package since other nations will provide assets.

96. Bhubhindar Singh, ed., *Is Northeast Asian Regionalism the Centre of East Asia Regionalism?*, special policy report, Centre for Multilateralism Studies (Singapore: S. Rajaratnam School of International Studies, Nanyang Technological University, July 2012).

97. Gopal Ratnam and Daniel Ten Kate, "U.S. Navy's Pacific Presence to Expand, Panetta Says," *Bloomberg.com*, 2 June 2012, <http://www.bloomberg.com/news/2012-06-02/u-s-navy-s-pacific-presence-to-expand-panetta-says.html>.

98. Not only does the Asia-Pacific region lead the world in the number of Internet users, but also the countries within it lead the world on the variables in which the region could overtake the United States—in terms of cyber power—by 2020.

99. As evidenced by the deployment of Internet Protocol version 6 (IPv6) in Russia and China and the development of new standards for the world to adopt, near-peer competitor nations are innovating and deploying new technological standards into other markets. See also US-China Economic and Security Review Commission (USCC), *The National Security Implications of Investments and Products from the People's Republic of China in the Telecommunications Sector*, USCC Staff Report, January 2011, 7, http://origin.www.uscc.gov/sites/default/files/Research/FINAL%20REPORT_TheNationalSecurityImplicationsofInvestmentsandProductsfromThePRCintheTelecommunicationsSector.pdf.

100. House, *IT Supply Chain: Additional Efforts Needed by National Security-Related Agencies to Address Risks, Statement of Gregory C. Wilshusen, Director, Information Security Issues, to the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives*, 112th Cong., 2nd sess., 27 March 2012, <http://gao.gov/assets/590/589617.pdf>. For example, US original-equipment manufacturers' (OEM) reliance on China, Singapore, Taiwan, and India for design and assembly of hardware components puts these countries in an excellent position to exploit their places on the supply chain to implant self-modifying code and back doors into equipment used by US citizens, private organizations, and government departments. See also Barrington M. Barrett Jr., "Information Warfare: China's Response to U.S. Technological Advantages," *International Journal of Intelligence and CounterIntelligence* 18, no. 4 (2005): 682–706. As an example, in one case, Headquarters US Pacific Command was shut down after a Chinese-based attack. See also "Chinese Counterfeit Cisco Network Routers Targeted in North America," *ChinaTechNews.com*, 3 March 2008, <http://www.chinatechnews.com/2008/03/03/6443-chinese-counterfeit-cisco-network-routers-targeted-in-north-america/>. US reliance on China as a manufacturer of computer chips and other information and communication technology hardware has allowed for viruses and back doors in equipment used by US-based entities, including the military.

101. The Stuxnet malware uses the Siemens default password to log into the PCS7/WinCC database and extract process data or gain control of the targeted system. Stuxnet or similar malware was used to infect the systems controlling the high-speed centrifuges at Iranian nuclear facilities.

102. James A. Lewis, "The 'Korean' Cyber Attacks and Their Implications for Cyber Conflict," Center for Strategic and International Studies, 23 October 2009, 7, http://csis.org/files/publication/091023_Korean_Cyber_Attacks_and_Their_Implications_for_Cyber_Conflict.pdf.

103. Col Charles W. Williamson III, "Carpet Bombing in Cyberspace: Why America Needs a Military Botnet," *Armed Forces Journal*, May 2008, <http://armedforcesjournal.com/2008/05/3375884>.

104. National Intelligence Council (NIC), *Mapping the Global Future: Report of the National Intelligence Council's 2020 Project* (Washington, DC: NIC, December 2004), 96.

105. Jonathan Levine, "The Coming Asian Rebalancing," *National Interest*, 25 September 2012, <http://nationalinterest.org/commentary/the-coming-asian-rebalancing-7513?page=show>.

106. Gunzinger, *Sustaining America's Strategic Advantage*, xi.

107. Ibid., xi–xii.

108. Luis Ramirez, "Panetta Calls for Expanded Military Ties with China," *Voice of America*, 18 September 2012, <http://www.voanews.com/content/panetta-calls-for-expanded-military-ties-with-china/1510086.html>.

109. Maren Leed with Becca Smith, David Sokolow, and Mahrukh Hasan, *Rolls-Royce North American Military Strategy Forum*, 2009 Summer Series on the Quadrennial Defense Review (Washington, DC: Center for Strategic and International Studies, July 2009), 12.

Chapter 4

Most Likely Case

A Strategy of Constructive Collaboration

Dr. Kevin C. Holzammer, Jeffrey B. Hukill, and Dr. Dale L. Hayden

As mentioned in the introduction, the alternate-path methodology is not designed to predict the future; rather, it examines the different ways the US Air Force (USAF) may posture itself for the future. Accordingly, this chapter uses the most likely path to explore the Asia-Pacific region, based upon the assumption that the current environment will continue without unforeseen catastrophic events that could dramatically alter the path toward the best-case or worst-case scenarios.

The most likely case that will develop by 2020 involves a region in which intense economic competition exists for natural resources and markets. Nations will attempt to avoid direct, state-on-state military action; however, some will use “shows of force” as a tool to obtain political gains, resulting in an “arms stroll” rather than the “arms race” that we saw during the Cold War. Shows of force, though, could lead to miscalculation within the region, creating situations in which state-on-state armed conflict might occur. Further, this particular path does not frame the near future as one that pits the United States against another peer competitor or coalition of states that actively work against US interests.¹

Five key factors will shape the region during this time frame. Not only do they drive the currents of the future, but these factors are also characteristics that the United States must leverage if it wishes to follow the most likely path. The first major feature—the dynamic growth of the Chinese economy—has been studied and discussed as one of the most popular news topics of the first decade of the twenty-first century.² Although economists debate the level of growth occurring within the Chinese economy, it has grown at a staggering rate—a universally acknowledged fact that makes it is easy to forget other important economic trends in the region. According to Wayne Morrison, “China’s real GDP [gross domestic product] growth fell from 14.2% in 2007 to 9.6% in 2008 to 9.2% in 2009. In response, the Chinese government implemented a large economic stimulus package and an expansive monetary policy. These measures boosted domestic investment and consumption and helped prevent a sharp economic slowdown in China. In 2010 China’s real GDP grew by 10.4%, and in 2011 it rose by 9.2%. During the first quarter of 2012, real GDP growth was 8.1% on a year-on-year basis.”³

Second, the economies of the leading states of the Asia-Pacific region have become increasingly integrated, a trend that will continue over the next 10 years. Brooks B. Robinson, the economic adviser to US Pacific Command, notes that, “based on statistical analysis alone, the top five Asian economies are likely to reflect a significant degree of EI [economic integration] as they proceed through the current decade.” These nations—Australia, China, India, Japan, and South Korea—have merged into a large, highly integrated trading block that dominates the regional economy. In 2010, for instance, more than 20 percent of Australia’s, Japan’s, and South Korea’s bilateral trade occurred with China. Using data from

the Bureau of Economic Analysis, Robinson concludes that by 2020 the percentage rate will exceed 30 percent.⁴

Third, many experts have written that China's dramatic economic rise will eclipse the US economy, transforming the Middle Kingdom into the leading power in the Asia-Pacific region and perhaps the world. Some use the rise and fall of gross national product as a measure, while others—such as prominent international relations scholar John J. Mearsheimer—tie together population size and economic power. Mearsheimer concludes that population size rules out many nations: "States with small populations cannot be great powers." Wealth is important because a "state cannot build a powerful military if it does not have the money and technology to equip, train, and continually modernize its fighting forces."⁵

Economists generally agree that the Chinese GDP will surpass that of the United States sometime within the next decade. In November 2012 the Organisation for Economic Co-operation and Development published a study of global, long-term growth prospects concluding that China's GDP will pull ahead of the United States' around 2016 and become 1.5 times larger by 2030.⁶

Looking at GDP as the single factor depicting that Chinese power will surpass that of the United States may be problematic, though, insofar as GDP may not be the best single measure of power, whether economic, political, or military. According to the World Bank, for example, Mexico (no. 14) ranked higher than Sweden (no. 21) in GDP for the year 2011.⁷ Despite their respective rankings, Sweden's standard of living is generally recognized as significantly higher than that of Mexico. Thus, any single factor may prove too simplistic to portray reality accurately. Michael Beckley bluntly concluded that "the key point is that national power is multifaceted and cannot be measured with a single or a handful of metrics."⁸ Although the Chinese GDP may be poised to surpass that of the United States within this decade, America will remain well ahead on most indicators related to living standards and quality of life. However, China's surging economic clout may motivate the country to accelerate its challenging of the United States on a number of fronts, including diplomacy and military matters.

How might China translate its growing economy into military power? Perhaps through power projection. In November 2012 China launched its first capital ship, the *Liaoning*. Only a few months after the *Liaoning*'s launch, Song Xue, deputy chief of staff of the Chinese navy, announced that "China will have more than one aircraft carrier. . . . We hope the next aircraft carrier can be bigger, because then it would be able to carry more aircraft and be more powerful."⁹ As Brig Gen John Frewen of the Australian army recognized, "For the Chinese people, carriers will be the jewels in the crown of a powerful navy, one befitting China's rising great nation status."¹⁰ Not surprisingly, many nations—mainly, those near China—are concerned about the *Liaoning*'s launch and sea trials.¹¹

Making the ship combat capable introduces an entirely different set of problems and issues. China has yet to develop the experience to handle the complex skill sets needed to utilize the approximately 50 fixed- and rotary-wing aircraft planned for the carrier. Moreover, China currently lacks a vital aspect of surface warfare: force-protection ships. The complex integration of surface vessels with aviation assets creates the formidable force of a US Navy carrier task force. China likely will master the skills necessary to fully leverage the capabilities of its new weapon platform, but doing so will take years—some believe, decades.

Other nations in the region are not ignoring the increase in Chinese military capabilities. As an example of the arms stroll, mentioned earlier, several countries are improving their

power-projection capabilities. Japan already possesses two force-projection ships and is in the process of building a new generation of them. According to Thomas Withington, “Australia is moving forward with the wholesale rejuvenation of its force-projection fleet,” launching the first of a new class in 2011. The Republic of Korea is in the midst of building four such ships—among the fastest of their class in the world.¹²

Fourth, the integrated economy has created a sense of regionalism among the states of the Asia-Pacific but has not engendered the level of cooperation we have seen develop in Europe during the past decades. Undoubtedly, organizations such as the Association of Southeast Asian Nations (ASEAN), the Asia-Pacific Economic Cooperation organization, and the Trans-Pacific Partnership, among many others, have made positive contributions to regional politics over their lifespans. Nevertheless, no universal consensus exists about either the circumstances under which these organizations are effective or their future role. Regional leaders point to the dramatic economic transformation over the past several decades as the basis for regional cooperation, but such efforts have largely failed. Heribert Dieter, of the German Institute for International and Security Affairs, observes that although the Asian financial crisis of 1997–98 prompted regional leaders to create “a range of projects in trade and finance as well as integration projects covering the harmonization of regulation,” these regional institutions remain weak. For example, in the wake of the Asian crisis, ASEAN established the ASEAN Surveillance Process (ASP) in order to provide “collective supervision of financial markets.” Dieter further notes that “although the surveillance mechanism seemed to address some of the problems that contributed to the emergence of the Asian financial crisis, on closer inspection the ASP is not yet a meaningful regime for supervising regional financial markets.”¹³ The difficulty that the Asia-Pacific states have with institutionalizing regional security or economic organizations should not be surprising. Strategists dealing with the Asia-Pacific area must recognize that the historical record favors bilateral agreements rather than multilateral ones and that each nation’s history and development are markedly different from those of its neighbors. Thus, finding common ground for multilateral cooperation will require understanding of the unique interests of all of the states in the region.

Fifth, some Asia-Pacific states have concerns about the current and future intentions of the United States in the region. For more than 100 years, America has maintained a presence in the Pacific. Following World War II, that presence increased dramatically. Forces from South Korea to Japan to Australia ensured stability in the region against the perceived growth of communism during the Cold War. However, starting with Operation Desert Storm in 1990 and reinforced by the terrorist attacks of 11 September 2001, some had the impression that Washington had shifted its interests from the Pacific to Southwest Asia. Although the United States maintained significant forces in South Korea and Japan, nations like Australia and the Philippines began to question what role the United States will play in the future, especially given the dynamic Chinese economy. This situation has resulted in a near bifurcation of attitudes toward US involvement in the region.

The rise of the Chinese economy interjected a new dynamic into the area. Asian economic and security issues have become more complex, in large part because they are becoming intertwined. US allies now have to consider two strategic partners—one on the economic front and another on the military and security fronts. The growing and increasingly integrated economy—dominated by China—is creating prosperity for many nations in the region but also causing some degree of concern. Australia—one of America’s closest partners—has found itself in an unexpected security and economic position, one shared by

many others.¹⁴ On the one hand, it has been one of America's closest allies since World War II. In his Australian speech of 17 November 2011, President Obama emphasized that "bonds" between the two nations "run deep. . . . And it will be a reminder that—from the trenches of the First World War to the mountains of Afghanistan—Aussies and Americans have stood together, we have fought together, we have given lives together in every single major conflict of the past hundred years. Every single one." On the other hand, the Australian economy thrives due to trade with China. In the first decade of the twenty-first century, that trade has tripled.¹⁵ This trend has continued in the second decade as well. China purchases 9.5 percent of Australia's coal and 20 percent of its natural gas.¹⁶ Anthony Harrington succinctly concludes that "Australia's economy has boomed on the back of the rise of China over the last decade or so."¹⁷

The Cold War presented a simpler, though at times more threatening, environment. Two clear choices confronted most of the world. The Soviet Union's socialist economy not only represented an alternative to America's capitalist system but also was ideologically determined to overthrow capitalism. In such a bipolar world, nations such as Australia seem to have had an easy choice concerning security *and* economic matters—it wanted both democracy and capitalism. Although proclaiming itself a "communist" state, China operates under a capitalist economic structure that since the 1970s has brought prosperity to many nations of the region. Its thirst for natural resources enriched Australia and others but has also created regional uncertainty. Hugh White, former Australian deputy secretary for strategy and intelligence in the Department of Defence and the first director of the Australian Strategic Policy Institute, has advised that (unlike the practice during the Cold War) one can no longer lump the Asia-Pacific region into two camps. Yet, even though Australians share in China's economic growth, they are uncertain what to make of a potentially powerful China in the decades to come and unsure about America's own policy toward China. White writes that "this has raised some concerns in America, and in Australia among those who wonder how Canberra will balance its growing economic, political and even strategic alignment with Beijing with its alliance with Washington. But on this issue also the government has been resolutely optimistic—at least so far." For the time being at least, Australia has had a singular vision: do not get involved with any disputes between Beijing and Washington. Many suggest that Canberra should enjoy both the friendship and security of the United States while continuing to pour coal into the holds of a seemingly endless line of Chinese cargo ships.¹⁸

Australia's predicament is replicated among many nations in the region. A number of them prosper by China's dynamic economy yet remain unsure of its current and future intentions; at the same time, they enjoy political and social relationships with the United States. The predicament is as real as it is complex. Speaking as a one-time member of his government, White again sums up the central issue not only for Australia but arguably for most nations of the Pacific: "We want Asia to keep growing strongly, and for Australia to be part of that growth. And we want America to stay engaged in Asia, to prevent domination by China, but not in a way that forces us to choose between them, or inhibits Asia's economic growth."¹⁹

In the complex environment of today's Asia-Pacific region, the United States has new opportunities to strengthen regional political and economic stability by using existing and new international regimes. Becoming the transitional leader in the region would allow the United States to leverage existing cooperative forums to create new avenues in the region,

shepherding in an era in which the rule of law and cooperation become the international norm. Multinational organizations do exist through which the United States can begin its journey to transitional leadership, perhaps using ASEAN to create informal regimes and implicit arrangements that meet the interests of member states and to provide stability.²⁰ The challenge lies in ensuring a peaceful rise of the region's major powers, including China, incorporating each into the global, capitalist economic structure. After all, it is even in China's best interest to continue the path it took in the 1970s after that country opened its economic markets.

One might reasonably ask whether the region will accept the United States as a transitional leader, especially in light of the past few decades. On this issue, there is room for optimism. Discerning any region's views toward the United States often escapes serious analysis. Many observe that even though they embrace the US culture, they may still riot in protest of its policies. In his comprehensive survey of global anti-American sentiments, Giacomo Chiozza concludes that "the image of the United States is not as tarnished as is often dreaded nor is it as shiny as is occasionally dreamed."²¹

Chiozza and Ajin Choi have examined the evolution of South Koreans' view of America between 2002 and 2007 by comparing the answers to nine questions, such as whether South Koreans favor the US war on terror and the US commitment to promote democracy. The authors concluded that, in addition to looking favorably on the United States for the most part and believing it an ideal to emulate in certain aspects, South Koreans *want* America to lead on the most important international problems—from the spread of nuclear weapons to pollution and other environmental issues.²²

We have reason to believe that these types of attitudes toward the United States are not confined to American allies. A longtime observer of East Asia recently stated that "the USA remains by far the most powerful and important country in the world, and all East Asian states would like more, not less, American attention to the region. Yet this also means that East Asian states know they cannot rely on, or expect, unquestioned US support. Most East Asian states welcome or accept US leadership."²³

Because of the level of uncertainty across the region, US leaders will need a concrete approach exemplified by realistic expectations and patience. Specifically, instead of setting a goal of getting *all* of the states of the region in cooperative regimes and trying to tackle all of the important policy issues, America should begin its efforts at the *subregional* level. Multilateral, informal arrangements on issues that affect every nation in this region will be doomed from the start. The factor of a lack of regionalism once again is key here. But by tackling a series of subregional issues—not necessarily sequentially but addressing only those it can afford economically and diplomatically—the United States will build momentum that strengthens the informal modes of cooperation into more formal ones subregionally. *Only then* can the United States work at the regional level. Even proceeding on a subregional level, like Central Asia or Northeast Asia, is a daunting task. Even though the United States likely will not prove successful until well beyond 2020, it should begin efforts now.

Adopting the ideas of William J. Lahneman are important for thinking about subregional leadership initiatives that do not overextend America's abilities. In his article "Changing Power Cycles and Foreign Policy Role-Power Realignments: Asia, Europe, and North America," he attempts to explain and then prescribe ways that nations can align their foreign policy roles with their power to play them. He thus emphasizes a conscious correlation between what role a state needs to play regionally or internationally and the material capability

that same state needs to actually maintain that role. To correlate power to role, Lahneman suggests breaking down the role of a state into subgoals that more accurately allow it to correlate power to its overall role in the international system.²⁴

A key element is a state's *ascribed role*—one that comes from a nation's history and how other states view it. The United States' *ascribed role* should be clear at this stage. Because of its historical roots in the Pacific and its dominant material capability, America's ascribed role is that of a transitional leader. Perhaps more importantly, many other states see the United States in this role as well.²⁵

Next, it needs to have a *declaratory role*. This is of great importance since many underlying problems have sprouted from “benign neglect” over many years. This role requires a “whole of government” approach. Although the president's speech was a fitting start, it was just that—a start. The United States must first engage with the core nations with all departments of the federal government: Defense, Justice, Treasury, to name but a few. The declaratory role is an elaboration of America's foreign policy in this region, involving federal agencies that will play a role in the strategy of transitional leadership.²⁶

If the United States is to become the transitional leader, it must begin with efforts to strengthen its formal, institutional ties to long-term allies and partners of America in the region, such as Australia, Japan, South Korea, and Thailand. Unfortunately, these nations are not only among the closest to the United States but also they are tragically and ironically among the nations that have expressed concerns over America's future role in the region. Reassuring the Asia-Pacific of its long-term commitment, the United States can then rely upon those long-term allies and partners to establish subregional regimes to address critical issues. These regimes can become the cornerstone for stability within the region. They will have the best possibility to resolve conflicts successfully by bringing states together to reconcile conflict through the informal mechanisms of regimes. Thus, they will play a greater part in stabilizing the region by establishing cooperation as the principal means through which states attain their mutual interests. In these regimes, persuasion and social influence help spread the process of socialization, in which cooperation and collective solutions occur. If a nation acts cooperatively because of internal motivations (i.e., because it believes that doing so is the correct course of action) rather than external factors (i.e., because it is receiving some material benefit or, in other words, being “paid off” to be a part of the institution), then conflict management, stability, and certainty in both the economic and security realms will become more predictable and lead to more stability. Moreover, informal institutions such as regimes may be more prone to socialize states. A prominent international relations scholar has observed that “an efficient institution might then be reconceived as the *design* and *process* most likely to produce the most effective environments for socializing actors in alternative definitions of interest. As I have argued . . . such an institution may have to be informal, weakly institutionalized, consensus-based—the opposite of an institutional design . . . [with strong, formal structures to promote cooperation]” (emphasis in original).²⁷

The whole-of-government approach will figure prominently in the United States' becoming the region's transitional leader, just as its armed forces will prove pivotal in this process. The soft power that exists within the Department of Defense—more specifically, the USAF—is unrivaled around the globe. In addition to sheer military might, the ability to improve the human condition through air, space, and cyber power will be a significant part of reassuring the region that America's role is unequivocal.

Air Force Strategy for the Asia-Pacific Region's Most Likely Path

The USAF's development of an approach toward supporting the United States as the region's transitional leader should capture and guide the thinking, planning, development, and execution of the integrated whole of Air Force power. In other words, a strategy focuses on ways to create effects in any and all domains—be they air, space, cyber, land, or sea, and from the global to tactical levels—to support a joint force commander's requirements.

The USAF contributes to this integrated strategy through its five enduring contributions—holding targets at risk; building regional influence; maintaining rapid global transport; establishing responsive, full-spectrum intelligence, surveillance, and reconnaissance (ISR); and controlling domains.²⁸ This approach proposes using Air Force capabilities resident within these five categories in a way that maximizes their potential. The following brief discussion addresses how these actions contribute to the regional end state.

Holding Targets at Risk in the Asia-Pacific Region

The USAF's enduring contribution of holding targets at risk is vital to achieving deterrence, aiding in assured access to the global commons, supporting economic interdependence, and defeating aggression if necessary. Deterrence operations contribute to regional peace and stability, which in turn help keep the global commons open, which in turn allows for economic development and the potential for greater economic interdependence. The USAF contributes to effective deterrence through nuclear deterrence operations and with conventional and cyberspace forces able to conduct global precision attack. Conducting nuclear, conventional, and cyberspace deterrence operations to assure allies, dissuade proliferation, and deter potential adversaries supports not only the Asia-Pacific region but also all geographic combatant commanders. If deterrence fails, the ability to defeat an act of aggression quickly through the use of conventional strike and/or cyberspace assets assures access to the global commons and contributes to the quick return of regional stability.

Deterrence operations—nuclear. Nuclear deterrence operations are the most critical core function provided by the USAF to support the end state of the Asia-Pacific's "most likely" path.²⁹ It is the most critical because of the stability that nuclear deterrence brings to the region, the counter it presents to other nuclear powers there, and the potential use of nuclear weapons if deterrence fails.

The region must view American nuclear deterrence as credible. Regional partners from South Korea to Australia and the Philippines must have confidence in the US nuclear umbrella. A loss of confidence could lead to the proliferation of nuclear weapons in the region as countries develop their own nuclear capability or—potentially more detrimental to US national interests—realign their national policies with those of other nations in the region.

Deterrence and global attack operations—conventional and cyberspace forces. Conventional and cyber forces able to conduct global precision attack have a dual purpose in relation to the concept of holding targets at risk. These forces offer nonnuclear ways and means to conduct conflict deterrence in the Asia-Pacific region as well as the more likely form of military force used to defeat aggression. Both deterrence and the use of force against aggression help assure access to the global commons and create stability, promoting economic growth and the potential for economic interdependence. The ability to strike rapidly and persistently at strategic targets such as leadership, critical infrastructure, and, at times,

fielded forces anywhere in the Asia-Pacific region can deter aggression or end it quickly if deterrence fails.

Building US Influence in the Asia-Pacific Region

Airmen play an increasingly important role in building US regional influence. Every Airman is a diplomat, not only representing military might but also demonstrating every day how militaries operate with democratic societies. Further, Air Force leaders in the region spend more time conducting diplomacy than directing kinetic military effects on the battlefield. Air Force efforts to build partnerships with foreign countries must move from the “nice to do” category to the “necessary” one. Building influence in the Asia-Pacific region is essential to maintaining access to the global commons, strengthening economic interdependence, and, if necessary, helping defeat aggression. Strong regional partnerships enable regional access and international cooperation to keep global domains open if contested, promote economic growth and interdependence through regional stability, and—if conflict does occur—provide allied basing, logistical support, and combat forces to defeat aggression. Building partnerships comes through interaction with regional governments, militaries, and populations. This interaction occurs mainly through military engagement, security co-operation, and foreign humanitarian assistance.

Military engagement and security cooperation with Japan, South Korea, Australia, Thailand, and the Philippines are strong and must continue. Along with these critical allies, we should give attention to expanding interaction with countries that in the past have been suspicious of contact, such as China, Vietnam, India, Indonesia, Singapore, Malaysia, and the Pacific Island countries.

Maintaining Rapid Global Transport in the Asia-Pacific Region

Rapid global transport by means of airlift, in-flight refueling, and global communications networks offers senior leaders the ability to project power as well as conduct stability and humanitarian-relief operations. Rapid global transport ties the region together, supplying airlift, air refueling, and communications infrastructure that enable strike missions to defeat aggression, while at the same time conducting missions that support regional nations in need. As it has demonstrated time and again, when disaster strikes—such as the Indonesian tsunami or the Fukushima Daiichi nuclear disaster in Japan—rapid global transport provides the first American response to those in distress.

Establishing Responsive, Full-Spectrum ISR in the Asia-Pacific Region

Responsive full-spectrum ISR in the Asia-Pacific is essential to enabling operations that give decision makers essential intelligence to make informed decisions. Decision superiority enables commanders to design operations that hold targets at risk through deterrence and strike missions and help build US regional influence through information sharing with partner nations, thereby strengthening relationships and contributing to achievement of the desired end state. Establishing responsive, full-spectrum ISR for the Asia-Pacific region requires conducting and synchronizing surveillance and reconnaissance assets across global, theater, and tactical levels throughout all domains. The USAF should integrate its air, space, and cyberspace surveillance and reconnaissance assets with other land and naval assets—and, at times, those of other international partners—to leverage the greatest amount

of leadership within the region. The AirSea Battle initiative offers a framework to identify and develop such integrated, cooperative structures and processes—those necessary not only to support the joint fight but also to leverage space and cyberspace capabilities as part of the overall mix of ISR capabilities, joining with coalition and interagency partners.³⁰

Controlling Domains in the Asia-Pacific Region

The USAF has joint responsibilities within the cyberspace domain; additionally, it is the lead service for control of the air and space domains.³¹ Securing the high ground enables freedom of action for the entire spectrum of military operations with joint and coalition operations, not to mention civil and commercial activities. Freedom of lines of communications—through air, space, cyber, or sea—enhances and enables the role of the United States as the transitional leader. The unimpeded flow of commerce and information is critical to the long-term stability of the region. The ability to create and maintain freedom of action produces the opportunity to conduct ISR operations; share information on secure and open networks; support objectives through airlift and air refueling; maintain the viability of commercial, civil, and military lines of communication; and strike targets to defeat aggression. These activities contribute to holding targets at risk by making deterrence operations credible and, if deterrence fails, by making strike operations effective. The activities also help build regional influence by assuring access to the global commons of air, space, and cyberspace. Access to the global commons gives nations in the region the opportunity for economic expansion and interdependence. It also allows them to partner with the United States in responding to civil and military crises in the region. One cannot overstate the fact that domain control, applied at the appropriate degree for operational objectives, is a critical prerequisite for all operations and an enabler for attaining this path's end state.

Summary

The Asia-Pacific region is dynamic. The bipolar world of the Cold War is a distant memory. The region is experiencing an economic boom as much of the West remains mired in the recession that began in 2007. Some countries question American leadership; others challenge it. Is a new leader emerging while the old one fades, or is the natural order of 2,000 years simply reasserting itself? One senior Asian official, who asked not to be named, remarked, “We have paid tribute to China in the past, and will do so again . . . if the United States allows it.” The path toward transitional leadership is still under construction. It is in the United States’ national interests to take an active role in helping create the course that leads to strengthened regional, political, and economic stability via existing and new international regimes. As part of an integrated national strategy, the USAF can and should provide significant capabilities to help achieve this end state.

Notes

1. For a current list of many of the works in this camp, see Michael Beckley, “China’s Century? Why America’s Edge Will Endure,” *International Security* 36, no. 3 (Winter 2011/12): 41n2, http://belfercenter.ksg.harvard.edu/files/Chinas_Century.pdf.
2. *Ibid.*, 41.

3. Wayne M. Morrison, *China's Economic Conditions*, CRS Report for Congress RL33534 (Washington, DC: Congressional Research Service, 26 June 2012), 3, <http://fpc.state.gov/documents/organization/194783.pdf>.
4. Brooks B. Robinson, "Top Five Asia-Pacific Economies: Integration, Conflict, Vulnerability, and Crisis, 2010–2020" (paper presented at the Air Force Research Institute's Asia-Pacific Conference, Maxwell AFB, AL, 6–7 December 2011), 2.
5. John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: W. W. Norton, 2001), 61.
6. Åsa Johansson et al., *Looking to 2060: Long-Term Global Growth Prospects*, Organisation for Economic Co-operation and Development (OECD) Economic Policy Paper no. 3 (Paris: OECD Publishing, November 2012), 22.
7. World Bank, "Gross Domestic Product 2011," World Development Indicators Database, 1, accessed 8 November 2012, <http://databank.worldbank.org/databank/download/GDP.pdf>.
8. Beckley, "China's Century?" 57.
9. Quoted in Agence France-Presse, "State Media: China Plans Second, Larger Aircraft Carrier," *DefenseNews*, 24 April 2013, <http://www.defensenews.com/article/20130424/DEFREG03/304240010/State-Media-China-Plans-Second-Larger-Aircraft-Carrier>.
10. John Frewen, "Harmonious Ocean? Chinese Aircraft Carriers and the Australia-U.S. Alliance," *Joint Force Quarterly* 59 (Fourth Quarter 2010): 69, http://www.ndu.edu/press/lib/images/jfq-59/JFQ59_68-74_Frewen.pdf.
11. "What China's 1st Aircraft Carrier Means for the Region," *Chosunilbo* (English edition), 8 April 2011, http://english.chosun.com/site/data/html_dir/2011/04/08/2011040801156.html.
12. Thomas Withington, "Force Projection Ships," *Armada International* 36, no. 1 (February/March 2012): 36, 38.
13. Heribert Dieter, "Changing Patterns of Regional Governance: From Security to Political Economy?," *Pacific Review* 22, no. 1 (March 2009): 81, 85.
14. Ibid.
15. Pres. Barack Obama (remarks before the Australian Parliament, 17 November 2011), <http://www.whitehouse.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament>.
16. Odette Mucha, *Asia-Pacific Economic Update 2011*, vol. 4, *Energy Supplement: Profiles and Key Statistics for Asia-Pacific Countries and Territories* (Honolulu, HI: US Pacific Command, 2011), 2.
17. Anthony Harrington, "The 'Resource Curse': The Australian Economy and the Growth of Asia," *QFinance: The Ultimate Financial Resource*, 29 October 2012, <http://www.qfinance.com/blogs/anthony-harrington/2012/10/29/the-resource-curse-australian-economy-growth-asia-markets-australia-china>.
18. Hugh White, "The Limits to Optimism: Australia and the Rise of China," *Australian Journal of International Affairs* 59, no. 4 (December 2005): 470; and the authors' interviews with Australian government officials and research specialists, May 2012.
19. White, "Limits to Optimism," 470–71. Interestingly, White was still wrestling with these same issues six years later. See Hugh White, "Power Shift: Rethinking Australia's Place in the Asian Century," *Australian Journal of International Affairs* 65, no. 1 (February 2011): 81–93.
20. Richard Stubbs, "The ASEAN Alternative? Ideas, Institutions and the Challenge to 'Global' Governance," *Pacific Review* 21, no. 4 (December 2008): 451–68.
21. Giacomo Chiozza, *Anti-Americanism and the American World Order* (Baltimore: Johns Hopkins University Press, 2009), 201.
22. Giacomo Chiozza and Ajin Choi, "Going the American Way: The Surprising Case of Korean Pro-Americanism," *Pacific Review* 25, no. 2 (May 2012): 277.
23. David C. Kang, "The Security of Northeast Asia," *Pacific Focus* 24, no. 1 (April 2009): 18.
24. William J. Lahneman, "Changing Power Cycles and Foreign Policy Role-Power Realignments: Asia, Europe, and North America," *International Political Science Review* 24, no. 1 (January 2003): 6–7.
25. Ibid., 7.
26. The discussion of roles comes from power-cycle theory, which explores "the nature of power-role gaps (misalignment) in contemporary world politics." Ibid., 97. Interestingly, Lahneman suggests that close coordination with allies will produce great dividends for the United States in managing its "power-role gap" (109).
27. Alastair Iain Johnston, "Treating International Institutions as Social Environments," *International Studies Quarterly* 45, no. 4 (December 2001): 511. See also Alexander Wendt, "Collective Identity Formation and the International State," *American Political Science Review* 88, no. 2 (June 1994): 384–96.
28. A number of documents with similar but varying titles describe enduring Air Force contributions: House, *Department of the Air Force, Presentation to the Committee on Armed Services, United States House of*

*Representatives, Fiscal Year 2013 Air Force Posture Statement, Statement of the Honorable Michael B. Donley, Secretary of the Air Force, and General Norton A. Schwartz, Chief of Staff, United States Air Force, 112th Cong., 2nd sess., 28 February 2012, 3–5 (hereafter *Air Force Posture Statement 2012*); Philip M. Breedlove, vice chief of staff, US Air Force, “Air Sea Battle for the Future” (presentation to the Mitchell Institute for Airpower Studies, 20 July 2011), 5–6; and Department of the Air Force, *The Air Force and U.S. National Security: Global Reach–Global Power*, white paper (Washington, DC: Department of the Air Force, June 1990), 5–15.*

29. The 12 Air Force core functions describe in greater detail the ways the USAF carries out its enduring contributions. *Nuclear deterrence operations* is one of 12 Air Force core functions described in Air Force Doctrine Document 1, *Air Force Basic Doctrine, Organization, and Command*, 14 October 2011, 42–53.

30. *Air Force Posture Statement 2012*, 17.

31. Department of Defense Directive 5100.01, *Functions of the Department of Defense and Its Major Components*, 21 December 2010, p. 27, par. 2a; p. 28, par. 2h; p. 34, par. 6b(2) and 6b(5).

Chapter 5

Findings and Recommendations

US Air Force Strategy in the Asia-Pacific to 2020

Air Force Research Institute

Based on the Eisenhower administration’s Solarium Project, this study seeks to undertake what Michèle Flournoy and Shawn Brimley describe as strategic planning or foresight analysis. More than six decades since undertaking Solarium, the federal government still has no integrated effort for national security planning across the governmental enterprise. Thus, it needs to find a way to keep urgent problems from crowding out important, long-term trends and issues.¹

Like Solarium, this study examined three paths to consider “future trends, possible developments and wildcards” that inform national security and US Air Force (USAF) decisions.² As a reminder, these paths included a best case, in which the Asia-Pacific region proceeded along a path toward mutual cooperation largely bounded by the rule of law; a worst case that placed the region on a path toward open hostilities; and a most-likely case, which largely extrapolates the status quo into the time frame under analysis.³ The research team developed each of these paths with 2030 in mind but analyzed the world at a waypoint in 2020 on the path leading to the 2030 destination as a means of informing near-term USAF decisions.

The best and worst cases require deviation from the status quo. Stated differently, “trip wires” must be crossed to push the United States onto either path. For the best-case scenario to emerge, disputant states in the region would need to find a mechanism or set of mechanisms by which they agree to settle their differences peacefully—a sequence of events that would be readily recognizable if it occurred. Similarly, deviation toward the worst case, as described in chapter 3, would take place only if an ongoing dispute became militarized—perhaps by accident—resulting in the onset of hostilities and the possible triggering of mutual defense treaties, thus widening the dispute and conflict.

This chapter seeks to integrate these three paths in a method similar to the Solarium Project design. As in Solarium, the research team cross-compared the various trends, possible developments, and wild cards of the three paths. Based on analysis of recent and historical trends, the middle path appears more probable than the other two (hence the descriptor “most likely”); consequently, much of the analysis focused on this path. However, because the other two paths are possible, throughout this analysis the team ensured that it kept the “best case” and “worst case” in view.⁴

This chapter begins by presenting the findings from this analysis, which in most cases are trends or developments that the team found common to all three paths. As such, these can be considered definitive conclusions or “predetermined elements.”⁵ The chapter also discusses findings particular to potential conflict in the region. Although not necessarily embedded in the best-case path, these findings appear in both paths that have the potential for conflict. Further, should the Asia-Pacific region not move along a path toward mutual,

peaceful collaboration, such findings are also essentially predetermined elements.⁶ Next, the chapter explores the implications of these findings, synthesizing what they mean for our nation and our USAF. Lastly, the chapter evaluates these implications, using doctrinal constructs as a lens to provide definitive recommendations for what the USAF must do to be ready for future possibilities in the Asia-Pacific. The chapter then discusses the concept of “transitional leadership,” which this study considers the key to shaping the region in a manner that decreases the probability of a worst-case scenario.

Findings

By cross-comparing the three paths and the events, trends, and actions of the major players, the study team synthesized a set of findings regarding the economic, military, and diplomatic backdrop against which activities in 2020 will take place. These findings represent the basis for the conclusions on airpower and the recommendations that follow later in the chapter.

Economic

Among the more important findings is that Asian economic growth and integration will continue. The Asian economy is both rapidly developing and becoming more integrated through increasingly dynamic interregional trade. This dynamic remains constant across all three paths, with only minor variations in growth predictions for the region as a whole—or for the region’s individual states.

China’s economic growth will continue, tied in great part to the larger Asia-Pacific region. Although some variation occurs in the estimates of China’s growth, all sources consulted indicate that its economy will continue to develop and do so at rates faster than those of Europe and the United States. Despite the existence of some variation on specific projections, several trend analyses—such as the International Monetary Fund (IMF) data previously mentioned—suggest that China will surpass the United States in total gross domestic product (GDP) before 2020. It is important to realize, however, that China’s per capita income and standard of living will remain markedly below those of the West—or even many of its Asian counterparts. Further, as Kevin Holzammer, Jeffrey Hukill, and Dale Hayden point out in their “most likely” analysis, total GDP is not a precise measure of national power.⁷ However, this continued growth, with projections of interconnected trade possibly reaching 30 percent of the regional economy, points to a Chinese nation that will have substantial economic clout that increases over time.

Asian growth will have some uneven spots; nonetheless, it will continue to be broad, resulting in the continent’s playing a larger role in the global economy. Data on North Korea is sparse, but no evidence indicates that the robust growth experienced by East Asia will spread to North Korea.⁸ Japan’s economy is expected to develop slowly but steadily at rates around 2 percent during this period.⁹ Meanwhile, virtually all of the rest of the continent is expected to have growth rates in excess of 6 percent.¹⁰ The result, as mentioned in earlier chapters, is that Asia—as a collective whole—surpasses North America in total economic productivity, thereby making it increasingly the nexus for international trade. By extension, the Strait of Malacca and other transit routes around the Asian periphery become economically more important with time.

Military

Asian military spending is increasing rapidly, a trend that will continue over the next eight years. The International Institute for Security Studies (IISS) concluded that the countries of Asia now spend more on defense than does the whole of Europe. The IISS estimates the combined defense spending of the region at \$287 billion, with a growth rate of 4.94 percent per year.¹¹

Within this Asia-Pacific region, China's military spending is growing fastest—although it will not pass the United States in either overall military expenditures or global military capability until well after 2020. The IISS estimates growth in China's military spending at just below 10 percent in the past year.¹² However, the longer-term trend in Chinese spending is even more robust. As discussed in earlier chapters, China's outlays for defense have risen at an average rate of over 13 percent per year so far this century.¹³ Although approximations of this spending vary, the Chinese government estimated its budget in 2012 at \$106 billion, with valuations from a variety of sources largely clustered between \$110 and \$140 billion. If all military-related expenditures are included, the latest Department of Defense (DOD) estimate of Chinese spending comes to between \$135 and \$215 billion.¹⁴ This range reflects the uncertainty in these estimates. Certainly, however, these numbers are very much lower than total US spending, and even though China is rapidly developing its military capabilities, it is doing so from a baseline well below that of the United States. The IISS believes that even if China's economy continues to grow at an unchanged rate, its military spending will remain inferior to that of the United States until at least 2025.¹⁵

Even though China's overall military capability is inferior to that of the United States, the geography of the Asia-Pacific region gives it the advantage of shorter interior lines of communication. In the event military operations became necessary in the region, the United States would have the tyranny of distance to overcome, accompanied by significant issues with supply and sustainment. Demands for oil and other consumables would be significant, placing added importance on keeping major shipping and air routes open. Lastly, China's recent emphasis on antiaccess and area-denial (A2/AD) strategies creates an additional set of challenges that, in some scenarios, we may have to surmount. The existence of A2/AD systems and the distances across the Asia-Pacific region limit the ability to project force and must be considered in military planning.

Space access is not only vitally important in this region but also vulnerable. Vast distances make the region too large to attempt to conduct intelligence, surveillance, and reconnaissance (ISR) solely through the use of remotely piloted systems. Whether for humanitarian operations (best case) or combat operations (worst case), cross-oceanic and in-theater navigation will depend upon the Global Positioning System (GPS). These two issues, the gathering of data and navigation, will demand robust access to space-based systems. Yet, both the United States and China have successfully conducted direct-ascent intercepts of satellites, showing that these systems are vulnerable. Strong evidence suggests that directed-energy weapons may expand this vulnerability in the years to come.¹⁶ Complicating matters is the risk of leaving behind significant debris should space-based assets come under attack—a situation already problematic for some orbital configurations. This, in turn, could make space access more difficult still.

Should the best-case path not prevail, significant risk attaches to our ability to maintain credible nuclear and extended deterrence as we approach 2020—and in the years beyond. The USAF's pieces of the US nuclear triad are aging, and parts of the triad may be unable to

carry out their mission by the end of the decade. As Steve Hagel points out in the worst case, the age and radar signatures of the B-1 and B-52 call into serious question whether they can penetrate advanced A2/AD systems already deployed by two of the region's nuclear powers and sought by a third. Even the early-generation stealth technology of the B-2 may be obviated by technological advances coming in the next seven years. Further, the aging nature and reliability of the weapons that sit on our intercontinental ballistic missile (ICBM) fleet have already been called into question publicly. Meanwhile, as the United States and Russia negotiate nuclear arms reductions, the available evidence suggests that other states in the region—including North Korea, India, and Pakistan—are expanding the size of their arsenals.¹⁷ The combination of these dynamics extrapolated over time can cause US allies and potential adversaries alike to believe that the US nuclear umbrella has holes in it.

Diplomatic

The question of whether the United States is containing China remains extremely sensitive, but in reality, China is containing itself. It has publicly claimed that America is engaged in a deliberate attempt at containment, which the People's Liberation Army (PLA) warns "is making the situation there tenser."¹⁸ In fact, however, a change in the execution of China's foreign policy beginning in late 2008 or early 2009 has caused a shift in the perception of its neighbors. Until the Beijing Olympic Games, China worked to avoid confrontation with regard to its maritime and land disputes. Through compromise, it even resolved some of its land disputes during this time. After 2008 China's large-scale demonstrations of force, using flotillas of official governmental and naval vessels, have caused a shift in regional opinion. States that once viewed China solely in terms of their economic benefits derived from its opening and growing economy began to view China as a potential rising hegemon, leading them to engage in balancing behaviors against Beijing.¹⁹ In the end, regardless of the issue's sensitivity, China is pathologically containing itself.

Some multilateral institutions exist in the Asia-Pacific region, but they lack the authority to resolve the outstanding boundary disputes. China has remaining land boundary disagreements with India, one of which involved Chinese troops crossing the line of control in May 2013.²⁰ In addition, China has ongoing disputes with Japan regarding islands and maritime territory in the East China Sea as well as with its neighbors to the south regarding much of the South China Sea. Although regional institutions such as the Association of Southeast Asian Nations (ASEAN) have proven useful in establishing a mechanism for discussion—even a code of conduct—for these disputes, they lack the authority and power to resolve them.²¹

It is possible for the United Nations International Court of Justice (ICJ) to adjudicate the differences over maritime boundaries, but this will not likely occur prior to 2020. Deferring adjudication to the ICJ requires the consent of all disputant states. In the Fourth Xiangshan Forum in Beijing in late 2012, senior PLA officials indicated China's unwillingness to consult the ICJ until the boundary disputes had remained in an impasse status for at least 10 years. This implies that the ICJ will not be consulted to resolve these matters before 2020 and that the disputes will remain active throughout the study's time frame.

Leading indicators will tell us which path is unfolding as we head toward 2020. These indicators take the form either of potential trip wires as we go down the worst-case path or of "signposts" suggesting that nations of the region are choosing a better or even best-case path. The path toward open hostilities among the major regional powers is not one of rational

decision making but a course that would be triggered by miscalculation or mistake. As argued in the most-likely case, the regional boundary and border disputes will largely still exist in 2020. Continued intrusions and shows of force by governments—and, potentially, militaries—of multiple sides in these disputes are also probable. These shows of force, like the one between the Philippines and China in 2012, can become extremely intense, with dozens or even more than 100 vessels on each side arrayed against the other.²² In some cases, shots have been fired—but so far between a military vessel and a fishing boat, not between two militaries.²³ Tensions, emotions, or miscalculations could cause one of these disputes to evolve into armed hostilities, thereby crossing a trip wire and leading to a worst-case outcome. The United States has multiple treaty partners in the area, and numerous bilateral agreements exist. If hostilities trigger any of these, a local boundary dispute could rapidly spiral toward a conflict between multiple parties—an outcome that all of the disputants have gone on record as hoping to avoid.

Signposts leading to the best case are different. If the Asia-Pacific region begins to trend in the direction of the best-case path, then we will not see more incidents in which one or more countries transgresses a disputed boundary. Rather, we will see increased use of negotiation and of a formal mechanism for resolving international disputes, such as the ICJ. Should China and the nations with which it has both land and boundary disputes either start reaching bilateral settlements and/or begin placing their differences on the ICJ docket, then it will be clear that a trend away from the worst-case path is under way.

Implications of the Findings

Although the United States cannot drive the Asia-Pacific region along a particular path, we can take actions related to the findings above that will make it easier for the region to travel a less conflictual and mutually beneficial path. The United States should build on its recently articulated “pivot to Asia” to broaden its focus beyond merely the ongoing war on terror, should better understand the region, and should build a military—specifically, an USAF—capable of addressing the findings listed above. Many of these actions lie outside the purview of the DOD, but it is important to put the contributions of the USAF into their broader context.

Although the nations of Northeast Asia never perceived the United States as having left, Pres. Barack Obama’s recently articulated pivot to Asia does have meaning for the rest of the region, and we must now build upon this declaration. In his announcement, the president spoke of his “deliberate and strategic decision” that the United States “will play a larger and long-term role in shaping this region and its future, by upholding core principles and in close partnership with our allies and friends.” The announcement sought to confirm to both his Australian hosts and other allies across the region that the United States—as a “Pacific nation”—would “stand for an international order in which the rights and responsibilities of all nations and all people are upheld. Where international law and norms are enforced. Where commerce and freedom of navigation are not impeded. Where emerging powers contribute to regional security, and where disagreements are resolved peacefully. That’s the future that we seek.”²⁴

This speech and subsequent moves by the administration focus on Asia; however, Asia-Pacific states remain confused about the current and future intentions of the United States. For more than 100 years, America has maintained a strong presence in the Pacific. Most of

the first half of the twentieth century was spent planning on preventing Imperial Japan from upsetting the regional balance. As China's dynamic economy rose over the past 30 years, US absence from the central and southern Asia-Pacific regions raised doubts in many states—including America's traditionally closest partners—regarding what role it would play in the future. The US war on terror added to these concerns, since America largely found itself tied down in two major wars removed from the Asia-Pacific, hunting transnational terrorists. The Bush Doctrine—“You're either with us or against us in the fight against terror”—placed many Asian states in an awkward position. Most of them did not have major terrorist threats within their borders and were perplexed as to what the United States expected from them. Others—such as Thailand and Indonesia—had been battling insurgencies and terrorist for years yet received little attention from Washington. “On balance,” one analyst observed, “the obsession of policy makers in Washington with the so-called war on terror has weakened the US position in Asia.”²⁵ In the rare instances in which the United States took a prominent role in the region, it appeared to many that US actions amounted to attempts at “containing” the rise of China, a stance that worried most of them—if not all.²⁶ As another writer noted, “Since 2001, the United States has been essentially AWOL from Asia.”²⁷

As the United States pivots to Asia, the nation must use this focus to improve its understanding of the region and thus benefit its partners rather than harm them, as occurred in the financial crisis of the late 1990s. Many Asian states still resent the timing and means with which the United States attempted to stop the Asian financial crisis of 1997–98. It is difficult to overemphasize the financial carnage that occurred, which has been compared to the Great Depression of the 1930s.²⁸ Richard Higgott describes it as “the most traumatic [economic downturn] experienced in Asia since decolonization and the Cold War confrontations of the 1950s and 1960s.”²⁹ Attempting to assist the region, the United States and the IMF overlooked unique business practices in the region. In many states—such as Thailand, where the crisis originated—business and government interests are often blended. In fact, these states' economies depended on “intimate connections between business and government, underpinning government intervention in support of particular industries.”³⁰ Yet when asked for assistance, the United States and the IMF employed their “tried and tested” methods for dealing with such crises: decrease domestic spending while reforming the economy along liberal economic lines of the West, insisting upon separation of public and private enterprises. South Korea, Thailand, and Indonesia all rioted against these “imposed” reforms.³¹ The US response to the Asian financial crisis and the effects the global war on terrorism are but two examples of a decline in America's stature in the Asia-Pacific region. Morton Abramowitz and Stephen Bosworth, two former US ambassadors to Asian countries, have made the claim even more strongly, writing in 2005 that “since the end of the cold war the U.S. has paid attention to Southeast Asia mostly when there is trouble. America's initial lack of attention to the region contributed to the financial crisis of 1997 which went on to ravage much of Asia and threaten global economic stability. The U.S. is still paying the costs of that episode in Asian public opinion.”³² By paying continuous attention to the region and by understanding it better, the United States can alleviate the doubt created in the minds of our partners.

As part of creating a better understanding and partnership in the region, the United States should help build regimes that contribute to stability. Multilateral organizations and regimes in Asia are young. Yet ASEAN may be one existing structure useful for creating informal and implicit arrangements (i.e., regional regimes) that do meet the interests of the

member states and offer stability.³³ As a member of the “ASEAN Plus” structure, Washington should reenergize its role in established regional institutions and place itself at the forefront of establishing new international regimes—the form of cooperation that best fits the history and nationalism of the region and that has the best chance of success. This is important for two reasons. First, it will have the best chance of successfully resolving conflicts. Second, bringing states together to reconcile conflict through the informal mechanisms of regimes will play a substantial role in stabilizing the region by establishing cooperation as the primary means through which states attain their mutual interests. In these regimes, persuasion and social influence help spread the process of socialization, in which cooperation and collective solutions may occur endogenously rather than exogenously. This has the potential to reduce the economic and security instability that has developed over the past 30 to 40 years.

Lastly, if events in the region move along the most likely or the worst-case paths, the United States and its USAF need to maintain a robust capability to—ideally—deter conflict and protect our partners or allies should strife arise in the region. US armed forces play a role in diplomatic efforts, insofar as they reassure partners that America’s role and support are unequivocal. The message we must send in the Asia-Pacific region is that although we do not seek conflict, we will maintain a position of strength, committed to ensuring that our partners and allies can create regimes that promote economic stability and security. Ideally, such regimes will reach to every nation in the region with a stake in the dynamic and growing Asian economy, including China. Each agency must devise its own strategy, which needs to be integrated with those of all of the other US departments. Because such a product lies outside the scope of this study, we now examine how the USAF should position itself to support this overall end state.

The Concept of Transitional Leadership

These findings indicate that the United States needs to work to become a “transitional leader” that engages the Asia-Pacific community via several avenues to assist the region in peacefully transitioning from an era of American leadership to one in which Asia will be either a major focus or perhaps *the* major focus of the world. The term “transitional leader” implies a role for leadership by the United States, the world’s preeminent power during this time period.

Transitional leadership is defined as the sum of its core elements: leading from a position of strength, using that leadership to build partnerships and establish regimes that enhance freedom of navigation and commerce, fostering and continuing economic integration, leading from a position of understanding and working within the cultures and governmental structures of the region, and using our military might to conduct humanitarian-relief operations and disaster response to ensure that no single natural event derails the regional economy. To realize all of these elements of leadership, the United States must maintain sufficient power, both conventional and nuclear, to assure allies and partners in the region that it indeed will be able to lead from a position of strength. Using this position, we must work within existing multilateral regimes (such as ASEAN-Plus) that may develop to enhance belief in these multinational mechanisms so that regional disputes may be handled through consultations and negotiations. If these fail, fostering increased trust in the regime of rule by law may result in arbitrating some disputes but settling all of them by using mechanisms

other than armed conflict. To be a transitional leader, the United States should not believe that a “cookie cutter” approach to solving world problems can work in all situations and understand the unique culture and governmental structure of each nation in the region. Different countries require different approaches to enhance economic growth, healthy governance, and trust. We must not repeat the mistakes of the late 1990s. Lastly, although the United States must not create a provocative presence in the region, we do need to establish interoperability with allies and partners alike. Because the Asia-Pacific region is highly disaster-prone, the increased presence of airlift, tanker, and supply capabilities—all of which are useful in disaster relief—gives the United States the chance to work alongside every nation in the region. It is in the mutual interests of all states of the world that no natural disaster derail the regional economy, since each nation would suffer. As such, establishing a presence in the region to the extent that allies and partners are willing to do so will assist America in leading from a position of strength. Moreover, it will ensure freedom of navigation and commerce; improve our understanding of other nations, including our allies’ and partners’ cultures and governmental structures; and allow us to use our collective might to assist in leading a transition in the Asia-Pacific based on the same norms that the world has used since the close of World War II. This study advocates that the United States adopt this form of leadership toward the Asia-Pacific basin.

The USAF’s Contribution to Transitional Engagement

Perhaps more ink has been spilled and more paper used on various ways the interagency process should work than on “the rise of China.” Be that as it may, the USAF has the opportunity to play a fundamental role in the region by working with our friends and partners in the Asia-Pacific region, our sister services, and other government agencies, bringing to bear our own unique and distinctive capabilities. This section discusses the fundamental elements of airpower, airpower concepts, and the ways that the USAF should employ these concepts to address the findings and implications described above.

Fundamental Elements of USAF Power

Each military service possesses certain fundamental elements that make unique its contributions to a joint operation. For the USAF, these elements are speed, range, persistence, and payload.³⁴ Exploiting the interaction among these elements through sound operational design enables decision makers to use the service’s capabilities to attain desired ends.

Speed enables the compression of time. Few boundaries prevent USAF power capabilities from quickly concentrating and then delivering desired effects at any point. Depending upon the capability used, “quickly” is defined as hours for air, minutes for space, or nanoseconds for cyber. USAF capabilities dominate the element of time by compressing the tempo of events and producing physical and psychological shock.

Geographic range of USAF power capabilities enables the creation of effects across the globe. Range gives USAF capabilities the ability to react quickly and refocus both globally and across a theater to changing demands. Numerous types of operations display the geographic range of USAF power capabilities. A mission may consist of a bomber or a cyber attack launching from the United States to strike a target thousands of miles away—or of

tankers extending the range of close air support assets supporting ground forces within a joint operating area. The ability to range gives USAF power its unique capability to produce effects rapidly—any time, any place.

Persistence is the ability to deliver and maintain the desired effect at the time, place, and duration required by the joint force commander (JFC). USAF power's exceptional speed and range allow its forces to visit and revisit a wide variety of targets nearly at will. Examples of persistent operations might include maintaining a continuous flow of materiel to peace-time distressed areas, constantly monitoring adversaries to ensure they cannot conduct actions counter to those agreed upon, assuring that targets remain out of commission and denying an enemy resources and facilities or providing them to an ally during a specified time.³⁵

Payload is the reason for being. Range and persistence are meaningless unless the payload can deliver the required effect. Every operation in air, space, and cyberspace is conducted to deliver effects from some type of payload, which might be a warhead, a computer virus, relief supplies, or a GPS signal. The payload is the “load” that consists of anything carried by an air, space, or cyberspace vehicle that delivers effects. Always, the goal is to have the right payload available at the right place at the right time to support fulfillment of the commander's objectives.

Airpower Concepts

A well-developed USAF strategy uses airpower in a way that maximizes the potential of its speed, range, persistence, and payload in order to realize the stated operational objectives. This section addresses various USAF concepts, including both foundational ideas and the service's enduring contributions.³⁶ The descriptions here will prove useful in understanding how airpower applies to the region in the section below.

Foundational ideas. Captured in various vision documents from 1990 to 2000, these three concepts are global reach, global power, and global vigilance.³⁷ In his book *In Service to the Nation: USAF Research Institute Strategic Concept for 2018–2023*, Dr. John A. Shaud, former director of the USAF Research Institute, recasts these three concepts, making them more inclusive and bringing them closer to their original intent.³⁸ It is important to understand these broad concepts before moving on to more specifics.

Global reach is operational access that allows the use of USAF capabilities to project power and enhance presence in a very short time, regardless of mission type or location. The service does not achieve global reach simply by means of air-mobility assets but does so through space-based lines of communication, a long-range-strike platform holding targets at risk, or a portal-to-portal Internet connection.

Global power uses USAF capabilities to create and sustain a full range of effects necessary to support national objectives throughout the spectrum of military operations. The service produces these effects through the integrated use of its capabilities during missions ranging from humanitarian relief to nuclear deterrence. The integration must occur within the USAF itself as well as with joint partners and other instruments of national power. The synergistic use of USAF capabilities enhances the ability to produce more discrete effects with more productive results in all five domains: air, space, cyberspace, land, and sea.

Global vigilance provides awareness for understanding both the necessity for action and the types of effects needed to produce the set of conditions demanded by the commander's objective. Global vigilance underpins both global reach and global power by integrating the collection capabilities from all domains and the cognitive processes necessary to create

situational awareness. It identifies linkages and assesses the potential for success as well as validates actual success or progress achieved through the application of global reach and power. Global vigilance depends upon global reach to gather data and disseminate intelligence.

These three foundational ideas supply the vision to guide development of any USAF strategy. Not the purview of any one command or weapon system, they embody the essence of the integrated whole of USAF power that unleashes the service's potential to carry out a JFC's objectives. Applying these concepts requires breaking them into the enduring contributions, which are then carried out through specific USAF core functions and supporting capabilities.

USAF enduring contributions. Five concepts describe the USAF's enduring contributions: domain control; responsive, full-spectrum ISR; rapid global transport; holding targets at risk; and building US influence.³⁹

Domain control allows for global reach, global power, and global vigilance, enabling the successful accomplishment of all the enduring contributions. The USAF has the assigned mission of gaining and maintaining the appropriate level of control of the air and space and, with other joint partners, of gaining and maintaining assured access to cyberspace.⁴⁰ This control allows US and coalition forces to take advantage of unique capabilities in mobility, strike, and ISR, permitting surface forces freedom of action without the threat of adversarial attack from above.⁴¹

Responsive, full-spectrum ISR is the object of global vigilance, realized through global reach. It provides data turned into knowledge that allows for the effective use of global power. Responsive, full-spectrum ISR affords leaders an unparalleled decision-making advantage on which commanders rely—from supporting national strategic decision making to successful outcomes in life-and-death tactical situations.

Rapid global transport is evident in global reach, a form of global power. It supports and is supported by global vigilance. Through airlift, in-flight refueling, and global communications networks, rapid global transport offers decision makers options to deter and defeat aggression, project power, provide a stabilizing presence, conduct stability operations, and carry out humanitarian and other relief operations.

Holding targets at risk is one of the most visible elements of global power, made possible through global reach and supported by global vigilance. Holding targets at risk supports a range of joint missions, from deterrence to close air support. It involves conventional and nuclear capabilities launching from the United States or from within a JFC's area of responsibility. This enduring USAF power contribution gives national leaders a range of options for crisis response and escalation control.

Building US influence occurs when global reach, power, and vigilance are used to strengthen security partners and relationships.⁴² USAF capabilities that support military engagement, security cooperation, and foreign humanitarian assistance aid in establishing, shaping, maintaining, and refining relations with other nations.⁴³ The relationships built through these activities prior to a conflict's outbreak can play an important role in gaining necessary allied support. Strong partnerships established on trust further the United States' national and shared global security interests.

Applying the Concepts to the Asia-Pacific Region

The next step in developing a USAF strategy entails applying the concepts described above to the Asia-Pacific. The intent is to create specific ways to use airpower to reach the

desired goal of strengthening regional political and economic stability via existing and new international regimes. Achieving this goal requires a strategy that integrates all of the instruments of national power and that focuses on attaining the following objectives:

- Sustain deterrence and, if necessary, defeat aggression of any potential adversary
- Assure access to global commons
- Support growth of international organizations for conflict management
- Support continued expansion of economic interdependence

Determining the USAF's contribution to this integrated strategy involves using the five enduring contributions as a lens to analyze the situation and then recommending specific ways and means for reaching the stated goal. In line with the conclusions of the chapter on the most-likely path, the overall strategy for the Asia-Pacific includes two lead actions and three enabling actions.

Lead Actions

Lead actions are the enduring contributions that create effects directly linked to realizing regional objectives that produce a desired end state. Two lead actions achieve regional stability and enable the building of regimes: (1) ensuring the USAF's capability of holding targets at risk and (2) establishing US regional influence.

Sustain Deterrence and, If Necessary, Defeat Aggression of Potential Adversaries

The USAF's enduring contribution of holding targets at risk is vital to achieving deterrence, aiding in assuring access to the global commons, supporting economic interdependence, and defeating aggression if necessary. The US focus here is to deter hostilities, since deterrence operations contribute to regional peace and stability, which in turn help keep the global commons open, which in turn allows for economic development and greater economic interdependence. The USAF contributes to effective deterrence through nuclear deterrence operations and conventional and cyberspace forces able to conduct global precision attack. Carrying out nuclear, conventional, and cyberspace deterrence operations to assure allies, dissuade proliferation, and deter potential adversaries supports not only the Asia-Pacific region but also all of the geographic combatant commanders. If deterrence fails, the ability to defeat an act of aggression quickly through the use of conventional strike and/or cyberspace assets assures access to global commons and can contribute to the prompt return of regional stability.

Deterrence operations—nuclear. Nuclear deterrence operations are the most critical core function the USAF provides to support US objectives. It is the most critical because even though credible nuclear deterrence brings stability to the region, the loss of US extended deterrence's credibility would trigger nuclear proliferation by adversaries and allies alike, creating a cascading situation of uncertainty, destabilization, and—in the worst case—the use of nuclear weapons. The presence and possible use of nuclear weapons demand that conflict escalation be factored into an USAF and national strategy for the Asia-Pacific. Toward that end, military leaders and politicians must communicate clear, unequivocal “red lines” unambiguously understood by all parties involved. If the USAF is to properly play its

part in these missions, it must maintain credible airborne (aircraft) and ground-launched-missile capabilities.

To be convincing, any USAF nuclear deterrent must include the ICBM and bomber legs of the nuclear triad. The greatest issues reside with aging ICBM launch facilities and the 450 Minuteman III missiles. Much of this equipment reaches the end of its scheduled life span during this study's timeline in 2020–23.⁴⁴ Efforts are under way to extend the life of the ICBMs to 2020, possibly 2030, and of launch-control facilities to 2025, but no serious options have materialized for life-extension programs for these systems past these dates.⁴⁵ In addition to the ICBM force, the USAF's nuclear-capable, long-range bomber force is facing modernization challenges. The current combination of 20 B-2s, 76 nuclear-capable B-52Hs, and associated weapons provides an adequate nuclear strike force to support nuclear deterrent operations through 2020. However, even with planned modernization, we have serious concerns about the ability of these systems to continue as a legitimate part of the nuclear deterrent family of systems in 2025 and beyond.⁴⁶

In a highly contested nuclear environment, the USAF would look to its most capable bomber—the B2. Although the B-2 is young compared to the B-52H, its 1980s stealth technology will make it less survivable in future contested airspaces.⁴⁷ In addition to the B-2's aging stealth effectiveness, the small number of airframes limits the aircraft's ability to provide persistence, restricts the amount of total available payload, and puts survivability at risk because all aircraft are located at one base. To make up for the relatively small number of B-2s, the USAF relies on the more numerous but lower-penetrating-quality B-52Hs. Since it first deployed in 1962, the B-52H has gone through constant modifications that have made it a very effective weapons-delivery platform expected to stay in the USAF inventory into the 2040s. Regular updating has improved the aircraft's avionics as well as its communication, offensive, and defensive systems; however, no update can significantly change the size, radar cross section, or speed of the aircraft. Without heavy support from other conventional or nuclear-capable assets, the lack of stealth and speed makes the B-52H vulnerable in a highly contested A2/AD environment.

An aging, ineffective nuclear deterrent force—either perceived or actual—loses its deterrent value. Such a situation may embolden a potential adversary such as China or Russia and cause a loss of confidence in various US-led security arrangements with regional partners such as Japan, Korea, and Australia. Such a loss may motivate a country to develop its own nuclear force capability or realign its national policies with other nations in the region.⁴⁸

Deterrence and global attack operations: Conventional and cyberspace force. Conventional and cyber forces able to conduct global precision attack have a dual purpose in relation to the concept of holding targets at risk. These forces provide nonnuclear ways and means to conduct conflict deterrence in the Asia-Pacific as well as the more likely form of military force used to defeat aggression. Both deterrence and the use of force against aggression help assure access to the global commons and create stability that promotes economic growth and the potential for economic interdependence.

Conventional forces. For the Asia-Pacific region, the B-1, B-2, and B-52 weapon systems are best suited to meet the conventional deterrent needs of a JFC. These systems can overcome the long distances and lack of land-based military airfields; furthermore, if necessary, they can penetrate sophisticated A2/AD systems with enough payload and persistence to hold strategic targets at risk. For the time period of this study, these long-range bombers are sufficient to meet conventional deterrence needs. However, the concerns described earlier

for the use of the B-2 and B-52 for the nuclear deterrence mission remain the same for their employment in the conventional deterrence role. B-52s' ability to penetrate sophisticated air defenses without significant support remains doubtful, and the aging stealth capability and meager numbers of the B-2 raise concerns. The B-1 bomber's capabilities are better suited for the current demands of the Asia-Pacific. That aircraft's higher speed and lower radar cross section make it more survivable than the B-52; moreover, the larger number of airframes (65 total aircraft) offers more payload and persistence capability to a JFC than the B-2. However, like its other bomber counterparts, the B-1 faces age-related issues. In 2003 the USAF retired 33 B-1 aircraft to free up money for upgrades to extend the service life of the remaining fleet.⁴⁹ In addition, as of 2012 the USAF plans to spend "\$191.4 million in modernizing the B-1 to prevent obsolescence and diminishing manufacturing sources issues and help sustain the B-1 to its approximate 2040 service life."⁵⁰

By 2020 the utility of these conventional aircraft will begin to decline, and the USAF will need to invest in and field new long-range-strike capabilities. Fielding this family of capabilities is critical and must not be derailed by budget constraints. Other cuts to USAF programs, including reduction of the programmed number of the F-35 purchase, should be considered before cuts to the long-range-strike program. Development of long-range-strike systems must focus on the expected mission and the ability to produce certain effects. Given that understanding, then the decision on the type of platforms and weapons that make up the family of systems takes care of itself. For example, the need to assure nuclear surety and to hold targets at risk deep in the interior of a country makes a manned penetrating bomber the best option for nuclear deterrence operations. For conventional strike missions, long-range, stealthy, high-speed standoff munitions delivered from less expensive platforms can attain a JFC's desired effect.

In addition to their use in deterrence operations, conventional strike and—potentially—cyber assets are the primary military means of defeating aggression should deterrence fail and some type of armed conflict occur. Most likely, these assets will be a part of a combined and joint operation to suppress small-scale skirmishes over boundary disputes if international regimes fail and if US treaty or other obligations are invoked. We could also call upon these capabilities in a major combat operation in places like the Korean Peninsula. In light of the possibility of unplanned conflict escalation, we must carefully weigh any conventional strike operation that could result in a force-on-force confrontation between the United States and any major regional power. Escalation control must be factored into operations since the most worrisome scenario requiring conventional USAF strike operations is support of an ally involved in a maritime territorial dispute with China. Although the likelihood of major combat operations is low, we cannot rule them out. The USAF must be ready to conduct such operations if necessary.

If the United States has to engage in combat operations during the time frame considered by this study, both the bombers discussed above and the fighter force are fully capable of conducting strategic attack, interdiction, or close air support. The modernization of the fighter force with the fifth-generation F-35A will enhance the USAF's conventional strike capability when it reaches initial operational capability toward the end of this study's time frame. The F-35's stealth, sensor package, and integrated avionics provide a lethal and survivable strike capability. This aircraft is not only critical to modernization of the US fighter force but also essential to key allies' force-upgrade plans. Currently the F-22 adds a highly survivable strike capability to the fighter mix. Its stealth, supercruise, and maneuverability

make this platform well suited to penetrate highly defended airspace and accurately strike assigned targets. Major issues affecting the use of all fourth- and fifth-generation fighters include their reliance on air refueling to extend their geographic range, their small payload capacity, and in some cases the total number of airframes available, which limits persistence. Basing is a critical factor in minimizing the negative impact of these three issues. Options that provide basing near potential areas of operation for fighter forces reduce transit distance to and from targets, thereby lowering the need for tanker support, maximizing the available sorties during each 24-hour period, and effectively increasing payload and persistence.

Cyberspace attack capabilities. The speed, range, and payload of cyberspace attack capabilities are quite capable of overcoming the Asia-Pacific's vast distances, basing issues, and A2/AD concerns within the physical domains. The fact that cyberspace attack can hold targets at risk from strategic to tactical levels makes it suitable for deterrence and strike operations.

In their deterrent role, cyberspace attack capabilities complement nuclear and conventional deterrent capabilities. Although cyber offers a credible threat against elements of national power to deter aggression, it does have limits, compared to nuclear and conventional forces. These limits include the ease of defending against a cyber attack, the lack of cyberspace targets in an underdeveloped country, the inability to precisely communicate intent due to the nature of cyber attacks, and the difficulty of rendering a victim state completely unable to respond.⁵¹ Understanding these limits enables a JFC to effectively integrate cyberspace attack capabilities with those of other nuclear and conventional forces, producing a coherent overall deterrent strategy. If deterrence fails, cyberspace attack can independently—or in support of other military capability—strike at targets to defeat aggression. Military networks, databases, and other electronic equipment, as well as civilian infrastructure that supports military operations, are possible targets.

Over the next seven years, the USAF must continue to develop the organizational structures and processes to integrate cyberspace attack capabilities into operational plans for the Asia-Pacific. This is critical since a variety of government agencies are involved with the development and use of cyberspace attack. Further, the fact that private corporations own much of the means of carrying a cyberspace attack payload further complicates the use of this capability. The USAF must become proactively involved with all partners to help design the appropriate laws and policies governing the potential use of cyberspace for military activities.

Building US Influence in the Asia-Pacific Region

The second of the two lead actions that the USAF must take to realize overall US objectives is crucial to the outcome in all three paths. That is, USAF efforts to build partnerships with foreign countries are no longer optional but necessary. Establishing US influence in the Asia-Pacific region is essential to maintaining access to global commons, strengthening economic interdependence, and, if necessary, helping to defeat aggression. Strong regional partnerships enable regional access and international cooperation to keep global domains open if contested, promoting economic growth and interdependence through regional stability. If conflict does occur, such relationships secure allied or partner basing, logistical support, and combat forces to defeat aggression. Building partnerships comes through interaction with regional governments, militaries, and populations. Such interaction occurs through military engagement, security cooperation, and foreign humanitarian assistance.

The US military already uses exercises to develop regional partnerships. In 2011 US Pacific Command participated in 172 multilateral and bilateral exercises with 24 countries in the region and plans to increase the number and size of these events in the Asia-Pacific.⁵² These exercises range from joint military activities to enhance extended deterrence, interoperability, and the readiness of alliance forces in places such as South Korea and Japan, to counterterrorism training in the Philippines, to talks on establishing a hub of regional humanitarian and disaster-relief efforts in Thailand.⁵³

The alliance with Australia has evolved from a Pacific partnership to an Indo-Pacific one. The two countries' political and military leaders are considering an increased combined naval presence and capabilities to respond more readily to humanitarian disasters, improved Indian Ocean facilities, and expanded training exercises for amphibious and land operations.⁵⁴

To achieve optimum levels of multinational cooperation in these partnerships, the USAF must help determine what combination of military advice, technical assistance, and weapons sales will best help each country in the region. Consequently, the service must integrate its efforts into an overall joint military plan that supports a whole-of-government strategy to build regional influence. The partnering strategy must proceed from the premise that the interaction will benefit the needs and desire of all parties involved. The relationship should follow regional engagement guidelines articulated by organizations such as ASEAN, honoring nonalignment principles where appropriate, and should recognize existing United Nations practices, international laws, and guidelines common to the members of that organization. These partnerships should not be built on zero-sum terms—that is, a partner nation should not have to relinquish other relationships deemed important to its national interests in order to enter into a relationship with the United States. No US partnering relationship should be presented as a loss for other major regional actors (e.g., either China or Russia).

As part of the transitional leadership strategy, the key involves establishing interrelationships, economic interdependence, and regimes and norms that reflect peaceful conduct and resolution of disputes. Doing so demands fully cooperative engagement by the United States in a manner that does not lead to nations having to "choose sides." Building such a partnering strategy calls for flexibility and, at times, patience on the part of the United States—flexibility because relationships will vary from bilateral to multilateral arrangements and patience because some partners are comfortable with the current level of activity in the defense relationship and may not be ready to move into new areas as quickly as the United States.

Military engagement and security cooperation with Japan, South Korea, Australia, Thailand, and the Philippines are strong and must continue. Expanding programs such as RC-135 Rivet Joint shared operations with these countries and others in the region will strengthen relationships and interoperability. The United States must not back away from assuring partners—and this includes Taiwan—of its willingness to defend them from unprovoked aggression. Additionally, we should pay attention to expanding interaction with countries that in the past have resisted significant contact. These countries include but are not limited to China, Russia, Vietnam, India, and Indonesia. With the exception of Russia and China, US partnerships should emphasize the following:

- Increasing the general professionalization of military education and training

- Developing the capacity of the armed forces to cooperate in international coalitions
- Conducting training in the area of military law and justice
- Helping militaries develop skills to combat threats to the nations and to support civil-military operations. These skills could include search and rescue, support of international relief, stability and peacekeeping operations, strategic communications, coordination and support of relief and humanitarian organizations, combined operations in both civil and military situations, and combating transnational terror and crime.
- Within proper parameters, conducting foreign military sales to enhance strategic relationships⁵⁵

Relationships among the United States, China, and Russia could benefit from the items presented in the list above; however, US military engagement with these two countries seeks to improve communications and understanding with each country's military—not necessarily to develop capacity. Improved interaction builds trust and reduces the chance of taking action based upon a miscalculation of intent—an important factor in all three paths examined by this study. Here, military engagement should consist of military education and training exchanges as well as exercises and actual combined operations focused on confronting regional challenges such as disaster-relief operations and combating the alarming levels of illegal trade in timber, wildlife, and illicit drugs by sophisticated transnational criminal networks.⁵⁶

Enabling Actions

This section addresses three contributions of USAF power that enable the success of the two lead actions, which are necessary to address challenges along the three paths. The enabling contributions provide the means of supporting the creation of effects that build US regional influence or hold targets at risk, thus helping to reach the desired end state.

Rapid Global Transport in the Asia-Pacific Region

Rapid global transport in the region is essential to a JFC's ability to conduct operations and build US regional influence, which contributes to attaining the desired end state. Such transport provides the airlift, air refueling, and communications/computer network infrastructure to produce desired effects across the vast distances of the Asia-Pacific theater. Airlift offers vital support to deterrence and strike operations by moving and supporting personnel and equipment needed to conduct these missions. It also helps establish US influence by providing disaster relief and other supplies to regional nations in need. Air refueling enables nuclear and conventional deterrence as well as the ability to strike targets to defeat acts of aggression by extending the range and increasing the persistence and payload of strike assets. Global and regional cyberspace networks provide communication and computer capabilities that send and receive data, information, and knowledge payloads. These cyber payloads enable deterrence, strike, and influence missions through a variety of means, such as command and control (C2) functions as well as planning and targeting information.

The military configuration of the region makes the combined employment of airlift and cyberspace capabilities especially useful for military engagement opportunities there. Many of the smaller nations with which the United States should strengthen partnerships have air forces with limited capabilities, especially airlift and communications/computer infrastructure. Current and potential regional partners could benefit from the USAF's knowledge in the areas of airlift and cyberspace infrastructure that supports communications and computer networks. In addition, nations are more inclined to grant access to global transport aircraft. Greater access shows American presence and helps build influence.

Over the next seven years, forces used for air refueling and airlift will be well equipped to conduct missions in the Asia-Pacific region. The C-5M and C-17 provide the payload and strategic reach necessary to support US operations. Further, the C-130 J/H supplies critical intratheater lift to shift personnel and equipment throughout the region to support contingencies. Vast over-water distances in the region and the USAF's increasing dependence on short-range strike aircraft make the KC-135 and KC-10 air-refueling fleet a critical asset—one that could experience severe stress if multiple contingencies occurred simultaneously. We might be able to alleviate this stress by exploring opportunities for contract air refueling for missions in the continental United States, freeing tankers for other global missions.⁵⁷

Beyond 2020, modernization issues exist for some of these capabilities. The KC-46A is the new tanker under development to replace the aging KC-135 fleet. It is vital to the USAF that development of this new tanker remain on time because any significant delay threatens the viability of the most important enabling capability for a US strategy reliant upon the USAF's global prowess. Even theater-level capabilities are threatened. If major strike operations are needed, the limited number of USAF long-range-strike assets makes basing and refueling issues critical to mission accomplishment. Along with keeping the KC-46A procurement on time, the USAF must continue to expand the overall procurement numbers. Presently the service has funds to buy 179 KC-46As, with all aircraft delivered by 2028.⁵⁸ These new tankers replace only about 40 percent of the KC-135 force and 35 percent of the combined KC-135/KC-10 tanker fleet.⁵⁹ Even with these additions, the USAF's air-refueling capability would not meet the stated requirement for two of the three scenarios used in the *Mobility Capabilities and Requirements Study 2016*. Replacing the aging tanker force must remain the USAF's number-one acquisition priority. In addition to modernizing the tanker fleet, research and development must continue to develop capabilities for remotely piloted air-refueling options. Moreover, modernization of the strategic airlift fleet must continue—specifically, conversion of the C-5 fleet to 52 C-5Ms—and work must begin on the early analysis and research of a new strategic airlift aircraft. Although the 223 C-17s are among the newest aircraft in the USAF's inventory, they have seen higher-than-expected utilization rates supporting operations in Iraq and Afghanistan.⁶⁰ This increased wear and tear will shorten the planned life expectancy of the C-17, requiring a replacement aircraft sooner than anticipated. This analysis and research effort should include looking at the feasibility of using remotely piloted aircraft (RPA) and lighter-than-air vehicles for air-distribution needs.

Keeping up with the rapid pace of technology and the skill sets needed to create and employ cyberspace communications and computer networks is a constant challenge and an issue that will continue throughout the time frame of this study and beyond. The USAF is working hard to create a skilled, technical workforce through collaborations and partnerships with academic institutions as well as established, deliberate processes for training, continuing education, and certification of cyberspace professionals.⁶¹ However, these highly

skilled individuals are in demand outside the USAF, so retaining/growing this precious pool of expertise is problematic.⁶² In addition, rapid upgrades to hardware and software challenge the service's ability to maintain standardized joint acquisition of systems to create both rapidly delivered and fully interoperable cyber network capabilities. Further complicating this issue, USAF network systems must also work with our partner nations to conduct combined operations ranging from humanitarian assistance and disaster response to territorial defense.

Responsive, Full-Spectrum ISR in the Asia-Pacific Region

To enable operations that give decision makers the essential intelligence they need to make accurate and timely decisions, we must have responsive, full-spectrum ISR in the Asia-Pacific region. Decision superiority allows commanders to deter conflict by demonstrating the ability to hold targets at risk and, when deterrence fails, to conduct strike missions alongside partner and allied nations, strengthening relationships with all who contribute to achieving the desired end state. Establishing responsive, full-spectrum ISR for the Asia-Pacific requires conducting and synchronizing ISR assets across global, theater, and tactical levels throughout all domains. The USAF must integrate its air, space, and cyberspace ISR assets with other land and naval assets and, at times, with those of our international partners and allies.

The AirSea Battle initiative offers a framework to identify and develop integrated structures and processes that leverage space and cyberspace assets as part of the overall mix of ISR capabilities with joint, coalition, and interagency partners to develop required capabilities for the joint fight.⁶³ The sharing of classified intelligence information with coalition members presents problems during any type of operation. One must strike a balance between protection of national secrets and the need for effective mission planning and execution. Overcompartmentalization of classified information hurts vertical and horizontal integration by limiting the distribution of information needed for mission accomplishment. This issue can negatively affect the establishment of trust among allies during operations—trust that may otherwise have strengthened partnerships. US information security policies should give a commander flexibility to share information based upon mission needs. Furthermore, information systems such as the Combined Enterprise Regional Information Exchange System should provide for coalition information exchange at the secret-releasable level. This network should offer a common operating picture, e-mail, web dissemination, and full collaboration capability within the network domain.

In addition to strengthening ISR integration, the USAF must develop a more balanced and survivable mix of airborne platforms to enable ISR operations. Recent heavy investment in MQ-1 Predator and MQ-9 Reaper RPAs and the MC-12 Liberty has greatly improved ISR capabilities. These assets are perfect for supporting the desire to develop influence in the region by helping partners combat terrorism and transnational criminal networks, respond to disasters, keep an eye on borders, patrol lines of communication, and conduct counterpiracy operations. For these roles, partner nations likely will permit basing support, negating the lack of range for these assets. However, if deterrence fails and armed conflict occurs, then these assets may lose their ability to operate effectively in a contested environment.⁶⁴ In addition, during strike operations, basing access may be limited, thereby putting these assets out of range due to the lack of air refueling. The USAF must continue to invest in all-weather, wide-area surveillance platforms—including space assets focused on

the region as well as upgrades to the U-2 and the Global Hawk—and begin research for a follow-on airborne wide-area surveillance platform. Moreover, integration of the sensor capabilities of the F-22 and F-35 into theater ISR systems will greatly enhance theater awareness over time.

Domain Control in the Asia-Pacific Region

Designated the lead service for control of the air and space domains, the USAF also has joint responsibility for the cyberspace domain. Securing the high ground of air and space and the electromagnetic spectrum that defines cyberspace enables freedom of action for joint and coalition military operations as well as civil and commercial activities. At the appropriate degree for operational objectives, domain control is a critical prerequisite for all operations and an enabler to attaining this path's end state.

The ways and means of gaining control of a domain are not exclusive to that domain. For example, assets used for that purpose may come from the cyberspace, space, maritime, or land domains. Computer network attack (CNA) against an adversary's air defense system can enable strike operations. At the same time, space assets can pass information to Navy Aegis cruisers, enabling them to conduct integrated missile defense while F-22s, enabled by space-based GPS and the cyber-degraded air defense system, can fly offensive counterair missions against enemy airfields. The effective control of one domain relies upon control of other domains.

This integrated understanding of domain control must become part of an Asia-Pacific strategy. USAF elements needed for such an integrated strategy include integrated joint C2; secure, reliable networks; space assets that provide responsive situational awareness; communications and navigation; air-breathing strike and ISR platforms to conduct offensive and defensive counterair missions; adequate land basing; and air refueling. Efforts under way with the AirSea Battle construct should help build such an integrated strategy leading to air, space, and cyberspace superiority. Domain control has a symbiotic relationship with other types of operations: it enables all operations and all operations contribute to its accomplishment.

Major obstacles to gaining and maintaining domain control through air, space, and cyberspace superiority operations in the Asia-Pacific region include basing, recapitalization/modernization of space and fighter assets, and cyberspace network attack and defense. Gaining access to land basing is essential due to the maritime nature of the region and the short range of fighter aircraft in comparison to the size of the region—hence the importance of developing partnerships there. One of the US goals for partnering is to obtain access to basing for the purpose of conducting air superiority missions in potential conflict areas. Rather than build large, permanent US-controlled bases, the United States only wishes to rotate forces through a location for developing partnerships and interoperability and for gaining specific situational awareness in the region. A more detailed discussion of basing strategy occurs later in this chapter.

The current mix of fighter aircraft is sufficient to conduct air superiority missions across the range of military operations in the Asia-Pacific for the next seven years—as long as we can position them sufficiently close to their required locations and as long as the legacy fleet continues to receive upgrades to respond to increasingly modern threats. Currently the F-22's ability to conduct counterair missions is unmatched. The platform's effectiveness continues to increase as the USAF gains operational experience through deploying it to the

Asia-Pacific region. Once operational, the F-35 will significantly improve the USAF's counter-air capability; however, only small numbers will be operational by the end of this study's time frame. As a result, the USAF must rely on its legacy fighters to supplement the next-generation aircraft and to provide sufficient assets to generate the payload and persistence of operations needed to cover the vast Asia-Pacific region. As A2/AD threats continue to improve in range and lethality, upgrades to legacy fighter systems must continue. These upgrades include programs already under way, such as those to extend aircraft service life, aircraft radar and sensor upgrades, improvements to air-to-air munitions, select electronic-warfare enhancements, and refinement of training capabilities and training-range equipment.⁶⁵

Budget constraints have slowed the pace and scope of the modernization of space forces, causing the USAF to concentrate its investment on programs critical to joint force success. One such focus area must be space programs needed to conduct domain-control operations, including fielding new satellite communications systems; replacing legacy early missile warning systems; improving space-control capabilities; upgrading position, navigation, and timing capabilities; and conducting space launch.⁶⁶ Two Asia-Pacific nations have demonstrated antisatellite capabilities. The United States can mitigate this capability through a space-defense-in-depth strategy, but it must have reliable launch so that it can replace disabled satellites.⁶⁷

The ability to operate in cyberspace is essential to an integrated strategy of domain control. Cyberspace is a network of interdependent information technologies, including the Internet, telecommunications networks, computer systems, and embedded processors.⁶⁸ Armed with an understanding of the growing threat to and our dependency upon cyberspace, the USAF is increasing the network's defensibility by creating the AFNet Migration and applying a "defense-in-depth" alignment.⁶⁹ AFNet Migration turns the current dispersed, installation-managed network architecture into a single, homogeneous, and centrally managed USAF network: "Migration to a single architecture provides the opportunity for USAF-wide network situational awareness—an awareness that enables robust, defensible and trusted air, space, and cyber operations."⁷⁰

In addition to the network-migration initiative, the USAF must continue to move from a reactive to a proactive cyberspace defensive posture.⁷¹ The service can do so by continuing to expand its small number of teams that seek out friendly network vulnerabilities. The proactive network probing by USAF cyberspace professionals will eliminate problems with cyber domain control before an adversary can exploit them. Proactive defense also reduces the need for reactive human-in-the-loop processes. The USAF must continue to invest in automated sensors that will recognize and repel network attacks as they happen. Although no defensive measures can make cyberspace completely safe, adopting a proactive approach will increase the USAF's ability to maintain control of this domain.

Finally, offensive use of the cyberspace domain can assist in domain control. CNA capabilities can control the cyber domain by denying an adversary's use of the cyber domain and can deny, disrupt, or destroy capabilities used to help control other domains. Pacific air forces must work with other appropriate agencies to operationalize and integrate CNA capabilities into campaign plans by reducing the excessive security compartmentalization of CNA methods. A commander who does not become aware of an effective CNA means until a crisis occurs is unlikely to use that capability. Prior familiarity with a capability fosters understanding, which gives a commander and staff confidence that the means will deliver the desired effect.

Basing Approach in the Asia-Pacific Region

The desire to base USAF assets close to a potential area of conflict must be balanced with the threat to the base as well as the political climate of the host country that determines use of the base for a specific operation. Thus, to provide flexibility for operations, the basing approach for the Asia-Pacific relies upon a three-tiered construct: (1) US-based global power projection and deterrence, (2) outer regional presence for regional power projection and staging, and (3) inner regional presence for engagement, influence, and—if required—close combat. The three-tiered basing approach is designed to support US objectives by supplying the infrastructure necessary to support operations to deter conflict, respond to contingencies involving the global commons, defeat any aggression, and provide stability to encourage economic growth and interaction.

The first tier of basing resides in the United States itself. Long-range operations from America can support deterrence, global strategic attack operations, and rapid global mobility. They also offer reachback capability needed to support any mission conducted across the five enduring contributions.

The second tier consists of bases in the Asia-Pacific region that lie outside the range of the greatest A2/AD threats. These bases should be located only in countries that are strong US allies, such as Australia; in British territory such as Diego Garcia; and in US territories such as Guam and the Northern Mariana Islands. These locations would provide the greatest guarantee of host-country political support, ensuring base usage for any anticipated operation. Bases in the second tier must have well-developed infrastructure to support the full range of USAF missions contributing to all five of the service's enduring contributions. These bases should primarily consist of US-run facilities but also should include host-nation facilities through which US forces rotate as part of a standard deployment schedule.

The third tier of bases consists of current permanent locations (Japan and South Korea) as well as present and future expeditionary locations close to expected operating areas. The permanent bases in Japan and South Korea will need the same infrastructure as the second-tier bases, together with substantial hardening and defensive capabilities—but most third-tier bases will not be hardened. These operating bases should include Central and South Asia as well as the greater Asia-Pacific region. The primary objective of third-tier basing is to show presence, develop working relationships with our partners, prepare to aid in times of disaster, and—if needed—project appropriate forms of power with the ability to disperse assets. Although the survivability of these bases would be at risk during a major combat operation, their value in terms of regional influence outweighs that risk. The goal is not to build more permanent, US-run third-tier bases in our partner nations throughout the region, because doing so would likely be seen as a threat to regional powers—possibly contributing to regional instability that would adversely affect achievement of the desired end state. This study envisions these bases having as their primary missions humanitarian assistance, disaster response, civil search and rescue, ISR, development of partnership capacity, airlift, air refueling, logistical support, and C2. Locations for the potential expeditionary bases include countries such as Singapore, Thailand, Philippines, Australia (the Cocos Islands), Vietnam, Indonesia, Malaysia, Brunei, and India.⁷²

Command and Control of USAF Forces in the Asia-Pacific Region

Effective C2 of USAF operations remain essential to success in the expected, dynamic Asia-Pacific operating environment, both now and in the future.⁷³ Over the next seven years, the Asia-Pacific region will challenge military forces with threats and opportunities across the range of military operations, extending from relief and reconstruction in crisis zones, to cooperative engagement in the global commons, to small-scale conflicts over territorial disputes, to least likely but always possible large-scale major conflict. Integration across such a wide range of missions stresses the need for the USAF to adjust its C2 structures to a more adaptive C2 approach for USAF operations built upon unified action that leads to unity of effort.⁷⁴ Adaptive C2 of USAF capabilities places decision authority at the most appropriate level of command, achieving agility and speed of action in delivering effects. Creating unity of effort through horizontal collaboration built on mutual trust among war-fighting partners rather than a primary emphasis on traditional vertical interaction in the military hierarchy is critical. The design for realizing the goal of adaptive C2 will vary from situation to situation. At times, the lowest level is national command, such as nuclear deterrence and some cyberspace operations. Other times, effective operations necessitate the presence of commanders having decision-making authority, possessing the required information, and interacting at organizational levels below the most senior commander—individuals who can provide optimal span of control, unity of command, and tactical flexibility. These operations also warrant distributing planners and control elements to appropriate partners' echelons and giving them information access and the authority to make decisions. A disaster-relief action led by a joint task force (JTF) exemplifies such an operation. A commander should consider six key variables when determining the lowest appropriate level to place C2 nodes: (1) the nature of the operation, (2) the capacity of available resources versus the requirement, (3) the capabilities of subordinate units, (4) the degree of trust and confidence among partners, (5) the political risk, and (6) the desire to exploit interaction among the speed, range, persistence, and payload of USAF capabilities. Considering these six variables within the context of a specific situation will assist a commander in creating a C2 design with the proper balance of centralization versus decentralization.

The USAF should make adjustments to its current C2 structure that will allow the service to become more adaptable and better prepared to support the full range of military operations expected in the Asia-Pacific region. At present, the structure is optimized for global and theater-level missions such as major combat operations on the Korean Peninsula or with a peer adversary such as China or Russia. More probably, however, the USAF will use its capabilities in this region for smaller-scale contingencies led by a JTF. This likelihood creates a problem for the USAF because, other than through ad hoc means, its C2 structure is not fully organized, trained, or equipped to provide C2 nodes in support of JTF-led operations. To overcome this lack of adaptability, the service must address several issues in order to create a more scalable C2 structure. First, it must broaden Airmen's understanding of the concept of centralized control, the mainstream USAF interpretation of which holds that centralized control of its capabilities occurs only through the command of a senior Airman at the combatant commander level, supported by centralized planning. This limited understanding of the concept creates resistance to change. Airmen must grow to understand, as they once did, that establishing a USAF commander with appropriate command authorities at an echelon below the combatant commander level or attaching

USAF forces to a JTF *does not* necessarily violate the doctrinal concept of centralized control. Once this barrier to understanding is removed, the next step is to create the scalable capability and capacity of a more adaptive C2 structure, including mobile command elements having the trained personnel, communications equipment, and planning tools to integrate USAF capabilities into JTF operations. These units will promote effective integration and synchronization of the service's capabilities with the joint mission, including aligning forces and establishing command authority—along with planning expertise—at the appropriate organizational level. The intent is not to replicate the full capabilities resident within current air operations centers. Mobile command elements need the proper people, equipment, and processes and procedures established to reach back and rely on the theater air operations center to produce the air tasking order, integrate theater and global assets, and provide airspace control measures. Developing a scalable C2 structure not only will optimize USAF C2 for the Asia-Pacific region but also will help all of the service's operations worldwide. Because this is a servicewide need, the USAF should develop an integrated set of defined planning, programming, and budgeting requirements, thus eliminating redundant efforts in different USAF commands.

Conclusion

Asia's future path remains uncertain. It may evolve along a path toward peaceful cooperation or one that leads to confrontation and war. Most likely, it will follow a route somewhere between these extremes. As it does so, there are things we know.

Asia will continue to evolve largely along its current path. China's and Asia's rise will continue. Over the next 10 years, China will not overtake the United States in overall power or military power, but it will likely pass us in total GDP and will certainly exert strong influence in the Asia-Pacific region. Economic interdependence will grow, linking the economies of the region more closely and making warfare a more painful exercise for all than it would be today. If not properly managed, this rise of China will persist in inducing unease in the region. Further, if China cannot develop mutual strategic trust with its partners, it may well successfully contain itself completely. Regardless of China's behavior, relations between the United States and its partners will be sensitive, since Asian economies will be intertwined with China's and none of our partners will want to be in the position of having to choose sides.

Developing a USAF strategy for the Asia-Pacific that addresses the military-security needs of our partners without simultaneously jeopardizing their economic requirement is a complex and difficult undertaking. A successful strategy leverages appropriate USAF capabilities in a way that attains stated objectives leading to the desired regional end state. The multifaceted strategy must contend with a broad spectrum of threats and a diverse set of nations and their interests. The strategy must be part of an integrated DOD effort that supports the overall national strategy for the region. To achieve the USAF's strategy is to deter conflict by having the capacity to hold targets at risk through integrated nuclear, conventional, and cyberspace deterrence operations; to continue to build and strengthen regional influence through military engagement, security cooperation, and foreign humanitarian assistance; and, when all else fails, to conduct global precision attack to stop aggression when it occurs.

To execute these lead actions effectively, the USAF must be a transitional leader within the region. Specifically, it must lead from a position of strength and use that leadership to build partnerships and establish regimes that enhance freedom of navigation and commerce. It must foster and continue economic integration, leading from a position of understanding and working within the cultures and governmental structures of the region. Finally the service must use its military might to conduct humanitarian-relief operations and disaster response to ensure that no single natural event derails the regional economy. To produce this outcome, the USAF must continue its modernization efforts with long-range strike and the fighter force. The service must integrate cyberspace defensive and offensive operations into deterrence and strike operations as well as include measures to control conflict escalation into all operational plans as a means of preventing the inadvertent growth of conflict. The USAF's efforts to build regional partnerships must have a priority as high as that of its other mission areas. Partnerships develop trust, help align regional interest toward common goals, and provide access for US forces to conduct military operations when needed. The USAF must create unified action through an integrated plan that guides the actions of all US government partnership stakeholders.

If the USAF wishes to lead from a position of strength and with the reach necessary to maintain that strength, its strategy must also focus on global transport, full-spectrum ISR, and domain-control capabilities. To support operations throughout this large theater, the USAF must continue to modernize not only the C-5M but also its air-refueling fleet with the new KC-46. In the domain of space, the service must continue focused investment on new satellite communications systems, replacing legacy early missile warning systems, improving space-control capabilities, and upgrading position, navigation, and timing capabilities. The USAF must also develop a more balanced and survivable mix of airborne ISR platforms to enable operations in contested environments. The AirSea Battle construct should be used to develop an integrated domain-control strategy and to develop operational concepts that leverage space and cyberspace assets as part of the overall mix of ISR capabilities. In addition, the service must continue to reinforce the defense of its networks. Initiatives such as the AFNet Migration, defense-in-depth alignment, and the move toward a proactive cyberspace defensive posture are vital. These efforts will ensure a reliable network able to support the full range of military operations in the Asia-Pacific theater.

Finally, the strategy must be supported by a flexible basing strategy and scalable C2 structure. The recommended three-tiered basing plan enables global and regional power projection and deterrence, regional staging, and presence for engagement, influence, and close combat if required. Moreover, since operations in the Asia-Pacific region during this time period will serve a mixture of military and civil objectives, success in these operations demands the integration of capabilities from all government agencies, services, and coalition partners. Such integration stresses the need for the USAF to adjust its C2 structures to a more adaptive C2 approach for USAF operations built upon unified action that leads to unity of effort.

If these actions take place, then the USAF will have successfully played its part in building partnerships across the Asia-Pacific basin—partnerships that will help strengthen the norms and regimes that help reduce the probability of conflict and lead to a greater likelihood of peacefully reconciling differences. Alongside other aspects of the president's US pivot to Asia, this creates a set of circumstances that makes the best-case path more likely and the worst-case path less probable. Most importantly, regardless of which path the Asia-

Pacific region travels, it ensures that the USAF remains ready and able to handle any challenge that the future may hold.

Notes

1. Michèle A. Flournoy and Shawn W. Brimley, "Strategic Planning for National Security: A New Project Solarium," *Joint Force Quarterly* 41 (Second Quarter 2006): 80–86.
2. *Ibid.*, 81.
3. The Solarium study referred to the different cases as *paths*. Here, the terms *path*, *case*, and *scenario* are used interchangeably.
4. Failing to consider multiple possible outcomes can lead to surprise. See Peter Schwartz, *The Art of the Long View* (New York: Doubleday, 1991), 91–95; and Peter Schwartz, *Inevitable Surprises: Thinking Ahead in a Time of Turbulence* (New York: Gotham, 2003), 1–19.
5. Schwartz, *Art of the Long View*, 114–15. Schwartz defines a *predetermined element* as a feature seen to occur across the multiple scenarios. Features that appear regardless of the path the world is on are thus predetermined and should be treated as inevitable.
6. *Ibid.*
7. John Mearsheimer, *The Tragedy of Great Power Politics* (New York: W. W. Norton, 2001), 65, 426n30. In addition to discussing the idea that GDP is not the sole measure of national power, Mearsheimer addresses the concept of latent versus actual power. Nation-states that are largely agrarian and not industrialized cannot translate as much of their GDP to national power as can those states whose industrial capacity is more advanced.
8. Gooho Kwon, "A United Korea? Reassessing North Korea Risks (Part I)," Global Economics Paper no. 188, Goldman Sachs, 21 September 2009, http://www.nkeconwatch.com/nk-uploads/global_economics_paper_no_188_final.pdf.
9. International Monetary Fund, *World Economic Outlook: Hopes, Realities, Risks* (Washington, DC: International Monetary Fund, April 2013), 54–59. See also International Monetary Fund, *World Economic Outlook Database*, September 2012.
10. International Monetary Fund, *World Economic Outlook: Hopes, Realities, Risks*.
11. Myra MacDonald, "Asia's Defense Spending Overtakes Europe's: IISS," *Reuters*, 14 March 2013, <http://www.reuters.com/article/2013/03/14/us-security-military-iiiss-idUSBRE92D0EL20130314>.
12. *Ibid.*
13. Joachim Hofbauer, Priscilla Hermann, and Sneha Raghavan, *Asia Defense Spending 2000–2011: A Report of the CSIS Defense-Industrial Initiatives Group* (Washington, DC: Center for Strategic and International Studies, 2012), 3.
14. *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2013* (Washington, DC: Department of Defense, 2013), 44–53.
15. MacDonald, "Asia's Defense Spending Overtakes Europe's."
16. John P. Geis II et al., *Deterrence in the Age of Surprise* (Maxwell AFB, AL: Air University Press, 2014), 18–20.
17. China's official policy is to maintain relatively few nuclear weapons. However, the recent discovery of the "Underground Great Wall" with more than 3,000 miles of tunnels leads to ambiguity regarding the size of the Chinese program and whether it is growing. Hui Zhang, "China's Nuclear Weapons Modernization: Intentions, Drivers, and Trends" (presentation, Institute for Nuclear Materials Management, 53rd Annual Meeting, Orlando, FL, 15 July 2012). Data gathered during the study as part of researching the three paths leads to high confidence that the size of the arsenals in the states named is increasing.
18. Anna Mulrine, "US General Aims to Ease China's Concerns over Obama 'Pivot' to Asia," *Christian Science Monitor*, 23 April 2013, <http://www.csmonitor.com/USA/Military/2013/0423/US-general-aims-to-ease-China-s-concerns-over-Obama-pivot-to-Asia>.
19. John P. Geis II, "Harmonizing the Asia-Pacific: Which Path Will China Choose?" (paper presented at the Fourth Xiangshan Forum, Beijing, China, 15 and 17 November 2012). During the final plenary session at the forum, Carnegie vice president Doug Paal indicated that his research had reached the same conclusion. States motivated by security issues balance against a perceived threat. For more on this theory, see Stephen Walt, "Alliance Formation and the Balance of World Power," *International Security* 9, no. 4 (1985): 4.

20. Gardiner Harris and Edward Wong, "Where China Meets India in a High-Altitude Desert, Push Comes to Shove," *New York Times*, 2 May 2013, http://www.nytimes.com/2013/05/03/world/asia/where-china-meets-india-push-comes-to-shove.html?_r=0.

21. For the text of the code of conduct signed by the member states of ASEAN and China, see "Declaration on the Conduct of Parties in the South China Sea," Association of Southeast Asian Nations, accessed 28 May 2013, <http://www.asean.org/asean/external-relations/china/item/declaration-on-the-conduct-of-parties-in-the-south-china-sea>.

22. In the dispute between the Philippines and China in 2012, China eventually had a minimum of 79 (some reports put the number at 105) vessels arrayed against the Philippine navy, including five Chinese destroyers. As this event spiraled to a level where both nations became worried about an accident or miscalculation, diplomatic efforts were started to unravel the tensions. See "Firepower Bristles in South China Sea as Rivalries Harden," *Times of India*, 11 June 2012, <http://timesofindia.indiatimes.com/world/china/Firepower-bristles-in-South-China-Sea-as-rivalries-harden/articleshow/14033349.cms>; and Jamie Laude and Pia Lee-Brago, "Navy Monitors 79 Chinese Boats Near Shoal," *Philippine Star*, 24 May 2012, <http://www.philstar.com/article.aspx?pu=blicationsubcategoryid=63&articleid=810116>.

23. Tesia Jamandre, "China Fired at Filipino Fisherman in Jackson Atoll," *ABS-CBN News.com*, 6 February 2011, <http://www.abs-cbnnews.com/-depth/06/02/11/china-fired-filipino-fisherman-jackson-atoll>.

24. Pres. Barack Obama, "Remarks by President Obama to the Australian Parliament," White House, Office of the Press Secretary, 17 November 2011, <http://www.whitehouse.gov/the-press-office/2011/11/17/remarks-president-obama-australian-parliament>.

25. Heribert Dieter, "Changing Patterns of Regional Governance: From Security to Political Economy?," *Pacific Review* 22, no. 1 (March 2009): 79. See also David Capie, "Between a Hegemon and a Hard Place: The 'War on Terror' and Southeast Asian-US Relations," *Pacific Review* 17, no. 2 (June 2004): 223–48.

26. Richard Leaver and Robyn Sach, "Issues in Australian Foreign Policy: January to June 2006," *Australian Journal of Politics and History* 52, no. 4 (2006): 621–36, especially 627–28.

27. Donald C. Hellmann, "A Decade after the Asian Financial Crisis: Regionalism and International Architecture in a Globalized World," *Asian Survey* 47, no. 6 (November/December 2007): 838.

28. Anthony Milner, "Asia-Pacific Perceptions of the Financial Crisis: Lessons and Affirmations," *Contemporary Southeast Asia: A Journal of International and Strategic Affairs* 25, no. 2 (August 2003): 285–86.

29. Richard Higgott, "The Asian Economic Crisis: A Study in the Politics of Resentment," *New Political Economy* 3, no. 3 (November 1998): 353.

30. Milner, "Asia-Pacific Perceptions," 287.

31. Higgott, "Asian Economic Crisis," 337–38.

32. Morton Abramowitz and Stephen Bosworth, "America Rethinks Its Southeast Asia Policy," *Jakarta Post*, 20 April 2005, <http://www.thejakartapost.com/news/2005/04/20/america-rethinks-its-southeast-asia-policy.html>. Yuen Foong Khong does an excellent job of explaining how doubts about the US commitment to playing a major role in Asia are contributing to "strategic uncertainty." See his essay "Coping with Strategic Uncertainty: The Role of Institutions and Soft Balancing in Southeast Asia's Post–Cold War Strategy," in *Rethinking Security in East Asia: Identity, Power, and Efficiency*, ed. J. J. Suh, Peter J. Katzenstein, and Allen Carlson (Stanford, CA: Stanford University Press, 2004), 172–208, especially 180–84.

33. Richard Stubbs, "The ASEAN Alternative? Ideas, Institutions and the Challenge to 'Global' Governance," *Pacific Review* 21, no. 4 (December 2008): 451–68.

34. Within doctrine, the USAF lists persistence as a tenet of airpower and speed and range as attributes. One should not read this section as if the authors are attempting to relabel or re-create doctrine; rather, the elements described here have the greatest impact on the vast Asia-Pacific region under study. USAF Doctrine Document (AFDD) 1, *USAF Basic Doctrine, Organization, and Command*, 14 October 2011, 14, 37, <http://www.e-publishing.af.mil/shared/media/epubs/AFDD1.pdf>.

35. *Ibid.*, chaps. 2–5, p. 40.

36. The USAF's core functions are also important. Readers not familiar with these should consult *ibid.*, 43–53.

37. John A. Shaud, *In Service to the Nation: USAF Research Institute Strategic Concept for 2018–2023* (Maxwell AFB, AL: Air University Press, 2009), 28–29.

38. *Ibid.*, 98.

39. A number of documents with similar but varying titles describe enduring USAF contributions: House, *Department of the USAF, Presentation to the Committee on Armed Services, United States House of Representa-*

tives, *Fiscal Year 2013 USAF Posture Statement, Statement of the Honorable Michael B. Donley, Secretary of the USAF, and General Norton A. Schwartz, Chief of Staff, United States USAF*, 112th Cong., 2nd sess., 28 February 2012, 3–5 (hereafter *USAF Posture Statement 2012*); Philip M. Breedlove, vice chief of staff, USAF, “Air Sea Battle for the Future” (presentation to the Mitchell Institute for Airpower Studies, 20 July 2011), 5–6; and Department of the USAF, *The USAF and U.S. National Security: Global Reach–Global Power*, white paper (Washington, DC: Department of the USAF, June 1990), 5–15.

40. Department of Defense Directive 5100.01, *Functions of the Department of Defense and Its Major Components*, 21 December 2010, 27, par. 2a; 28, par. 2h; 34, pars. 6b(2) and 6b(5).

41. Department of the USAF, *USAF and U.S. National Security*, 3.

42. *Ibid.*, 13.

43. “Military engagement is the routine contact and interaction between individuals or elements of the Armed Forces of the United States and those of another nation’s armed forces, domestic or foreign civilian authorities or agencies to build trust and confidence, share information, and coordinate mutual activities. Security cooperation involves all DOD interactions with foreign defense establishments to build defense relationships that promote specific US security interests, develop allied and friendly military capabilities for self-defense and multinational operations, and provide US forces with peacetime and contingency access to [a host nation]. This includes activities such as security assistance. Security cooperation is a key element of global and theater shaping operations.” Joint Publication (JP) 1, *Doctrine for the Armed Forces of the United States*, 25 March 2013, I-15, http://www.dtic.mil/doctrine/new_pubs/jp1.pdf. *Foreign humanitarian assistance* is “Department of Defense activities, normally in support of the United States Agency for International Development or Department of State, conducted outside the United States, its territories, and possessions to relieve or reduce human suffering, disease, hunger, or privation.” JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 8 November 2010 (as amended through 15 April 2013), 110, http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

44. The Center for Counterproliferation Research, National Defense University, and the Center for Global Security Research, Lawrence Livermore National Laboratory U.S. *Nuclear Policy in the 21st Century: A Fresh Look at National Strategy and Requirements* (Washington, DC: National Defense University Press, 1998), 4–18. See also Shaud, *In Service to the Nation*, 35.

45. Senate, *Department of the USAF, Presentation to the Senate Armed Services Committee, Strategic Forces Subcommittee, United States Senate, Status of USAF Nuclear and Strategic Systems, Statement of Lieutenant General James M. Kowalski, Commander, USAF Global Strike Command*, 112th Cong., 2nd sess., 28 March 2012, <http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=4&ved=0CEQQFjAD&url=http%3A%2F%2Fwww.airforcemag.com%2FSiteCollectionDocuments%2FTTestimony%2F2012%2FMarch2012%2F032812kowalski.pdf&ei=aUuaUei9FYy70QHjvYGgCQ&usg=AFQjCNHNsqJ0LQzonsaTxds6AI34UDm5Ug&sig2=oFaGbgSXxYx0jJ8rB2rBgw>.

46. *Ibid.*

47. Jeff Schogol, “Schwartz Defends Cost of USAF’s Next-Gen Bomber,” *Defense News*, 29 February 2012, <http://www.defensenews.com/article/20120229/DEFREG02/302290005/Schwartz-Defends-Cost-USAF-8217-s-Next-Gen-Bomber?odyssey=tab%7Ctopnews%7Ctext%7CFRONTPAGE>.

48. Henry G. Chiles Jr., *Report of the Defense Science Board Task Force on Nuclear Deterrence Skills* (Washington, DC: Office of the Secretary of Defense, 2008).

49. “B-1 Bomber’s Final Flight,” *Arizona Star*, 21 August 2002, http://nl.newsbank.com/nl-search/we/Archives?p_product=ADSB&s_site=azstarnet&f_site=azstarnet&f_sitename=Arizona+Daily+Star%2C+The+%28AZ%29&p_multi=ADSB&p_theme=gannett&p_action=search&p_maxdocs=200&p_topdoc=1&p_text_direct-0=0F59D36BE743E3B9&p_field_direct-0=document_id&p_perpage=10&p_sort=YMD_date:D&p_trackval=GooglePM.

50. *USAF Posture Statement 2012*, 16. The reader should know that these numbers are in flux. Recent news reports now place the cost of this modernization at nearly \$400 million, including upgrades to the Link 16, radars, avionics, and cockpit display systems. “F-1E, B-1B Modernization and Upgrades,” *Defense Update.com*, 23 July 2012, http://defense-update.com/20120723_boeing-f-15e-radar-modernization-program-begins-2nd-low-rate-initial-production-phase.html.

51. Will Goodman, “Cyber Deterrence: Tougher in Theory Than in Practice?,” *Strategic Studies Quarterly* 4, no. 3 (Fall 2010): 124–29.

52. Gopal Ratnam and Daniel Ten Kate, “U.S. Navy’s Pacific Presence to Expand, Panetta Says,” *Bloomberg.com*, 2 June 2012, <http://mobile.bloomberg.com/news/2012-06-02/u-s-navy-s-pacific-presence-to-expand-panetta>

-says?category=&BB_Navi_Disable=MARKETS_%2Fslideshow%2F%3Fcategory%3D%2Fnews%2Fenvironment%2Ftopic.

53. Rouben Azizian and Artyom Lukin, eds., *From APEC 2011 to APEC 2012: American and Russian Perspectives on Asia-Pacific Security and Cooperation* (Honolulu: Asia-Pacific Center for Security Studies; and Vladivostok: Far Eastern Federal University, 2012), 120.

54. Ibid.

55. Recommendations derived from a variety of documents, including Department of the USAF, *Global Partnership Strategy* (Washington, DC: Department of the USAF, 2011), appendixes A, B, and C; William Jordan, Lewis M. Stern, and Walter Lohman, *U.S.-Vietnam Defense Relations: Investing in Strategic Alignment*, Heritage Foundation backgrounder, 18 July 2012; Azizian and Lukin, *From APEC 2011 to APEC 2012*, 114–26; US Department of State, *Congressional Budget Justification*, vol. 2, *Foreign Operations, Fiscal Year 2012* (Washington, DC: US Department of State, 2012), 125, 127, 131–33, 157, 159–60; and US Department of State, *Congressional Budget Justification, Foreign Operations Annex: Regional Perspectives, Fiscal Year 2012* (Washington, DC: US Department of State, 2012), 278–366.

56. United Nations Office on Drugs and Crime, *Regional Programme for East Asia and the Pacific, 2009–2012: Report on Operations and Future Prospects*, implementation update 3 (Bangkok: United Nations Office on Drugs and Crime, Regional Centre for East Asia and the Pacific, April 2012), 7–13. Engagement in mutual operations requires integrated planning and programming. See Department of the USAF, *Global Partnership Strategy*, 7 and Annex D. Achieving integrated planning across the potential partners is challenging. Pacific USAFs is working this issue.

57. The US Navy already contracts for some of its refueling missions, relying on a company named Omega Refueling Services, which uses two Boeing 707s and one modified DC-10 to conduct refueling operations. Contracting for this service is possible domestically. See “U.S. Military Contracts for Private Aerial Refueling Services,” *Defense Industry Daily*, 22 May 2011, <http://www.defenseindustrydaily.com/US-Military-Contracts-for-Private-Aerial-Refueling-Services-04802/>.

58. US Government Accountability Office, *KC-46 Tanker Aircraft: Acquisition Plans Have Good Features but Contain Schedule Risk*, Report to Congressional Committees (Washington, DC: US Government Accountability Office, March 2012), 4; and “KC-46A Tanker,” fact sheet, US USAF, 18 May 2011, <http://www.af.mil/information/factsheets/factsheet.asp?id=18206>.

59. The USAF inventory includes 453 KC-135s and 59 KC-10s. One hundred seventy-nine KC-46As replace 40 percent of the KC-135 fleet and 35 percent of the combined KC-135 and KC-10 fleet. See *USAF Posture Statement 2012*, 7; and “KC-10 Extender,” fact sheet, US USAF, 29 December 2011, <http://www.af.mil/information/factsheets/factsheet.asp?id=110>.

60. John A. Tirpak, “Airlift on Thin Ice,” *USAF Magazine* 91, no. 10 (October 2008): 32–38, <http://www.airforcemag.com/MagazineArchive/Pages/2008/October%202008/1008airlift.aspx>; and Tony Bartelme, “C-17’s Flight Time Piles Up Faster Than USAF Expected,” *Post and Courier*, 2 December 2008, updated 22 March 2012, <http://www.postandcourier.com/article/20081202/PC1602/312029896>.

61. House, *Major General Suzanne M. Vautrinot, USAF, Improving Military Capabilities for Cyber Operations, Department of the USAF Presentation to the Subcommittee on Emerging Threats and Capabilities, House Armed Services Committee, US House of Representatives*, 112th Cong., 2nd sess., 25 July 2012, 11–12.

62. The USAF Chief of Staff has asked the USAF Research Institute to examine this particular issue in the institute’s next major study.

63. *USAF Posture Statement 2012*, 17.

64. Ibid., 9.

65. Ibid., 11, 15.

66. Ibid., 19.

67. For an in-depth discussion of space defense, see Shaud, *In Service to the Nation*, 39.

68. House, *Major General Suzanne M. Vautrinot*, 3.

69. Ibid., 4.

70. Ibid., 5.

71. Ibid., 6.

72. Craig Whitlock, “U.S. Eyes Return to Some Southeast Asia Military Bases,” *Washington Post*, 22 June 2012; Whitlock, “Philippines May Allow Greater U.S. Military Presence in Reaction to China’s Rise,” *Washington Post*, 25 January 2012; David Nakamura, “U.S. Troops Head to Australia, Irking China,” *Washington Post*, 16 November

2011; Carlo Munoz, “The Philippines Re-opens Military Bases to US Forces,” *DEFCON Hill* (blog), 6 June 2012, <http://thehill.com/blogs/defcon-hill/operations/231257-philippines-re-opens-military-bases-to-us-forces>; and David Vine, “The Military’s New Lily-Pad Strategy,” *Nation*, 16 July 2012.

73. This paper uses US joint military doctrine to define *command and control*: “The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. JP 1-02, *Department of Defense Dictionary*, 49.

74. The term *unity of effort* is defined as “coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same command or organization, which is the product of successful unified action.” The term *unified action* is defined as “the synchronization, coordination, and/or integration of the activities of governmental and nongovernmental entities with military operations to achieve unity of effort.” JP 1, *Doctrine for the Armed Forces of the United States*, GL-13, GL-12.

Appendix A

Building Partnerships and Building Partnership Capacity in the Asia-Pacific Arena

John L. Conway III

Overview

This look at building partnerships (BP) and building partnership capacity (BPC) in the Asia-Pacific area is in two parts. The first is an overarching look at the regulatory guidance provided from the Department of Defense (DOD) and the United States Air Force (USAF), and the second is a look at an area of the Asia-Pacific that requires a pragmatic approach toward BP/BPC in order to achieve positive results for US interests. Changes to current BP/BPC guidance/terminology are suggested in order to produce clarity of purpose and effort. In addition, suggested USAF BP/BPC efforts actions are focused in a narrow region to achieve specific goals.

BPC is one of the USAF's core competencies, but it differs from the others because it is not a stand-alone activity. Instead, it is derived from many, if not all, of the others. Air Force Doctrine Document 2-3, *Irregular Warfare*, rather vaguely describes building partnership capacity as "targeted efforts to improve the collective capabilities and performance of the DOD and its partners."¹

On the other hand, BP is broader and was formally recognized as a joint capability area (JCA) in 2008.² According to one observer, the difference between the two is that "BP establishes the relationship and BPC enables the partner."³ Because many other terms describe both, allude to both, or encompass both, this last observation is as clear a definition as can be found.

There are other terms used to describe some facets of BP/BPC: security force assistance (SFA), irregular warfare (IW), civil affairs (CA), foreign internal defense (FID), counter-drug operations, and state-to-state partnerships (SSP). The sheer number of related terms clearly highlights the notion that BP/BPC is a mosaic rather than a line drawing. It also means that current USAF—and other service—efforts are diffuse rather than focused and that there is no clear BP/BPC template one can apply in the Asia-Pacific arena. Looking at the various elements tangential to BP/BPC illustrates these points.

Irregular Warfare

IW is a larger, and some would say less benign, concept than BP/BPC because some limited IW activities may not be executed in conjunction with a partner nation (PN), while BP/BPC activities, by their very nature, seek close and continuing relationships with them.

Security Force Assistance

SFA connotes direct involvement with a host nation's (HN) security agencies, usually characterized by sharing tactics, techniques, and equipment. It looks a lot like both BP/BPC and IW, but it is not. Defined in the 2011 *Air Force Global Partnership Strategy*, it is

comprised of activities “to support the development of the capacity and capability of foreign security forces.”⁴ This concept has gained momentum as stand-alone terminology via the 2010 *Quadrennial Defense Review (QDR)*.⁵

Civil Affairs

CA also covers a lot of BP/BPC ground, but the USAF has no civil affairs function in its organizational construct. CA doctrine documents ignore the USAF and focus on the Army and, to a very small degree, on the Navy and Marines. Joint Doctrine Document 3-57, *Civil-Military Operations*, observes that the USAF “does not maintain CA units,” but suggests using active duty Air Force, Air National Guard, and Air Force Reserve personnel to “support or complement” civil-military operations (CMO) “upon request.” It lists a number of USAF activities for this purpose, ranging from air mobility to the International Health Service.⁶

State Partnership Program

The National Guard’s State Partnership Program is an effective method to build partnerships but currently conducts most of its interactions in US European Command (USEUCOM) and US Southern Command (USSOUTHCOM) and not in the Pacific.⁷ The relative paucity of Pacific Rim state-to-state relationships means that the Guard’s State Partnership Program is less capable of influencing a large number of Pacific partners in the short-term. Building “air-centric” SSPs throughout the region is a long-term initiative worth pursuing.

Counterdrug Operations

Finally, counterdrug operations also could be a BP/BPC descriptor when applied to overseas activities in conjunction with local and national drug-law enforcement agencies. However, it is not an inherently military function. Instead, DOD is an enabler (e.g., air support, border patrols, etc.) to counterdrug operations, not the operator itself.

It is obvious that the multiplicity of terminology listed above can lead to confusion and to dilution of effort. USAF BP/BPC initiatives, points of contact, and activities should be expressed in a single format.

Recent Air Force Guidance

The *2011 US Air Force Global Partnership Strategy* identifies Headquarters Air Education and Training Command (HQ AETC) as the BP core function lead integrator and author of the BP Core Functions Master Plan. As such, AETC will guide “USAF-wide BP planning and programming efforts.”⁸ According to this publication, inputs from the other core functions and BP demand signals from USAF commands will flow to AETC for assimilation. While this may serve the 20-year planning vision (2014–2033) of the strategy, emphasis may be focused solely on training partnerships over which AETC has purview. This may narrow all other options for BP/BPC in the future, particularly in a budget-constrained environment. Input from Pacific Air Forces (PACAF) to AETC regarding Pacific-focused education and training opportunities, along with a reasonable budget request, would be appropriate to influence planning and programming.

BP/BPC Issues Relevant to the Asia-Pacific

While the Pacific Rim is a large geographic area of about 64 million square miles, over one-third of the earth's surface, its land mass comprises only a fraction of its total area.⁹ History has made the Pacific the US Navy's purview, but if one follows the strategic dicta of speed and mobility, the Navy falls short on both accounts due to the vast distances involved. Tsunami relief efforts in both Indonesia and Japan were spearheaded by USAF aircraft, followed by US Navy ships—albeit days later.¹⁰ Simply put, “flank speed” in no way approximates “take-off speed.”

The center of attention in the Pacific is currently on the South China Sea, but if one dismisses the scenario of a US “rescue” of Taiwan and assumes that the oil disputes in the Spratly Islands will not boil over into outright hostilities, issues in the South China Sea are more academic and legalistic than they are military. While it deserves the attention of strategists, it is not the center of gravity in the Pacific Rim. Today, the nations sitting astride the Straits of Malacca and their sister straits to the south and east—the countries of Indonesia, Malaysia, and the Philippines—should form the focus of new BP/BPC initiatives. This is an emerging center of gravity in the new Pacific order, referred to by author Robert Kaplan as “the Fulda Gap of the twenty-first-century multi-polar world.”¹¹

Adding weight to this argument, the People's Republic of China (PRC) has publicly admitted that it has a “Malacca dilemma” to point out its dependency on the Straits of Malacca as a sea line of communication for her commerce.¹² Observers estimate that 60 percent of all shipping currently transiting the Straits of Malacca (fig. A-1) is Chinese flagged and that oil tankers passing through the Straits of Malacca will carry over half of the PRC's energy needs by 2015.¹³ As a net importer of oil since 1993, any disruption of oil deliveries to the PRC would have serious economic consequences.¹⁴ To mitigate this, many Chinese strategists have suggested exploration of alternative shipping routes through the other straits adjacent to the Indonesian archipelago: the Sunda Strait to the south and the Lombok and Makassar Straits farther east.¹⁵

Therefore, pursuing BP/BPC initiatives with Indonesia, Malaysia, and the Philippines can pay several strategic dividends for the United States: assuring unimpeded access to the Straits by assisting in HN security and freedom-of-the-seas operations; reducing the threat of Muslim extremism; increasing the probability/ability to base US aircraft in the region; and strengthening each HN's military ability.

Building Partnerships: “BP Establishes the Relationship”

While many BP initiatives are under way that follow traditional military-to-military contacts with longtime friends, others are less obvious. The United States has strong bonds with the nations of Japan, Australia, South Korea, and New Zealand; so none of these relationships require a sharp refocus of BP/BPC—only a continuation of current efforts. For this study, the countries of Indonesia, Malaysia, and the Philippines are the new focus of BP initiatives.

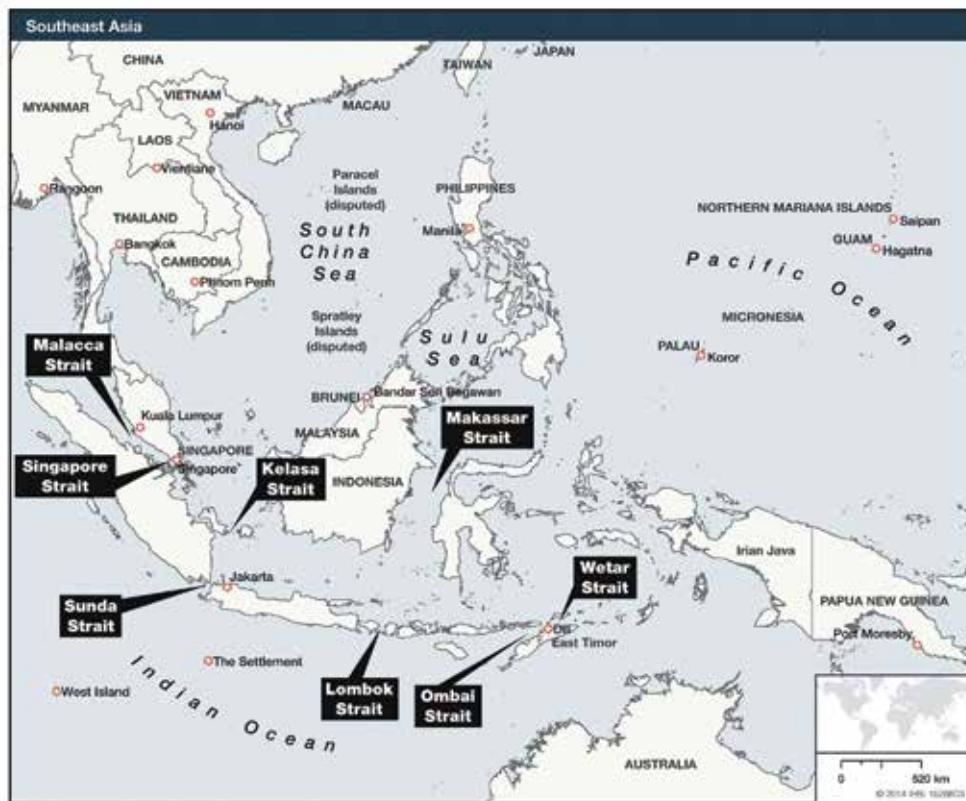


Figure A-1. Indonesian straits. (Courtesy of IHS, Inc., 2014.)

Indonesia

Indonesia is the fourth most populous nation in the world. Its population is estimated at almost 250 million people on over 13,000 islands and is predominantly Muslim (203 million or 81 percent). It also is the country with the largest Muslim population in the world: about 13 percent of all Muslims worldwide and 80 percent of all Muslims living in Southeast Asia.¹⁶ According to the Pew Forum on Religion and Public Life, Indonesia is also in the top 5 percent of all countries with high social hostility involving religion, meaning personal or mob attacks against persons of other faiths and beliefs are prevalent—on par with those occurring in Afghanistan and Pakistan. Although not listed by Pew in the top 5 percent of countries with government restrictions on religion, Indonesia's government still ranks among the world's most restrictive, surpassing Pakistan but falling just below Myanmar (Burma) and Iraq.¹⁷

Aside from sensitivity to religion, leaders must consider another factor as a basis for building partnerships with Indonesia: its language. Following independence in 1945, Malay—now called Indonesian or Bahasa Indonesian—was chosen as the new nation's national language. Although only 5 percent of the population spoke it at that time, it has served as a unifying language since then, and today almost 90 percent of the nation is literate in it.¹⁸

Both religion and language have contributed to Indonesia's state of semi-isolation in Asia in the ensuing decades. Islam itself seeks to create a closed society, and the paucity of English instruction in the country below the university level has frustrated scientific and technical connection with the rest of the world. It was not entirely surprising that US military relief assistance arriving in the aftermath of the 2004 Banda Aceh tsunami was initially met with apprehension. The US military was landing in a semi-cloistered, restrictive society. While the United States and Indonesia occasionally have conducted joint military exercises in the intervening years, enduring efforts at building partnership with Indonesia—particularly from an USAF perspective—can be bolstered by recognizing religious, linguistic, and cultural constraints.¹⁹

The Indonesian air force is equipped with an array of aircraft of diverse international manufacture—Russian, American, British, Brazilian, Spanish, and Korean, to name a few—reflecting the country's shifting alliances, changes in government, and various arms/trade exchanges/embargoes throughout the last few decades.²⁰ This has created chaotic supply chains, an assortment of different technical orders, and operating instructions in a myriad of (untranslated) languages, resulting in uncertain operational capabilities across its air fleet.

The USAF can address two fundamental issues to foster partnerships with the Indonesian air force: maintaining its sensitivity to the intensely Muslim culture in the country and assisting Indonesians to acquire English language skills. The first is an overarching enabler for all partnership efforts, and the second is a practical means to an end.

The USAF has a large number of Airmen who have previously served in the Middle East and Central Asia. These Airmen should form the cadre of any air advisory or mobile training team (MTT) sent to Indonesia. These expeditionary Airmen will be able to bridge cultural gaps much quicker than those without that experience. Previously mastered cultural skills will make it easier to relate to other cultures, much in the same way acquisition of a second language aids acquisition of a third language.²¹

AETC's Defense Language Institute English Language Center (DLIELC) at Lackland AFB, Texas, can offer in-residence courses in English as a second language (EASL) to Indonesian air force personnel to encourage much-desired English language skills among its military. The institute also can provide English language courses to the country as part of an air advisory team or in a stand-alone mode. Given the shortage (as compared to neighboring nations) of primary and secondary English language education in the country, these could become popular courses.²² Additionally, increasing the number of Indonesian officers who attend Air University schools would be a low-cost way of fostering greater military-to-military relationships that could pay dividends over the length of those officers careers and further reduce the level of mistrust over a US military presence in the area.

As another partnership initiative, health care should be explored in Indonesia. Life expectancy in the country is 103rd in the world, with death rates attributed to lung cancer, lymphomas, oral cancer, and rheumatic heart disease among the highest in the world.²³ The USAF's International Health Service (IHS) should focus some of its outreach efforts in Indonesia in close coordination with other USAF partnering efforts.

Malaysia

Nearby Malaysia has nearly 16,000,000 Muslims in a population of 27,635,000 (about 60 percent of the total). It ranks higher than Indonesia (in the top 5 percent) in government

restrictions on religion and has some of the toughest censorship laws in the world.²⁴ Even more troubling is the rise in social hostility toward religion, particularly toward the country's religious and ethnic minority populations of Christians, Chinese, and Indians. While Malay Chinese make up about 26 percent of the population, they generally are denied roles in government and the judiciary. However, as a solid mercantile middle class, Chinese hold considerable economic power in the country, further complicating the country's ethnic landscape.

Communication in this pluralistic society (Malay, Chinese, and Indian) is via the national language of Bahasa Malay, with strong underpinnings of other tongues, including English. It has been noted that "Malaysians are reluctant to lose English as a language in society . . . and the opportunities it presents to Malaysians to take part in the international community."²⁵ While promoting EASL is not as compelling in building a partnership in Malaysia as it is with Indonesia, English language MTTs and DLIELC involvement would be excellent partnership initiatives.

Malaysia's air force is equipped with a hodgepodge of old and new hardware from the United States, Russia, and elsewhere—less scattered in origin than Indonesia's equipment but equally reflective of the ebb and flow of arms deals throughout the last two decades. Supply issues, technical order translations, and interface among weapons systems appear to be problems similar to those found in Indonesia's air force.

The Philippines

To the north and east, the Philippines have recently extended a reluctant welcome to US forces after a lapse of some 20 years. However, this does not herald the return of permanent US military bases there but instead is an invitation for temporary US use of common Philippine airfields and ports—something that has occurred, albeit quietly, for some time.²⁶ Of particular concern in the southern Philippines is the continuing presence of two Islamic fundamentalist terrorist groups: the Moro National Liberation Front and the Moro Islamic Liberation Front (MILF). This "long war with the Muslims in the Southern Philippines" has been under way for over four centuries.²⁷ However, MILF cooperation with the al-Qaeda-backed Abu Sayyaf Group in Mindanao adds violent religious extremism to what observers previously have described as a territorial rather than religious dispute. BP with the Philippine air force may require more of a counterterrorism approach (in contrast to Indonesia and Malaysia) than a strictly military-to-military approach. During Exercise Balikatan in 2009, Zamboanga International Airport was a staging base for USAF C-17s. It is one of two major airfields in the southern Philippines capable of handling large cargo and tanker aircraft, and any disruption in the use of these two staging bases could impact potential US air operations in the Straits of Malacca.²⁸

BP initiatives should focus on sharing FID tactics, techniques, and procedures (TTP) with Philippine counterparts. These will strengthen indigenous security capabilities and help assure the safety of US air operations in Mindanao at the northern exit to the Makassar Straits: the Celebes Sea. This will involve use of special operations forces along with intelligence assets to achieve FID goals and to obtain a clear sight picture of the threat. Unlike the more benign people-to-people and military-to-military approaches within Indonesia and Malaysia, initial BP activities in the southern Philippines will more closely resemble current antiterrorist and antipiracy operations elsewhere in the world.

Of note, the official language of the Philippines, Tagalog, is not the dominant language in Mindanao. Other languages, Cebuano, Chavocano, and Hiligaynon, are the dominant tongues in the southern Philippines (see annex below for details). To effectively deliver FID in the southern Philippines, USAF personnel must achieve some proficiency in these languages, both for military-to-military contacts and intelligence operations.

Summary

Indonesia, Malaysia, and the Philippines all sit astride the transshipment routes from Asia to the Middle East and are important to the interests of the region and of the United States. Additionally, all three are unique in their customs, languages, and attitudes toward the United States. What binds the three is the common thread of Islam, from the blatantly militant Abu Sayad Group in the southern Philippines to the uneasy mixture of Muslims, Chinese, and Hindus in Malaysia, to the secular Islamic state of Indonesia.

The end state for BP in the region should be a focused effort to create US influence through training, common TTPs, and commonality of weapons systems.

Building Partnership Capacity: “BPC Enables the Partner”

Traditional BPC activities such as flying instruction and aircraft maintenance activities are the norm for USAF BPC initiatives and will not be addressed here for the sake of brevity. Instead, this section will focus on additional avenues for BPC and will do so by function and not by specific country. USAF core competencies in cyber and remotely piloted aircraft (RPA)—and by extension intelligence, surveillance, and reconnaissance—are areas of BPC that can be used to extend the capabilities of other nations. The fact that many nations of the Pacific Rim do not possess these enablers makes them even more potent as instruments of national policy.

Cyber

Cyber is the most talked about capability, and much of it can be shared to the mutual benefit of all parties in the Asia-Pacific region. At the same time, some of these nations' cyber capabilities can be accessed by the United States on a *quid pro quo* basis. Cyber support operations have a small personnel and equipment footprint—as opposed to putting iron on the ramp—and this makes cyber BPC a desirable export to those nations that are wary of American intentions or an American presence. By building or strengthening HN defensive cyber capabilities, the partner governments would be better capable of defending themselves from a cyber attack, protecting the infrastructure that might be of use to ongoing coalition operations, and potentially locating and neutralizing cyber attacks occurring inside their borders.

Remotely Piloted Aircraft

Another area of clear USAF leadership is in remotely piloted aircraft. These comprise a “poor man’s Air Force” and require fewer resources and less training than conventional aircraft systems. Dual-role RPAs can conduct reconnaissance and perform conventional attack missions, producing more cost savings for emerging allies. In addition, the US foot-

print for RPAs—like that of cyber—is extremely small and lends itself to nations whose population is not interested in a large US presence but who wish to enjoy the technological advantages of a partnership with the United States. Cost per RPA is well below that of a conventional fighter/reconnaissance aircraft, constituting a strong selling point. Viable BPC training options are MTTs in each PN and/or continental US training opportunities.

Health Care

Worth noting again, the USAF has the only international health service (IHS) program in DOD. Currently used for BP, it can be expanded to a BPC role by delivering health care provider education to Pacific Rim countries to complement its traditional health care provision mission. IHS MTTs tailored to each Pacific Rim nation's most pressing medical needs can be created to accomplish both. A comprehensive overview of each nation's medical ranking and its mortality statistics by cause is available online from the World Health Organization and can form the basis for this analysis.²⁹ For example, if heart disease is the leading cause of death in a particular country, cardiac training would be an excellent method of BPC, and cardiac risk screening as part of an overall health care provider outreach will strengthen partnerships.

Humanitarian Assistance / Disaster Relief

The most visible US presence in the Asia-Pacific has been our ability to rapidly deliver humanitarian assistance / disaster relief (HA/DR) throughout the region. Nevertheless, the nations of the Pacific Rim must establish their own response capabilities to handle disasters rising below the level of national catastrophes. The USAF has a proven capability to do this and should be able to share disaster relief organizational structures, procedures, and equipment with our Asia-Pacific partners. This function of BPC is perhaps best folded into the state partnership programs of the National Guard since they are America's first "first responders" and already in the forefront of these activities.

Developing the Capability to Provide BPC Assets

An overarching USAF problem in providing BPC assets to the Pacific Rim—or for that matter, elsewhere in the world—is the lack of a standing mechanism to do so. The Army uses its CA program as an omnibus vehicle to deliver a variety of BP, BPC, SPF, and similar capabilities worldwide, although the CA core mission is to manage governmental infrastructure following any US occupation of territory by force. The USAF uses contingency response wings and groups as vehicles to provide disaster support, but these are not comparable to the Army's CA units and are much more limited in their scope. For example, the core function of 36th Contingency Response Group at Anderson AFB, Guam, is opening airfields, with a secondary capability of SFA.³⁰ However, low manning (70 percent) inhibits both of these missions, and SFA is, by definition, focused on support and training of HN security forces. SFA as a function is self-limiting. Thus, the 36th's ability to function outside these two narrow lanes is limited doctrinally as well as physically.

The 2010 QDR calls for the USAF to "expand its regionally oriented contingency response groups," but it is uncertain whether this guidance means expanding them to embrace other functions or simply expanding their size and numbers.³¹ PACAF should ap-

proach this as an opportunity to expand the 36th to include more facets of BP/BPC in order to have an “on call” capability in-theater.

Recommendations

- Subsequent iterations of the Service Core Function Master Plan need defined milestones in order to assign offices of primary responsibility and offices of collateral responsibility. PACAF should make recommendations to the plan based on its specific needs.
- The USAF should establish stand-alone BPC doctrine and fold the rest of the acronyms listed above (minus IW, which has its own doctrine document) under it.
- The USAF should adopt some form of CA construct as an overarching structure for its BP/BPC activities.
- HQ PACAF’s International Affairs Division (PACAF/A5I) should engage in a close and continuing dialogue with the undersecretary of the Air Force for international affairs, Pacific region (SAF/IARP) to highlight Asia-Pacific partnership needs and to articulate the need for an Air Staff counterpart function.
- PACAF should implement the QDR guidance regarding development of an SFA capability within its general purpose forces but resist the temptation to place it entirely within its gained Guard and Reserve units.
- PACAF should explore the “apportioned requirements” listed in the draft “Air Force Building Partnerships Service Core Functions Master Plan: 2014” for specific funding outlays for it (i.e., below the US Pacific Command [USPACOM] line).
- The 36th Contingency Response Group at Anderson AFB, Guam, should add resources to accommodate a secondary designed operational capability (“DOC”) statement for SFA. At a minimum, this should include a teaching capability for civil engineering, medical, and security forces personnel.
- Building partnerships via cyber should become a major point of emphasis while building partnership capacity in cyber warfare.
- IHS should begin focusing on outreach programs in the Asia-Pacific theater. Health care provider education should complement its traditional health care provider mission. IHS MTTs tailored to each Pacific Rim nation’s most pressing medical needs can be created to accomplish both.
- USPACOM/PACAF should engage the National Guard Bureau, particularly the Air National Guard, to increase state-to-state partnerships in the Asia-Pacific theater. Also, for disaster relief, the HA/DR advisor mission could be folded into the state partnership programs of the National Guard since they are America’s first “first responders.”
- Lack of USAF expertise in Indonesian Malay and in several of the tongues of the southern Philippines will inhibit partnership efforts in the region. PACAF should send a demand signal to HQ USAF/A1D to increase emphasis in these tongues through targeted recruiting and increased class slots at the Defense Language Institute

Foreign Language Center in Monterey, California. (See annex to this appendix for specific recommendations.)

- While adhering to the previous guidance regarding the creation of “no new bases,” the USAF should explore the establishment of forward operating locations (FOL) at the three Royal Australian Air Force (RAAF) “bare bases” along its northern and western coasts—RAAF Learmonth, RAAF Curtin, and RAAF Scherger—and treat this much like the 1970s–80s concept of “Checkered Flag” FOLs.³²
- Consider using the Cocos (Keeling) Islands for RPAs via remote split operations from the Australian continent itself or from any number of PACAF locations.
- Air University schools should encourage attendance by officers of all the Pacific Rim nations as well as China, Russia, and Vietnam.
- In that same vein, PACAF should enter into discussions with AETC to stand up a Pacific Rim–focused counterpart to the Inter-American Air Forces Academy at Lackland AFB.
- AETC’s DLIELC at Lackland AFB should provide EASL MTTs to the Asia-Pacific as part of an air advisory team or in a stand-alone mode.

Annex

The Case for Increased Emphasis on Pacific Rim Languages

Building partnerships requires an understanding that can only come with the knowledge of another's native tongue. While the rest of the world learns English, we cannot assume that they do it without at least some grudge against that process if we—native-born English speakers—do not attempt to learn their language in return. After all, it is not the trained diplomat or corporate guru with whom most USAF personnel will work. Instead, it will be mechanics and trades people, farmers and shopkeepers. In humanitarian relief operations, it will be everyone.

The DOD produces its Strategic Language List (SLL) in order to focus efforts for growth and sustainment through monetary compensation, and it is largely, if not exclusively, drawn from the stated requirements of combatant commanders. DOD's SLL is usually followed by service SLLs. It should be noted that the services can add to the DOD list but cannot subtract from it.

This raises some questions:

- Has PACAF recently reviewed its language needs in the Asia-Pacific arena and assured itself that there is enough on-hand capacity for each country?
- Based on the on-hand evidence—that is, test scores—is there sufficient proficiency to carry out intelligence-related language activities as well as BP/BPC and humanitarian requirements in each country?
- Is there a need for increased/renewed emphasis on some Asia-Pacific languages in order to accomplish BP/BPC?

The following chart (table A-1) provides some insight into these questions. Documented requirements are lacking for some languages and dialects, while others (Vietnamese, Burmese, and the dialects of the Philippines, less Tagalog) are so small that they would seem to have little impact on operations. In contrast, some major languages (Chinese, Russian, and Korean) in the region have strong documented requirements, but only Korean shows an acceptable proficiency rate based on Defense Language Proficiency Test (DLPT) results. Chinese Mandarin has numerous filled requirements (473) and a tested cohort of 1200, but that group has a proficiency rate of less than 10 percent. Even if all who tested "proficient" were filling Mandarin-required billets, the proficiency rate would still fall below one in three. Of the 1,031 USAF personnel who tested in Russian, only 110 (roughly 10 percent) were found to be "proficient." Against filled requirements (377), this percentage is—like Mandarin—still less than 30 percent.

Of note, the languages of southern Philippines (Cebuano, Chavocano, and Hiligaynon) have no documented requirements; yet US operations in this region, as noted in the body of this paper, are slated to increase.

To assure the right languages with the proper proficiency are available in-theater, PACAF planners should undertake a new comprehensive review. See the attached chart for specific recommendations by language and dialect.

Table A-1. Major languages of the Asia-Pacific by DLPT score (as of December 2013)

Language	Formal Requirement Totals (Off/Enl) ³³	Current Capacity ^a	2/2 Proficiency or Better Total (Off/Enl) ^b	Recommendations
Burmese	0 (0/0)	9	5 (4/1)	Increase requirements
Cambodian (Khmer)	1 (1/0)	15	9 (3/6)	Review and increase requirements as required
<i>Chinese Dialects:</i>				
Amoy	0 (0/0)	5	0 (0/0)	Review requirements
Cantonese	0 (0/0)	57	17 (9/8)	Review requirements
Chinese	4 (2/2)	4	0 (0/0)	Define “Chinese” by dialect; recalculate
Mandarin	473 (461/12)	1,200	101 (65/36)	Increase proficiency levels of incumbents
Wu	0 (0/0)	1	1 (0/1)	Review requirements
Indonesian	11 (9/2)	69	14 (8/6)	Increase requirements
Javanese	1 (1/0)	1	0 (0/0)	Determine any requirements and increase as necessary
Japanese	13 (3/10)	193	35 (13/22)	Review requirements
Korean	429 (407/22)	1,207	248 (160/88)	No action required
Lao	2 (2/0)	19	14 (10/4)	Review requirements and increase as necessary
<i>Malaysian Dialects and Sub-Languages:</i>				
Malay	2 (2/0)	6	0 (0/0)	Increase requirements
Tamil	0 (0/0)	2	0 (0/0)	Review needed

**Table A-1. Major languages of the Asia-Pacific by DLPT score (as of December 2013)
Continued**

Language	Formal Requirement Totals (Off/Enl) ³³	Current Capacity ^a	2/2 Proficiency or Better Total (Off/Enl) ^b	Recommendations
<i>Philippine Languages:</i>				
Cebuano	0 (0/0)	18	1 (1/0)	Establish requirements
Chavocano	0 (0/0)	5	1 (0/1)	Establish requirements
Hiligaynon	0 (0/0)	3	0 (0/0)	Establish requirements
Ilocano	0 (0/0)	14	0 (0/0)	Review requirements
Maranao	0 (0/0)	0	0 (0/0)	Review requirements
Moro	0 (0/0)	0	0 (0/0)	Increase requirements
Tagalog	18 (12/6)	227	51 (40/11)	Review for sufficiency
Russian	377 (349/28)	1,031	110 (73/37)	Review PACAF requirements and increase as required
Thai	19 (10/9)	82	32 (24/8)	Review for sufficiency
<i>Vietnamese Dialects:</i>				
Hanoi	8 (7/1)	103	67 (32/35)	Determine overall Vietnamese language needs and review need for separate dialects
Central	1 (0/1)	2	1 (0/1)	
Saigon	0 (0/0)	1	0 (0/1)	

^aThis represents the total number of Airmen who have taken a particular DLPT test in the past 12 months.

^bThis is referred to in the source document as "proficient," generally accepted as a score of 2/2 (reading/listening) on the DLPT. The third modality, speaking, is rarely tested or recorded.

Notes

1. Air Force Doctrine Document (AFDD) 2-3, *Irregular Warfare*, 1 August, 2007, 27.
2. Joint Chiefs of Staff, "Joint Capability Areas (JCAs)," JCA 2010 Refinement, 8 April 2011, <http://www.dtic.mil/futurejointwarfare/jca.htm>.
3. Col Mylene Huynh (USAF), Maj O. Sean Friendly (US Army), and Cdr Timothy Donahue (US Navy), "Building Partnerships: Joint Capability Area" (presentation, 2011 Military Health System Conference, National Harbor, MD, 25 January 2011), 6.
4. HQ USAF, *2011 US Air Force Global Partnership Strategy* (Washington, DC: Department of the Air Force, 2011), 42.
5. Thomas K. Livingston, *Building the Capacity of Partner States Through Security Force Assistance*, Congressional Research Service (CRS) Report, (Washington, DC: CRS, 5 May 2011), 13. "The most dynamic in the coming years will be SFA missions." DOD, *Quadrennial Defense Review (QDR)* (Washington, DC: DOD, February 2010), 26.
6. Joint Publication 3-57, *Civil-Military Operations*, 11 September, 2013, A-A-6. The list includes judge advocate and paralegal support; air mobility; chaplain; health support; security forces; intelligence, surveillance, and reconnaissance; civil engineering; communications; bioenvironmental; and metrological services.
7. According to testimony given at the Senate Armed Services Committee nomination hearings for Lt Gen John Kelly, USMC (nominated to be commander of USSOUTHCOM), and Lt Gen Frank Grass, Army National Guard (nominated to be chief of the National Guard Bureau), on 19 July 2012, of the 31 countries in Latin and South America, there are 25 state partnerships in place. General Grass testified that during his time in USEUCOM, he worked partnerships with 21 countries in European Command and seven within US African Command. Senate, *Hearing to Consider the Nominations of: Gen. Mark A. Welsh III, USAF, for Reappointment to the Grade of General and to Be Chief of Staff, U.S. Air Force; Lt. Gen. John F. Kelly, USMC, to Be General and Commander, U.S. Southern Command; and LTG Frank J. Grass, ARNG, to Be General and Chief, National Guard Bureau*, Hearing before the Senate Armed Services Committee Confirmation, 112th Cong., 2nd sess., 19 July 2012. <http://www.armed-services.senate.gov/Transcripts/2012/07%20July/12-51%20-%207-19-12.pdf>. For a graphic representation of state partnership locations, see Lawrence Kapp and Nina Serafino, "The National Guard State Partnership Program: Background, Issues, and Options for Congress," Congressional Research Service, 15 August 2011, 4, 23, <http://www.fas.org/sgp/crs/misc/R41957.pdf>.
8. HQ USAF, *2011 US Air Force Global Partnership Strategy*, (Washington, DC: Secretary of the Air Force, 2011), 44.
9. Central Intelligence Agency, "Oceans: Pacific Ocean," in *The World Factbook*, n.d., <https://www.cia.gov/library/publications/the-world-factbook/geos/zn.html>.
10. Following the devastating tsunami in the Indian Ocean on 26 December 2004, Air Mobility Command aircraft were delivering equipment to the scene three days later on 29 December. By the 6th of January, over 1.66 million pounds of disaster relief cargo and 748 personnel were airlifted to the stricken area. In contrast, the US Navy began planning on 28 December as the "Lincoln strike group sprinted toward the Andaman Sea." Mark Diamond, "AMC Aircraft, People Support Tsunami-Relief Operations," *Air Mobility Command New Service*, 6 January 2005, <http://www.af.mil/news/story.asp?storyID=123009535>; and Thomas J. Kilcline, "Naval Aviation Key to Tsunami Relief Efforts," *Hook: Journal of Carrier Aviation*, Spring 2005, http://web.archive.org/web/20120831030215/http://www.tailhook.org/Sp05_Kilcline.htm.
11. Robert D. Kaplan, *Monsoon: The Indian Ocean and the Future of American Power* (New York: Random House, 2011), 261. The Fulda Gap is an area that once followed the border between East and West Germany during the Cold War and represented one of the most obvious routes for a possible Soviet invasion of the West. Another emerging Pacific region is the High North. See Appendix E: The Asia-Pacific and the High North in 2020 in this study for a discussion of the region.
12. Chen Shaofeng, "China's Self-Extrication from the 'Malacca Dilemma' and Implications," *International Journal of China Studies* 1, no. 1 (January 2010), 2.
13. Graham Lees, "China Seeks Burmese Route Around the 'Malacca Dilemma,'" *World Politics Review*, 20 February 2007, <http://www.worldpoliticsreview.com/articles/562/china-seeks-burmese-route-around-the-malacca-dilemma>.
14. Shaofeng, "China's Self-Extrication," 3.
15. "Myanmar Rights Groups to Monitor Effects of Controversial China Petroleum Pipeline," *Radio Free Asia*, 28 October 2013, <http://www.rfa.org/english/news/myanmar/pipeline-09242013163443.html>. One pipeline solution to this Chinese dilemma has sparked protests by environmental groups with the completion of the gas

pipeline from Myanmar (Burma) to the Chinese border province of Yunnan in July 2013. A parallel oil pipeline to Yunnan is still under construction. According to official Chinese news sources, when both are finished, they will deliver about 423.8 billion cubic feet of natural gas (about a quarter of China's total demand) and 22 million tons of oil. Still to be completed is a connecting pipeline from the Myanmar–Chinese border to a refinery in the provincial capital of Kunming (some 400 miles further inland) is under way but not yet complete.

16. Pew Forum on Religion and Public Life, *Mapping the Global Muslim Population: A Report on the Size and Distribution of the World's Muslim Population* (Washington, DC: Pew Research Center, October 2009), 14, <http://www.pewforum.org/uploadedfiles/Topics/Demographics/Muslimpopulation.pdf>.

17. Brian J. Grim, "Indonesia's Place among the Spectrum of Global Religious Restrictions," *Pew Forum on Religion and Public Life*, 4 November 2010, <http://www.pewforum.org/Government/Indonesia's-Place-Along-the-Spectrum-of-Global-Religious-Restriction.aspx>.

18. Scott Paauw, "One Land, One Nation, One Language: An Analysis of Indonesia's National Language Policy" (working paper, University of Rochester, 2009), 5–6, <http://www.bcs.rochester.edu/cls/s2009v5n1/Paauw.pdf>.

19. Tiarma Siboro, "Indonesia, US Deepen Defense Ties Amid Exercises and Defense Deals," *Defense News*, 30 September 2013, <http://www.defensenews.com/article/20130930/DEFREG03/309300033/>.

20. S. Rajaratnam School of International Studies (RSIS), "Revitalizing Indonesia's Defence Industrial Base: Agenda for Future Action," *RSIS Policy Report*, 5 July 2012, 2, http://www.rsis.edu.sg/publications/policy_report/Revitalizing_Indonesia_Defence_Industrial_Base--_Agenda_for_Future_Action_5_July_2012.pdf.

21. "Bilinguals Find it Easier to learn a Third Language," *Science News*, 1 February 2011, <http://www.sciencedaily.com/releases/2011/02/110201110915.htm>. The idea presented here (and in many scholarly journals) is that the learning norms for acquiring a second language will aid in the acquisition of a third. Equally, the framework of norms, customs, and courtesies associated with understanding a culture other than one's own also will serve as a framework for understanding a third culture.

22. The 2010 *QDR* stresses language in partnerships with HN security forces and among the broad population as well.

23. World Health Organization, "Health Profile: Indonesia," 2010, <http://www.worldlifeexpectancy.com/country-health-profile/indonesia>.

24. "Malaysia Country Profile," *BBC News*, 21 March 2013, <http://www.bbc.co.uk/news/world-asia-pacific-15356257>.

25. Paauw, "One Land, One Nation, One Language," 9.

26. Exercise Balikatan, "Shouldering the Load Together," has been held annually since resuming in 2001.

27. Thomas G. Wilson, Jr., "Extending the Autonomous Region in Muslim Mindanao to the Moro Islamic Liberation Front a Catalyst for Peace" (monograph, US Army School of Advanced Military Studies, Ft. Leavenworth, KS, 2009), 39, <http://usacac.army.mil/cac2/cgsc/sams/media/Monographs/WilsonT-21May09.pdf>.

28. Zamboanga International's main runway is 8,564 feet long. The other major airfield in the southern Philippines is Francisco Bangoy International, near the city of Davao to the east, with a 9,842 foot runway.

29. The World Health Organization website is available at <http://www.who.int>.

30. Livingston, "Building Capacity," 48.

31. *QDR*, 29.

32. Tactical Air Command instituted a training program in 1979 called "Checkered Flag." It was designed for stateside fighter units (active, Guard, and Reserve) to train for and to deploy to selected forward operating locations in Europe to provide a realistic and observable (via the inspection process) readiness program.

33. This refers to Airmen occupying language positions. Air Force Personnel Center, "Active Duty Resources Who Have Completed Defense Language Proficiency Tests (DPLT)," December 2013, http://access.afpc.af.mil/vbinDMZ/broker.exe?_program=DEMOGPUB.static_reports.sas&_service=pZ1pub1&_debug=0. Note: This number may not reflect all requirements.

Appendix B

Chinese Soft Economic Warfare

Dr. Chad Dacus

Of the world's largest economies, the People's Republic of China (PRC) boasts the lowest debt-to-gross domestic product (GDP) ratio and the most extensive currency reserves. Indeed, the PRC holds more US Treasury notes than any other country.¹ Furthermore, the PRC's economic growth rates during the last decade have dwarfed those of its rivals. These factors permit the PRC to flex its muscles on the international stage and enable Chinese leaders to choose from a wide variety of economic policies. This annex explores how the PRC might exploit its economic power in the coming years. That is, will the PRC adopt policies that will embrace the international community and maximize opportunity, or will it seek to minimize threats through forming strategic partnerships and attempting to isolate and weaken its most worrisome competitor: the United States?

One can characterize the PRC's future economic policy options as one of three possible states: peace and prosperity, soft economic warfare, and hedging between these two extremes. It is highly improbable that the PRC will adopt a pure strategy at either end of the spectrum and more probable that it will instead seek hybrid solutions to achieve national goals. The elements of a peace-and-prosperity strategy are similar to many countries' current practices and do not require exposition. Meanwhile, selected elements of the soft-economic-warfare strategy will be discussed briefly. Readers desiring a more complete exposition should consult the "Chinese Soft Economic Warfare" chapter in *The Asia Pacific Century: Challenges and Opportunities*.²

Chinese leaders envision a "harmonious society in a harmonious world" and profess they value internal stability and economic growth above military conquest.³ Moreover, relations with Taiwan (Republic of China) have thawed recently, so prospects for a militarily aggressive PRC over the next decade seem remote. Therefore, it is more likely the PRC will seek economic means to mitigate the risks posed by the military might of the United States.

Soft Economic Warfare

Although engaging in foreign trade without caveats will almost certainly maximize the PRC's future economic growth and, therefore, military strength, the country's leaders may reason that a more constrained approach minimizes risk more effectively. It is abundantly clear that the PRC considers the United States to be its primary rival and only real existential threat. Chinese leaders may desire a less provocative means of neutralizing the US threat than through force of arms; they can partially achieve this through economic means. Chinese leaders can carry out this strategy by accelerating liquidation of the PRC's long position in US Treasury bonds, by limiting US access to certain commodities and lines of communication, and by seeking exclusive partnerships with European Union (EU) countries and Japan in high-tech industries.

For some time now, many have been calling for the end of the dollar's reign as the de facto world currency.⁴ The difference between word and deed is particularly stark, however,

because no practical alternative to the dollar currently exists. Though the PRC does not publish the currency composition of its official foreign reserves, it is widely believed that the PRC has been steadily diversifying its reserve holdings and decreasing its exposure to the risk of a precipitous decline in the dollar's value.⁵ Because the PRC pegs the value of its renminbi to the dollar and runs huge trade surpluses with the United States, it is difficult for the nation to distance itself from the dollar. In addition, dumping dollars at an accelerated pace would cause the currency's foreign exchange value to dive and substantially decrease the value of the PRC's reserve holdings. Some have referred to a decisive Chinese move against the dollar as economic "mutual assured destruction."⁶ The United States has far more to lose from such a move, however, because the cost of financing its already tremendously burdensome debt would rise.

The consequences of a precipitous US decline in demand for American Treasury securities are potentially dire. The most obvious repercussion would be an increase in the cost of servicing the national debt due to an interest rate spike. The Congressional Budget Office (CBO) states that a four-percentage point across-the-board increase in interest rates would cause a jump in federal interest payments of about \$100 billion for fiscal year 2011 alone. In future years, the impact of this rate increase would be much more pronounced, with an estimated \$460 billion in increased expenditure in 2015.⁷ Such pressure on already strained budgets could prove unsustainable, and a fiscal crisis would likely ensue with debt restructuring or inflationary monetary policy becoming essentially obligatory. If the PRC is intent on neutralizing the United States, moving away from the dollar and causing it to lose its status as the world's default reserve currency would undoubtedly do the most damage.

Control of strategic minerals is another tool the PRC may use to exercise economic leverage over its competitors. The International Union of Pure and Applied Chemistry defines rare earth elements (REE) as members of the family of lanthanoid metals, scandium, and yttrium.⁸ The heavy REEs are used in high-technology applications such as lasers, magnetic resonance imaging, and fiber optics. Although REEs can be found throughout the world in the earth's crust, locations where it is economically feasible to mine for them are much less common. Currently, the PRC controls approximately 97 percent of the world's REE market and boasts 58 percent of world reserves.⁹ The PRC has instituted export controls of rare earth minerals, and some experts envision scarcity of some REEs by 2015.¹⁰ The PRC has a near stranglehold on the market, and the country is devoting substantial resources to discovering industrial and military uses for these metals.¹¹

The United States controls 9 percent of the world's REE reserves and is beginning to realize its vulnerable position.¹² California's Mountain Pass rare earth mine once supplied the majority of the world's rare earth minerals. The mine is undergoing modernization efforts that should bring it back up to full production by the end of 2012. This mine was reopened so that the PRC and Japan could not corner the market and expose the United States to significant national security risk with an export moratorium. It might be able to fulfill the United States' future needs if demand does not skyrocket due to a scientific breakthrough, but other developed nations could well be entirely dependent on the PRC's exports. While substitutes exist for some of the REEs, they are generally less effective and could compromise military superiority.¹³

Clearly, the PRC's REE monopoly could be a powerful tool for the PRC in forming economic and, potentially, military alliances with Japan and other strategically important nations. Barring a larger commitment to revitalizing rare earth mining in the United States,

the country is highly unlikely to possess sufficient productive capacity to export in substantial amounts. If a future technological advance requires the exploitation of REEs, the United States would likely exhaust the Mountain Pass mine's capacity and be 10–15 years away from augmenting current production through another mine. The potentially stark implications for national security are obvious.

The PRC can also interfere with American lines of communication (LOC). Closing selected sea and air LOCs to some of America's commercial traffic would have negative consequences such as starting a trade war, sacrificing trade revenue, and losing goodwill among other allies. Taking this action would be unnecessarily provocative and would arguably end up damaging Beijing much more than Washington. Interference with cyber LOCs is a more intriguing possibility. Cyber attacks aimed at commercial targets offer the possibility for furthering the objectives of soft economic warfare because attribution is difficult. US intelligence agencies cannot necessarily connect a lone hacker sitting at a keyboard in a remote location to the Chinese government. Furthermore, if estimated economic damage from past computer viruses is even remotely accurate, commercial virus production and hacking may play a crucial part in the soft economic warfare strategy.¹⁴

The decision of whether to implement a more structured commercial cyber operation reduces to a relatively straightforward cost-benefit analysis that will illuminate important aspects of the stratagem. The benefits associated with corporate hacking—lowering of US GDP—are relatively straightforward. However, as Martin Libicki observes, cyber attacks are self-depleting.¹⁵ To simplify the term and put it into economic language, computer hacking exhibits diminishing returns to labor. Some of the costs involved in producing commercial hacking are less tangible than the benefits. The opportunity costs of the labor and expenses for the computer equipment and infrastructure are relatively simple to estimate. Estimating loss of goodwill associated with suspicion of government participation is more problematic, but losses are likely to increase rapidly as the size of the operation expands. One could therefore express the PRC's utility function for commercial hacking as the economic damage inflicted on the United States minus direct costs, economic damage inflicted indirectly on the PRC, and total loss of international goodwill. Since the marginal economic damage inflicted by the next hacker is almost certainly decreasing, direct costs are at best linear in labor, and marginal loss of international goodwill is likely to be increasing. As the number of hackers goes up, the PRC should devote a relatively small, highly trained rotating group to this effort. The staff should rotate to ensure the team infuses fresh ideas periodically into the operation.

Another area in which the PRC might be able to undermine US hegemony is through its international trade policy. The PRC is the number one exporter in the world, and exports account for about 25 percent of Chinese GDP. However, the country's reliance on the US consumer market for economic growth could easily be overstated. In "China's Embrace of Globalization," the authors state that it is untrue that exports were the primary driver of Chinese growth in recent decades.¹⁶ During the period 2002–7, increases in net exports accounted for only 15 percent of total real GDP growth.¹⁷ Nevertheless, it would still be catastrophic for the Chinese to lose access to any considerable portion of the US consumer market. Therefore, the primary goal of China would be to retain access to as much of the US consumer market as possible, while distancing itself from the United States in other areas. The PRC would want to err on the side of caution and refrain from coming close to forfeiting

strong trade relations with the United States, but the PRC could still implement policies to advance its interests at America's expense.

Strengthening economic partnerships with the EU countries and Japan would diversify sources of demand for Chinese products and thus decrease dependence on the US market. Partnerships excluding the United States in key high-technology sectors with potentially substantial military value would characterize this aspect of the PRC's soft economic warfare policy. The PRC is already the top exporting nation to both the EU and Japan.¹⁸ However, among the larger EU economies, the PRC is the largest exporter only to Germany, so the Chinese can arguably accomplish much more through increased outreach. This objective may have motivated Vice Premier Li Keqiang's trip to Europe in early 2011.¹⁹

Since the EU still has an arms embargo on the PRC dating from the Tiananmen Square massacre, Chinese leadership has its work cut out for it in reaching trade agreements with EU countries on advanced technologies with possible military applications. The PRC's ability to bankroll the EU countries' debts could provide the necessary leverage for substantial influence with EU leaders, and the PRC's transition to the world's largest economy will certainly attract potential trade partners to the table for trade agreements with neither the need nor the concern for American participation.²⁰ The PRC's tremendous economic advantage is likely to motivate European countries to transfer and share technological advances for economic benefits in other areas without regard for how this will affect US national security interests. That is, the Europeans could find that their concerns for international security and human rights become subordinate to economic necessity. The long-rumored end of the North Atlantic Treaty Organization (NATO) would smooth Europe's path to cozier relations with the PRC.²¹ Although European countries will not necessarily intend to damage US national security, their actions could result in serious damage to American interests. This implicit collusion by the EU in advancing Chinese national security objectives could cause the United States to lose some of its technological edge over the PRC.

Japan's potential future role in implicitly undermining US national security through warmer relations with the PRC could prove decisive over the coming decades. Using the purchasing power parity valuation of GDP, the combined economies of the PRC and Japan are roughly comparable to that of the United States. A coalition led by these states would be incredibly powerful and eventually far outstrip the United States in economic might. Japan leads the world in patent applications, and the PRC ranks third.²² Moreover, a Sino-Japanese alliance could create a scientific juggernaut of 1.5 billion people. A cozy economic relationship between the two powers coupled with somewhat intensified protectionism toward the United States would deal a substantial blow to US economic interests.

Conclusion

Clearly, the PRC can damage US interests through several means other than war. The immediate question that comes to mind is what can the United States do to deter the PRC from adopting these strategies? The most important policy objective the United States should pursue is long-run fiscal solvency. The PRC is unlikely to pursue antagonistic economic policies unless the United States appears to be a soft target. The United States should continue and expand efforts to acquire REEs by vigorously seeking partnerships around the globe. Finally, the United States should do its utmost to promote free trade and to avoid discouraging existing and potential trade partners from closing off trade lanes.

Notes

1. Department of the Treasury and Federal Reserve Board, "Major Foreign Holders of Treasury Securities," 16 April 2012.
2. Chad Dacus, "Chinese Soft Economic Warfare," in *The Asia Pacific Century: Challenges and Opportunities*, ed. Adam Lowther (Maxwell AFB, AL: Air University Press, 2013).
3. Hu Jintao, "Hold High the Great Banner of Socialism with Chinese Characteristics and Strive for New Victories in Building a Moderately Prosperous Society in All" (report, 17th National Congress of the Communist Party of China, Beijing, China, 15 October 2007). Hu stressed the "harmonious society" theme throughout the address.
4. See, for example, International Monetary Fund (IMF), *Enhancing International Monetary Stability—A Role for the SDR [Special Drawing Right]?* (Washington, DC: IMF, 7 January 2011).
5. See, for example, Wang Xiaotian, "China Starts Diversifying Forex Reserves," *China Daily*, 18 August 2010, http://www.chinadaily.com.cn/china/2010-08/18/content_11167785.htm.
6. Ambrose Evans-Pritchard, "Concerns Grow over China's Sale of US Bonds," *Telegraph*, 23 February 2010, <http://www.telegraph.co.uk/finance/currency/7300770/Concerns-grow-over-Chinas-sale-of-US-bonds.html>.
7. Jonathan Huntley, "Federal Debt and the Risk of a Fiscal Crisis," Economic and Budget Issue Brief (Washington, DC: CBO, 27 July 2010), 7, http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/116xx/doc11659/07-27_debt_fiscalcrisis_brief.pdf.
8. Neil G. Connolly, Ture Douglas, Richard M. Hartshorn, and Alan T. Hutton, eds., *Nomenclature of Inorganic Chemistry: IUPAC Recommendations 2005* (Cambridge, UK: International Union of Pure and Applied Chemistry, Royal Society of Chemistry Publishing 2005), 51, http://old.iupac.org/publications/books/rbook/Red_Book_2005.pdf.
9. Cindy Hurst, *China's Rare Earth Elements Industry: What Can the West Learn?* (Leavenworth, KS: Institute for the Analysis of Global Security, March 2010), 3, <http://fmso.leavenworth.army.mil/documents/rareearth.pdf>.
10. Robin Bromby, "Caution, Rare Earths Ahead," *Australian*, 26 April 2010, <http://www.theaustralian.com.au/archive/business-old/caution-rare-earths-ahead/story-e6frg9ex-1225858477751>.
11. Hurst, *China's Rare Earth Elements Industry*, 7.
12. Ibid., 14.
13. James B. Hedrick, "Rare Earths," in *Mineral Commodity Summaries* (Washington, DC: US Geological Survey, US Department of the Interior, January 2009), 131.
14. For instance, the information technology firm Computer Economics estimates economic damage from malicious code at \$13.2 billion in the year 2001 alone. See Computer Economics, "Malicious Code Attacks Had \$13.2 Billion Economic Impact in 2001," January 2002, <http://www.computereconomics.com/article.cfm?id=133>.
15. Martin Libicki, "Cyberwar as a Confidence Game," *Strategic Studies Quarterly* 5, no. 1 (Spring 2011), 133, <http://www.au.af.mil/au/ssq/2011/spring/libicki.pdf>.
16. Lee Branstetter and Nicholas Lardy, "China's Embrace of Globalization," working paper no. 12373 (National Bureau of Economic Research, July 2006), 14, <http://www.nber.org/papers/w12373.pdf>.
17. Pranab Bardhan, *Awakening Giants, Feet of Clay: Assessing the Economic Rise of China and India* (Princeton, NJ: Princeton University Press, 2010), 24.
18. European Commission, "Eurostat Statistical Database," n.d., http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_122530.xls; and Ministry of Finance, Government of Japan, "Trade Statistics of Japan," February 2012, <http://www.customs.go.jp/toukei/srch/indexe.htm?M=23&P=1,.....,1,0,2012,0,2,0,.....,1,.....,20>.
19. Banning Garrett, "Is China Trying to Divide U.S. and Europe?," CNN, 21 January 2011, <http://www.cnn.com/2011/OPINION/01/20/garrett.china.europe.us/index.html>.
20. Nerys Avery, "Greater China Daybook: China May Buy More Europe Bonds; Chalco Profit Drop," *Bloomberg News*, 21 April 2011, <http://www.bloomberg.com/news/2011-04-21/greater-china-daybook-china-may-buy-more-europe-bonds-chalco-profit-drop.html>.
21. Thomas L. Friedman, columnist for the *New York Times*, sounded the alarm in his article "The End of NATO?," 3 February 2002, <http://www.nytimes.com/2002/02/03/opinion/the-end-of-nato.html>. To some observers, the 2011 Libyan uprising signaled the end of NATO. See Steven Metz, "Is Libya the End of NATO?," *New Republic*, 15 April 2011, <http://www.newrepublic.com/article/politics/86683/libya-qaddafi-nato-intervention#>.
22. Francis Gurry, Carsten Fink, Mosahid Khan, Kyle Bergquist, Ryan Lamb, Bruno Le Feuvre, and Hao Zhou, *World Intellectual Property Indicators, 2011* (Geneva, Switzerland: World Intellectual Property Organization, 2011), table P.1, 126.

Appendix C

China and Japan

Partners in Innovation?

Dr. Chad Dacus

Japan and the People's Republic of China share a mutual distrust of one another stemming, in large part, from animosity during World War II. Juxtaposed on this hostility is one of the world's most fertile foreign trade partnerships. Whether these countries' historical antipathy and recent tensions will triumph over considerable and growing commercial synergy is a question of great importance to US international relations and possibly national security. This appendix highlights trends that make a deepening of the Sino-Japanese relationship more likely and examines the technological implications of bilateral coordination. This annex is not intended to be a prediction of future events; it is intended to serve as a scenario for consideration in writing *An Approach toward an Asia-Pacific Strategy: 2012–2020*.

Bustling Trade

If one removes the United States from consideration, then Japan and China share the highest bilateral trading volume in the world.¹ China is Japan's largest trading partner by a substantial margin, and China receives a larger volume of goods from Japan than from any other country.² Although Japan's economy is relatively insular compared to China's, it will protect and seek to enrich its relationship with its most vital trading partner.

Japan's motivation to maintain a fruitful trading relationship extends well beyond trade volume to specific resource needs. Japan has found itself subject to China's whims on supplying rare earth elements for export. Due to the strength of Japanese electronics manufacturing firms, Japan is among the world's most prolific consumers of these metals. Due to Japanese rare earth trading agreements and what is sure to be a contentious cache of minerals discovered in the Pacific Ocean near Hawaii, this issue might be declining in importance. However, the Chinese wield considerable power through their current stranglehold on worldwide supply.³

Although China is more dependent on the United States for its unparalleled markets than it is on Japanese consumers, the same is not true for Japan when it comes to China. China is Japan's most important trading partner, and the country's economic dependence on China is likely to grow in coming years. This is a powerful incentive for Japanese policy makers to consider Chinese interests carefully when making decisions.

Foreign Direct Investment

Foreign direct investment (FDI) has been an important engine for Chinese economic growth, and countries like Japan have been able to remain competitive in key industries through relocating manufacturing and production facilities to China. Japan was the world's

second-leading provider of foreign direct investment in 2011, and it has long been China's top backer.⁴ Japan's stake in China has consistently grown as a percentage of the country's total FDI and comprised 9 percent of Japan's FDI stock as of 2012.⁵

Since 2004, Japanese FDI in China has performed better than any other country's investments except for that of Germany. Furthermore, surveys of Japanese manufacturing firms have indicated that China continues to be the most promising country in the world for Japanese foreign direct investment.⁶ This result has endured even during periods of strained bilateral relations between the countries.

Japan's FDI differs in kind from US investment efforts in China. Japan's investments are concentrated in manufacturing industries, while the United States has invested more heavily in wholesale trade industries and services. In 2004 more than 80 percent of Japan's FDI flows to China were in manufacturing industries; less than 60 percent of 2007 US FDI flows to China were in manufacturing.⁷ As such, it is quite likely that there has been significantly more technology transfer between Japan and China because of FDI flows.

China reaps substantial benefits from the manufacturing jobs created through Japanese investment. Since these types of jobs pacify its citizens, it is clear that Chinese leaders will continue to make every effort to sustain and encourage more Japanese FDI. In addition, lessons learned from these Japanese manufacturers can help nascent Chinese industrial concerns gain access to Japanese and Western consumer markets. Increasing Chinese managerial sophistication through lessons learned will magnify the beneficial impact of Japanese technology transfer.

Japanese investment in China is a rapidly growing segment of the country's overall FDI portfolio. Furthermore, this investment has focused on industries that likely involve significant technology transfer. It is easy to see how technology transfer in typical manufacturing concerns could lead to technology transfer on a more comprehensive level—perhaps involving scientific collaborations that could extend to national security applications. Although these types of partnerships are probably more than a few years away, the trend is unmistakable and provides reason for US concern.

Historical Behavior

Other than the Imjin War, China and Japan did not engage in armed conflict between 1368 and 1841. This period of relatively harmonious relations stands in marked contrast to the many European wars during this period. China was clearly the dominant state, and other states readily accepted their own statuses as lesser powers. This could soon be the case, once again, as China's power easily eclipses that of the other Asian nations.

For hundreds of years until the middle of the sixteenth century, the Japanese paid tribute to the Chinese under the elaborate Chinese tributary system. While China explicitly reigned as the hegemonic state, the system was not without benefits for the so-called tributary states. For example, before Japan entered into the tributary system, the Chinese twice intervened to protect Korea from Japanese invasions.⁸

The long period of relatively peaceful relations in East Asia coupled with China's historical record of intervening on the behalf of its allies sets a precedent for a future with China as a protector state. A hierarchical arrangement would pay large dividends to China through regional stability, and the benefits to Japan would be obvious and substantial. A strong ally next door is much more reliable than a friend halfway around the world.

Picking the Winner and Accepting Its Fate

Arguably the most profound arguments for Japan to eventually pursue a much closer relationship with China is the realization that China will soon far outstrip Japan's might and the widespread belief that China will surpass the United States sooner rather than later. It is clear that China has eclipsed Japan in gross domestic product. The only uncertainty is whether China will also surpass the United States in this measure of economic strength. In most circles, the question is when and not if China's economy will become the world's largest.⁹ Combined with the other economic rationalizations previously mentioned, this makes Japan's decision clear as to which country to prefer. If the Japanese were to choose power as the main criterion for making alliances, it could be considered an example of the well-known "bandwagon" effect.¹⁰

Japan's historically high levels of debt support the hypothesis that it will eventually choose China as its closest ally. This choice is likely to be inevitable since China has the world's largest reserves, while the United States is the world's preeminent debtor. In addition, China is a country full of savers, compared to the United States' middling savings rate. When Japan requires foreign capital in abundance, China will be there to answer the call; the United States will be busy dealing with its own debt problems.

Significance of a Partnership

From a national security perspective, the implications of a cozier Sino-Japanese relationship extend far beyond the economic realm. Such an alliance could create a scientific juggernaut of 1.5 billion people. Japan leads the world in patent applications, and China ranks second.¹¹ Moreover, it would be difficult to overstate Japan's level of scientific achievement. Japan has become, very quietly, one of the world's leaders in scientific innovation. For example, according to the Boston Consulting Group's Global Innovation Index, Japan ranked third in innovation performance. To put it in objective terms, Japan dominates the world in the number of patent applications overall and, especially, per million residents when compared with the other five most prolific countries.¹² Japan's number of resident patent filings per million people is over twice as high as the second most prolific country, South Korea. In individual fields of technology such as electrical machinery, optical equipment, and audio-visual technology, Japan more than doubles its closest competitor. In semiconductor technology, Japan's number of patent applications doubles that of any other nation except South Korea. The United States consistently exceeds Japan in the number of patent applications only in the fields of chemistry, telecommunications, and computer technology.

With China's military buildup and a stagnating economy that could use some defense industry stimulus, Japan would not have much difficulty justifying a more rapid militarization that would frighten its neighbors and conflict with the desires of Western countries. Of course, this would reinforce China's buildup and create an Asian arms race. As previously stated, this environment would be likely to increase tensions in the short run, but in the long run the outcome is unclear.

Even before any shift to increasing militarization, Japan excels in industries with obvious defense applications. For example, the Japanese have strong or dominant market share in the aircraft, robotics, and battery technology industries.¹³ In addition, its carbon fiber manufacturers control almost 70 percent of a rapidly growing market. The military

applications of carbon fiber composites are well known, and such applications will only become more numerous.¹⁴ These resident strengths, combined with the talented researcher workforce described above, could translate to great military power when combined with a skilled and relatively low-cost Chinese workforce.

Barriers to Partnership

The barriers to a deepening Sino–Japanese relationship, while certainly daunting, are far from insuperable. Tensions from World War II behavior have already been mentioned and linger to this day, but much of it has been driven by insensitive behavior by Japanese senior officials. Most notably, Japanese prime ministers have visited the Yasukuni shrine honoring Japanese war deaths during imperial Japanese rule. Although the historical animosity between the countries is real and unlikely to be forgotten, the Japanese could go a long way toward smoothing things out by avoiding insensitive behavior. This process of changing attitudes has clearly already begun. That is, Japan's strong interest in preserving their relationship with the strongest country in the region and eventually the world should trump scoring cheap domestic political points.

Tensions over territorial claims present the most important obstacle to harmony between these nations. Although these disputes seem to be increasing in intensity, this is another area where Japan might consider its interest in preserving relations to be more important than securing sovereignty over sparsely or unpopulated islands.¹⁵ This remains a stiff headwind against closer relations, as it is uncertain how these territorial disputes will be resolved.

Countering This Partnership

A Sino–Japanese technological partnership would be quite formidable and able to threaten US national interests. What actions could the United States take now to protect, in some measure, its national interests in the event of such a partnership? It is beyond the scope of this paper to sketch a comprehensive strategy, but there are a few general policies the United States could adopt that may help protect US interests.

The United States should increase its commitment to science, technology, engineering, and mathematics education and to basic and applied scientific research. Of course, politicians often mention these goals, but they seldom follow through. The clarity offered by a potentially hostile nascent partnership technologically outstripping the United States will provide a powerful incentive to develop more innovative methods to improve the performance of US students.

The US military can choose policies that will put the country in a better position should a Sino–Japanese partnership become a reality. The natural place to start would be to focus on recruiting and cultivating science and engineering talent in the military's officer corps. Since the military has one the most persuasive recruiting tools for attracting capable young people available in the allure of becoming a pilot, the services should exploit this advantage and condition eventual pilot training on the pursuit of a college degree in a technical discipline. Having officers who understand advanced technology will make a difference in both acquisition product development and management. Some may object and voice concern that this will result in failing to meet recruiting targets. However, this concern seems un-

warranted because recruiters have consistently met their goals over the past several years, and the future force will likely be somewhat smaller than today's end strengths.

If there is to be a "scientific arms race," the US military must be on the cutting edge of technology. Toward that end, the services should maintain or, preferably, increase science and technology (S&T) spending in both absolute real terms and as a share of the defense budget. This would fly in the face of current trends. In fiscal year 2000, S&T accounted for approximately 3 percent of the DOD budget.¹⁶ In the fiscal year 2013 budget, S&T has slipped to 2.26 percent of DOD's allocation.¹⁷ Of course, if Sino-Japanese scientific efforts combine, the United States will be unable to keep up on its own. The United States must look to expand its partnerships through the North Atlantic Treaty Organization and other international organizations. Since it is difficult to envision European increased real defense expenditure, this will be a tough sell but could be made more plausible through promises of significant US commitment and contribution.

Given the long acquisition cycle for many systems, the United States military should turn its focus increasingly to defensive technologies. That is, the United States must realize that its time as the world's sole superpower is nearing an end. Although it is important to retain strong offensive capabilities such as long-range strike, sound defensive capabilities for protecting the homeland will become vital when the United States inevitably has a potential adversary that can come close to matching its capability. A well-publicized example of using S&T funding for defensive capabilities is the development of directed energy weapons for antiballistic missile purposes. The US military should redouble its efforts to develop such technologies.

Conclusion

Although one could not currently consider China and Japan as allies, there are strong ties that could bind the nations in the coming decades. The enormous and growing volume of trade between the nations will bring them together out of necessity. Continued Japanese FDI in China will inevitably lead to increased technology transfer, and it is not difficult to foresee research partnerships in high-technology sectors with national security applications. Recent history aside, the Sino-Japanese relationship has not been particularly contentious, so continued strife seems far from inevitable. Finally, Japan can certainly read the writing on the wall and would be foolish not to cast its lot with the eventual regional hegemonic power.

Japan is a leading country in scientific innovation. Of the world's largest economies, only the United States and Korea currently rival Japan's technological prowess. Marrying Japan's scientific talent with China's increasingly skilled workforce and ability to finance the discovery process is a recipe for eventually leading the world in high-technology weaponry. The United States discounts the possibility of Sino-Japanese partnership at its peril.

Notes

1. World Trade Organization, *International Trade Statistics 2011, World Trade Developments*, November 2011, Tables I.12-1.16d, and author's own calculations.

2. China receives more imports from the European Union than from Japan. National Bureau of Statistics of China, "Statistical Communiqué on the 2011 National Economic and Social Development," 22 February 2012, http://www.stats.gov.cn/english/newsandcomingevents/t20120222_402786587.htm.
3. Phil Muncaster, "Japan and Vietnam Push on With Rare Earth Mining Plans," *Register* (UK), 18 June 2012, http://www.theregister.co.uk/2012/06/18/japan_vietnam_rare_earth_minerals/; and Danielle Demetriou and Rowena Mason, "Rare Earth Minerals Find in Pacific Could Spark Japan-Hawaii Stand-off," *Telegraph* (UK), 4 July 2011, <http://www.telegraph.co.uk/finance/commodities/8616623/Rare-earth-minerals-find-in-Pacific-could-spark-Japan-Hawaii-stand-off.html>.
4. "Japan Tops China in 2011 Foreign Direct Investment," *Daily Yomiuri Online (Japan)*, 14 April 2012, <http://web.archive.org/web/20120417203615/http://www.yomiuri.co.jp/dy/business/T120413004062.htm>.
5. Author's calculations using Japan External Trade Organization, "Japan's Outward and Inward Foreign Direct Investment, FDI Stock, 2013," 2013, <http://www.jetro.go.jp/en/reports/statistics/>.
6. Japan Bank for International Cooperation Institute (JBICI) Review, "Areas Japanese Enterprises Consider Promising," *JBIC Today* 11, February 2012, 5–6, http://www.jbic.go.jp/en/report/jbic-today/2011/201202/td_2012feb.pdf.
7. Theresa M. Greaney and Yao Li, "Assessing Foreign Direct Investment," *Journal of Asian Economics* 20, no. 6 (2009), Tables 4.2 and 5.2.
8. Hosea Ballou Morse, *The International Relations of the Chinese Empire*, vol. 3 (London: Longmans, Green, and Co., 1918), 22.
9. See, for example, Organisation for Economic Co-operation and Development, *Looking to 2060: A Global Vision of Long-Term Growth, OECD Economics Department Policy Notes*, No. 15 (Paris, France: Organisation for Economic Co-operation and Development, November 2012), 8.
10. Stephen M. Walt, "Alliance Formation and the Balance of World Power," *International Security* 9, no. 4 (Spring 1985), 4.
11. World Intellectual Property Organization (WIPO), *World Intellectual Property Indicators, 2012* (Geneva, Switzerland: WIPO, 2012), 1, 55.
12. Ibid.
13. Ministry of Economy, Trade, and Industry, Government of Japan, "Japan's Manufacturing Industry," July 2010, 11–14, http://www.meti.go.jp/english/policy/mono_info_service/overall/overview.pdf.
14. Ivan Lerner, "Carbon Fiber Composites Will Still Find Good Business with the Military," *ICIS Chemical Business*, 11 December 2009, <http://www.icis.com/Articles/2009/12/14/9318709/carbon-fiber-composites-will-still-find-good-business-with-the.html>.
15. "Japan, China Tensions Flare Anew amid Island Dispute," *Pittsburgh Tribune-Review*, <http://triblive.com/usworld/world/2210186-73/japan-china-islands-government-tokyo-japanese-buy-beijing-ishihara-niwa>.
16. Walter E. Morrow, Jr., *Defense Science Board Letter Report on DOD Science and Technology Program* (Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, 2000).
17. Department of Defense, *Summary of the DOD Fiscal 2012 Budget Proposal*, 14 February 2011, [http://www.defense.gov/pdf/SUMMARY_OF_THE_DOD_FISCAL_2012_BUDGET_PROPOSAL_\(3\).pdf](http://www.defense.gov/pdf/SUMMARY_OF_THE_DOD_FISCAL_2012_BUDGET_PROPOSAL_(3).pdf).

Appendix D

Cyber Power in the Asia-Pacific

Dr. Panayotis A. Yannakogeorgos

Introduction

Cyberspace is the twenty-first century's powder keg. Competing interests and ideologies have emerged over the past decade to carve out digital spheres of influence within a domain that was supposed to represent the epitome of a project forging a global information society.

The US Air Force (USAF) has lost its innovative edge in cyberspace. Today, like its sister services, it runs cyber operations with great focus on the network and transport layers of the domain. This results in the standard computer network attack/defense models, with a focus on concepts such as resilience, reliability, and availability. While it is critical to understand these concepts and assure they are applied at the tactical and operational level, the strategic dialogue needs to move beyond system administration paradigms towards strategic uses of cyber power in military operations to preserve American national security. The USAF has a unique culture and operational experience from the other domains that will allow it to operationalize innovative applications of cyber power and lead the sister services.

The scope of this appendix is to provide a strategic-level assessment of cyberspace and its importance to the Asia-Pacific region. It begins with an overview of what the cyber environment may look like by 2020 given current technological trends. The focus is on the core protocols software and hardware that define cyberspace and their evolution within the context of the Asia-Pacific region. There is some discussion of the peripheral technologies as well. The work then moves into a discussion of cyber threats, with a focus on potential threats of national significance. The work concludes with a discussion of cyber statecraft and airpower in the region.

The Cyber Environment in 2020

According to USAF doctrine for cyberspace operations, "cyberspace is a man-made domain, and is therefore unlike the natural domains of air, land, and maritime."¹ This description creates an aura of cyberspace as a solely virtual domain, separated from the real world. Cyberspace has the sole purpose of serving human operators and creating effects in the physical world. Focusing on the network and logical layers of cyberspace rather than the characteristics that wholly compose the cyber environment (fig. D-1) creates the impression that this domain is unconnected with the real world. Refining the conceptualization of cyberspace will allow for its demystification and its closer alignment within the physical world.² This is important for strategic discussions. Reconceptualizing the domain from a model based on the principles adopted by network engineers and system administrators to a characteristics-based model allows leaders to attune strategy and policy to the operational elements within which the USAF aims to achieve effects.

Reconceptualizing the domain requires looking at cyberspace as a complex ecosystem composed of human operators, ranging from casual Internet users to information warriors;

the actual information that is stored, transmitted, and transformed; the computer code and protocols; and the physical elements that are configured by humans and on which the logical and informational layers ride.

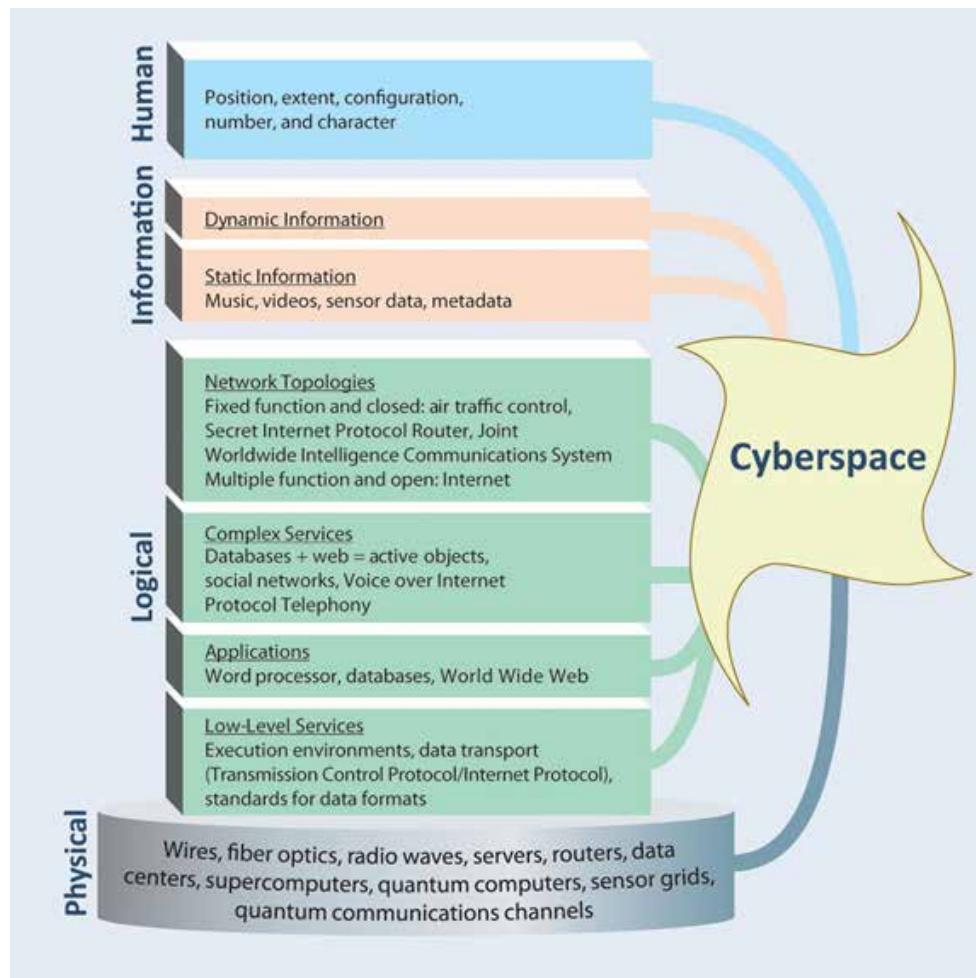


Figure D-1. The character of cyberspace

The current concentration on the importance of computer attack/defense paradigms, as well as problems with attribution, stems in part from an emphasis on the logical rather than the physical information and human layers that compose cyberspace. Although doctrine and policy note the physical elements of cyberspace, these remain largely secondary to the protocols and computer language through which digital communications occur. Data and information are not transported in a virtual ether divorced from the laws of physics, space, and time. Rather, they travel through physical infrastructures, such as undersea cables, and reside on devices operated by people located within the boundaries of a state's sovereign territory. Refocusing on the holistic characteristics of cyberspace allows for a conceptualization that may allow levers of US statecraft to resolve certain issues, such as the attribution challenge. An approach that does not treat cyber as a virtual domain but recognizes the physical and social attributes brings clarity to discussions of the kinds of effects that an organization can create via cyberspace.

Cyberspace Reloaded

The next 10 years will represent a paradigm shift in the fundamental character of the Internet, cyberspace's most potent manifestation. The underlying core technologies, including protocols, hardware, and the peripheral technologies, such as software, along with the convergence of several technical trends will revolutionize how people interact globally if they are on the developed side of the digital divide. It is not the purpose of this section to provide a deep technological assessment of cyberspace. The USAF chief scientist's study *Cyber Vision 2025* provides this scientific-level overview.³

The convergence of broadband Internet with mobile platforms will significantly shift the computing paradigm—similar to the shift from mainframe/micro computing to desktop computing. This shift will be much more rapid because of five converging technological trends: 4G and 802.11 (Wi-Fi), mobile devices, user interfaces, storage mediums, and power sources. These trends highlight a significant shift in kinds of devices used to access cyberspace and how people interact with the information on the Internet and with their industrial devices. Usage trends in cloud computing paradigms (software as a service, platform as a service, infrastructure as a service) will change the way content and information spread (social networking, Voice-over-Internet Protocol [VoIP], big data computation, and streamlined business processes) and revolutionize how the USAF operates if adopted.

Although the Internet and other elements of cyberspace touch on all nations, the Asia-Pacific region is emerging as a cyber powerhouse. Not only does the Asia-Pacific region lead the world in number of Internet users, but the countries within it also lead the world on the variables that by 2020 could see the region overtake the United States in terms of cyber power. Today, US companies provide technologies that allow more and better digital information to flow across borders, thereby enhancing socioeconomic and human development worldwide. When markets and Internet connections are open, America's information technology (IT) companies shape the world and prosper. Leveraging the benefits of the Internet cannot occur if confidence in networked digital information and communications technologies is lacking.

Worldwide, China is the leading Internet country by number of users. However, Internet penetration is not the only indicator of cyber power. Current USAF and Department of Defense (DOD) cyber policies and strategy are focused on catastrophic national security incidents and do not provide adequate attention to the issue of how the United States will maintain its status as core operator of the hardware and software comprising current and next generation digital networks and services. As reported by the US-China Economic and Security Review Commission (USCC), “If current trends continue, China (combined with proxy interests) will effectively become the principal market driver in many sectors, including telecom, on the basis of consumption, production, and innovation.”⁴ Technical standards and protocols do not elicit the same attention as the more visible threats to national cybersecurity. In an environment of human-capital and resource constraints, attention has tuned to crime, espionage, and other forms of cyber conflict rather than the issues related to governance of critical Internet resources, development of technical standards, design of new protocols, and manufacturing of information technology. In a domain that is already confusing to policy makers, the complexity of critical cyber resources makes it even harder for policy makers to commit resources to a field that has no analogy in the physical world.

Core versus Peripheral Technologies

Technical standards and protocols do not elicit the same attention as more visible threats to national cybersecurity. In a domain that is already confusing to policy wonks, the complexity and invisibility of the core technologies make it even harder for policy makers to commit resources to a field that has no analogy in the physical world. In the nuclear age, there was no debate as to whether one could redesign the physical properties of uranium and apply them universally to eliminate the element's potential for weaponization. The underlying language of nuclear conflict was constrained by the laws of physics (e.g., nuclear fission, gravity, etc.). Physical limits in cyberspace exist as well, constraining information flows to the laws of physics—the wave-particle duality of radiation that, when modulated with bits, creates an information flow. However, the “logic” elements of cyber that permit information to flow across networks and appear within the peripheral applications to create effects in the real world are bound only by the limits of human innovation. Following is a nonexhaustive list of these core and peripheral technologies that will change the actual cyber environment and is intended to inform US military planners and operators on how technological changes may shift their operational paradigms. It is critical that the USAF prepares for the next generation of cyber conflict by adapting to emerging network infrastructures and applications.

Core Technologies

First deployed in spring 1978, IPv4 has been the underlying protocol that allows computers to internetwork. The growth of the Internet from a small DOD project into a global phenomenon has resulted in Internet Protocol (IP) address space consumption (fig. D-2). Realizing that the future of the Internet was at stake in the mid-1990s, the Internet Engineering Task Force, an international IT community composed of industry experts concerned about the development of the Internet, undertook an effort to engineer a new version of the Internet Protocol to assure that IP addresses would not be outpaced by the rapid explosion of Internet growth.



Figure D-2. IPv4 exhaustion forecast. (Derived from IPv6 Forum, n.d., IPv6forum.org.)

Today's Internet, cyberspace's most potent and global manifestation, is on the cusp of shifting from IPv4 to IPv6. Once the shift is completed, it will be the first time in the Internet's history that the underlying protocol will have changed. The impact of this transition will affect US and global commerce and security for the next 20–50 years.

This protocol is considered more secure than IPv4 since, among other things, it makes available more address space, thereby establishing a system more resistant to denial of service and distributed denial of service and other malicious attacks. However, IPv6 is not a perfect security solution. The National Institute of Standards (NIST) notes that "some key IPv6 design issues remain unresolved. As the USG [US government] begins to undertake significant operational deployments and investments in IPv6 technology, additional efforts are warranted to ensure that the eventual resolution of these design issues remains consistent with USG requirements and investments."⁵

Therefore, it is imperative that USAF operators are educated and trained in IPv6 environments to assure they are prepared to deal with potential adversaries who have the operational experience within this new network topology. It must be stressed that this is not a hypothetical transition, but one that is grounded in the realities of critical Internet resource allocation (fig. D-3).

In August 2012 the European Internet registry exhausted its supply addresses, resulting in the regulatory body granting carriers only IPv6 addresses.⁶ In April 2011 the Asia-Pacific region was no longer able to meet IPv4 demand, and IPv6 became mandatory for building new Internet networks and services, as the final IPv4 spaces are rationed out to the Asia Pacific Network Information Centre.⁷ Thus, the Asia-Pacific region effectively became the first IPv6-enabled region.

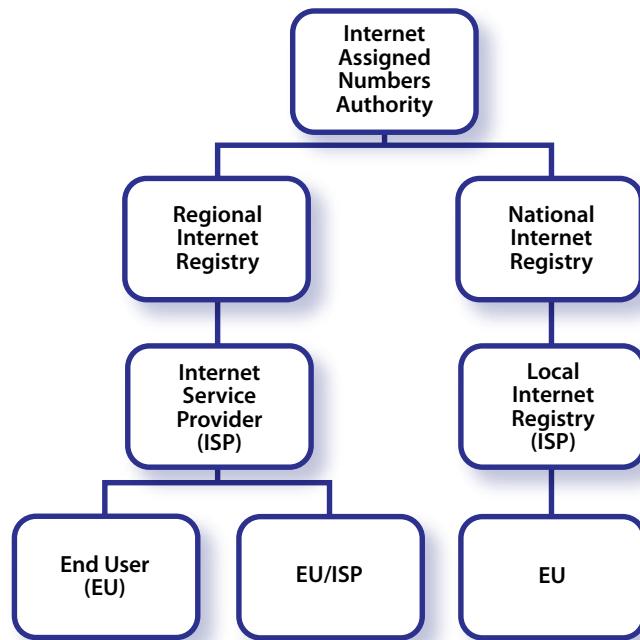


Figure D-3. Internet address allocation hierarchy. (Data from Internet Assigned Numbers Authority, "Number Resources," n.d., <https://www.iana.org/numbers>.)

The United States is at a disadvantage for transition. Because we pioneered the Internet, we own legacy technology that is IPv4. Thus, the cost of transitioning is higher than for most countries that do not have this legacy infrastructure and can migrate directly to IPv6-compatible infrastructure, dual-stacking during the transition period and then shutting off IPv4. IPv6 transition is strongest in the Asia-Pacific region given that its IPv4 allocation expired in 2012. Indeed, the China Education and Research Network is the largest IPv6 network in the world.

Peripheral Technologies

Referring back to the character-based model of cyberspace, peripheral technologies are those that reside within the “information” layer. That is, they are the applications that innovative people create to run on top of the network infrastructure. The World Wide Web (WWW) is a good example that shows the complex relationship between core and peripheral technologies. The WWW is a peripheral technology in that it requires core protocols, including IP and Hypertext Transfer Protocol and File Transfer Protocol, to exist. The WWW today, in all its dynamic and graphical glory, is the creation of applications that allow for the innovative use of core technologies, along with the organization of other information, to create applications that a user can operate to exchange dynamic or static information. The WWW also represents the development of specific hardware devices whose creators harness the powers of existing core protocols and standards to innovate and create new products that change the way people communicate. The following are some illustrations of emerging technologies that will have similar implications to peripheral technologies that have become a part of everyday life in the developed world, such as Facebook, Twitter, and broadband mobile devices.

- The technologies underlying IP television are better suited for operating under IPv6. This could result in a paradigm shift similar to the one experienced when the television model shifted from local broadcast to satellite broadcast.
- Wireless mobile applications need IPv6 to support large numbers of customers and will eventually make possible the creation of ad hoc networks. The latter presents both opportunities and risks for US military operations.
- 3G+ Telephony requires IPv6 for the IP Multimedia Subsystem on which 3.5G and later depend. Once on IPv6, consumers will save battery power, since energy in mobile 3G+ has to recover IPv4 addresses.

Ubiquitous Computing and the Industrial Internet

Sensors on fruit and vegetable cartons can track location and sniff the produce, warning in advance of spoilage, so shipments can be rerouted or rescheduled. Computers pull GPS [Global Positioning System] data from railway locomotives, taking into account the weight and length of trains, the terrain and turns, to reduce unnecessary braking and curb fuel consumption by up to 10 percent.

—Steve Lohr

“The Internet Gets Physical,” *New York Times*

IT professionals use the term *ubiquitous computing*—also known as the Internet of things—to describe the full universe of devices that, once combined, in the near future will drastically modify the way our societies function. It represents a paradigm shift from a networked laptop and desktop toward a paradigm of networked objects sensing their environments and communicating what they see among themselves.

This is more than an extension of the Internet to mobile and other devices, as it could include independent systems that operate on their own infrastructure and have only partial reliance on the Internet. These objects, from books to cars and from electrical appliances to food, create the Internet of things. These objects may have their own IPv6 addresses or be embedded in complex systems, using sensors to obtain information from their environments (such as food products that record the temperature along the supply chain).

Broadband Mobility

The deployment of IPv6, with its massive address space, and the convergence of industrial sensing systems with the Internet are two trends that will drive the third major change in the cyber landscape: the intensification in the use of broadband mobile devices (fig. D-4). In the developing world, the trend is for countries to skip over the plain old telephone system and install wireless communications infrastructures, including broadband Internet and cellular communications.

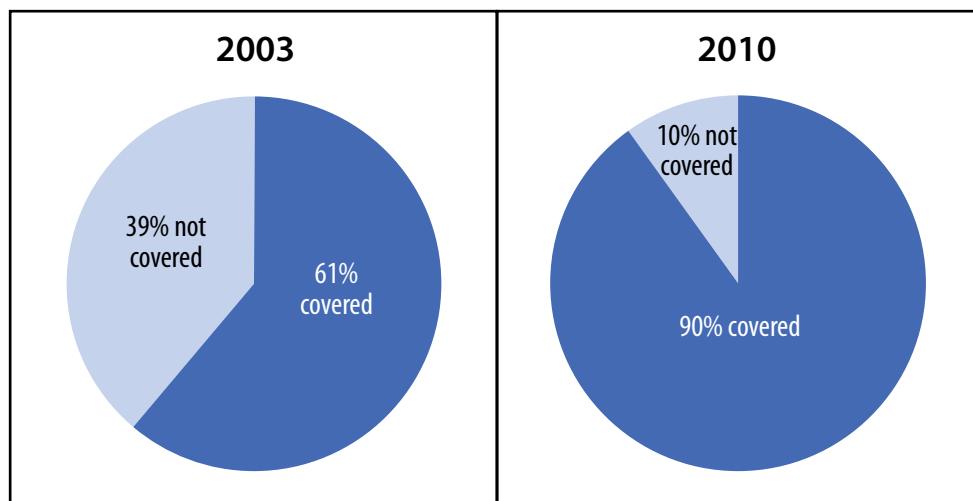


Figure D-4. Percentage of the world's population covered by a mobile cellular signal, 2003 compared to 2010. (Reprinted from ITU World Telecommunication/ICT Indicators database)

Cloud Computing and Operational Resilience

NIST has defined cloud computing as a model for “enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud

model is composed of five essential characteristics, three service models, and four deployment models”⁸ (fig. D-5).

Private Cloud. The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). The organization, a third party, or some combination of the two may own, manage, and operate the cloud, and it may exist on or off premises.

Community Cloud. The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). One or more of the organizations in the community, a third party, or some combination of them may own, manage, and operate the cloud, and it may exist on or off premises.

Public Cloud. The cloud infrastructure is provisioned for open use by the general public. A business, academic institution, or government organization, or some combination of them may own, manage, and operate the cloud. It exists on the premises of the cloud provider.

Hybrid Cloud. The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

Figure D-5. Cloud computing deployment models. (Derived from Peter Mell and Timothy Grance, *The NIST Definition of Cloud Computing* [Washington, DC: National Institute of Standards and Technology, 2011], 2, <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>.)

There is an increasing trend today within the commercial sector of locating many independent services on one physical host. From an operational perspective, this paradigm allows greater tolerance to operate resiliently in a contested environment—the ability of a system to continue operation transparently in the face of one or more faults that would otherwise cause a system to fail. This does not inherently prevent the exploitation of latent vulnerabilities. Highly resilient systems are ones that could restart quickly. In a virtual environment, a sensor will be able to detect a virtualized machine’s failure and conduct a replacement of the virtual machine with a duplicate backup based on the snapshot of a trusted virtualized environment. All data would be lost; however, the system functionality would be restored.

The cloud environment will also enable a protected environment for deploying security services. This would enhance efforts to mitigate the risk of malicious software infections and social engineering attacks. However, there are still problems of the virtual machine understanding how to detect whether or not a guest application is behaving in an anomalous manner, and thus, the potential for false positives will persist.

At the same time, centralizing management of the virtual assets may lead to an increased risk of a single point of failure that would not have existed before. Virtualization also makes installing and managing instances of a specific operating system (OS) configuration under one authority easier. This lends itself to automating the installation of the same OS across several virtual machines. Such massive deployments create software monocultures that could facilitate that spread of malicious software.

Big Data and the Semantic Web

Beyond the fundamental changes to the structure of the Internet's network topology, there is also the shifting into the next generation of web applications. We are currently on the cusp of entering Web 3.0, or the semantic web. Web 1.0 was the static web, where people would go and read information without interacting with the media. Web 2.0 is the interactive and social web. The trend toward this started circa 2000 but did not fully take off until later in the decade with the popularization of services such as YouTube and Facebook.

Web 3.0, or the semantic web, is the next evolution of the web, which we saw in 2012 and which will only intensify by 2020. The semantic web is about machines connecting data that were not previously linked.⁹ Machines will be able to understand data in a way that a human can via the metadata.¹⁰

Industrial Control Systems

The above technical trend focused on the information and communication technology (ICT) application of cyber power. In the national security context, one must also consider industrial control systems (ICS). While ICSs may utilize ICT in some of their components, they are very different. Essentially, all critical infrastructure and key resources today are migrating towards using ICSs to control critical elements of our national infrastructure. In the current system design paradigm, computer engineers designing these networks focus on availability. ICS development cultures see security as irrelevant because their systems are closed. Therefore, ICS systems are vulnerable and are susceptible to one vulnerability in particular: the Aurora vulnerability. This out-of-phase condition has the potential to cause incidents of national significance if manipulated by a malicious cyber threat actor. The reality today is that Aurora has caused problems in ICS because of poor system implementation. Figure D-6 provides an example of the vulnerabilities. During a time of increased political tension, an Aurora exploitation could cause the same type of effects.

Cyber Statecraft in the Asia-Pacific

China's rapid rise as an economic power is in part the result of effective economic reforms but also a result of a large-scale effort to use cyberspace as a means to conduct state-sponsored espionage in China's attempt to "catch up" with advanced nations such as the United States.¹¹ The extensive press coverage surrounding Google's 2010 "exit" from China is only the most public example of Chinese efforts to appropriate intellectual property and control Internet usage. Recent information about China's rapidly expanding use of the Internet suggests that people in China's 60 largest cities spend 70 percent of their leisure time online, some actively engaged in attempts to exfiltrate corporate and government information from the United States.¹² Whether such activities are state sponsored or not, China is proving unwilling to undertake efforts to stop them. With the United States inflicting only limited costs, cyberspace is proving to be a relatively risk-free area where there are many opportunities for China to both expand its economic development and increase its global military advantages.¹³

- Brazilian control system network infections
- Russian Sayano-Shushenskaya Dam failure
- ExxonMobil Yellowstone River gasoline pipeline break
- China bullet train crash
- BART computer failure
- San Bruno
- Illinois water SCADA hack?
- South Houston water SCADA hack
- ICS metasploits now available
- Polish train crash
- Digital camera shuts down nuclear plant
- International power plant with loss of all control logic
- Iranian paper on Stuxnet
- Telvent notice
- Class 1 trauma system compromise
- Mining truck vulnerabilities

Figure D-6. Real ICS events. (Joe Weiss, “ICS Cyber Security-The Impact on National Security” [presentation, Conference on Cyber Power: The Quest towards a Common Ground, Air Force Research Institute, Maxwell AFB, AL, 10 October 2012], <http://afri.au.af.mil/cyber/Docs/Weiss.pdf>.)

Although the United States has been the technological pioneer in cyberspace, China is proving itself a pioneer in strategic thinking. One Chinese military theorist has stated that “in confrontations on the future battlefield, what is scarier than inferior technology is inferior thinking.”¹⁴ On the other hand, the United States has focused on using technology to resolve issues without strategically thinking through the dilemma to make sure the technology is the right fit for the problem at hand.¹⁵ Thus, China’s approach to cyber espionage is proving highly effective.

After the June 2009 publication of the White House’s *Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure*, elements of the defense community either launched or announced several initiatives. In an effort to deal with the rising cyber threat from China and elsewhere, Twenty-Fourth Air Force and Tenth Fleet were activated as the USAF’s and US Navy’s cyber commands. In addition to these defense activities, the *Comprehensive National Cyber-Security Initiative* was distributed widely in unclassified form on 2 March 2010 to inform a wider public audience.

The threats posed to the private sector are so severe that it is also weighing in on the importance of improving global cybersecurity. After Google announced on 12 January 2010 that it, along with 33 other companies, suffered a major cyber attack—likely originating from China—cybersecurity news coverage increased exponentially. Shortly afterward, US Secretary of State Hillary Clinton gave a blunt speech on Internet freedom and openness:

The spread of information networks is forming a new nervous system for our planet. . . . States, terrorists, and those who would act as their proxies must know that the United States will protect our networks. Those who disrupt the free flow of information in our society or any other pose a threat to our economy, our government, and our civil society. Countries or individuals that engage in cyber attacks should face consequences and international condemnation. In an internet-connected world, an attack on one nation's networks can be an attack on all. And by reinforcing that message, we can create norms of behavior among states and encourage respect for the global networked commons.¹⁶

Despite these strong words, the United States has largely failed to give the Chinese a reason to cease their espionage activities. Indeed, Secretary Clinton's speech on Internet freedom seemed to embolden hackers of Chinese origin who increased the activity targeting US corporate networks and the networks of our partners and allies.¹⁷

It must be emphasized, however, that thus far Chinese activities focus on espionage in cyberspace, and many breaches are successful due to insufficient security measures being put in place by targeted systems. However, Chinese military treaties indicate that, in time of conflict, China will target US critical military and civilian infrastructures.¹⁸

The long-term success of the United States will require cooperation with China on cyber issues—but cooperation from a position of strength. Recent studies have concluded that intense international pressure prompted the Chinese government to escalate efforts to curb doping in sports, implying that similar efforts to prevent malicious hacking might encourage Chinese compliance with emerging international cybersecurity rules and norms.¹⁹ Gen Joseph Ralston (USAF, retired), former vice chairman of the Joint Chiefs of Staff, makes a compelling case for the long-term benefits of building trust with China through military-to-military contacts. One can make a similar argument for building trust with China regarding the areas of computer security and critical infrastructure protection.²⁰ Finally, Vice Adm Mike McConnell (US Navy, retired) suggests that US-Chinese cooperation would help to “clean up” the muck and minimize hostile intrusions and disruptions in cyberspace caused by hacking and cybercrime.²¹ In short, for the United States to eliminate opportunities for China to exploit cyberspace, it must cooperate with the Chinese government on cyber issues.

One of the reasons that overall prospects for US-China cooperation are positive ties directly to the increasingly intimate economic/financial relationship in which China holds more than \$1 trillion of American sovereign debt—helping to fill the shelves of Wal-Mart and Target, while employing millions of Chinese.²² Former Chinese premier Wen Jiabao expressed hope for improvement in US-China relations, saying, “We also don't hope for this year to become an unpeaceful year in the China-US economic and trade relationship. This will require both sides to work together.”²³ Incorporating cyber into cooperation will prove important. Should China refuse to engage in more cooperative cyber activities, it would serve as a clear indication of how Chinese leaders see the China-US relationship and the imperative to exploit American weakness in cyberspace.

The visit to Beijing of James Steinberg, US deputy secretary of state, signals a bilateral thaw after a series of intensifying controversies over US weapons transfers to Taiwan, UN sanctions on Iran, Chinese support of Bashar al-Assad in Syria, and Chinese restrictions on Internet freedom—heightened by the recent Google flap. Steinberg's visit may also lend credence to Brad DeLong's suggestion that the balance of influence in China-US relations

has changed dramatically due to fundamental economic factors, which may dominate the substance and tenor of China-US relations during the coming years. Clearly, there will be ups and downs in this bilateral relationship—with the most recent “downs” linked to Chinese support of Syria, weapons sales to Taiwan, the Dalai Lama’s White House visit, and China’s growing assertiveness in the South China Sea—not to mention rampant cyber espionage. However, experts believe that the United States and China can establish and then sustain a friendly and cooperative strategic relationship, in spite of serious issues that might arise from time to time.²⁴

Congressional testimony by Larry Wortzel, a member of the USCC, also makes clear that cooperation in cyberspace is possible, as evidenced by supportive activities for specific law enforcement purposes: “in some areas of cybercrime, such as credit card theft rings and the theft of banking information, China’s law enforcement services have cooperated with the United States.”²⁵ Chinese authorities criminalize malicious hacking, putting culprits in jail if they are found guilty of creating damage through illegal actions involving intrusions in computer systems and networks, and China’s law enforcement services have cooperated with their American counterparts.²⁶ This common approach to dealing with cybercrime paves the way for serious US-China discussions (and ultimately bilateral negotiations) on approaches for building a strong code of conduct dealing with criminality in cyberspace. Common ground exists for bilateral discussions and ultimately negotiations about US-China cooperation on cyber security. Finally, several leading members of Congress recognize that US-China cooperation in cyber security needs to encompass both military and nonmilitary aspects of cyberspace—that an informed focus on the military sector is just as important as focus on its nonmilitary counterpart in this field of interest.

Should China ignore US overtures, such as those described, it will serve as a clear signal that China does not view cooperation with the United States as necessary to pursue core interests. Indeed, the ratcheting up of Chinese cyber-espionage activities since the onset of track-2 initiatives could be an indication of Chinese intentions to continue their activities until a US strategy is formed and implemented that either offers incentives to cease these activities or makes it more painful for them to conduct cyber espionage, changing their behavior.²⁷ Absent a marked decline in Chinese cyber espionage, leaders in the public and private sector should attribute failure to cooperative efforts and expect expanded Chinese efforts in cyberspace. Given this backdrop, the feasibility of US-Chinese cybersecurity cooperation and defining of several strategic paths for airpower diplomacy to achieve this critical goal should be points of further study within DOD.

On the Chinese front, the strategic prospects for US-Chinese cooperation are relatively bright. As international relations expert Robert J. Art points out, “Just as the United States will have to accept a more powerful Chinese navy, China will have to accept America’s maritime supremacy, just as the Soviet Union did. . . . [T]he challenges for American and Chinese leaders are, first, to see that their common interests—and remember that they have many common interests—remain strong enough to outweigh the inevitable conflicts that will arise between them, and then, second, to lay the basis for a cooperative strategic relationship. These two challenges are daunting but not impossible.”²⁸

Recognizing that solutions to global challenges cannot be met without cooperation between the two countries, the Obama administration convened the first US-China Strategic and Economic Dialogue conference during July 2009 in Washington, DC. The second Strategic and Economic Dialogue meeting was held during 2010 in Beijing, and its strategic track

focused on people-to-people exchanges, international security issues (nuclear nonproliferation and counterterrorism), global issues (health, development, energy, and global institutions), and regional security.²⁹

As was noted in 2010, “in some areas of cybercrime, such as credit card theft rings and the theft of banking information, China’s law enforcement services have cooperated with the United States.³⁰ At the time of writing, this trend continues. Prospects for the continuation of such cooperation exist. In the aftermath of the Chinese crackdown on one hacker group, Xu Jianzhuo of the Ministry of Public Security’s network security bureau stated that “we need laws and regulations to strengthen the obligations of Internet service providers to verify users’ information. . . . It’s difficult to collect evidence for cybercrimes.”³¹

USAF Recommendations

Currently, the USAF paradigm for cyber operations is structured within the very technical fields of computer network attack, computer network defense, and computer network exploitation. Some have suggested these methods in order to attack and dismantle trans-national networks of technological innovation that may harm US interests.³² While such strategies could be useful at times, they are difficult and could drive network operators further underground. Thus, using the computer-network-attack framework in an environment in which adversaries innovate their defenses against attacks will not always be advisable.

One emerging threat that is often overlooked is the space where psychological and cyber conflicts converge. Recall that in the character-based model of cyberspace introduced earlier, the human element is at the top. This is because there is no purpose for cyberspace other than to create effects in the real world and to allow humans to attain a personal, community, or organizational goal. The question is thus: What is the USAF’s role in defending the nation from cognitive cyber attacks, or what can be termed as *psyber warfare*? To demonstrate the convergence between psychological and cyber warfare, we may examine the flash crash of 2013, when the Syrian Electronic Army (SEA) hijacked the Associated Press’s Twitter feed and tweeted the message, “Breaking: Two Explosions in the White House and Barack Obama is injured via @AP.”³³ The result was a drop in the Dow Jones Industrial average of about 150 points in seconds. The market recovered quickly; however, currency, bond, and other financial markets were also affected by the SEA’s operation.³⁴ This example illustrates an increasing trend in adversaries abroad being able to infiltrate our networks to cause effects in human cognition that result in actions with very real-world impacts. The USAF needs to consider and examine its role in countering such operations. This is not to say that it is time for the military to protect the networks of the private sector. Instead, the USAF should organize, train, and equip to not only focus on the network layers of cyberspace but also merge military information support operations and cyber formally into “psyber” to prepare for conflict in the area where information, networks, and the human mind converge. Airpower has successfully been used for psychological effect in the past, whether it is a sonic-boom over enemy positions or the specter of a nuclear response deterring armed attacks. Thus, this mission needs to adapt to the cyber domain where new strategic and operational thinking will be required to leverage the cyber domain to protect the psyber domain.

A hypothetical example of psyber conflict is useful to further illustrate the significance of the convergence of cyber with psychological domains. Imagine a world in which the Chinese government is planning to resolve the Uyghur problem in the Xinjiang region of China.

Concurrent to the Chinese planning, a cyber-operations group conducts traditional cyber defense operations to maintain that country's national security. Concurrently, however, the Chinese government is conducting offensive cyber operations, not with computer systems in mind. Rather, it is targeting the human mind. The team consists of people who studied in the United States and understand how Americans think. Months prior to their operations, they have been building personas on social media that appear trustworthy. Using these false personas, they reach out to real citizens in the United States and begin establishing trusted relationships with them. What these particular American citizens have in common is that they are disgruntled with the 1 percent and want to revive the Occupy movement that took place earlier in the decade. Nonviolent demonstrations start again. Dialogues for the Occupy movement's social space are more heated and angry this time around, and people begin to revolve around key influencers, who are all part of the same team of Chinese cyber operators in the social media space. In the midst of the increasing tempers, a YouTube video showing scenes of gross violations of protestor human rights is released, sparking the demonstrations nationally to go from nonviolent to violent. Once domestic unrest within the United States begins, leaders call in the National Guard. As the world focuses on the US turmoil, the Chinese kill Uyghurs en masse without much international notice.

This scenario is meant to illustrate that cyber power is more than just the use of information to attack information. It can also be used to influence the human brain and mobilize otherwise ordinary people to do radical things. Today cyber criminals, terrorists, and clandestine networks create effects globally. The focus on cyber has largely been on catastrophic digital attacks against critical infrastructure. Consequences of cyber on the cognitive domain may be just as consequential. As has been observed in recent protest movements such as the Greek riots (2008), the Iranian election protests (2009), the Pittsburgh Summit of the G-20 (2009), the Thai political protests (2010), the British antiausterity protests (2011), and the Occupy Wall Street movement (2011–2012), individuals used converged Internet and cellular technologies such as Twitter and Facebook to spontaneously organize themselves into groups that began with nonviolent principles—though in some cases they turned to violent protest. While cyber capabilities are not the reason for either the protests or the violence, they certainly catalyzed the events and their effects. These phenomena have been understudied within the military context.

To remain innovative, the USAF must create strategies on how to use digital ICT to enable the ability to influence and manage cognitive processes to influence perceptions across the range of military operations to benefit US national security interests. Within the military, the USAF is the correct place to do this. Airpower has been used for psychological effect against adversaries, and the employment of cyber effects outside of the network defense/exploitation/attack paradigms will put the USAF back on the leading edge of cyber conflict. Examining the application of methods that would enhance our ability to organize, train, and equip for cyberspace operations targeting cognitive processes on the range of actors, environments, and motivations will require capabilities that are not solely confined within the USAF core of expertise. As much digital communication in the twenty-first century will not be done in either the English language or a Western cultural context, using cyberspace to influence perceptions will require either recruiting multilingual Airmen or investing in language training in key languages of national security interest.

While the operating environment today contains social media platforms on the Internet, the ability to influence and manage cognitive processes to influence perceptions across the

range of military operations to benefit US national security interests will become more restricted. Examining the expertise of each service in order to assign roles and missions to apply their expertise would enhance our ability to organize, train, and equip for operations targeting cognitive processes on a range of actors. This will require capabilities that are not solely confined within the service core areas expertise.

Conclusions

The convergence of broadband Internet with mobile platforms will significantly shift the computing paradigm similar to the shift from mainframe/micro computing to desktop computing. This shift will be much more rapid, as a result of broadband mobile devices working within an increased IP address space. These trends highlight a significant shift in the kinds of devices used to access services in cyberspace and how people interact with the information on the Internet and with their industrial devices. Usage trends in cloud computing paradigms (Software as a Service, Platform as a Service, Infrastructure as a Service) and the power that these applications exert over the way content and information spread (social networking, VOIP, big data computation, and streamlined business processes) will revolutionize not only how the DOD operates in cyberspace but also how the people connect and are influenced.

Notes

1. Air Force Doctrine Document (AFDD) 3-12, *Cyberspace Operations*, 15 July 2010, 2.
2. David Clark, "Characterizing Cyberspace: Past, Present and Future" (working paper, version 1.2, Office of Naval Research, Arlington, VA, 12 March 2010), <http://web.mit.edu/ecir/pdf/clark-cyberspace.pdf>.
3. Mark T. Maybury, AF/ST TR 12-01, *Cyber Vision 2025*, 15 July 2012, http://www.globalsecurity.org/security/library/policy/usaf/cybervision2025_afd-130327-306.pdf.
4. US-China Economic and Security Review Commission (USCC), *The National Security Implication of Investments and Products from the People's Republic of China in the Telecommunications Sector* (Washington, DC, USCC, January 2011), 7.
5. Stephen Nightingale, Doug Montgomery, Sheila Frankel, and Mark Carson, *A Profile for IPv6 in the U.S. Government—Version 1.0* (Gaithersburg, MD: National Institute of Standards, July 2008), 2, <http://www-x.antd.nist.gov/usgv6/docs/usgv6-v1.pdf>.
6. Carolyn Duffy Marsan, "Europe's Supply of IPv4 Addresses Could Be Exhausted This Month," *TechWorld*, 1 August 2012, <http://news.techworld.com/mobile-wireless/3373483/europe-s-supply-of-ipv4-addresses-could-be-exhausted-this-month/>.
7. Anuradha Shukla, "Asia Pacific Internet Registry Unable to Meet IPv4 Address Demand," *TechWorld*, 19 April 2011, <http://news.techworld.com/networking/3275330/asia-pacific-internet-registry-unable-to-meet-ipv4-address-demand/>.
8. Peter Mell and Timothy Grance, *The NIST Definition of Cloud Computing* (Washington, DC: National Institute of Standards and Technology, 2011), 2, <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>.
9. Tim Berners-Lee, "Linked Data," *Design Issues* (blog), 18 June 2009, <http://www.w3.org/DesignIssues/LinkedData>.
10. Nigel Shadbolt, Wendy Hall, and Tim Berners-Lee, "The Semantic Web Revisited," *IEEE Intelligent Systems* 21, no. 3 (May/June 2006): 96–101.
11. Antone Gonsalves, "Chinese Cyber-Espionage Threatens U.S. Economy, DOD Says," *CSO Online*, 24 May 2012, <http://www.csionline.com/article/707035/chinese-cyber-espionage-threatens-u.s.-economy-dod-says>.
12. Yuval Atsmon and Max Magni, "China's Internet Obsession," *McKinsey Quarterly*, March 2010, http://www.mckinsey.com/insights/marketing_sales/chinas_internet_obsession. See also Bryan Krekel, Adam Patton, and George Bakos, *Occupying the Information High Ground: Chinese Capabilities for Computer Network Operations and*

Cyber Espionage (Washington, DC: USCC, 7 March 2012), http://origin-www.uscc.gov/sites/default/files/Research/USCC_Report_Chinese_Capabilities_for_Computer_Network_Operations_and_Cyber_%20Espionage.pdf.

13. Information here is current as of late April 2013. It must be noted that as this study went to press, there have been significant efforts to ramp up high-level US–Sino cooperation in cyberspace. The outcomes of the Obama–Xi summit in June 2013, and the standing up of a high-level working group within the US–China Strategic and Economic Security Dialogue are two examples of the rapid shifts in cyber statecraft in the past year. These are milestone events that could not be captured in time for thorough analysis for the purpose of the study without delaying release of study.

14. Timothy L. Thomas, *The Dragon's Quantum Leap: Transforming from a Mechanized to an Informatized Force* (Fort Leavenworth, KS: Foreign Military Studies Office, 2009), 238.

15. Ibid, 13–33. US history is replete with examples. The Allies won World War II using technological superiority—not better strategy. When US and German forces were on parity earlier in the war, the Germans would typically win. The invasion of Iraq is a more recent example. Entering the war with the wrong strategy, the situation on the ground did not improve until strategy caught up with technology and the United States implemented the “surge.”

16. US Secretary of State Hillary Rodham Clinton, “Remarks on Internet Freedom” (address, Newseum, Washington, DC, 21 January 2010), <http://www.state.gov/secretary/rm/2010/01/135519.htm>.

17. J. Nicholas Hoover, “NSA Chief: China Behind RSA Attacks,” *Information Week*, 27 March 2012, <http://www.informationweek.com/government/security/nsa-chief-china-behind-rsa-attacks/232700341>; “Google Warns Gmail Users of ‘State-Sponsored’ Cyber Attacks,” *Voice of America*, 6 June 2012, <http://blogs.voanews.com/breaking-news/2012/06/06/google-warns-gmail-users-of-state-sponsored-cyber-attacks/>; and “Japan Parliament Hit by China-based Cyber Attack,” *Telegraph* (UK), 25 October 2011, <http://www.telegraph.co.uk/news/worldnews/asia/japan/8848100/Japan-parliament-hit-by-China-based-cyber-attack.html>.

18. Jeremy Kirk, “US Warns of Problems in Chinese SCADA Software,” *PC World*, 17 June 2011, <http://www.pcworld.com/article/230530/article.html>. For a full literature review of Chinese thinking in cyberwarfare see: Thomas, *The Dragon's Quantum Leap*.

19. Dali Yang and Alan Leung, “The Politics of Sports Anti-Doping in China: Crisis, Governance and International Compliance,” *China: An International Journal* 6, no. 1 (March 2008): 121–48. This paper was published several months prior to the Beijing Olympics—judged widely to be an amazing success for China in its transformational era of rapid economic growth and entry into the international community.

20. Joseph W. Ralston, “Why the Pentagon Needs Friends in Beijing,” *Wall Street Journal*, 4 March 2010, <http://online.wsj.com/article/SB10001424052748703862704575100083682240878.html>.

21. James Fallows, “Cyber Warriors,” *Atlantic*, 1 March 2010, <http://www.theatlantic.com/magazine/archive/2010/03/cyber-warriors/307917/>. Also see Mike McConnell, “Mike McConnell on How to Win the Cyber-war We’re Losing,” *Washington Post*, 28 February 2010, <http://www.washingtonpost.com/wp-dyn/content/article/2010/02/25/AR2010022502493.html>.

22. Stephen Cohen and J. Bradford DeLong, *The End of Influence: What Happens When Other Countries Have the Money* (New York: Basic Books, 2010). Also see Niall Ferguson, “Complexity and Collapse: Empires on the Edge of Chaos,” *Foreign Affairs* 89, no. 2 (March/April 2010): 18–32.

23. J. R. Wu and Jason Dean, “Wen Engages Web Users in Rare Web Chat,” *Wall Street Journal*, 1 March 2010, <http://online.wsj.com/article/SB10001424052748704089904575093102225297546.html>.

24. See Richard Rosecrance and Gu Guoliang, *Power and Restraint: A Shared Vision for the U.S.–China Relationship* (New York: Public Affairs, 2009).

25. House, *China’s Approach to Cyber Operations: Implications for the United States*, Larry M. Wortzel, Testimony to the Committee on Foreign Affairs, 111th Cong., 2nd sess., 10 March 2010.

26. James T. Areddy, “People’s Republic of Hacking,” *Wall Street Journal*, 18 February 2010, <http://online.wsj.com/article/SB10001424052748704140104575057490343183782.html>. This article describes the three-year imprisonment of a convicted Chinese hacker.

27. Karl Frederick Rauscher and Zhou Yonglin, *Fighting Spam to Build Trust* (New York: EastWest Institute and Internet Society of China, 27 May 2011), <http://www.ewi.info/system/files/reports/China-US-Fighting-Spam.pdf>.

28. Robert J. Art, “The United States and the Rise of China: Implications for the Long Haul,” in *China’s Ascent: Power Security and the Future of International Politics* ed. Robert Ross and Zhu Feng, (Ithaca: Cornell University Press, 2008).

29. House, *U.S.-China Relations: Maximizing the Effectiveness of the Strategic and Economic Dialogue*, David B. Shear, Testimony before the Committee on Foreign Affairs, Subcommittee on Asia, the Pacific, and the Global Environment, 111th Cong., 1st sess., 10 September 2009.
30. House, *China's Approach to Cyber Operations*.
31. Xu Jingxi and Zhang Yan, “Major Hacking Syndicate Cracked,” *China Daily*, 26 July 2012, http://www.chinadaily.com.cn/china/2012-07/26/content_15618241.htm.
32. George J. Stein, “Active Deterrence” (working paper, Air University Space and Cyberspace Study Center, Maxwell AFB, Alabama, 2011).
33. Anonymous, “Breaking,” *Twitter*, 23 April 2013, <https://twitter.com/YourAnonNews/status/326744876018458625>. See also: Mark Memmott, “AP Twitter Account Hacked, Tweet about Obama Shakes Market,” *National Public Radio*, 23 April 2013, <http://www.npr.org/blogs/thetwo-way/2013/04/23/178620410/ap-twitter-account-hacked-tweet-about-obama-shakes-market>.
34. Simone Foxman and Matt Phillips, “Markets Briefly Plunge after AP’s Hacked Twitter Account Falsely Reports White House Explosions,” *Quartz*, 23 April 2013, <http://qz.com/77413/markets-briefly-crash-after-aps-hacked-twitter-account-falsely-reports-white-house-explosions/>.

Appendix E

The Asia-Pacific and the High North in 2020

John L. Conway III

Lost in all of the concern about events elsewhere in the Pacific is that the High North is playing a growing part in the strategy of many nations of the Pacific Rim. Arctic climate change, potential large energy extraction opportunities, and the prospect of two or more passages across the Arctic between Asia and Europe have made China, Russia, and several other Pacific Rim nations reassess their aims there. This bears some discussion, particularly in light of the growing body of High North articles focusing on Chinese aspirations in the region and the resurgence of the Russian Pacific fleet.

China’s “Malacca Dilemma”

China has admitted that it has a “Malacca dilemma” in a phrase possibly first used by former Chinese president Hu Jintao to point out China’s dependency on the Straits of Malacca as a sea line of communication for her commerce.¹ Adding weight to that statement is the fact that oil tankers passing through the Straits of Malacca will carry over half of China’s energy needs by 2015.² Any disruption could pose dire consequences for her economy, and while not stating the potential perpetrator’s name aloud, China believes that any blockade of the Straits of Malacca would be by the United States. Observers have echoed the “Malacca dilemma” catchphrase in their writings and estimate that 60 percent of all shipping currently transiting the Straits of Malacca is Chinese flagged. Author Robert Kaplan calls the Strait “the Fulda Gap of the twenty-first-century multi-polar world.”³

China has been a net importer of oil since 1993; shutting down the Straits of Malacca would be painful for the Chinese economy.⁴ To mitigate this calamitous effect, Chinese strategists have suggested exploration of alternative shipping routes: the Sunda Strait to the south and, farther away, the Lombok and Makassar straits. The increase in distance and cost to navigate these alternative seaways is dismissed by Chinese writers as negligible. As one Chinese observer noted, “blocking all four straits is too costly for the US.”⁵

The Sunda Strait has numerous navigational hazards and is not well suited for deep draft vessels such as supertankers. While the Lombok and Makassar straits are significantly deeper and wider, they are farther away.⁶ Transit distance from the Persian Gulf to Chinese ports using the Lombok and Makassar straits would increase sailing distance by roughly 1,600 miles over the Malacca Strait, adding 3.5 days steaming time. Since time and distance are money, these routes may be alternatives to a complete blockage of Straits of Malacca, but they are currently viewed as “complementary” ones, not alternatives.⁷

Pipeline solutions to this “dilemma” have also sprung up, and the completion of oil and gas pipelines from Myanmar (Burma) to the Chinese border province of Yunnan will be completed in the fall of 2013.⁸ However, an extension of the pipeline from the Myanmar-Chinese border to a refinery planned for the provincial capital of Kunming (some 400 miles farther inland) is under way but not yet complete.⁹ Other pipeline projects in the region have been proposed and withdrawn, and even a mid-seventeenth-century Thai plan for a canal

across the Kra Isthmus has been discussed as a possible alternative. However, if all of these alternative pipelines to China were built, their volume would not equal the oil throughput currently enjoyed via the Straits of Malacca.¹⁰ This would help ease the dependency on the Straits, but it is not a solution to the overall problem of delivering oil to slake China's rapidly growing thirst.

Looking at High North shipping routes to ease dependence on the Straits of Malacca, China has attempted to assert rights in the Arctic, although in reality China has no territory there. In March 2010 Rear Adm Yin Zhin was quoted in the *New China Daily* stating, "China must play an indispensable role in Arctic exploration as we have one-fifth of the world's population."¹¹ To bolster its presence, China has ordered construction of its second icebreaker and has successfully petitioned the Arctic Council for permanent observer status to its deliberations. Additionally, the government recently concluded a major trade agreement with Iceland. Not surprisingly, China's High North initiatives (icebreakers, rhetoric, and diplomatic overtures) have unleashed a flurry of "China and the Arctic" speculative op-ed articles.¹²

A Brief Review of Recent China/Arctic Literature

In "China Prepares for an Ice-Free Arctic," Finnish author Linda Jakobson observes that although nearly one-half of China's gross domestic product is thought to be dependent on shipping, China appears to be "natural science focused" in the Arctic rather than trade or natural resource focused. She observes that China is "wary" of Russian intentions in the region despite Russia's apparent lack of technology and capital to extract natural resources there. Jakobson further notes that current Chinese writers are pushing for international cooperation in the Arctic under the twin auspices of the United Nations Convention on the Law of the Sea and the Arctic Council.¹³

Another 2010 article, "China's Snow Dragon Sweeps into Arctic," continues the themes of new Chinese diplomatic initiatives and interest in the region's natural resources and introduces the *Snow Dragon* (*Xue Long*), China's lone icebreaker, as a visible symbol of peaceful scientific aims in the High North.¹⁴ Another *Snow Dragon*-themed article, "A Snow Dragon in the Arctic," continues these subjects and highlights Chinese Rear Adm Yin Zhin's comments about the North Pole belonging to the world. The author points out that the admiral's comments came out just a few days after the Jakobson article and wonders if his statements mark the beginning of a new Chinese direction in the Arctic. He concludes—after many, many pages—that it is too soon to tell.¹⁵

The Naval War College's "The Dragon Eyes the Top of the World: Arctic Policy Debate and Discussion in China" points out the seeming dichotomy of Chinese territorial claims (i.e., Taiwan, the Senkaku/Diaoyu Islands, and the Spratly Islands) versus its assertion that the Arctic is not part of any country and thus belongs to everyone.¹⁶ It warns that China is in the Arctic to stay, pointing out that a second icebreaker is being built to complement the *Xue Long* and foot-stomping the point that this will be double the number of icebreakers currently operational in the US inventory.¹⁷ The author cautions that the United States should not underestimate China's intentions or burgeoning capabilities in the High North.¹⁸ He does not see China and Russia cozying up to one another in the near term and notes that China's relationship with Norway is not on a solid footing. The article offers some suggestions for US Arctic policy in the coming decades, including building more icebreakers and keeping an eye on submarine activities beneath the Arctic sea ice. Finally, the article makes a bid for US lawmakers to

approve the United Nations Convention on the Law of the Sea, echoing the same recommendations from the Navy's 2009 *Arctic Roadmap*, and also warns that China's dependency on international maritime shipping may cause her to act aggressively in the High North if thwarted elsewhere.

In "China's Arctic Powerplay," Isabella Mroczkowski observes that all is not well with China's diplomatic forays in the High North. Although she notes that Chinese-Canadian relations "are on the upswing"—due primarily to heavy Chinese investment in Canadian shale oil extraction efforts—and that Chinese-Danish relations have been strong since 2008, other relationships are not so smooth. A recent attempt by a Chinese "tycoon" to purchase about 300 square kilometers in northern Iceland—near newly uncovered mineral deposits—for an "eco spa" has led to a heated public debate about Chinese influence in that country. From the Chinese perspective, relations with Norway have cooled since the award of the Nobel Peace Prize to a Chinese dissident in 2010.¹⁹

Canadian author Frédéric Lasserre maintains a pragmatic view of Chinese intentions in *China and the Arctic: Threat or Cooperation for Canada?* He notes that Chinese investment in Antarctic research has been much more extensive than their research in the Arctic, that Chinese interest in Iceland as a possible transshipment port is "far-fetched," and that the Northwest Passage (NWP) through Canadian waters is not necessarily the shortest route between Europe and the Far East. Lasserre casts doubts on Chinese natural resource aspirations, echoing the point that most natural resource finds are in the exclusive economic zones of Arctic nations and would be off-limits to any others. He feels that China's "Malacca dilemma" is real, due to overcapacity in the Strait, but doubts that there are shipping alternatives that are available "for now."²⁰

This wave of "China and the Arctic" articles adheres to several themes: the frustration, now alleviated, of China vis-à-vis the Arctic Council; China's potential for both capital investment and scientific exploration in the High North; and of course, the cliché of the Snow Dragon. Authors' opinions are varied concerning the viability of an Arctic route to alleviate transit issues though the Straits of Malacca and appear to be shaped by the scientific evidence du jour in regard to polar ice melt. Little beyond these issues has been brought to light.

Now that China has been granted observer status within the Arctic Council, more "China in the High North" articles are appearing. Stephen Blank's "China's Arctic Strategy" overstates China's new status within the Arctic Council, claiming that it will "have a real say" in its proceedings.²¹ Based on a close read of the council's founding documents, China will have a say during council deliberations only when founding members allow it and then only when it—or any other observer—does not act contrary to the council's deliberations.²²

Russia and the High North

Russia has made plans to assure its control of the Northern Sea Route (NSR) and protect its economic growth in the region with the "renaissance" of the Russian Pacific Fleet and through the continued dominance by its fleet of icebreakers. This has more to do with "global trade and oil security" than defense.²³ Although some have denigrated Russia's "new" navy as being comprised of only "workhorses," she does plan to place one of her newly acquired (from France) *Mistral*-class large deck carriers in the Pacific Fleet, a significant upgrade to a force previously comprised of rusting Soviet-era submarines.

Russia plans a major expansion of its Siberian oil and gas fields to make up for dwindling oil and gas supplies from existing fields in the east, and it appears that China wants to be its prime customer.²⁴ The NSR will play a large role in this growth, facilitating shipment of drilling equipment to the drill sites and providing transshipment of oil and other raw materials to customers in the south. In the near term, most of the ship traffic on the NSR will continue to be local, not international. However, it is anticipated that international traffic will grow rapidly in the coming two decades. With that growth are greater risks (oil spills, collisions, etc.) and rewards (revenue) for the Russian economy.

One area of possible economic cooperation in Northeast Asia is the Tumen River Area Development Plan, a highly ambitious project to create a free trade zone in Northeast Asia. It will require the cooperation of long-time rivals/enemies Russia, China, North and South Korea, Mongolia, and Japan.²⁵ If the impossible—a coalition of the willing—becomes the possible, it will create access to a new northern port for Chinese shipments to Europe via the NSR and a new market for natural resources within Siberia. This would have economic influences stretching far beyond the region. Despite the plan's conception in the early 1990s, no real results can be expected until after the limits of this study. Nevertheless, it bears watching.

Further to the north and east, the Kuril Islands have become a renewed area of dispute between Russia and Japan, prompting more impetus for Moscow to revitalize the Russian navy.²⁶ The Bering Strait is the gateway from the Pacific to the High North and serves as a chokepoint in much the same manner as the Straits of Hormuz or Malacca. Given that the fees for icebreaker escort through the NSR provide a source of revenue for Moscow's coffers, it is doubtful that a Russian Bering Strait blockade would ever unfold. However, it cannot be ruled out. A more likely scenario—one espoused by the US Naval Institute—is that Russia's naval growth in the Pacific is prompted by its desire to assure its economic gains in the High North and its adjacent waters rather than any territorial ambitions.²⁷

All of these factors combine to make the North Pacific and the High North areas of interest for the US Pacific Air Forces (PACAF). One thing is for certain, Russia has the means and the desire to exploit the High North unlike any other nation in the world, certainly more than any nation, or combination of nations, in the Pacific. The region has been characterized as the Russian navy's "backyard"—an apt description given the lack of any other significant national military presence in the region.²⁸

Assessing the Arctic's Energy Sources

In 2008 the US Geologic Survey produced its estimate of High North energy resources, considered to be the most authoritative survey to date. Its data suggested that 13 percent of the world's undiscovered oil and 30 percent of the world's undiscovered natural gas lies in the Arctic.²⁹ The appraisal indicates that there are approximately 90 billion barrels of oil, 1,669 trillion cubic feet of natural gas, and 44 billion barrels of natural gas and liquid natural gas in the Arctic, exceeding all other previously known quantities of oil and natural gas in the High North.³⁰

Seven areas in the Arctic contain about 87 percent of the region's known gas and oil reserves. Two are astride Greenland, three more hug the northern Russian coast and its adjacent waters, and the last two lie along the coast of Alaska and Canada's Yukon Territory. Most of the undeveloped natural gas lies in Asian Russia, while the Arctic Alaska Basin is estimated to hold over 40 percent (29.96 billion barrels) of the entire total of undiscovered

Arctic oil—over three times as much as the next largest field (the Amerasia Basin).³¹ All of this supposed bounty should be tempered by cold reality: oil and gas experts report that even if fully exploited, the Arctic fields will not replace the resources and capacity of the Middle East.

Unlike Antarctica, a *terra nullius* or “land belonging to nobody,” most of the Arctic is claimed by countries in or bordering it. In practical terms, the “race” for exploitable natural resources is just about over. What remains is economic exploitation via leasing rights and transportation nodes.

Many of these resources lie in relatively shallow (500 feet) coastal waters. What tempers these estimates is the enormous cost to develop them. These resources are “technically recoverable,” but not necessarily “economically recoverable”—meaning that there is no current infrastructure to develop offshore oil and gas in the Arctic—particularly in North America. Estimates indicate that it may be a decade or more before both capital and technology are available to begin the extraction process in earnest.³²

Royal Dutch Shell’s highly publicized and very expensive (over \$4.5 billion) attempt to be the first company to drill extensively in the Chukchi Sea highlights some of these problems. In 2012 it drilled only modest exploratory wells—far short of its planned six deep wells—before abandoning efforts as the end of the short season approached. Afterward, its drill ship ran aground on an uninhabited island 300 miles southwest of Anchorage, and calls for tighter environmental regulation of offshore exploration increased in the aftermath. Despite its investment over the past five years, Shell has cancelled plans for the coming exploration season, prompting others to take a long look at what is ahead.³³ Nevertheless, the lure of this much untapped oil and gas cannot be forestalled for long, despite many nagging concerns that there will be potential disasters in the early phases of exploitation and extraction.

Ice, Ice, Baby

Receding summer sea ice coverage in the High North since 2007 has made long-sought-after sea routes across the Arctic an emerging reality—at least in the late summer and early fall.³⁴ Claims that Arctic passages would “rival the Suez Canal” and that these would be “ice free” by 2015 have grudgingly yielded to more measured assessments of both; yet the promise of an ice-free Arctic and a shorter sea route to and from Europe and Asia continues to gain traction and international attention. Some selected headlines reinforce this notion: “Northwest Passage Channel Appears Free of Ice”; “Study Predicts Arctic Shipping Quickly Becoming a Reality”; “Open Seas: The Arctic Is the Mediterranean of the 21st Century”; and as late as May 2013, “White House Warned on Imminent Arctic Death Spiral.”³⁵

While some observers use the term “ice free” to describe the region’s future, it is one that should be used with caution.³⁶ Even “open water” can contain icebergs.³⁷ While ice free is a catch phrase for newspapers, experts prefer a more precise term: “ice diminished.”³⁸ Canadian geographer Frédéric Lasserre explains: “Ice diminished waters will have occasional ice which will continue to pose a hazard to navigation for decades to come.” He points out that multi-season ice formations (frozen, thawed, and refrozen) are particularly dense and very difficult to spot. They will linger as a hazard to navigation throughout any ice free season.³⁹

University of British Columbia professor Michael Byers agrees, adding that because of thinning ice there are actually more icebergs in the eastern Arctic as climate change causes Greenland’s glaciers to move more quickly into the sea. Glacial ice is very hard, he explains,

particularly multiseason ice—frozen, thawed, and refrozen pieces of ice termed “growlers” are very dangerous to even ice-strengthened ships. He points to the 2007 sinking of the ice-strengthened passenger ship *MS Explorer* in the Antarctic as a stark example of what can happen when ship meets multiyear ice.⁴⁰

Perhaps the Center for Climate and Energy Solutions presents the most measured discussion out of dozens of claims of total Arctic ice-melt. Its 2012 report, *Climate Change & International Security: The Arctic as a Bellwether*, lists three dates for an ice-free (i.e., 80 percent loss of historical summer sea ice) Arctic based on linear and nonlinear extrapolations of summer minimum sea ice extent.⁴¹ Not surprisingly, these projections vary widely from 2025 to 2072, placing the Navy’s 2030 projection a bit on the optimistic side.⁴² Insurer Lloyd’s of London, an entity more interested in the bottom line than bombast, agrees with the midrange scientific forecasts but warns that thinner ice may mean more wave action and more abrupt destruction of the ice pack.⁴³

Transportation Issues in the High North

The promise of a shorter sea route to and from Europe continues to gain traction in China and elsewhere in the Pacific. This has created a rise in “ice capable” or “ice-strengthened” cargo shipbuilding in Japan and South Korea; Russia is making plans for third-generation icebreaker construction in anticipation of a viable water transportation route across the North Pole in the next two decades.

There are two open sea routes across the Arctic: the fabled Northwest Passage adjacent to the United States and Canada and the Northern Sea Route along Russia’s northern border (fig. E-1).⁴⁴



Figure E-1. The Northwest Passage(s) and the Northern Sea Route. (Reprinted from Central Intelligence Agency, “The World Factbook,” <https://www.cia.gov/library/publications/the-world-factbook/geos/xq.html>.)

The Northwest Passage(s)

The NWP features more than one route across Canada and Canadian-claimed territory.⁴⁵ The more southerly route holds the promise of less ice, but is beset with shallower waters that could hamper passage of larger vessels, forcing them to take the more northerly, albeit more ice laden, passage through the recently (2007) opened McClure Strait.⁴⁶

Canada claims that the entire NWP falls within Canadian territory and must follow Canadian guidelines for passage, including asking permission and possibly paying a fee. The United States, among others in the international community, contends that part of the NWP is located outside Canadian territory, thus making the entire passage international waters.⁴⁷ This is not a “Fifty-Four Forty or Fight” type of dispute between the United States and Canada and does not affect search and rescue or maritime patrols conducted by the two nations. However, it does, on occasion, strain diplomatic ties.⁴⁸

Whatever the future outcome of these political disputes, the NWP is still in its early stages of development. Its lack of supporting infrastructure, inadequate navigational aids, less than accurate maps, and limited search and rescue assets—all compounded by seasonal ice—make it less likely to be a thriving transoceanic waterway in the near term than its economic rival, the NSR. While transits of the NWP grow each year, these are mainly accomplished by cruise ships (three projected for the 2013 season), yachts (including the world’s largest private yacht, aptly named *The World*, last summer), and a few container vessels. The NWP does not rival the NSR for traffic or ease of transit at this stage of its development.

The NSR closely follows the coastline along Russia’s northern tier and is already in full operation. Russia claims that the entire passage lies in Russian territorial waters across the top of its landmass. Like the NWP, others believe it’s an international waterway and therefore should be subject to freedom of navigation.⁴⁹

In the past few years the NSR has seen far more success in Arctic transshipment than its Canadian rival. In 2010 a bulk freighter containing 40,000 tons of iron ore bound for China’s steel mills made the trip from Kirkenes, Norway, to Shanghai, and 34 cargo ships made the transit in 2011.⁵⁰ During 2012, 46 cargo vessels transited the NSR, carrying over a million tons of cargo, a 53 percent increase in tonnage over 2011.

More freighters, aided by Russia’s sizable fleet of icebreakers, are anticipated to add to that total in the coming years, with China announcing its first commercial voyage there during the summer of 2013 and planning for 5 to 15 percent of its container traffic to use the route by 2020.⁵¹

The Future of High North Transportation

Two issues cloud the future of both passages as a universally viable alternative to the Hormuz–Malacca or the Mediterranean–Suez route to and from Asia: ice (as detailed above) and distance.

While the distances to some destinations reached by transiting the Arctic are shorter than the Suez and Hormuz routes, others are not. Of the eight city pairs illustrated in table E-1, the Suez–Malacca route was the shortest in four instances; transit via the Panama Canal was the shortest route for another, while the remaining three were shortest through the Arctic.

Table E-1. Comparative distance between major ports. (Distances are in kilometers with the shortest distance in bold type.)

City Pairs	Panama Canal	NWP (McLure Strait)	NSR	Suez Canal & Malacca Strait
Rotterdam-Shanghai	25,588	16,100	15,793	19,550
Hamburg-Seattle	17,100	13,410	12,770	29,780
Marseilles-Shanghai	26,038	19,160	19,718	16,460
New York-Shanghai	20,880	17,030	19,893	22,930
Rotterdam-Los Angeles	14,490	15,120	15,552	29,750
Gioia Tauro-Singapore	29,460	21,700	23,180	11,430
New Orleans-Singapore	22,410	21,950	25,770	21,360
Barcelona-Hong Kong	25,044	18,950	20,380	14,693

*Adapted from Frédéric Lasserre, “High North Shipping: Myths and Realities,” *Security Prospects in the High North: Geostrategic Thaw or Freeze?* ed. Sven G. Holtsmark and Brooke A. Smith Windsor (Rome, Italy: NATO Defence College, 2009), 192–93.*

Shipping to Asia from Mediterranean ports, Marseilles to Shanghai for example, through the Arctic would provide no economic benefit because the distances are significantly greater than using the Suez-Malacca routing. Tellingly, this also holds true for oil shipments from Middle Eastern ports or from US Gulf of Mexico ports to China.⁵²

However, high-latitude to high-latitude shipping will benefit from these Arctic passages, and container shipping via the NSR will increase each year. Lloyd’s estimates a savings of 16 days from Kirkenes, Norway to Shanghai, China via the NSR vice using the Suez-Malacca route.⁵³

However, until new Russian Arctic oil fields are developed for export, oil shipments to China—and the rest of Asia—will not benefit from Arctic transit through either passage. Moreover, environmental concerns—oil spillage for one—will inhibit tanker traffic in the High North for decades to come. Thus, China’s “Malacca dilemma” remains.

Impact of Changes to the Unified Command Plan–2011 on the High North

The 2011 changes to the Unified Command Plan removed US Pacific Command’s (USPACOM) responsibility in the High North and replaced it with US Northern Command (USNORTHCOM) and US European Command (USEUCOM). Previously, USPACOM was responsible for the area of the High North from the Bering Strait (which it shared with USNORTHCOM) to the North Pole and west along the Siberian coast to the Kara Sea. The 2011 realignment keeps the Russian Pacific littoral in USPACOM’s area of responsibility (AOR) but nothing further north—meaning Russia’s land mass and the Northern Sea Route along Russia’s northern coast now are completely within USEUCOM’s purview. Meanwhile, the eastern approaches to the Bering Strait, once a shared responsibility, are passed to USNORTHCOM alone. To reiterate, USPACOM has the responsibility for the extreme western approaches to the Bering Strait and the seas adjacent to Siberian Russia but nothing farther north or west. Responsibility for the defense of Alaska, as well as search and rescue efforts, resides solely with USNORTHCOM (fig. E-2).

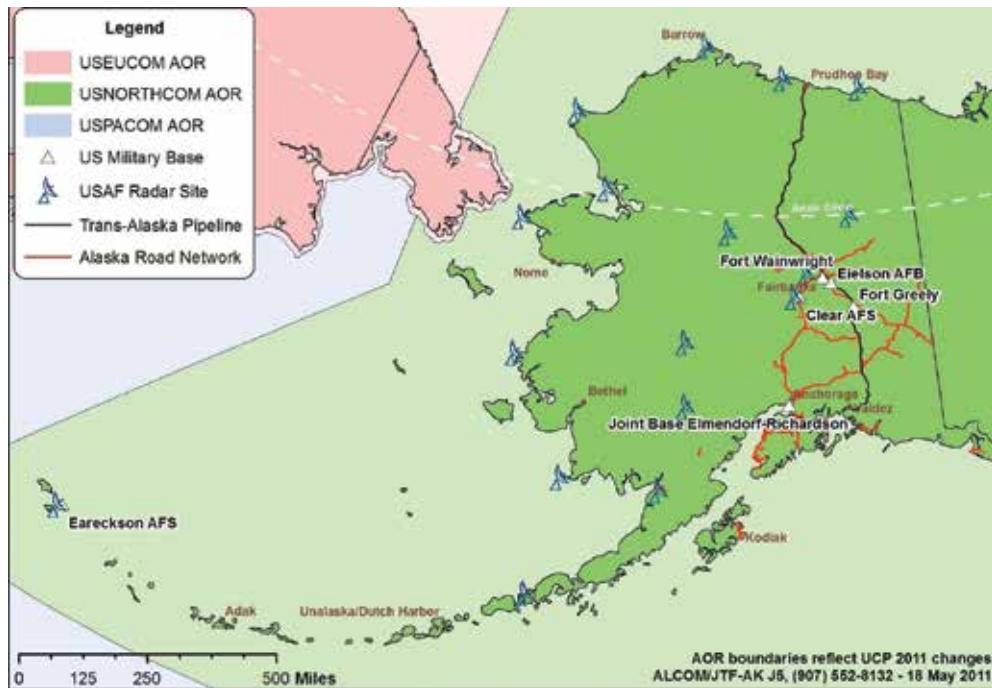


Figure E-2. Existing DOD bases in Alaska and the Arctic. (Department of Defense, *DOD Report to Congress on Arctic Operations and the Northwest Passage* [Washington, DC: DOD, May 2011], 21.)

However, most USAF assets in Alaska are PACAF units, including fighter, tanker, and search and rescue aircraft. Alaska Air National Guard units are included in this mix and are also PACAF-gained, but they serve a dual state function in peacetime under Title 32. With only two US Coast Guard icebreakers in service and a limited number of other ice-capable vessels scattered throughout the High North, air assets are the fastest method to respond to any disaster or search and rescue mission off Alaska's north coast. While this is a stated role for the Coast Guard and the US Navy, it is also an implicit one for the USAF, which has more, faster, and better aerial platforms with which to do the job.

It is also important to note that USEUCOM is charged with an AOR along Russia's NSR, yet its assets lie literally on the other side of the world. How effective will be USEUCOM's overwatch of the western end of the NSR?

Implications for the USAF's Asia-Pacific Strategy

As previously mentioned, recent literature has made ice-melt events in the High North sound more profound and optimistic than they presently are: virtually ice-free is not the same as ice-free. Nevertheless, things are changing, and by 2030 there will be considerable periods (late March–October) when regular transit via the NWP and the NSR will be economically viable.

For the time frame of this study, the High North will not produce sufficient energy resources nor create enough transportation opportunities to offset China's current dependence on the Middle East and the Straits of Malacca for its oil shipments. While there may be some economic benefits for shipping bulk cargoes via the NSR, it is too soon to tell if this

will become a major transshipment venue for China or, for that matter, any other Pacific Rim nation in the next decade.

For now, China will gradually increase its shipments via the NSR, but this increase will not come close to approximating its shipments through the Straits of Malacca. The sheer volume of China's shipping through the Straits and the lack of any economically viable alternative routing—at least in the short run—means that China's Malacca dilemma will continue for the foreseeable future.

Travel, tourism, and, as one commentator observed, “even private yachts” attempting to transit the High North will find it a daunting task in the near term.⁵⁴ If the “virtually ice-free” perception of the Arctic continues and is not bounded by the realities of a harsh climate, lack of navigational aids, and spotty satellite coverage, there will be ecological and human disasters with which to contend and, consequentially, calls for USPACOM/PACAF support.

Canadian rescue forces are stationed below the Arctic Circle, as are most US assets. Thus, all aid must travel some distance to reach an emergency in the High North. Inadequate numbers of US Coast Guard vessels and aircraft and a minimal US Navy presence in the High North mean that other assets in the area, namely USAF aircraft, may be pressed into service when speed is of the essence.

The revision to the Unified Command Plan in 2011 placed USPACOM (and by extension PACAF) outside the High North and expanded the roles of USEUCOM and USNORTHCOM, particularly the role of USNORTHCOM, in the region. However, Air Force air assets in Alaska are primarily PACAF owned. This dichotomy means that USNORTHCOM must use PACAF (USPACOM) aircraft to deter aggression, defend airspace, and respond to natural and manmade disasters. On the other hand, PACAF must ensure that these same Alaska-based resources are prepared to carry out USPACOM’s taskings as well.

This decade’s return or renaissance of the Russian navy’s Pacific Fleet, while still a shadow of its former self, will complicate US campaign planning for the North Pacific/High North in the coming decades. From nuclear icebreakers to an aircraft carrier, the Russians seem determined to equip themselves to defend their territory from the sea. This becoming confrontational in the near term is highly unlikely but is a distinct possibility beyond the time frame of this study.

Complicating US aims, courses of action, and influence in the High North is the US failure/inability to pass the International Law of the Sea Treaty. Without this legal (and moral) force, it will become increasingly difficult to defend American interests in the region *de jure* and could result in backing up *de facto* claims of territory and sovereignty by use of force.

Recommendations

1. PACAF should view the High North as part of its AOR. It has assets in Alaska that will be part of any High North response to terrorism, violation of sovereign airspace, or natural disaster. Therefore, it should be aware of USNORTHCOM planning efforts and, to a lesser extent, those of USEUCOM.
2. In the coming years, Pacific Rim nations will focus on transiting the High North as an alternative to other waterborne routes and their interest in the region will increase. While often considered a Navy mission, surveillance and interdiction (if necessary) will require USAF assistance.

3. A balance must be struck between local (i.e., High North) missions and more distant (i.e., PACAF) missions in support of USPACOM to avoid task saturation.
4. PACAF should increase its coordination/liaison with USNORTHCOM and USEU-COM planners in order to understand and influence their High North operations. This liaison should extend to the Coast Guard as well.
5. Alaska's "Red Flag" training area also should be used to train PACAF forces in Alaska for combat/humanitarian assistance missions in the High North.
6. Likewise, cold weather training for all PACAF aircrews stationed in Alaska should be expanded to assure their survival and their ability to work in harsh conditions.
7. Eareckson Air Station should be considered for use by Global Hawk remotely piloted aircraft to extend intelligence, surveillance, and reconnaissance coverage in the High North and northern Pacific. At a minimum, a site survey to determine its current status and viability should be undertaken by PACAF planners.

Annex

The Eareckson Initiative

A sidebar to this study was the review of US bases in the High North and the realization of a possibly overlooked Air Force asset that could be used as part of a Pacific basing strategy: Eareckson Air Station (formerly Shemya Air Base).

Located approximately 1,500 miles west of Joint Base (JB) Elmendorf-Richardson, Alaska, Eareckson is a contractor-maintained alternate / emergency landing field / refueling location and the location of an Air Force “Cobra Dane” radar site. More important to this study, Eareckson’s 10,000-foot runway and several hangers constitute an in-place resource for the USAF.

Sitting on the extreme western end of the Aleutian Island chain, Eareckson could return to the reconnaissance role that it performed during the Cold War without creation of too much new infrastructure (fig. E-2). As an example, stationing Global Hawks at Eareckson would require only a small contractor launch-and-recovery footprint, and the aircraft’s publically stated range of 8,700 nautical miles (nm) would provide high-altitude reconnaissance into the northern Pacific and the Arctic.⁵⁵ Since PACAF has declared that there will be no new bases in the Pacific, Eareckson, an existing base managed by the 611th Air Support Squadron (ASUS) at JB Elmendorf-Richardson, does not violate that dictum.⁵⁶ Moreover, the 611th ASUS is part of the 611th Support Group, which, along with the 611th Air and Space Operations Center, falls under Eleventh Air Force: all PACAF assets. This means an untapped PACAF asset could be used with minimum cost and minimum fanfare to provide a forward operating location and a launch/recovery location for unmanned aerial surveillance aircraft. Assuming a nominal 2,500 nm radius, a Global Hawk mission could extend as far north as the North Pole itself and southward into the Pacific—winds and weather permitting—as far as the East China Sea.

Using remote split operations from Beale AFB, California, where the 9th Reconnaissance Wing, 12th Reconnaissance Squadron operates Global Hawk aircraft, assets could satisfy the Arctic domain awareness requirements outlined in the *2010 Quadrennial Defense Review* and the Navy’s *2009 Arctic Roadmap* and also be available for overwatch missions in the Pacific.⁵⁷ While it can be argued that Eareckson is farther from, say, Shanghai (about 3,300 miles) than Shanghai is from Anderson AFB, Guam (roughly 1,920 miles), Eareckson-based Global Hawks could be used in support of US assets in Japan and Korea and as a “window” on Russian activity in the northern Pacific. In addition, a plausible, and not entirely untrue, explanation for the deployment to Eareckson would be its new reconnaissance role in the High North. Launching from there rather than from JB Elmendorf-Richardson would also avoid most Federal Aviation Administration issues concerning unmanned aircraft operations over US territory—another *raison d’être* for its deployment at Eareckson.

Key to the success of this initiative is its small footprint and the airfield’s “as is” status, eliminating the need for substantial military construction funding. Any major construction or modification of existing facilities would not only require unprogrammed funds but also would attract the attention of friends and foes alike—not to mention Congress—in an era of declining resources. Likewise, permanent stationing of USAF personnel there would create a personnel support tail in excess of mission requirements. “As is” basing and the use of contractors instead of uniformed personnel avoid these pitfalls.

RC-135s could also stage from Eareckson as they did during the Cold War, along with tanker aircraft to support a Northern Pacific air bridge. Eareckson also could be designated a forward operating location for packages of fighters and tankers during crises or contingencies. This designation would not increase day-to-day operations at the airfield but would be a viable plan for hostilities in the Pacific—effectively providing another US aircraft launching point for any requirements to the south.

A review of Eareckson's airfield chart indicates no control tower in operation (although one exists) and little in the way of maintenance facilities or equipment on hand. However, there are over a half dozen hangers still in place and sufficient ramp space for several aircraft at a time.⁵⁸

Given its often severe weather and its lack of sustainment facilities, Eareckson may not be a “turnkey” operation. It is, however, a current asset that could be used to strengthen USAF posture in the Pacific. Given that Eareckson is managed by the 611th ASUS, additional operational information should be readily available at JB Elmendorf-Richardson. Nevertheless, a site survey may be in order to update details related to a deployment of Global Hawks and to determine transient aircraft maintenance needs.

Notes

1. Chin Shaofeng, “China’s Self-Extrication from the ‘Malacca Dilemma’ and Implications,” *International Journal of China Studies* 1, no. 1 (January 2010), 2.
2. Graham Lees, “China Seeks Burmese Route around the ‘Malacca Dilemma,’” *World Politics Review*, 20 February 2007, <http://www.worldpoliticsreview.com/articles/562/china-seeks-burmese-route-around-the-malacca-dilemma>.
3. Robert D. Kaplan, *Monsoon: The Indian Ocean and the Future of American Power* (New York: Random House, 2011), 261.
4. Chin Shaofeng, “China’s Self-Extrication,” 3.
5. Ibid., 9.
6. Mohd Hazmi bin Mohd Rusli, “Maritime Highways of Southeast Asia: Alternative Straits?” *RSIS Commentaries*, no. 024/2012, 10 February 2012, <http://www.rsis.edu.sg/publications/Perspective/RSIS0242012.pdf>.
7. Lehman Brothers, *Global Oil Choke Points* (New York: Lehman Brothers, 18 January 2008), <http://www.deepgreencrystals.com/images/GlobalOilChokePoints.pdf>.
8. Jason Szep, “Burma Gas Pipeline Complete but Cites China Delays,” *Reuters*, 12 June 2013, <http://www.irrawaddy.org/archives/37266>.
9. Graham Lees, “China Seeks Burmese Route around the ‘Malacca Dilemma,’” <http://www.worldpoliticsreview.com/articles/562/china-seeks-burmese-route-around-the-malacca-dilemma>.
10. Shaofeng, “China’s Self-Extrication,” 17. The author aggregates totals from the Sino-Soviet pipeline, the Sino-Kazakhstan pipeline, and the future Sino-Burmese pipeline. Estimates say that such alternatives would barely equal 26 percent of China’s current oil imports.
11. Gordon G. Chang, “China’s Arctic Play,” *Diplomat*, 9 March 2010, <http://thediplomat.com/2010/03/09/china%E2%80%99s-arctic-play/>.
12. Here are representative titles: Linda Jakobson, “China Prepares for an Ice-Free Arctic,” *SIPRI Insights on Peace and Security*, no. 2010/2 (March 2010), <http://books.sipri.org/files/insight/SIPRIInsight1002.pdf>; Joseph Spears, “China’s Snow Dragon Sweeps into Arctic Ocean,” *Arctic Progress* (blog), 28 January 2011, <http://web.archive.org/web/20111204093250/http://www.arcticprogress.com/tag/xue-long/>; Chang, “China’s Arctic Play”; and David Curtis Wright, *The Dragon Eyes the Top of the World: Arctic Policy Debate and Discussion in China*, China Maritime Study No. 8 (Newport, RI: Naval War College, August 2011).
13. Jakobson, “China Prepares for an Ice-Free Arctic.”
14. Spears, “China’s Snow Dragon.”
15. Joseph Spears, “A Snow Dragon in the Arctic,” *Asia Times*, 8 February 2011, <http://www.atimes.com/atimes/China/MB08Ad01.html>.
16. Wright, *Dragon Eyes the Top of the World*.

17. At this writing, the heavy icebreaker *Polar Star* has rejoined the Coast Guard's fleet, complementing the medium icebreaker *Healey*, thus changing this equation.

18. A United Press International (UPI) report in *Science News* states that China's icebreaker *Xue Long* was headed to Norwegian waters in April 2013 to start a "research mission" through the NSR to the Barents Sea—a first for China. "China Readies Arctic Research Mission," *UPI*, 21 March 2012, http://www.upi.com/Science_News/2012/03/12/China-readies-arctic-research-mission/UPI-87381331603146/.

19. Isabella Mroczkowski, "China's Arctic Powerplay," *Diplomat*, 15 February 2012, <http://the-diplomat.com/flashpoints-blog/2012/02/15/chinas-arctic-powerplay/>.

20. Frédéric Lasserre, *China and the Arctic: Threat or Cooperation for Canada?*, Canadian International Council (CIC), China Papers No. 11 (Toronto: CIC, June 2010), 8.

21. Stephen Blank, "China's Arctic Strategy," *Diplomat*, 20 June 2013, <http://thediplomat.com/2013/06/20/chinas-arctic-strategy/>.

22. Sections 37 and 38 of the Arctic Council, "Arctic Council Rules of Procedure" (Iqaluit, NU, Canada: Arctic Council, 17–18 September 1998), make it clear that observers are on a short lease: "Any Observer that engages in activities that are at odds with the Council's Declaration shall have its status as an Observer suspended." (para. 37) and "Observers may make statements at the discretion of the Chair and submit relevant documents to the meetings." (para. 38), http://www.google.com/url?sa=t&rct=j&q=arctic%20council%20observer%20status%20rules&source=web&cd=3&ved=0CDYQFjAC&url=http%3A%2F%2Fwww.arctic-council.org%2Findex.php%2Fen%2Fdocument-archive%2Fcategory%2F4-founding-documents%3Fdownload%3D120%3Aarctic-council-rules-of-procedure&ei=CgjEUb3iFuqa0QHziYDgAw&usg=AFQjCNHdc5kauhckzU2GwpCU_PoO4Q_gSQ&bvm=bv.48293060,d.dmg.

23. Capt Thomas R. Fedyszyn (USN, retired), "Renaissance of the Russian Navy?" *US Naval Institute Proceedings Magazine*, March 2012, <http://www.usni.org/print/24042>.

24. Blank, "China's Arctic Strategy."

25. Michael P. Lavallee, "Tumen River Free Trade Area: Trade and Environment Implications," *TED Case Studies* 5, no. 1 (January 1996), <http://www1.american.edu/TED/TUMEN.HTM>.

26. Michael Auslin, "Russia Fears China, Not Japan," *Wall Street Journal*, 4 March 2011, <http://online.wsj.com/article/SB10001424052748703559604576175660916870214.html>. See also Fedyszyn, "Renaissance of the Russian Navy?"

27. Fedyszyn, "Renaissance of the Russian Navy?"

28. Peter Apps, "Melting Arctic May Redraw Global Geopolitical Map," *Reuters*, 3 April 2012, <http://www.reuters.com/article/2012/04/03/us-arctic-resources-idUSBRE8320DR20120403>.

29. European Parliament, "The Geopolitics of Arctic Natural Resources," (Brussels, Belgium: Policy Department, Directorate-General for External Policies, European Parliament, 31 August 2010), 4, <http://www.tepsa.eu/download/Valur%20Ingimundarson.pdf>. See also US Geological Survey, "Circum-Arctic Resource Appraisal," 19 July 2013, <http://energy.usgs.gov/arctic/>.

30. US Geological Survey, "Circum-Arctic Resource Appraisal."

31. Hobart King, "Oil and Natural Gas Resources of the Arctic," *Geoscience News and Information*, 2013, <http://geology.com/articles/arctic-oil-and-gas/>.

32. Yue Wang, "Experts: Arctic Drilling for Security," *Energy Daily*, 16 July 2012, http://www.energy-daily.com/reports/Experts_arctic_drilling_for_security_999.html.

33. "For Shell, Wait 'til Next Year in the Arctic," *Wall Street Journal*, 1 November 2012, <http://online.wsj.com/article/SB10001424052970204789304578086770366680196.html>. The Norwegian oil company Statoil announced it would delay its operations for at least a year, while French oil giant Total said that environmental risks were too high to continue exploration in the Arctic. See also "Shell Puts Off Drilling in Alaska's Arctic," *Wall Street Journal*, 27 February 2013, <http://online.wsj.com/article/SB10001424127887324662404578330423854552576.html>.

34. Anatoly Karlin, "ARCS of Progress—The Arctic World in 2050," *Arctic Progress*, 1 February 2011, <http://arcticprogress.com/2011/02/arcs-of-progress/>. These predictions were bolstered by the news of the second smallest summer ice pack that summer. US National Intelligence Council, *Global Trends 2030: Alternative Worlds* (Washington, DC: National Intelligence Council, 2012), 65. The authors assert that by 2030 it would be possible to transit both the "Northern and Northwest Passage for about 110 days per year."

35. David Perera, "Northwest Passage Channel Appears Free of Ice," *Fierce Homeland Security* (blog), 16 August 2012, <http://www.fiercehomelandsecurity.com/story/northwest-passage-channel-appears-free-ice/2012-08-16>; Nathan Vanderklippe, "Study Predicts Arctic Shipping Quickly Becoming a Reality," *Calgary Globe and Mail*, 4 March 2013,

<http://www.theglobeandmail.com/report-on-business/international-business/study-predicts-arctic-shipping-quickly-becoming-a-reality/article9264672/>; James Holmes, "Open Seas: The Arctic Is the Mediterranean of the 21st Century," *ForeignPolicy.com*, 29 October 2012, http://www.foreignpolicy.com/articles/2012/10/29/open_seas; and Nafeez Ahmed, "White House Warned on Imminent Arctic Death Spiral," *Guardian* (UK), 2 May 2013, <http://www.theguardian.com/environment/earth-insight/2013/may/02/white-house-arctic-ice-death-spiral>.

36. Here is an example of a headline getting the article's content wrong: "US Navy Says North Pole to Be Ice Free by 2035," *Arctic Progress* (blog), 25 January 2011, <http://web.archive.org/web/20111204100303/http://www.arcticprogress.com/2011/01/us-navy-north-pole-ice-free-2035/>. Writing in the *Naval War College Review*, Adm Dave Titley, the US Navy's chief oceanographer, actually stated that "the consensus of most models and researchers is that the Arctic will experience ice-free conditions for a portion of the summer by 2030." David W. Titley and Courtney St. John, "Arctic Security Considerations and the US Navy's Roadmap for the Arctic," *Naval War College Review* 63, no. 2 (Spring 2012), 36, <http://www.usnwc.edu/getattachment/e0734d9a-386e-4a2c-ba9d-86e7b290c57f/Arctic-Security-Considerations-and-the-U-S--navy-s>.

37. The World Meteorological Association defines *open water* for navigation as areas where the ice covers less than one-tenth of the surface. Svend Aage Christensen, "Are the Northern Sea Routes Really the Shortest?," *DIIS Brief*, March 2009, 3, http://www.diis.dk/graphics/Publications/Briefs2009/sac_northern_searoutes.pdf.

38. Ronald O'Rourke, *Changes in the Arctic: Background and Issues for Congress* (Washington, DC: Congressional Research Service, 21 July 2010), 8n28. O'Rourke's 2012 data showed more polar ice melting at a faster rate and intensified scientific discussion of the Albedo ice effect: a measure of how much of the sun's energy is reflected back into space. For a discussion of the Albedo effect in the Arctic, see "The Albedo Effect—Ecocem," <http://www.ecocem.ie/environmental,albedo.htm>.

39. Lasserre, *China and the Arctic*.

40. Michael Byers, "Canada's Not Ready to Have the World in the Arctic," *Globe and Mail*, 15 August 2012, <http://www.theglobeandmail.com/commentary/canadas-not-ready-to-have-the-world-in-the-arctic/article4481519/>.

41. Rob Huebert, Heather Exner-Pirot, Adam Lajeunesse, and Jay Gulledge, *Climate Change & International Security: The Arctic as a Bellwether* (Arlington, VA: Center for Climate and Energy Solutions, May 2012), 12, <http://www.c2es.org/docUploads/arctic-security-report.pdf>.

42. Ibid., 11–12. Another interesting fact: physics-based climate models show that the rate of ice loss is likely to slow before the Arctic progresses to an ice-free state, which could cause an overestimation of future ice loss.

43. Charles Emmerson and Glada Lahn, *Arctic Opening: Opportunity and Risk in the High North* (London: Chatham House, 2012), 13. Writing for Lloyd's, the authors hedge their ice-melt comments by conceding that "more abrupt destruction" could accelerate melting but do not specifically announce this to be fact.

44. Talk of a third route—the Transpolar Route—must await further ice melt. Even then it will be one without infrastructure and considerably more treacherous than the other two.

45. For purposes of clarity, the term *Northern Sea Route* will be used in this paper, rather than "Northeast Passage." A third route, directly over the North Pole, is not anticipated to be a transportation consideration until the middle of this century, beyond the time frame of this study.

46. The lower Union Strait has a draft of 13 meters, while the McClure Strait has an average depth of 200 meters. Lasserre, *China and the Arctic*, 195.

47. "The Geopolitics of Arctic Natural Resources," 16–17.

48. Emmerson and Lahn observe that the legal rights of coastal states to regulate shipping in ice-covered waters under the UN Convention of the Laws of the Sea (UNCLOS) may be challenged because of climate change; that is, provisions for regulation of ice-covered waters may not apply if the waters are no longer "ice covered." Emmerson and Lahn, *Arctic Opening*, 33.

49. Valur Ingimundarson, "The Geopolitics of Arctic Natural Resources," Brussels: European Parliament, Directorate General for External Policies of the Union, PE 433 (2010): 16–17.

50. Karlin, "ARCS of Progress," 5; and Trude Pettersen, "China Starts Commercial Use of Northern Sea Route," *Barents Observer*, 14 March 2013, <http://barentsobserver.com/en/arctic/2013/03/china-starts-commercial-use-northern-sea-route-14-03>.

51. Pettersen, "China Starts Commercial Use."

52. Lasserre, *China and the Arctic*, 6. Note: the New Orleans to Singapore passage via the NWP is only slightly longer (about 600 km) than via the Suez-Malacca routing. However, given the short season of the NWP and slower transits speeds in the Arctic, time-in-transit may be another factor to ship via the Suez instead of the NWP.

53. Emmerson and Lahn, *Arctic Opening*, 30.
54. Bob Reiss, “Why We Should Look to the Arctic,” CNN, 16 July 2012, <http://www.cnn.com/2012/07/16/opinion/reiss-arctic-drilling/index.html>.
55. USAF, “RQ-4 Global Hawk,” 27 January 2012, <http://www.af.mil/information/factsheets/factsheet.asp?id=13225>.
56. Marc V. Schanz, “New Places, Not Bases Key to the Pacific,” *Air Force Magazine*, 28 February 2012, <http://www.airforce-magazine.com/DRArchive/Pages/2012/February%202012/February%2028%202012/NewPlaces,NotBasesKeytoPacific.aspx>.
57. Department of Defense, *Quadrennial Defense Review Report, 2010* (Washington, DC: DOD, February 2010), 19, <http://www.defense.gov/qdr/qdr%20as%20of%20206jan10%200700.pdf>. See also, Task Force Climate Change, Oceanographer of the Navy, *Navy Arctic Roadmap* (Washington, DC: Department of the Navy, 10 November 2009), 24, http://www.navy.mil/navydata/documents/USN_artic_roadmap.pdf. Action Item 5.11: “Increase operations of unmanned systems for Arctic data collection, monitoring and research.” Also, see Office of the Undersecretary of Defense–Policy, *DOD Report to Congress on Arctic Operations and the Northwest Passage* (Washington, DC: DOD, May 2011), 14, http://www.defense.gov/pubs/pdfs/Tab_A_Arctic_Report_Public.pdf. “Demand for domain awareness in the Arctic is projected to increase in pace, . . . placing heavier demands on Intelligence, Surveillance, and Reconnaissance (ISR) assets such as . . . unmanned aerial systems (UAS).”
58. US Federal Aviation Administration, “Eareckson Air Station,” 27 June 2013, <https://nfdc.faa.gov/nfdcApps/airportLookup/airportDisplay.jsp?category=etops&airportId=PASY>.

Appendix F

Airlift in the Asia-Pacific: 2020 and Beyond

Foundations and Forecasts

Robert C. Owen

Introduction

This appendix has two broad objectives. First, it will assess likely US Air Force (USAF) airlift force-structure requirements and shortfalls in the Asia-Pacific hemisphere around the year 2020 and beyond. This assessment will culminate in qualitative recommendations for mitigation strategies to address those shortfalls. Second, the report aims to provide a historical, conceptual, and timely strategic framework for understanding how the national military airlift system (NMAS) works, and likely will work, in the Asia-Pacific. Together, this force structure analysis and analytical framework should help military leaders, staff officers, and policy makers of all stripes to understand the airlift challenges ahead and to develop effective and financially bearable mitigation strategies to address them.

That there will be a need for mitigation strategies is a given in a force structure analysis of this sort. The history of airlift planning and major conflict operations bears out the truth that whatever airlift capacity leaders buy or make available will not meet planning goals and will not be enough to meet actual requirements. The United States has never afforded all the airlift capacity for which generations of planners have called and, in the event, the use of available airlift usually has caused airlift commanders to wish they had more of it.

Thus, this report will seek to characterize likely airlift shortfalls in ways useful to planners. Its first question will be whether future inadequacies in the NMAS will be quantitative (how much, how far, how quickly) or qualitative (what, where, or under what conditions will airlift operations occur). Characterizing shortfalls in this way will simplify the process of articulating mitigation strategies and, in turn, categorizing them as “internal” or “external” to the Department of Defense (DOD). Internal strategies will involve organizational, doctrinal, and resource *realignments* within the NMAS. External mitigation strategies would include such things as the *acquisition* of new systems, bases, or capabilities. The former strategies involve actions largely within the purview of the military alone, while the latter would involve concerted analytical, investment, and political support from outside the DOD.

The organization of this analysis is straightforward. It begins with a historically based “discovery” of the Asia-Pacific operational context. This historical approach lays a better foundation for understanding the underlying logic of future mitigation strategies than would a snapshot recitation of only the Asia-Pacific’s present geopolitical features and operational context. The appendix next will describe the dynamics of the national military airlift system. To be viable, future air-mobility policies must accommodate the full institutional, legal, and cultural complexity of the NMAS. It is a webwork of interconnected parts and systems; a change to one will affect and be affected by the others. Having described how the airlift system works in the Asia-Pacific, this report will forecast airlift requirements in

US Pacific Command's (USPACOM) area of responsibility (AOR) in 2020. Inescapably in an unclassified study, this discussion will be more qualitative—too much, too little, and why—than quantitative—how much, when, and where. In a similar balance of quality and quantity, the next section will lay out the capabilities that the US Transportation Command (USTRANSCOM) and USPACOM likely will have to address airlift requirements in the AOR. This section also will identify anticipated shortfalls in those capabilities. Last, this study will identify and assess strategies to mitigate future limitations effectively and affordably.

Before moving on, it will be useful to clarify the use of some terms in this study, beginning with its designation of the two sources of airlift in the Asia-Pacific as “global” and “theater.” Global airlift forces are those assigned to USTRANSCOM, which exercises its operational control and administrative responsibilities over them through its air component, the Air Mobility Command (AMC). USTRANSCOM has ongoing global responsibilities, and even in a large-scale conflict, its conduct of airlift in the Asia-Pacific would be only one of its numerous concerns—albeit a preeminent one. Theater airlift forces in the context of this study are those operated by USPACOM, which exercises its control and responsibilities over them through Pacific Air Forces (PACAF). Given the vast expanse of the USPACOM AOR, its airlift management challenges mirror those of USTRANSCOM. The sheer size of the Asia-Pacific hemisphere will oblige theater airlift commanders and planners to treat it as a “theater of theaters,” requiring them to balance competing peacetime and wartime requirements across distances hardly less vast than those dealt with by their global counterparts.

Likewise, this appendix will use the term “Asia-Pacific” with specific meaning. Until quite recently, many discussions of this area of the world appended “region” to the term, as in “Asia-Pacific region.” As pointed out recently by the current commander in chief of USPACOM (CINCPAC), Adm Samuel J. Locklear III, this convention is awkward and “tends to over-simplify and under-represent the size, complexity, and diversity” of the USPACOM AOR.¹ Locklear uses the term “Indo-Pacific” to describe a realm of concern and strategic complexity that is “incredibly culturally, socially, economically, and geopolitically diverse, . . . the engine that drives the world’s economy, . . . [and] the most militarized area in the world.”² Of course, Admiral Locklear is correct; his AOR and the geopolitical context of this study embrace a *hemisphere*, not a region. It contains over half of the earth’s surface, includes the Pacific and Indian Oceans and 36 countries, and abuts on every continent, except Africa and South America. However, “Indo-Pacific” can seem to emphasize the oceans Admiral Locklear worries about rather than the “Asia” in the original term. The nations of the USPACOM AOR are the loci of economic and military power; the oceans are just the byways and the likely cockpits of future conflicts between them. Nevertheless, to say “Indo-Pacific-Asia Hemisphere” would be awkward, even if more accurate. Therefore, this study will stick with the more conventional “Asia-Pacific” but drop the misleading term “region” whenever possible. That will not be an elegant way to embrace the totality of this truly big place that everyone is worried about, but it will have to suffice.

Discovering the Operational Context

A still life of current airlift arrangements in the Asia-Pacific is not a useful starting point for developing future policies. Current arrangements alone provide no sense of the movement or evolution of airlift affairs—nothing about the opportunities and boundaries of the possible or the practical. The sense of those things begins with an understanding that the

present situation is a construct of over 70 years of operational, technological, and institutional refinement. As successive generations of Pacific airlift practitioners refined that construct, they discovered the enduring and transient elements of their operational context. Some things, like geography and the small size of transport aircraft in relation to the demands placed upon them, never changed. Other things, like strategic context, military threats, and the organization of airlift operations, did change. Those changes required responses, but the responses had to make sense in the immutable context of geography, the relative capabilities of transport aircraft in regard to tasks and alternative transportation modes, and the institutional imperatives of the American way of war. Thus, in the absence of a holistic grasp of what the present system is today and how it came to be, leaders cannot formulate or advocate confidently any sensible strategy to mitigate future airlift shortfalls and challenges. This process of change and response began in the earliest days of World War II.

World War II

The United States entered World War II just as routine, long-range military air transportation was becoming practical. In the previous decade, commercial carriers in the United States, Britain, France, and Germany had developed aircraft and operational techniques necessary for such operations. Like its counterparts in other countries, Pan American World Airways (Pan Am) based its transoceanic operations on four-engine seaplanes. The airline began routes from California to China in 1935 using Martin M-130s. Over the next few years, Pan Am expanded operations to the Philippines and New Zealand and brought nine Boeing 314 Clippers into its fleet. The 314s were technological milestones, able to make the 2,200 nautical mile (nm) jump between Oakland, California, and Honolulu, Hawaii, carrying 74 sitting passengers or 36 enjoying the comfort of berths. This was an important capability, since California to Hawaii was the longest transoceanic jump in the world without the possibility of making an intermediate stop for fuel or emergency. An aircraft that could make that jump with a useful load possessed a practical capability to go anywhere in the world, usually in a direct line. Immediately after the Japanese attacked Pearl Harbor, the US Army and Navy took control of Pan Am's fleet of seaplanes and their personnel. As that was happening, Douglas Aircraft Corporation was assembling its first DC-4 aircraft. The DC-4 was a world-beater, able to carry 50 passengers for 3,000 nm.³ At the moment of mobilization, then, the United States had a small body of operational experts and an airliner coming into production that, together, could make global military air transport a matter of day-to-day routine.

The Pacific was a tough place to operate transport aircraft in the early 1940s—really tough. As of today, the ocean covers 64 million square miles—20 times larger than the continental United States (CONUS). Behind its western boundaries were other significant bodies of water, such as the Sea of Japan and the South China Sea, and dozens of countries and European colonies. By the summer of 1942, Japanese military forces effectively denied access to at least the western third of the Pacific down to the Coral Sea and posed a threat eastward to the US coastline. The Pacific's western rim stretched 8,500 nm along its face from the Aleutians to Australia. The flight distance from San Francisco to Sydney alone was about 6,400 nm. These were daunting dimensions at a time when the Boeing 314 cruised at about 140 knots and the C-54 (the military designation for the DC-4) at about 170 knots. Worse, between the west coast of the United States and any point on the Pacific Rim, only the Hawaiian Islands in 1941 possessed runways capable of receiving and withstanding the

ground maneuvering of C-54s routinely. C-54s were not available in significant numbers anyway until early 1943, by which time Allied engineers had constructed dozens of suitable airfields. So, early in the war, much of the transport flying among the pinprick islands of the Pacific was done in two-engine DC-3/C-47s, converted B-24 bombers (the C-87), and seaplanes. It was slow, inefficient, and usually dangerous work indeed!

Two global air transport commands operated in the Pacific during World War II, the Army Air Forces (AAF) Air Transport Command (ATC) and the Naval Air Transport Service (NATS). Their primary mission, logically enough, was *air transport*—the logistical support of forces deployed already in forward battle zones. Operating much of the same equipment and generally overlapping routes, these two transport arms carried people and stuff. They carried important passengers throughout the Pacific and wounded and sick personnel from the battlefronts back to Hawaii and the continental United States. They also moved mail, maps, medicines, blood, and delicate, high-value equipment, such as radios, radars, optical equipment, vacuum tubes, laboratory equipment, and anything else that justified some extremely expensive and scarce space in the hold of a C-54 or other aircraft. As the number of available transport aircraft grew to the thousands late in the war, the list of cargo merititing air transport expanded to include aircraft engines, ship parts, and other heavy items. Compared to movements by sea, US air transport forces did not move much. However, what they moved was vitally important and made much more productive by the shortened travel times incumbent in air transport.

As a secondary role, ATC explored the mission of long-range *airlift*—the transportation of combat-ready forces into or within a combat zone. In the early part of World War II, ATC and NATS simply did not have enough aircraft available to support combat moves, and they never had appropriate aircraft. C-54s and the Navy's seaplanes could move people, packages, and light vehicles. They could not load larger vehicles, such as cargo trucks, heavy artillery, and tanks. As their aircraft complements increased, ATC and NATS did get in the business of moving the "air echelons" of many different units, such as combat aircraft squadrons, headquarters staffs, medical units, and the like. However, since the heavy equipment of these units had to go by surface means, their air movements were only practical between well-established bases possessing open surface lines of communication.

The closest ATC came to making a combat airlift of ground forces in the Pacific was "Mission 75" in August 1945. In an effort to accelerate and increase the psychological impact of the occupation of Japan, 202 ATC C-54s and 300 aircraft assigned to theater commands transported 23,000 troops and 1,200 light vehicles into the country in the space of two weeks.⁴ Nevertheless, even Mission 75 was not a true combat move. The 11th Airborne Division and other troops going into Japan brought their light weapons, ammunition, food, and jeeps but no artillery, tanks, or engineering equipment. They traveled by air only about 820 nm from Okinawa to Atsugi, a relatively intact Japanese air base just west of Tokyo. Air transport had come a long way during the war, but providing true air mobility for complete combat forces still was not on its agenda.

Throughout the Pacific, the Army, Marines, and NATS operated theater-level air transport units in direct support of combat operations. The vast majority of their flights were simple air transport missions linking local bases or picking up cargos and personnel delivered by ATC and NATS long-range aircraft and moving them deeper into the combat zones. However, the Troop Carrier Command of the AAF Fifth Air Force did conduct some "airhead" operations, in which combat forces were flown into isolated airfields and then

sustained by airlifted supplies for weeks. The Allied campaign to take the Markham Valley in New Guinea, during the summer and fall of 1943, stands as a salient example of an air-head operation. For several weeks beginning in early September, troop carrier squadrons equipped with Douglas C-47s sustained several forward airfields and a division of Australian infantry—over 20,000 personnel in all—in offensive operations. These airlift operations were preceded and then accompanied by a powerful Allied counterair campaign that reduced Japanese air forces in the area to near impotency. Captured Japanese bases supported landing operations in forward areas, augmented occasionally by parachute drops of supplies to forward units. Lift distances were short, however—never more than about 250 miles each way (Port Moresby–Dumpu) and generally less than 75 miles once the Allies opened Lae as a port. Faced by their inability to load trucks and other heavy equipment into the small cabins of their C-47s, American Airmen learned to cut vehicles into portable sizes and then weld them back together at forward airfields.⁵

In keeping with lessons from larger operations in Europe, the Markham Valley campaign revealed the essential ingredients of successful airlift operations into marginally developed airheads. Sustained operations in such places required airfields, preferably captured but built if necessary. In the absence of fuel at the forward fields, the “projection” distances of such operations could not be more than the unrefueled flight radii of the transport aircraft used. Shorter flight distances were desirable, since they allowed transport units to generate the large number of sorties necessary to insert and then support large units. Shorter flight distances were possible since, once the vast Pacific had been crossed, the scale of airlift operations generally shrank to that of tactical air and ground operations—just a few hundred miles or so. Last, the possession of at least local air dominance was a critical prerequisite to sustainable and efficient transport operations.

Operationally, the separate existences of air transport and troop carrier organizations made sense in World War II. In the first place, the two organizations performed distinct, though sometimes overlapping, missions. The ATC became the first truly global military operating command in history. By late 1942, it exercised central direction over a network of routes and units that extended to every battle zone on every continent except Antarctica. Its daily operations were characterized by scheduled flights, usually by single aircraft, between developed terminals and along organized routes studded by bases with robust aircraft servicing capabilities. Such “conveyor belt” or “daisy chain” operations were well suited to the routine movement of passengers and piece cargo, particularly because their rhythmic departures and arrivals made efficient use of cargo handling, aircraft servicing, crew billeting, and other support assets.⁶ Troop carrier commands, in contrast, were assigned to and identified with specific theater air forces. The Fifth Troop Carrier Command, for example, was assigned to the Fifth Air Force in the Southwest Pacific. While troop carrier commands expended most of their sorties on routine transport missions, their core mission was airlift, which is what distinguished them from ATC and NATS operationally. Whether dropping paratroops in airborne missions or airlanding troops and supplies at forward fields, their operations were shaped by the tactical necessities of their operational environments and of the units they delivered. Above all else, they had to deliver (“close” in modern terminology) units in time windows as narrow as possible and in ready-to-fight condition. Achieving such “dense” deliveries of combat units in fighting trim often obliged troop carrier forces to fly in large formations of aircraft and employ combat tactics to evade detection and engagement by enemy forces. While training for and conducting such operations certainly reduced

the amount of routine cargo troop carrier units could haul, that was a secondary consideration to the necessity of delivering combat units densely and supporting them in battle.

Despite the operational logic behind the *organizational* separation of ATC and troop carrier aviation in the Pacific, it did raise doctrinal questions that remain relevant today. As a command conducting operations globally, ATC required continual operational control of its people and aircraft, regardless of where they were based or transiting. Though this arrangement made sense and was consistent with the long experience of managing global maritime transport operations, the sight of those big transports passing through their areas of operations grated on some theater commanders. Desperate to accomplish their missions, some of those commanders commandeered ATC planes for their own purposes.⁷ Likewise, as it became clear that the overwhelming percentage of troop carrier sorties were expended on air transport rather than combat airlift missions, some commanders back in Washington, DC, wondered why they existed as forces separate from ATC. In their view, great training and logistical efficiencies and operational advantages could be achieved through consolidation of the two airlift arms.

Importantly, all senior leaders involved with airlift at the time recognized the necessity of leaving theater-assigned forces directly under the operational authorities of theater commanders and their troop carrier staffs. What was being proposed at the time and in later years was consolidation of the support aspects of airlift forces, not their direct operational control.⁸ At the same time, Mission 75 and other actions had shown troop carrier leaders the value of four-engine transports in support of operations in expansive theaters like the Pacific, and after the war, the Air Force converted several troop carrier wings to C-54s and, later, C-124s. Even in the midst of war, then, the community of Americans involved in military air transport operations discovered serious grounds for thought and debate over the proper distribution of command authority.

The debate over airlift organization continued after the war, on the foundation of two generally accepted principles: the quest for greater efficiency in the application of finite airlift resources must never end, but the *operational command* boundary between global and theater air transport commands is and probably will remain inviolable. At various moments in the war, the AAF worked with the Navy to achieve the former and worked internally to buttress the latter. In September 1942, AAF headquarters moved to protect ATC transports from local impressment, directing theater air commanders to “take all possible actions to facilitate air transport operations through the area of their commands” and to divert ATC aircraft only to protect them from enemy actions.⁹ That same month, the Army and the Navy formed the Army-Navy Air Transport Committee to coordinate and reduce redundancies and inefficiencies in ATC and NATS operations.

In the realm of theater operations, troop carrier leaders early in the war simply ignored any suggestions for consolidation. Later, when recommendations for consolidation became more persistent, they argued that integrating a “logistics” (ATC) with a “combat” (troop carrier) organization was inappropriate and would degrade the capabilities of the latter.¹⁰ Frankly, troop carrier warriors disdained what they perceived as the noncombat ethos of ATC and NATS, acronyms that they sometimes rendered among themselves as the “Association of Terrified Civilians” and “Never around Tough Situations.”¹¹ Regardless of the injustice of such a position—hundreds of transport aircraft and personnel were lost to accidents and combat during the war—the Army and even the AAF chief of staff, Gen Henry H. Arnold, supported the separation of air transport and troop carrier aviation.¹² So, by the end

of the war, ATC and NATS had become used to coordinating their operations, while a troop carrier's institutional boundaries were protected by its combat record and powerful supporters.

By the end of World War II, then, the essentials of planning and conducting airlift operations in the Asia-Pacific were well understood. Distances were great and bases were few. Moving just administrative supplies, people, and cargo was a great challenge. Moving full-up combat forces into battle beyond a few hours of transport flying time was not practical. The problem was not just the small size of the aircraft but also their inability to generate the round-trip sorties needed to build up the forces at a distant airhead before they could be overwhelmed by enemy counterattacks. Perhaps most importantly, global and theater airlift forces operated in realms that differed distinctly enough in flying procedures, integration with overall combat operations, and geography to justify their separate existences. In the decades following 1945, therefore, modernized airlift forces would greatly increase their capacity to move things in a hurry. However, the essential realities of their limited capacity in relation to potential needs, time and distance challenges, and command relationships would remain in the bedrock of their planning and organization.

Korea

American airlift operators fought their portions of the Korean War largely with the capabilities and organization with which they had finished World War II. Pacific troop carrier forces underwent few substantive changes in organization and equipage between the end of World War II and the start of the Korean War in June 1950. Likewise, the establishment of the Military Air Transport Service (MATS) in 1948 had changed the formal organization of global airlift but hardly altered its content. MATS was little more than a cosmetic effort by the newly created National Military Establishment (soon to become the Department of Defense) to do something that demonstrated the promised benefits of creating a unified defense establishment. The action involved disestablishing ATC and the NATS and assigning all of the former's and some of the latter's assets to MATS. To avoid a squabble between service proponents in Congress, Secretary of Defense James Forrestal placed MATS under a USAF lieutenant general and allowed the Navy to keep whatever transports and personnel it felt were required for its "internal administration and the fulfillment of its mission."¹³ Having thus shed unwanted reservists and excess capacity, the Navy established two fleet logistics support groups and operated them on routes that often duplicated those of MATS. Forrestal also directed that the responsibilities of the new command would *not* include "the tactical air transportation of airborne troops, . . . [or] the initial supply and resupply of units in forward combat areas."¹⁴

The war in Korea also put long-range airlift operators face-to-face once again with the Pacific's unchanging tyranny of distance. The distance between MATS bases in California and Japan along the northern route via Alaska is about 4,900 nm. The central Pacific route, with stops at Hawaii and Midway Island, is about 5,600 miles long. Thus, for a MATS C-54 cruising along at 170–180 knots, a round trip on either route equated to 60–65 flying hours and more than a week of travel for crews shuttling Pony Express-style from base to base. When, therefore, the Joint Chiefs of Staff directed MATS at the beginning of the war to increase its daily lift to Japan from around 73 tons per month to 70 tons per day, they presented MATS commanders with an almost impossible challenge.¹⁵

Rising to the challenge, MATS leaders reinforced the 60 C-54s based already on the US Pacific coast with additional crews and planes, including 60 C-54s chartered from commercial

cargo carriers, 75 from two long-range troop carrier wings, and a squadron of Northstars from the Canadian air force.¹⁶ MATS also reached out to the major airlines, which were equipped with faster, pressurized transports, such as Boeing Stratoliners and Lockheed Constellations. Nevertheless, the big carriers were busy with the tourist season and demurred until a later time when they could deal with the war more conveniently. Working with what they had, MATS commanders and personnel achieved impressive results. By the fall of 1950, the MATS Pacific Division had raised its average aircraft utilization from the three-hours-per-day-per-aircraft peacetime rate to six hours and was moving about 70 tons of cargo and 150 passengers out to Japan each day.¹⁷

Impressive as these accomplishments were, however, they could not hide the general limitations of the airlift system in relation to the demands placed upon them. During the war, MATS aircraft moved about 214,000 passengers and 80,000 tons of cargo to Korea and Japan. The Military Sea Transportation Service, the nautical equivalent of MATS, meanwhile transported 54 *million* tons of cargo, 22 *million* tons of fuel, and almost five *million* passengers in support of Korean operations.¹⁸ Airlift unquestionably was vital for the movement of the most precious or urgent cargoes and the most important or fortunate military travelers. However, it was sealift that moved combat forces and supplied the war.

Compared to the contribution made by MATS to the strategic logistics effort, transport units of the Fifth Air Force played a relatively more important role on the Korean Peninsula. Starting with just two squadrons of C-54s and one of C-47s at the war's onset, the Fifth AF Combat Cargo Command (Combat Cargo) grew by the end of the year to a force of 140 transports, including a wing of about 75 new C-119s. The C-119 was a valuable addition, since its high-wing design and rear loading doors eased cargo operations on the ground and permitted it to drop palletized light vehicles, howitzers, and other items by parachute. As the battle lines surged up and down the mountainous peninsula, airlift often was the only way to move supplies to maneuvering units or transport the ground echelons of USAF tactical squadrons. Combat Cargo also conducted the last brigade-sized parachute assault thus far in US history, when it deposited over 4,000 soldiers, vehicles, and artillery of the 187th Regimental Combat Team at the twin drop zones at Sukchon and Sunchon on 20–22 October 1950.¹⁹ During the southward retreat of US forces before the Chinese counterattack during the winter of 1950–51, Combat Cargo played an unexpected but vital role of moving fuel and other supplies forward and “backhauling” thousands of sick and wounded soldiers and thousands of tons of ammunition and equipment that otherwise would have been abandoned to the enemy. By the time a truce ended large-scale fighting in June 1953, Combat Cargo aircraft had flown 210,343 sorties, evacuated 307,804 patients, and transported 2,605,591 passengers and 391,763 tons of freight into, out of, and within Korea.²⁰

Consistent with the strategic logistics experience, sealift moved far more “theater” cargo and personnel between the ports of Korea than did airlift. During the evacuation of coalition forces from Hungnam, North Korea, in the winter of 1950, for example, ships transported 105,000 UN troops, 91,000 refugees, 17,500 vehicles, and 350,000 tons of cargo.²¹ On its part, Combat Cargo flew 1,608 sorties in support of combat operations in northeast Korea and the evacuation, which carried 5,300 tons of vital supplies to retreating UN forces and 14,518 passengers into and out of the battle zone.²² The Korean experience, then, reinforced the relationship between airlift and sealift in the Asia-Pacific. The speed and flexibility of airlift could make the difference between tactical and operational success and failure in

specific engagements, but sealift allowed the United States to get into and stay in the fight overall.

Vietnam

In many ways, Vietnam was the first airlift war. For the first time in history, the great majority of soldiers going into and out of the war zone traveled by air. In 1967, near the peak of the American involvement in the war, the average *monthly* airlift over the Pacific was 65,000 passengers and 42,000 tons. This equated to virtually all passenger movements and 10 percent of all cargo moving into the theater of operations.²³ Meanwhile airlift made a proportionally greater contribution to the theater logistics effort. Again in 1967, trains and long-haul trucks carried 2,741,000 tons of cargo in and around Vietnam; coastal sealift, 1,823,000 tons; USAF theater airlift, 984,000 tons; and Army and Marine helicopters, 827,000 tons.²⁴ In other words, 28 percent of the gross theater cargo effort went by air.

The presence of such a large Army and Marine helicopter lift capability also indicated one of the more revolutionary aspects of airlift in Vietnam: the United States had developed a networked system of airlift capabilities that formed an unbroken bridge from training camps and supply depots in the States to foxholes in the most remote parts of Vietnam. In the Pacific, as for the US military in general, airlift had transitioned from being the vital adjunct of war it had been during World War II and Korea to being so integrated in the American way of war that fighting without it was unthinkable. By war's end, US military planners and personnel presumed the availability of capacious and unbroken air lines of communication whenever and wherever they were needed.

America's large-scale commitment of combat forces to the Vietnam conflict in late 1964 caught MATS with a mixed fleet of piston- and turbine-powered aircraft. In 1965 the MATS fleet included about 350 C-124s, 110 C-130s, 40 C-133s, and 40 new C-135s, cargo versions of the Boeing 707.²⁵ Additionally, MATS and its successor, Military Air Command (MAC), were augmented by six squadrons of Air National Guard (ANG) C-97s and several Air Force Reserve groups of C-124s. Commercial contract airlines, most of them members of the Civil Reserve Airlift Fleet (CRAF), presented a collection of last-generation piston-engine transports, mainly DC-7s and Lockheed Constellations, and turbofan-powered Boeing 707s and Douglas DC-8s.²⁶

Although capable of producing significant lift in aggregate, all of the aircraft in this fleet presented serious shortfalls individually as military transports in the Pacific. The C-133 was capacious but not particularly fast (280 knots) and was beset by maintenance problems. The C-124 was just plain obsolete, with a 180-knot cruise speed and a big appetite for maintenance time. Pressed into MATS as stopgaps pending the arrival of more capable aircraft, the C-130s were small and no faster than the C-133. The turbofan-powered C-135s and the jets offered by the CRAF carriers offered great advantages in speed and range, but their cargo decks were too small to carry anything but passengers and piece cargo. Therefore, in the MATS fleet of the mid-1960s, big was slow and fast was small. MATS planners made it work as best they could, but they were waiting for better.

The Lockheed C-141 Starlifter and C-5 Galaxy were about to bring "better"—much, much "better"—to the MATS fleet. Powered by newly developed turbofan engines, these two planes would become the core of the long-range airlift fleet until the 2000s. They also would raise the capacity of the airlift system by an order of magnitude—from barely 3 million ton-miles per day (MTM/D) in 1960 to 34 MTM/D in 1970.²⁷ The keys to this increase

were the greater speed, capacity, and reliability of turbofan-powered transports. Instructively, the C-124 lumbered along at 180 knots, carried around 25 tons on Pacific routes, and had an en route utilization rate of about 12 hours per day.²⁸ In the common measurement of airlift productivity, therefore, a C-124 could produce about 54,000 ton-miles of lift per day (180 knots X 12 hours X 25 tons). By comparison, the C-141 cruised at 480 knots, carried about 40 tons, and averaged about 15 hours per day en route—all of which equated to a productivity of around 288,000 ton-miles per day per aircraft. The Starlifter and the Galaxy also made the 13–14,000 mile round trip to Vietnam in two to three days, compared to seven to eight days for the C-124—a difference that greatly eased aircraft maintenance and crew management. Just for comparison, a World War II-era Victory ship sailing with 5,000 tons of cargo at 12 knots produced about 1.44 MTM/D.²⁹

The transition to the C-141 and the C-5 represented a qualitative as well as a quantitative revolution in the USAF's ability to move and support forces across the Pacific. Together, these aircraft ushered in the modern airlift era, when USAF transports are capable of moving entire ground and air combat units over transoceanic distances in a tactically useful time frame. The large C-141 fleet (ultimately the USAF acquired 272) could move people, palletized cargo, and vehicles, while the big C-5s (81 C-5As acquired) could bring along the Army's largest combat vehicles, including battle tanks, mobile bridges, and self-propelled artillery. Augmented by the CRAF, they represented a powerful increase in the capacity and flexibility of the US airlift fleet. For the first time, the airlift community's unofficial credo of “anything-anytime-anywhere” required few caveats, like “well almost,” to make it true.

With these improved airlift capabilities on hand, transoceanic deployments of Army and USAF combat units became a frequent feature of the Vietnam War. Two such deployments bear particular note for modern airlift planners, since they illustrate the development in the capacity and sophistication of transoceanic airlift during the Vietnam War. The first was Operation Blue Light, which ran from 23 December 1965 through 23 January 1966. During Blue Light, a MATS force made up primarily of C-124s and some C-133s hopped along the islands of the central Pacific airlift route to move the 3rd Brigade of the 25th Infantry Division directly from Hawaii to a forward airfield at Pleiku, Vietnam—a distance of about 5,400 nm. This movement involved 2,952 troops and 4,749 tons of materiel. Not a year later, in November and December 1967, MATS moved twice as much nearly twice as far in Operation Eagle Thrust. In this operation, the command carried 10,024 troops and 5,357 tons of vehicles and helicopters of the 101st Airborne Division from Fort Campbell, Kentucky, to Saigon. This larger lift, which included the big jump from California to Hawaii, was made possible by the use of an all-turbine fleet of C-133s, C-141s, and CRAF charter jets. Actually, air deployments of USAF and Marine air combat units were far more frequent events than deployments of whole ground formations. The advantage of air forces, of course, is that their heavy equipment—their aircraft—deploy themselves. Their equally obvious mobility disadvantage is that they can go only to places equipped already with large and secure airfields.³⁰

The details of these unit moves provide valuable grist for planners considering the future of airlift in the Asia-Pacific. Most importantly, unit moves during Vietnam were administrative in nature. USAF and Army planners spread out Blue Light and Eagle Thrust over a month each to minimize their impacts on the overall flow of people and materiel into and back from the theater of operations. Airlift planners estimated at the time that a fully mobilized airlift effort could have accomplished Eagle Thrust in just three days, or perhaps twice

that long if the 101st had been required to bring along its supplies.³¹ However, making the move so quickly would have required theater commanders to shut off virtually all airlift support to other forces and missions. Fortunately and of necessity, then, these were movements of relatively “light” infantry and air assault brigades from between fully developed airfields. These airfields were under the protection of ground and air units already present, had facilities to refuel arriving aircraft, and were able to supply arriving troops. Therefore, one should understand these Army strategic air movements as experiments in the rapid reinforcement of a battle zone—not as air assaults designed to open a theater or take territory away from an enemy.

Modern airlift planners also should be aware of the significant institutional reforms that underpinned the increased capacity and flexibility of the USAF’s long-range airlift program during the Vietnam War. Until just a few years before the United States committed ground combat units to Vietnam in 1964, the major components of the national airlift system existed in largely separate worlds from one another. These airlift components included MATS, which was designated MAC in 1967; troop carrier units in the Tactical Air Command (TAC) and assigned to overseas air forces; the air reserve components (ARC) consisting of airlift units in the ANG and Air Force Reserve Command (AFRC); and the CRAF. MATS conducted long-range air transport operations as its primary mission. Combat unit moves, except of the Strategic Air Command, were not part of its repertoire. TAC and overseas troop carrier forces had the unit-move mission, but their force structure consisted largely of medium-range C-130s. The ANG was an air defense organization with few transports, while the AFRC operated a number of wings equipped with aging C-119s utilized mainly in the CONUS to support Army training. The CRAF, while established in 1952 as a wartime adjunct of MATS, was largely moribund. Organized around an all-or-nothing mobilization scheme and unremunerative rates for peacetime airlift contracts, it was unusable in situations short of general war and failed to attract major carriers to join anyway.³² Thus, until around 1960, the USAF possessed substantial airlift capacity, but it was distributed among components that were not organized or doctrinally committed to close operational integration.

Things began to change as the United States embraced the possibility of fighting limited wars overseas. The ANG began activating its first long-range transport wings in 1960 with hand-me-down MAC C-97s, which had been made redundant by the command’s acquisition of C-130s and C-135s.³³ The continued influx of turbine aircraft into MATS also released C-124s for assignment to AFRC wings, beginning in 1961. In an innovative move, the USAF converted several Reserve wings into Reserve Associate wings in 1968. Partnered with active duty wings, associate wings provided crews and support personnel to extract additional productivity from the available pools of C-141s and, later, C-5s.³⁴ The Reserve Associate program was an undiluted success. It not only produced the desired immediate results, but it also started a line of institutional reform that led to the Integrated Total Force units forming the backbone of strategic airlift today.³⁵

Fundamental statutory and procedural reforms from 1960 to 1963 also expanded the availability of the CRAF and its suitability for routine integration in long-range airlift operations. The most important of these reforms were establishing an incremental mobilization process, tying the privilege of bidding on peacetime contracts to CRAF membership, and increasing contract rates to levels profitable to the major commercial airlines.³⁶ As a consequence of these reforms, the CRAF entered Vietnam operations in 1965 as an organization consisting of 62 last-generation piston and 198 turbine aircraft provided by 20 carriers

and the best of the country's air cargo and charter operators.³⁷ By that time, for an annual administrative cost of \$250,000, the CRAF was providing a wartime reserve airlift capacity of about a million ton-miles per day, somewhere around a fifth of the total lift capacity available.³⁸

While all of these reforms were reshaping intertheater airlift, USAF theater airlift also underwent changes that set the stage for present and future operations. The USAF committed an unprecedented amount of theater airlift capacity to the conflict. Compared to the 140 or so transports allocated in support of Korean War operations, the theater Common Service Airlift System (CSAS) in Vietnam contained 28 flying squadrons and about 400 planes at the peak of US operations in 1968. During that year, the CSAS lifted an average of 83,500 tons of cargo and 375,000 passengers each month. Calculating eight passengers as a ton, this monthly average equated to about a 4,000-tons-per-day effort, compared to the 1,050-ton average daily load moved by air during the Korean War.³⁹ As in previous wars, virtually all of the theater airlift work in Southeast Asia was logistical—the routine movement of personnel, materiel, and supplies. Parachute assault operations all but disappeared from the theater task list in Vietnam. US theater airlift supported a few company- and battalion-sized parachute assaults by the Vietnamese army during the war. However, the only significant US airborne assault of the war was made by a parachute battalion during Operation Junction City on 22 February 1967.⁴⁰ Otherwise, US troops flew into combat in Army helicopters or, less commonly, on USAF transports landing at forward airstrips.

The decline of airborne missions in the USAF theater airlift repertoire was a direct outcome of the revolutionary growth of Army aviation forces in Vietnam. After a decade of intense technological development and operational experimentation, the US Army entered the Vietnam War with a large aviation arm focused on short-range air transport but also capable of secondary fire support, communications, and reconnaissance missions. In mid-1964, the Army was operating about 400 aircraft in the theater. Four years later, the aviation order of battle included the 1st Aviation Brigade, a headquarters unit that managed logistics and personnel in the theater: 641 fixed-wing aircraft and a helicopter strength that included 311 Boeing CH-47 Chinook medium transports, 2,202 Bell UH-1 Iroquois assault helicopters, 441 Bell AH-1 Cobra gunships, and 635 Hughes OH-6A Cayuse observation helicopters. Almost all of these aircraft were assigned directly to the ground units they supported.⁴¹ By that time, the aviation arm was capable of supporting airmobile operations by whole divisions.

Operation Pegasus was a prime example of the effects of these capabilities on Army operations. Organized to relieve the Marines defending their base at Khe Sanh against heavy North Vietnamese attacks, Pegasus began with the preliminary movement of the entire 1st Air Cavalry Division, mostly by theater airlift, from the Central Highlands of Vietnam to a newly established base complex on the country's northern border about 180 miles away. After weeks of preparation, Pegasus kicked off in early April 1968 as a series of battalion- and regimental-size helicopter assaults designed to leapfrog North Vietnamese forces and put them in danger of entrapment. Heavily supported by air and artillery strikes and operating in conjunction with a Marine ground advance and the "anvil" provided by Marines holding Khe Sanh, these assaults by the 1st Air Cavalry Division quickly unhinged enemy defenses through maneuver rather than heavy ground fighting.⁴² Pegasus and hundreds of other large and small air assaults during the Vietnam War thus confirmed the leverage provided by Army battlefield airlift.

The impacts of these institutional and capabilities improvements were soon evident in the interaction of the various components within the overall airlift effort. In the realm of

transoceanic operations, ARC long-range airlift units began flying small numbers of missions to Vietnam as soon as the US phase of the war began. By 1967–68, largely volunteer ANG and AFRC crews were flying 75–90 missions per month to Southeast Asia and many other missions to other parts of the world—8 percent of the USAF's total airlift effort.⁴³ CRAF member airlines meanwhile increased their military contract operations from \$192 million in fiscal year (FY) 1964, most of it to places other than Southeast Asia, to over \$500 million in FY 1966 (\$3.3 billion in inflation adjusted 2012 dollars), most of which was to the war zone.⁴⁴ Accordingly, from 1966 through 1970, contract carriers accounted for over 90 percent of the passengers and 25 percent of the bulk cargoes airlifted in support of the war.⁴⁵ The degree to which the strategic airlift providers integrated their operations could be seen daily on the parking ramps of major debarkation airports in Vietnam, where Boeing and Douglas jets in civil liveries could be found loading and unloading every day among MAC C-141s and ARC C-97s and C-124s. More to the point, during later unit moves, such as Eagle Thrust, the airlift stream was a mix of airliners carrying troops and military transports delivering their heavy equipment and vehicles.

Long-range airlift and troop carrier forces, redesignated as tactical airlift in 1967, also learned to integrate their operations. To free up jets for the Pacific routes, for example, TAC and ANG C-119s and C-130s flew as many as 3,800 hours per month to cover MATS missions within the United States.⁴⁶ To offset the commitment of most PACAF C-130 squadrons to Southeast Asia operations, MATS and then MAC C-141s picked up PACAF routes in the Pacific theater. The long-range airlift commands also carried some of the intratheater load in Southeast Asia by delivering their cargos directly to forward bases, rather than offloading them at main bases for forward movement by less efficient C-123s and 130s.⁴⁷ Later in the war, MAC allowed the 834th Airlift Division, which controlled airlift operations in Vietnam, to divert inbound C-141s to forward air bases to expedite deliveries of their cargos or even to use C-141s on intratheater sorties.⁴⁸

Theater airlift operators and Army aviators also learned to integrate their operations in ways that minimized the drawbacks and maximized the strengths of their particular aircraft. During the initial operations of the 1st Air Cavalry Division in 1965, for example, Army aviators planned to satisfy their airlift requirements with organic assets. However, the Army's C-7 Caribou and CH-47 Chinook transports, with their slow speeds and small payloads, quickly proved inadequate to support forward base camps once the 1st Cavalry began sustained combat operations in the Ia Drang Valley and elsewhere. Fuel and ammunition stocks quickly shrank to critical levels at forward operating locations. On the 1st Cavalry's request, USAF C-130s began lifting fuel, ammunition, and rations to forward landing zones. Their ability to carry 5,000 gallons of fuel or up to 18 tons of dry cargo dwarfed the three-ton capacities of the Chinooks and Caribous. The USAF effort soon reached 190 tons of supplies per day, in addition to the 120 tons the Army was moving by aircraft and trucks.⁴⁹ As the war progressed, this division of labor became standard. USAF theater airlift did the heavy lifting into existing airstrips or airfields built for the purpose prior to major campaigns. Army airlifters focused on moving people and supplies from forward bases and airfields into landing zones that often were under enemy fire.⁵⁰ It is worth noting here that theater airlift distances remained very short in comparison to transoceanic routes. Few theater airlift route segments were more than 100–150 miles long in Vietnam, although the country itself was almost 500 miles in length. Helicopter assault and combat supply missions rarely reached out more than 30–40 nm.

For planners and leaders concerned with the future of airlift in the Asia-Pacific, then, the Vietnam War experience carries several important implications. First, the war revealed for the first time the fully articulated airlift system of today. As a consequence of a decade of prior development and then the demands of the war itself, the USAF and the Army fielded a continuum of capabilities that stretched unbroken from “fort-to-foxhole.” That continuum, in turn, reflected and enabled a deep integration of air mobility into the war-fighting concepts and operations of the US military. Again, there was a long history behind this development, but Vietnam was the milestone at which military airlift became a signature characteristic and advantage of US military planning and operations. Last, particularly for Pacific planners, the war reaffirmed the differences between the character of transoceanic airlift operations and operations in a combat zone. The tyranny of distance continued to set the boundaries of the possible in transoceanic operations. Modern turbofan-powered aircraft had made the movement of fully equipped ground combat forces across the Pacific *possible* by the latter 1960s—but only on a limited scale and at great impact on overall military operations. Global airlift’s predominant roles remained as they always had been: moving individuals and high-priority cargos. In contrast, providing unit mobility over shorter theater distances became a more important mission than it had been in earlier conflicts, at least in its day-to-day utilization and proportionate consumption of theater and particularly battlefield airlift sorties.

Pax Americana

With great validity, the period between the close of World War II through the 1990s has been labeled as the *Pax Americana* in the Asia-Pacific. Apart from two regional conflicts (Korea and Vietnam), intentionally constrained conflicts between India and Pakistan, India and China, and China and Vietnam, and some localized insurgencies, the region has been at peace. American economic, political, and military power undergirded this prolonged peace. Throughout the pax, the United States has promoted peace, economic development, and stability in the hemisphere through diplomacy, opening its markets to a series of Asian economic “tigers” and maintaining unassailable military power in the region. Offered a golden door to economic development and political modernization, and with their militaries powerless to challenge the American presence in the region, most Asian states chose to exploit the pax and prosper. In its role as the “nonthreatening guarantor of regional order,” the United States, thereby, enjoyed exceptional success in pursuing its interests in the region.⁵¹ The Soviet Union, China, and North Korea were notably dissatisfied participants in the pax, of course. However, their general military weakness in the face of US capabilities held them in check and left the rest of Asia free to get richer.⁵² Even avowedly communist China and Vietnam eventually moved to exploit the pax in 1978 and 1986 respectively, following the usual path of exporting to the American consumer market and then moving into the rapidly expanding trade of Asia itself.

In general, the *Pax Americana* was characterized by a busy and steady operating environment for US global airlift. For the main, MATS and MAC expended their Pacific sorties on knitting together the US base structure scattered across the central, northern, and western Pacific regions. Typical military and civil contract missions carried servicemen and their dependents back and forth, hauled mail, carried sensitive and valuable supplies, and moved all the other things required by complex bases, their communities, and the units operating from them. Exercise support and other “engagement” activities consumed a large percentage

of the remaining sorties. Once turbofan-powered aircraft became available, starting in the latter 1960s, air mobility quickly became a signature element of most exercises. By the late 1970s, for example, the annual Team Spirit exercise involved the movement of thousands of US troops and significant quantities of their equipment from Pacific bases and the CONUS into Korea.⁵³ Team Spirit, which became Foal Eagle in 1997, was only the largest of dozens of unilateral and international exercises in which the United States participated every year. Its annual exercise partners included the Philippines, South Korea, Taiwan, Japan, Australia, Thailand, Singapore, and a list of other states that changed from year to year. Another consumer of airlift sorties during the pax was responses to humanitarian disasters, which come frequently in a heavily populated hemisphere characterized by typhoons, earthquakes, and volcanism.

If anything stands out about airlift operations during the pax, it would be that no one expected to operate transport aircraft in the Pacific under threat, except perhaps in the last miles into an aerial port of debarkation or on the ground. Air transports landing at South Korean airbases during a war with North Korea, for example, might face the unlikely danger of air interception and the more realistic possibility of suffering attacks on the ground by enemy special forces or artillery. However, for the main, US air superiority would reduce the threat of air attack to “unlikely,” and landing at bases beyond the range of cannons and short-range rockets would reduce the possibility of ground attack to a similar level. Airlift planners in the latter 1990s did perceive that the danger of some artillery and rocket attacks involving chemical or biological warheads was high enough to justify the establishment of decontamination facilities on remote Pacific islands. Nonetheless, other than in the immediate vicinity of a battle zone, airlift planners in MAC and, after 1992, the AMC were not obliged to worry about significant attacks on airlift assets. They were not complacent; they simply knew that, apart from a nuclear exchange with China or Russia, no likely Pacific opponent posed a realistic threat to the airlift system very far beyond their coastlines. Consequently, none of the airlift bases and facilities stretching along the north and central Pacific airlift routes was protected or bunkered against attacks from the air or ground. Their security did not go beyond fencing and roving patrols around base perimeters and guards at sensitive sites. Likewise, airlift war plans and studies presumed reliable access to combat zones and made no allowance for serious casualties. It was a good time to be an airlifter in the Pacific, but it would not last.

The National Air Mobility System of the United States

Before moving on to examine future requirements, capabilities, and shortfall mitigation strategies, it will be useful to blueprint the structural and operational characteristics of the national military airlift system. The NMAS is unique to the United States. No other nation possesses its complex and closely articulated capability to deploy and sustain conflict-winning combat power over global distances. Previous senior airlift commanders have tried to capture the importance of the NMAS with sobriquets like “The Backbone of Deterrence” and “A National Treasure.” However labeled, the NMAS represents an asymmetric advantage, and the US military counts on it in all regional war plans and actual operations. Consequently, any proposal to adjust airlift affairs in the Asia-Pacific or elsewhere must be made from a clear understanding of how the system works and its components interrelate. Any other approach would risk weakening the overall system in pursuit of limited advantages in specific areas.

Fully describing the theoretical and policy foundations of the US airlift system deserves more text than this short report can provide.⁵⁴ In broad terms, however, it consists of three components: active duty (AD) forces assigned to USTRANSCOM and overseas combatant commands; forces managed by the air reserve components, namely the Air National Guard and Air Force Reserve; and the commercial air carrier participants in the CRAF. The US Marine Corps also operates about 50 C-130 tanker-transports, and all of the services keep small transport fleets providing “administrative” lift of passengers and cargo between their bases. However, such “organic” airlift arms generally are reserved for the direct support of their owning services and only seldom enter into the equation of national airlift capabilities. Since the 1930s, an exceptionally complex and evolutionary civil and military policy process has structured these components into an articulated system in which each makes an optimal contribution to wartime mobilization and peacetime operational requirements.⁵⁵

Structuring the NMAS and its individual components, and then operating them effectively in peace and war, is a complex business. Its structure and component roles are laid out in statutes and a series of policy documents stretching back to the early 1960s. Broadly, the NMAS is structured to cover anticipated wartime requirements, when fully mobilized, and also to conduct peacetime operations to train and exercise the overall airlift system, support deployed forces, and handle contingencies and emergencies below the level of a major conflict. In the ideal, each component is structured to make an optimal contribution to the mobilized and peacetime missions of the NMAS in keeping with its particular operational and economic characteristics. Operational characteristics tend to drive the utilization of the components, while their relative costs of producing mobilization capacity and specific capabilities largely shape their actual structures. In practice, however, politics, the ebb and flow of military budgets, and high day-to-day operational tempos also affect the utilization and structure of the components and their relationships to one another. As a conceptual starting point, the chart qualitatively illustrates the roles of the components in filling the peacetime operational and mobilization requirements of the NMAS (fig. F-1).

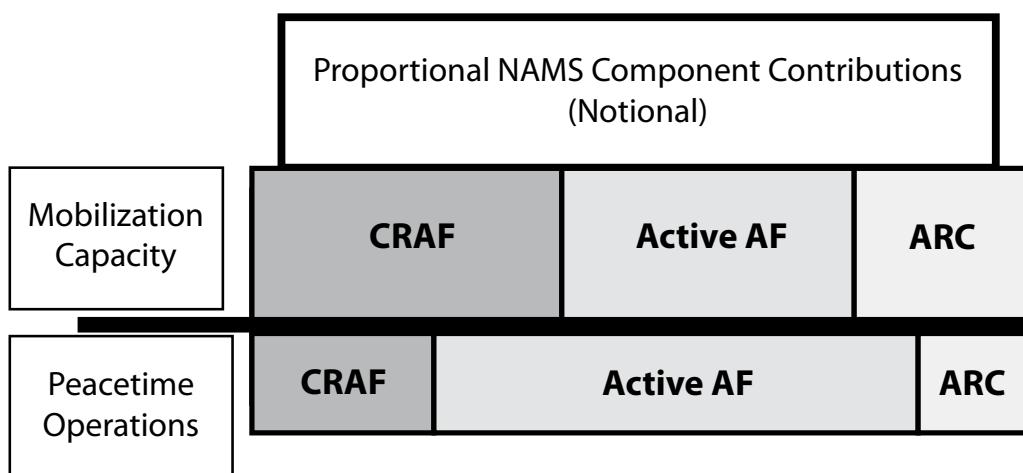


Figure F-1. Proportional NAMS component contributions (notional)

As indicated in this chart, the CRAF is the major contributor to the mobilization capacity of the NMAS, and DOD planners expect it to remain the “primary means of delivering passengers and bulk air cargo.”⁵⁶ Indeed, by 2005 the DOD recognized that the CRAF had grown to the point that it “greatly exceeded” wartime requirements to move passengers and bulk cargo.⁵⁷ Accordingly, the Department of Transportation, which administers the program, recently reduced the CRAF fleet from 1,025 aircraft in April 2012 to 555 in October of that year. Most of this drawdown consisted of aircraft in the international short-range and aeromedical segments of the fleet, which USTRANSCOM planners had identified as redundant to requirements.⁵⁸ Most of the remaining aircraft are wide-body designs that, if fully mobilized, represent about half of the CRAF-ARC-active mobility triad’s mobilized gross lift capacity.

The DOD’s sustained enthusiasm for the CRAF program is a consequence of both policy and economics. General government policy guidelines require all departments to “rely on the private sector for needed commercial services” to the extent possible.⁵⁹ In keeping with that general policy, DOD regulations require it to “rely on commercially available sources to provide commercial products and services except when required for national defense.”⁶⁰ To avoid unnecessary competition with private industry then, airlift planners and operators are obliged to rely on the CRAF to accomplish whatever missions it can and will undertake in peace and war, so long as that reliance will not undermine other military missions or needs. Economically, the CRAF represents the least costly way to maintain the reserve mobilization capacity of the NMAS. Member air carriers receive no direct compensation for their participation and are paid for their contract services only when they render them. Since those services otherwise would have to be provided by the military components, probably at greater expense, CRAF contracts generally represent economic credits to the cost of defense, rather than debits. Military airlift planners in the Asia-Pacific, in other words, should expect the CRAF to remain a mainstay of their plans and operations, because doing so is consistent with the law and because the country could not afford to provide equivalent lift capacity in any other way.

For all its mobilization value, there is reason to be concerned about the availability of the CRAF in future Asia-Pacific combat zones. As civilians, CRAF personnel cannot be ordered into hazardous environments. Under their contract agreements, member airlines must provide their CRAF-allocated aircraft when called, along with at least four crews with CRAF obligations in their personal contracts. Nonetheless, at the bottom line, the companies do not have to send their aircraft into danger, and their personnel do not have to go, unless they do so willingly. In the past, CRAF crews have flown in the face of episodic and localized danger during operations in Vietnam and the Persian Gulf War. However, in a major conflict in the Asia-Pacific, where enemies may have the ability to launch powerful, persistent, and precise attacks against airlift destinations, there is no convincing reason to expect that the CRAF will go forward.

This is not to say that the CRAF will not be useful in future Asia-Pacific conflicts—quite the opposite. While the CRAF likely will not go into threatened areas, it will be available to go to bases near those zones, where their cargos can be transferred to military transports. Just as importantly, the CRAF can be expected to increase the availability of military transports in the USPACOM area of operations by picking up missions in other theaters and the CONUS that otherwise would be carried by military transports.

Beyond the war-fighting limitations of the CRAF, some peacetime users of its contract services voice concerns about its costs. Users of DOD military and CRAF airlift services pay for them through a revolving business fund managed by USTRANSCOM known as the Transportation Working Capital Fund (TWCF). Like other DOD working capital funds, the purpose of the TWCF is to “instill in officials . . . a greater sense of responsibility and self-restraint in balancing the cost of specific goods and services to be ordered against . . . competing demands.”⁶¹ It does so by requiring users to budget and pay for services directly, rather than drawing from a less accountable appropriation of general funds provided directly to USTRANSCOM. Under TWCF guidelines, rates for airlift services are at times painful for users, since they reflect commercially competitive prices by CRAF-quality air carriers rather than cheaper charter operators (table F-1). They also pass on a wide range of predictable and unpredictable cost factors to users, including aircraft flight hours, laundry services for onboard comfort items, snacks, and personnel billeting and feeding costs during unexpected delays.⁶²

Table F-1. Hourly TWCF charter rates for government users in FY 2012

Fiscal Year 2012	
C-5	\$29,099
C-17	\$13,280
C-130	\$7,512

Reprinted from US Transportation Command, “Charters-Special Assignment Airlift Missions [SAAMS], Joint Chiefs of Staff Exercises [JCSE], and Contingencies for the Transportation Working Capital Fund [TWC], and Non-TWCF Aircraft,” 2012, 9, http://www.transcom.mil/rates/fy12Rates/SAAMs,_JCS_Exercises,_and,_Contingencies,_Rate,_Guidance.pdf.

Particularly galling for some users is having to pay for the flight hours expended to “position” TWCF aircraft to initial onload locations and then to “deposition” them to their home bases after completing their missions.⁶³ US Army Pacific planners, for example, point out that positioning CRAF aircraft to Hickam AFB on Oahu to move 25th Infantry Division soldiers about 160 nm to the Pohakuloa training range on the island of Hawaii cost \$650,000, well more than the exercise itself. With its 2013 exercise budget being cut 40 percent from 2012 levels, such transportation costs will force US Army, Pacific Command (USARPAC) to eliminate or reduce the size of many exercises.⁶⁴

After the CRAF, the ARC are the most cost-effective source of mobilization capacity in the fleet, though presently only by a margin less than active forces. In their traditional roles, the ANG and AFRC exist as a mobilization base to provide combat-ready forces or service-ready individuals in times of conflict or emergencies. In theory, then, they should be structured to cover mobilization emergency requirements that active forces and the CRAF cannot handle. To maintain readiness, ARC forces and personnel are statutorily required to train for only four four-hour drill periods per month and a 14-day period each year, or about 38 days annually. If ARC units actually operated at such a low tempo, they would provide mobilization capacity at a fraction of the cost of their AD equivalents.

However, as anyone familiar with the demands of maintaining readiness in flying organizations and with the continuously high operating tempo of airlift forces over the past two decades would know, ARC units and personnel serve many more days than required by the statutory minimum. ARC units and personnel often volunteer or are mobilized for additional

missions. Indeed, the USAF has established their mobilized and not-mobilized “dwell” ratios at 1:5 to 1:4, meaning that ARC members spend 16–20 percent of their time mobilized and overseas.⁶⁵ ARC volunteerism and these high dwell ratios have been indispensable elements of America’s ability to maintain its overseas commitments in an era of shrinking AD forces. Nonetheless, they also equate to ARC units that are nearly as expensive as their active equivalents in terms of the mobilization capacity they provide per dollar spent.

It follows from this discussion that the AMC exists to cover the mobilization requirements that the other two components cannot. While that would have been an obvious supposition in the late 1950s, when the USAF first began to articulate a national airlift system, it is less so today. Early national airlift policies justified the AD component’s force structure by giving it responsibility for accomplishing “hard core” requirements: that is, those that had to be done before the other components could mobilize or which could not be done with the types of aircraft they possessed.⁶⁶ The hard-core standard worked then, because it was large enough to justify a force structure that also allowed the MATS and the MAC to satisfy the demands placed on them for airlift in peacetime. However, as America’s engagement in overseas conflicts and deployments increased over subsequent decades, the scale of day-to-day operations began to approach or even outstrip identifiable hard-core requirements in scale, if not in importance. This obscuration of the hard core reached an extreme in the years since the Persian Gulf War (1990–91), when AMC and the whole airlift system have operated at a near-war level of effort almost continuously. Importantly, in the face of emergency after emergency, AMC refined its organization, command and control structure, and support structures in ways that greatly shortened the times required to access or even mobilize ARC and CRAF assets. An infrequently understood consequence of these reduced mobilization times was a practical reduction of hard-core requirements. If the other components can come on line more quickly, the active force has less of a hard core to handle.

As it does in the realm of force structuring, the operational logic of the NMAS has both theoretical and practical aspects. Theoretically, the purposes of NMAS operations are to keep the military components ready for mobilization and to incentivize commercial airlines to join and stay in the CRAF. Under the foundational provisions of the NMAS, reserve and active military airlift units were to be operated in peacetime only to the extent needed to keep them and their support forces exercised and ready for rapid mobilization. Military planners at the time estimated that the right operating pace to do these things was about one-half of the anticipated wartime rate, or about two to four hours per aircraft per day on average in peacetime. They also expected that this restrained military utilization rate would increase the amount of routine contract airlift available to reward airlines for joining the CRAF. As a second benefit, flying military transports less would extend their useful lives and reduce the costs of acquiring and replacing them. However, again, the pragmatic efforts of airlift managers to meet the high demands of the post-Persian Gulf War era have obscured the theoretical model, which focuses on maximizing mobilization capacity rather than on “answering the mail” day to day. Still, the imperatives of the theoretical model for managing NMAS operation remain operative and in the background of AMC’s current efforts to reduce its daily operations to minimize wear and tear on the military fleet and to free up money for CRAF contracts.⁶⁷

In summary, then, the DOD structures and operates the NMAS in accordance with time-honored theoretical and practical schema. In theory, the CRAF is the structural heart of the

NMAS; the DOD is obliged by law and practicality to utilize the CRAF as much as practical to do whatever its member airlines will and can do in peace and war. Military airlift forces are built to do what is left. The AD component should be structured to cover the hard core, while the ARC picks up whatever else the CRAF cannot be expected to do. Still, in accordance with theory, the military components should then be operated in peacetime only around the levels required to maintain their readiness for mobilization. CRAF carriers then get paid well to fly the remaining peacetime load, as a reward for offering up their planes and people for mobilization in crisis and war. At a practical level, the near-war airlift operating tempos since the Persian Gulf War have clouded the theoretical norm for the structure and operations of the NMAS. To meet the demand, the USAF has used all of the components, particularly the AD and ARC, heavily and has done much to integrate them in day-to-day operations.

It remains important, though, to remember that expediency is only the cost of meeting pressing challenges, while theory, if it is correct, must still guide plans for the future. In fact, an examination of major airlift planning documents would reveal that they have always reflected enduring theoretical propositions for the organization and utilization of airlift forces, even if they did not marshal formal theory or ancient terms, like hard core, to explain their logic. Asia-Pacific airlift planners, consequently, should keep the implications of and distinctions between theory and expediency in mind as they ponder their responses to future requirements and capability shortfalls.

Likely Requirements in 2020

A number of factors will determine future airlift requirements in the Asia-Pacific. Important among them will be the military power and strategic intentions of China, by far the most dangerous potential opponent to the United States in the region. Neither China nor the United States are seeking war. Nevertheless, there is always a danger that strategic misunderstandings or miscalculations could precipitate a war. US war-fighting concepts against China or lesser regional threats also will set the boundaries of airlift requirements. Air- and naval-centric operational concepts will reduce the demand on airlift, while land-centric plans will increase it. Obviously important too will be the nature and scale of the conflicts the United States fights. A direct fight with China, while almost unthinkable, could easily grow into a massive conflict manifesting large and exceedingly dangerous military challenges. Lesser regional conflicts are more likely and may seem less dangerous at their beginnings, but they may expand and draw in more dangerous opponents. So this discussion of likely airlift requirements will begin with a general look at the Chinese threat to set a context for understanding subsequent discussions of airlift futures. This section will then discuss US war-fighting concepts and finish by qualitatively examining airlift requirements in different conflict and nonconflict scenarios.

Pacis Aemulus

The stability of the *Pax Americana* was always the product of a three-sided balance of power. It only worked because the United States wanted and enforced it, most Asia-Pacific states accepted and exploited it, and dissatisfied states remained too isolated diplomatically and weak militarily to do anything about it. Thus, China's rise as an economic powerhouse

and regional military power constitutes a direct and intentional threat to the pax. China never accepted the pax, seeing it as an unwarranted intrusion into regional affairs and an implied threat to its own sovereign rights, particularly to reunite with Taiwan.⁶⁸ China also had a nationalist zeal and a domestic political need to assert its power and interests in a host of regional economic and territorial disputes. This combination of power and assertiveness began to peel away the obscuring layers of US military dominance in the 1990s and reveal what the pax had always been: a *Pacis Aemulus*, or competitive peace dominated for decades by one side of the competition.⁶⁹

China's economic rise began under the leadership of Deng Xiaoping, who launched the country on its export-orientated economic race in 1978.⁷⁰ By the late 1980s, China had become a magnet for foreign investment and had begun to sell its consumer products globally. A decade later, China's products were flooding the world and Chinese students, trade groups, spies, and computer hackers were vacuuming up global technological knowledge by the terabyte. China's trade with most Asian states exceeded that of the United States. Many Asian economies were buoyed by producing parts and components for Chinese companies that turned them into finished products for export. In 2010 China passed Japan to become the world's second-largest economy, completing a meteoric rise from a diplomatically isolated, economic basket case to a global power.

Economic power bought military power. Initially, China's military budget grew more slowly than its economic indices but accelerated in the latter 1990s. Between 2000 and 2011, China's military budget grew by 400 percent and the country was "pursuing comprehensive transformation from a mass army . . . to one capable of fighting and winning short-duration, high-intensity conflicts against high-tech adversaries."⁷¹ This military modernization program included acquisition of high-technology weaponry; mobile forces; several types of modern fighter aircraft; medium- and long-range missiles; multimission submarines and frigates; and an overlapping and connected array of land-, air-, and space-based information, surveillance, and reconnaissance systems.⁷² China also became an aggressive and comprehensive practitioner of peacetime cyber espionage and warfare. By 2012 the DOD advised Congress that "China's military modernization . . . would enable China's armed forces to conduct a wide range of missions, including those farther from China."⁷³ China has not yet become a peer competitor with the United States, but it is closing the gap, at least at its Pacific front door.

As its power grew, China became more assertive regarding its national security objectives and long-standing territorial disputes. Always obsessed with its goal of bringing Taiwan back into the national polity, China sought to intimidate the island's government in 1995, firing missiles into the nearby sea. To its chagrin, China then found that it had no counter to the American show of support for Taiwan, when the United States sent two carrier battle groups into the area. It was this event that most analysts believe sparked the acceleration of China's defense spending in the following years. Meanwhile, China began to systematically confront most of its maritime neighbors over conflicting claims to most of the South China Sea and its atolls and fisheries and clashed with Japan over the Senkaku Islands.⁷⁴ China also became clearer in expressing its long-term objective of gaining the ability to win "local wars" and, thereby, end America's unfettered military and political access to the Asia-Pacific and its ability to interfere with China's sovereign affairs.

At least in its potentials, China's economic and military rise posed a threat to regional peace and even US national security. China's use of the term "local war" is not constrained

by specific geographic boundaries. In broad terms, China sees local wars as wars fought to defend its sovereign rights and territorial integrity. However, actual military operations in such conflicts could extend anywhere needed to win them. Those operations certainly would include domination of the region inside the so-called First Island Chain, a line extending from Japan through Taiwan and the Philippines to Malaysia, inside of which are located China's disputed territorial claims (fig. F-2). They also would include the ability to conduct decisive operations out to the Second Island Chain, which runs along the Nampo Shoto, Mariana, and Western Caroline island chains to Borneo, including existing and potential US military bases. A regional conflict with the United States also could and likely would include Chinese operations clear into the American homeland, probably involving cyber and information operations and, possibly, operations by covert operatives. China's development of such comprehensive military capabilities, the continuation of which appears inevitable, clearly shakes the foundations of the *Pax Americana* and complicates the security calculations of every Asia-Pacific nation.⁷⁵

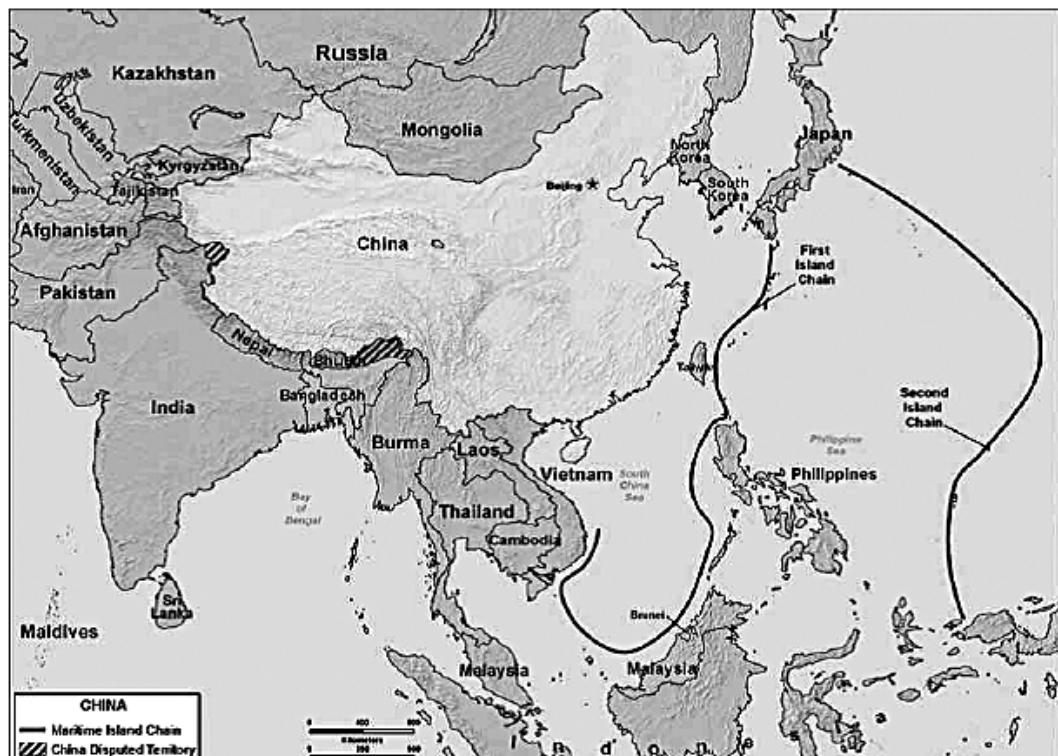


Figure F-2. Depiction of First and Second Island Chains. (US Department of Defense, Annual Report to Congress: Military Power of the People's Republic of China 2007 (Washington, DC: DOD, May 2007), fig. 1, 16.

Antiaccess/Area-Denial

The rise of China's antiaccess/area-denial (A2/AD) capabilities, or what China refers to as "anti-intervention capabilities," has spawned a cottage industry of books and reports that needs little expansion here. Nonetheless, China's growing A2/AD capabilities are what

make life uncertain for US airlift operators in the Asia-Pacific, now and in the future. Lesser states in the hemisphere also possess or will acquire limited A2/AD capabilities. However, China's military will dwarf their orders of battle and, consequently, will remain the standard against which US military capabilities in general and those of airlift in particular must be measured. Moreover, that standard will be daunting. China clearly and overtly identifies mobility forces as primary target sets in many conflict situations.⁷⁶ By 2020 Chinese A2/AD capabilities will make sustained airlift operations within the Second Island Chain dangerous and perhaps impossible at times. This will be the case because China's A2/AD posture will be robust, deep, and layered and will render airlift forces vulnerable from their operating bases in the American homeland to their points of landing at forward bases.⁷⁷

By 2020 airlift forces operating at all western Pacific US bases in a major regional conflict will be subject to robust and persistent attack. By that time, China's current force of 1,500–1,700 short-range ballistic and cruise missiles may have doubled in numbers and gained precision accuracy. These missiles will comprise the core of the threat to airlift aircraft on the ground at US and allied bases, but they also will be backed by hundreds of modern, air-refuelable, and probably stealthy strike aircraft carrying standoff precision weapons. US airlift aircraft and support elements on the ground also will face nonlethal threats from a wide range of kinetic, chemical, and biological weapons capable of incapacitating personnel or damaging materiel. These generally gaseous or liquid aerosol-based weapons are particularly suitable for delivery by special operations forces, remotely piloted aircraft, or even just a "commercial" truck parked along the upwind fence line of a base. In the midst of all these physical attacks, Chinese cyber-warfare specialists would be working hard in almost any conflict situation to take down everything from local military communications, local phone networks, and power generation capabilities at every base—all of which would work to degrade the efficiency of the airlift flow.

En route transport aircraft could face equally lethal threats as they approach second- and certainly first-ring bases. Air-refuelable fighters and air-to-air missile armed bombers could attack transports well beyond their arrival bases. Chinese warships also could slip under the airlift stream to pick off some aircraft, both to degrade US deployment operations and, perhaps, to draw US combat ships and fighters away from other operations and/or into the threat areas of Chinese aircraft, missiles, and submarines. A host of Chinese capabilities could cue these attacks. Sympathetic "stay-behinds" in Hawaii, for instance, could observe aircraft departures, access their flight plans, and then pass the data in near real time via commercial phone lines to the Chinese military. Chinese "fishing boats" on surveillance missions and scattered along likely trans-Pacific routes could listen in on aircraft communications and time their passing to provide accurate predictions of their intended destinations and arrival times.

Airlift personnel and aircraft probably will not be subject to large-scale attacks before they take off on Asia-Pacific missions, but they will be vulnerable to a host of nonlethal and even terrorist actions. A few examples from a long list of possibilities will suffice to make the point. At almost any level of conflict with China or even a secondary state, airlift personnel must expect cyber attacks against command and control systems at AMC headquarters and at individual bases. Airlift aircraft, personnel, and support assets will be subject to the same array of sticky agents, foaming mists, material degradation, and other nonlethal threats as will be those at forward bases. Chinese agents launching an attack by a swarm of small autonomously controlled aerial vehicles armed with nonlethal agents or even grenade-

sized warheads could disable a base full of aircraft in a matter of minutes.⁷⁸ Similar attacks against CRAF aircraft making ready at civil bases for an Asia-Pacific conflict could have a devastating effect on the willingness of companies and individuals to participate in further operations. Threatening messages sent to the families of military and CRAF personnel via automatic phone dialing, e-mails, Facebook, and other spam systems also could degrade morale and operational efficiency. In a particularly desperate conflict, covert agents could kill a handful of military and civilian pilots or their families to undermine morale and sow terror and confusion into the mobilization of airlift assets. The list of threats against the airlift flow before it even begins could go on for pages.

The US strategic response to the rise of China and the antiaccess threat ensures the continued importance of global and theater airlift in the Asia-Pacific. Most importantly, US leaders have reaffirmed many times that the United States intends to maintain its presence and access to the hemisphere. They demonstrated their resolve by continuing the permanent deployment of over 100,000 military personnel in the region and by strengthening USPACOM to deal with the increasing A2/AD threat. Since the mid-2000s, these strengthening actions have included repositioning of US forces, mainly to reduce political friction with host nations; modernizing and expanding by one the carrier battle groups assigned to the Pacific; increasing the number of submarines available; and expanding and modernization USPACOM's air mobility forces and related infrastructure.⁷⁹ In December 2011 Pres. Barack Obama announced that the United States would "rebalance" US military focus and some force deployments to increase emphasis on the Asia-Pacific—an action subsequently reflected in DOD strategic guidance.⁸⁰

The reemphasis on Asia-Pacific security has fostered new operational concepts and considerable debate over how to deal with expanding A2/AD threats. AirSea Battle (ASB) has been the most prominent and the most controversial among them. In mid-2009, the DOD activated the USAF-Navy Air-Sea Battle Concept Development Group to explore ways to use integrated air and naval forces synergistically to defeat severe A2/AD threats.⁸¹ Not surprisingly, counterpoint arguments have come from many directions. Andrew F. Krepinevich, Jr., an influential expert on land-war issues, spoke early in support of the strategy shift and ASB, saying that, in the Asia-Pacific, "invasion is not a business we can afford to be in."⁸² He was countered almost immediately by another experienced Army strategic thinker, who suggested that the whole shift in emphasis to the Asia-Pacific was unwise.⁸³ Apparently seeing ASB as a strategic rather than operational concept, another Army writer hastened to assure his readers that "land power . . . will inevitably play a critical role in any enduring security solution."⁸⁴ At least one naval-minded strategist proposed economic blockade by submarines in lieu of the more direct offensive operations he saw as the essence of ASB.⁸⁵ And so the debate has continued, with the examples here comprising only a tiny fragment of the serious and silly verbiage it has generated.

In an important effort to embrace the complexity of the A2/AD threat and the range of alternative operational responses to it, the DOD recently issued a *Joint Operational Access Concept (JOAC)*. This document places coequal and integrated emphasis on "overcoming the enemy's anti-access and area-denial capabilities . . . [and] moving and supporting the necessary combat power over the required distances."⁸⁶ The document goes on to assess and make general recommendations regarding the achievement of operational access in situations where enemies field strong A2/AD threats. A useful summary of the JOAC document is that (1) A2/AD threats will be common in the future, (2) the US must defeat them, and

(3) defeating them will be a prerequisite for conducting mobility operations to bring forward reinforcements and support ongoing operations logistically.⁸⁷

General Implications for Airlift Planning

For airlift planners and future operators, the Asia-Pacific strategy shift and its related operational-level debate and documents carry several general implications. In the near term, the daily demand for airlift support will continue, as substantial US forces stay forward and USPACOM continues its engagement activities throughout the hemisphere. In the longer term, the scale of contingency airlift requirements will wax or wane, depending on the nature of individual emergencies and which of the competing operational concepts USPACOM planners integrate into their war plans and actual operations. An ASB-based operation, for example, might focus on the trans-Pacific deployment of air units, which are “light” in relation to ground combat forces, and the theater-level redistribution of air and naval munitions. An operation requiring the early closure of land combat forces at forward locations, in contrast, would place much heavier demands on global and theater airlift.⁸⁸ Perhaps even more importantly, the nature of a particular contingency will shape airlift demands qualitatively and quantitatively. A direct, short-notice confrontation with China, for example, might of necessity emphasize ASB-type operations. In contrast, an escalating regional conflict involving possible Chinese intervention might begin with the air movement of land as well as air forces. Consequently, this section will examine general conflict scenarios to identify and differentiate their likely movement requirements and airlift operating environments.

War with China

The strategic risks and material costs of a US-China conflict are almost too daunting to imagine or even take seriously. Current national strategy guidance, in fact, expresses the need to rebalance US military attention toward the Pacific to counter China’s strategic intentions and growing A2/AD capabilities, and then hastens to reassure that China and the United States share an interest in preserving hemispheric peace and stability. Beyond that, in public forums at least, US officials carefully avoid Cold War-like rhetoric about military balances and actually fighting with China.⁸⁹ China’s concept of making a “peaceful rise” as a global economic and military power, likewise, steps around the probability that its conflicting strategic interests with the United States and the dynamics of a regional power shift probably make some level of military confrontation inevitable. If that were not the case, it would be hard to explain the growing preparations of both sides to build or maintain their capabilities to prevail in a Pacific conflict. So, for airlift planners, the possibility of a large-scale, US-China conflict almost anywhere along the Pacific Rim must be taken as the baseline for assessing future requirements. All other potentialities generally will be lesser-included cases.

Taking Chinese military documents at face value, a conflict involving the United States will have several characteristics of importance to airlift planners. Most importantly, its onset will be as sudden and unanticipated by the United States as Chinese leaders can make it. Deception and surprise are key elements in Chinese military doctrine, and Chinese leaders are acutely aware of the hazards of giving the United States warning of an impending strike and time to build up forces and logistics in the combat area.⁹⁰ Next in importance, if the

Chinese decide to attack US military forces, they most likely will strike to paralyze them rather than to defeat or annihilate them. Inflicting heavy casualties on US military personnel would carry a danger of escalation that China would want to avoid, except perhaps where it felt its national survival was at stake. More likely, China's initial strikes on US forces would focus on command and control, logistical, and base facilities. The purpose of these strikes would be to block effective counterstrikes by US forces, at least until Chinese forces had achieved their objectives. Most analysts doubt that China would want to escalate beyond those target sets, since a prolonged war would expose it to severe military risks and economic catastrophe if its trade routes across the Pacific and Indian oceans were cut (and they likely would be). The extreme danger of a preemptive attack for the Chinese, of course, will be that old adage about no plans surviving first contact with the enemy.

The immediate implication of a conflict with China for airlift planners looking at 2020 and beyond is that it will place profound demand on the fleet. US war plans for dealing with major crises centered on Korea, Taiwan, the South China Sea, and perhaps elsewhere are classified and beyond the scope of this report to discuss. However, it takes little imagination for anyone familiar with the history and nature of airlift operations to anticipate that calls for air transportation will shoot right past planning levels in the first hours of an emergency. Organizations and institutions—the president, the Congress, allied countries, nongovernment relief organizations, and so on—will come forward with unanticipated and undeniable needs and priorities for movements. Regardless of where fighting actually occurs, US citizens will emerge all over the hemisphere demanding evacuation back to the States. There also will be the possibility, perhaps the probability, of another conflict breaking out elsewhere in the world. Indeed, Chinese strategists and political leaders preparing for a precipitous action against the United States would be negligent if they did not seek to coordinate mutually beneficial actions by other states chafing under US restraint. The National Command Authorities and USTRANSCOM would respond to this tidal wave of demands by setting priorities and accelerating the pace of airlift operations to the extent possible. Nonetheless, whatever they do, Asia-Pacific commanders unquestionably will find themselves with less airlift capacity and a wider range of movement needs than their standing plans anticipate.

Helpfully, for the United States, the emphasis of airlift movements in a sudden-onset conflict in the western Pacific will be on forces and supplies needed to survive and recover from enemy offensive operations and then launch air and sea counterattacks quickly. Initial airlift movements will include the USTRANSCOM/AMC expeditionary units needed to expand the airlift flow into the Pacific and to open or keep open bases in the battle zone. Typically, AMC accomplishes these movements within the first 48 hours of a crisis, but little else can go forward until they are complete. Next in line will be an intermixed flow of combat squadrons and support elements and units to expand the *sustainable* US air order of battle as quickly as possible. Then, even as the movement of forces continues, more and more of the airlift stream will be consumed with bringing forward critical sustainment supplies, particularly high-value, scarce-supply air and naval munitions. If the conflict expands or persists, the flow of combat units and scarce munitions literally will come from US bases all over the planet—at great cost in airlift and increased risk to the missions of other combatant commands.

The issue of sustainability comprises much of the art of a large-scale deployment. Crises of any type create great pressure to move combat units as quickly as possible toward the

sound of the guns. Nevertheless, moving combat squadrons forward so fast that they fall in on bases without the resources to recover from battle damage, house and protect arriving personnel, or service and arm additional aircraft is to make those units ineffective and vulnerable to piecemeal destruction on the ground. Simultaneously, sending more support forward than immediately required will rob air commanders of vital fighting assets and jeopardize their campaigns. So airlift aircraft carrying the ground echelons of deploying combat squadrons must be interspersed with transports bringing forward the other impedimenta of air war—vehicles and other equipment and personnel skilled in command and control, intelligence, base protection, supply, personnel services, transportation, and a host of other skills. Choreographing such a movement is how airlift practitioners maximize the flow of combat power into a fight and earn their pay.

For several reasons, the only land forces likely to go forward in the initial airlift effort in a conflict with China will be those needed to support the battles for control of the air and sea domains. Most importantly, joint commanders should reject any force movements that would weaken their conduct of those all-important operations. If the air and sea are lost, there will be no possibility or need to bring substantial ground forces forward, the equipment of which will have to come by sea. Short of an escalation to nuclear conflict, the loss of the air and sea would be tantamount to losing the war, and under those circumstances, bringing combat brigades forward would only clutter up surrender negotiations. The second reason combat brigades will arrive later is that any anticipated employment of them will have to await the creation of permissive air and sea situations. Doing that likely will take enough time to allow brigades elsewhere in the theater and the homeland to load their equipment onto ships and then airlift most of their personnel to meet those ships when they arrive in the operational area(s) beginning not earlier than about three weeks after the start of hostilities.⁹¹ Last, combat brigades are heavy in terms of the capacity of air transports to carry them. As table F-2 indicates, they consume thousands of “plane-days” to move, days that Joint commanders trying to blunt and counterattack a Chinese offensive almost certainly will want to spend on moving more immediately relevant combat power forward.

Table F-2. Movement requirements for Army combat units

Unit	Personnel	STONS	Cargo C-17	Pax C-17	Total Sorties	Plane Days
Airborne Brigade	3,513	9,905.2	314	50	364	1,092
Stryker Brigade	4,203	15,111.1	340	36	376	1,128
Stryker Battalion	688	1,969.6	35	5	40	120
Patriot Battalion	575	3,790.2	69	0	69	207

Movement information extracted from a Microsoft Excel spreadsheet, “C-17 Sortie Requirements,” provided by Mr. Christian Bleber, Deployment Process Modernization Office (Ft. Eustis, VA: US Army Training and Doctrine Command, 27 February 2013).

In gross terms, this chart illustrates the long-honored airlift mantra that “the Army has no light combat units, only heavy and incredibly heavy ones.” To make the point, the table equates the cargo weight and personnel count of different combat brigades to the Boeing C-17 Globemaster III loads and “plane days” needed to carry them. A reasonable round-trip time for a C-17 delivering troops from the center of the United States to the western

Pacific is around three days. In theory, for example, a 440-knot-cruise-speed Globemaster III could cover the 16,000 nm round trip from Fort Campbell, Kentucky, to the Philippines in just 37 hours. However, 72 hours would be a more realistic and historically predictable reflection of the delays that would be imposed on the aircraft by such things as loading and unloading operations, en route stops for servicing and crew changes, weather, maintenance, delayed cargos, and other factors. So the three-day roundtrip time is realistic and indicates that every C-17 *load* required in a movement will equate to an investment of three aircraft *days* to deliver it. If so, then moving a Stryker brigade across the Pacific would involve something like 1,128 plane-days in a C-17-only move. If the secretary of defense assigned CINCPAC control of 50 percent of the total of 223 C-17s expected to be in the fleet in 2020, then moving a single Stryker brigade would consume almost 10 days' worth of their total capacity, or 20 days, if the CINC allocated a more realistic 50 percent of the USPACOM-assigned C-17s to make the move.⁹²

By way of comparison, moving the ground echelons of two, 18-aircraft, squadrons of McDonnell Douglas F-15 Eagle tactical fighters would consume about 16 C-17 loads. Moving the 425 personnel and 900 tons of equipment needed to support those squadrons at a bare base would require about 24 additional C-17 loads. Of course sustainment sorties would be needed thereafter to make up for whatever the bare base did not have. Munitions and maintenance supplies almost certainly would be part of the sustainment lift. The sustainment effort could become quite large if it also had to transport fuel.⁹³

Regardless of the challenge, airlift planners nevertheless should anticipate that a major Asia-Pacific conflict in 2020 or after will involve some land force movements, depending on the phase of the US campaign and its progress. Early in a conflict, these movements generally will be of air defense, intelligence, logistical, engineer, medical, staff, and other support organizations as needed to sustain and protect air and sea bases. Joint commanders also might call for airborne or ranger capabilities to take control of forward bases and/or constrain the operational options of opposing forces. As a major campaign progresses, airlift planners may find themselves expending a lot of sorties to bring in the personnel of Army combat units to marry up with their equipment arriving at forward ports by sea or perhaps positioned already on land. Last, as the Army evolves its A2/AD capabilities over the next decade or so, it may offer up specialized aviation or long-range surveillance and fire units that will be useful to joint commanders relatively early in a campaign.

However, planners and commanders should be aware that bringing in ground units will place a very heavy burden on the airlift stream, perhaps heavier than most users of airlift support fully understand. Movement of a “light” parachute brigade provides a case in point. As indicated in the chart in table F-2, moving the six battalions, 3,500 paratroopers, hundreds of wheeled vehicles, artillery, and helicopters of the brigade alone would consume almost 1,100 C-17 plane days, only slightly less than the number required to move a “medium” Stryker brigade. Nonetheless, an airborne unit taking and holding an airbase under threat would not go alone. Depending on circumstances, its “support slice” would include heavy air defense, logistics, military police, and services units and perhaps even tank and armored combat vehicle detachments to give the brigade defensive staying power and offensive punch.⁹⁴ The airlift sortie demands of these additional elements and their daily sustainment requirements would dwarf those of the core brigade itself. Inescapably, then, Pacific commanders and airlift planners thinking about 2020 and beyond must realize that while

transoceanic air movements of all-up ground combat formations will be possible, they will be doable only at the expense of disrupting the operations of virtually all other airlift users.

It is important at this point to consider again the threat environment under which these airlift movements will be performed. As discussed already, a war with China almost certainly would involve or at least threaten attacks on the entire airlift system through its full depth, from fort to foxhole. The potential for cyber and nonlethal chemical attacks against the command and control system and other things that support airlift operations—like the power grid, the Internet, and fuel distribution—seem too obvious to require much elaboration in this general report. Nevertheless, if the stakes of a conflict were high enough at the start or escalated later, the Chinese certainly could be expected to launch lethal attacks against US material assets and perhaps personnel. Terrorist attacks on airlift personnel, their families, aircraft, and facilities also would be a possibility. The possibility of terrorist attacks in the American homeland may seem fantastic, until one considers that nearly 1.5 million people, mostly working-age adults, have immigrated to the United States from mainland China and Hong Kong since 1980.⁹⁵ To believe there are no individuals in that group who are sympathetic to or actively connected to the Chinese military would seem naïve. Such individuals, even in small numbers could take actions that would be relatively low risk to themselves but disproportionately disruptive to the flow of air transports into the Pacific. Whatever the actual case, the possibility is worth considering in terms of its implications for the operations and protection of airlift forces.

In a fight with China or any other country possessing long-range weapons or special operations forces, airlift aircraft will be most vulnerable while on the ground at forward airfields. Their vulnerability will spring mainly from their large size and predictable operating patterns. Airlift aircraft are large; they cannot be put in hardened shelters or taxied and parked randomly. Moreover, enemies can see such aircraft from space, by reconnaissance drones, and by clandestine operations. Commercial-grade satellite imagery can reveal their taxi routes, likely parking areas, and locations of their support units. Military-grade satellites will be able to observe and target airlift aircraft in real or near-real time. Even if the Chinese do not have real-time visibility on US bases, they could strike with missiles carrying individually targeted submunitions that could hit known transport parking areas randomly or detect and strike aircraft directly. Depending on the state of the conflict, the Chinese would have a choice of using lethal or nonlethal munitions in these strikes. Transports will be particularly vulnerable to such attacks, since they usually will sit in place during loading and unloading operations for time windows longer than the observe-decide-strike cycles of Chinese missile systems.

The dispersal of airlift ground operations will be an obvious and time-honored tactic for reducing threats to airlift forces in forward areas. Dispersal works because real-time military detection systems, including pilot eyeballs in combat, have narrow fields of view. Servicing a transport aircraft at an air base unanticipated by the enemy, or even just a few hundred meters away from its normal parking area, can put it outside of the “soda straw” fields of vision of real-time electronic sensors and terminally guided munitions. Dispersing transport operations randomly also can slow an enemy’s observe-decide-strike cycle. The need to reprogram some weapons could slow things down, as would debates over the value of drawing from depleting stocks of costly munitions to shoot at uncertain targets.

Dispersal, however, does come at the risk of reduced productivity. Getting loads from dispersed operating locations to their primary destinations will be one challenge. Presuming

that a major conflict primarily would involve US air and naval forces, at least at its beginning, most air movements will terminate at the primary air bases supporting high-intensity operations. Loads delivered even only a few miles away at secondary airfields or landing areas, let alone at bases on other islands, will have to be moved again by air, sea, or surface. Movements by any of those modes would present their own costs in transload and en route times and vulnerabilities to enemy actions. Dispersed operations also will require dispersal of forward-deployed airlift support personnel and equipment. Managing those scarce elements, again, will present a host of challenges to optimizing their productivity and protection. Also worth considering would be the consequences of grounding an aircraft at a dispersed location where the necessary maintenance capabilities are not available. In the hours or even days it might take to get parts and mechanics to it, the aircraft will not be contributing to the airlift stream, and it will be a fixed target for enemy detection and attack.

In a major conflict with China in 2020 and after, therefore, airlift forces will face two great challenges. The first will be simply to move all of the things required by CINCPAC and other senior government leaders and politically powerful organizations. Movement demands in such a conflict will increase rapidly beyond the actual capabilities of the fleet and render moot peacetime planning predictions that airlift and other defense transportation assets are “largely satisfactory” for the demands to come.⁹⁶ The difficulty of meeting demands almost certainly will be increased by lethal and nonlethal attacks throughout the airlift system—attacks that will become more likely and dangerous as the transport stream approaches its destinations in the Second and, particularly, the First Island Chains. For that reason, the second major requirement will be for airlift forces to develop the capabilities needed to operate under a full spectrum of threats, particularly at air bases under attack.

Lesser Conflicts

The array of potential conflicts in the Asia-Pacific below the level of a direct state-on-state steel cage match between the United States and China is almost endless. Most Asia-Pacific states are politically stable and content with the benefits of the *Pax Americana/Pacis Aemulus*. However, there are latent territorial and resource disputes among many that could simmer into wars in the future. China, Russia, the Koreas, the Philippines, Vietnam, Thailand, Malaysia, Singapore, Indonesia, Myanmar (Burma), India, and Pakistan all have disagreements with neighboring states over borders and/or maritime boundaries. Energy resources, water, fishing grounds, and trade disputes all exist in the hemisphere now and could increase as growing economies increase resource competition.⁹⁷ While not as virulent as in Africa and the Middle East, Islamic fundamentalism creates ideological conflict and stability concerns and sometimes active insurgencies in a number of states, including China, Malaysia, Thailand, Indonesia, Borneo, and the Philippines.⁹⁸ The potential involvement of the United States and/or China in any of these disputes and insurgencies only compounds the range and character of possible threats in the region. Perhaps most importantly, both major powers would involve themselves in a regional conflict determined to achieve their objectives but also to prevent its escalation into a far more dangerous confrontation between their own forces.

For airlift planners the conceptual variety and unpredictability of most future conflicts in the Asia-Pacific make it impossible to develop detailed plans to handle them. There are standing plans for the reasonably predictable circumstances of conflicts involving Korea and almost certainly Taiwan. Nonetheless, beyond those “biggies,” lesser conflicts come in

too many forms to be covered comprehensively by a set of on-the-shelf plans. The best USPACOM planners will be able to do in preparing for lesser conflicts is and will be to develop generic concepts for various types of scenarios, prepare “plug-n-play” time-phased force deployment plans for likely unit moves, keep airlift forces exercised and trained, and then be ready to build movement plans on the fly when actual contingencies arise.

One of the most important variables in future contingencies for airlift planners will be the role of land combat forces in them. While transoceanic movements of whole combat brigades and their supporting elements probably will not be elements in the airlift flow of a major conflict, they well may be in lesser conflicts. It would be possible to conjecture dozens of scenarios where land forces could be the lead elements of a US involvement in lesser Asia-Pacific conflicts. Perhaps these three will suffice to make the point.

- To prop up an ally in imminent danger from an externally financed insurgency, the United States and other allies might deploy infantry and aviation forces to help stabilize the situation.
- To dissuade a major power from intruding into the affairs or even occupying the territory of an ally, the United States might choose to position a Stryker brigade in the threatened area.
- In a similar situation, the United States might choose to position ground units in a defensive posture, rather than increase the presence of inherently offensive air and naval forces. Such a move would demonstrate US determination and place the burden of further escalation on the shoulders of its opponent.

In such cases, and as discussed earlier, the movement of ground forces would consume most available airlift, if not all of it. By thus delaying the movement of air and some naval forces into a simmering conflict zone, USPACOM commanders will be taking the risk of not having what they need to conduct offensive operations should their efforts at deterrence, dissuasion, and/or escalation dominance fail.

The early involvement of significant land combat elements in some future scenarios may require airlift forces to deliver them to small, minimally developed airfields that are only marginally able to handle or service them.⁹⁹ The refueling facilities at such airfields usually will be inadequate to support large-scale airlift operations. Consequently, airlift aircraft transiting them will have to reduce their payloads and/or operational ranges in order to bring their return fuel with them.¹⁰⁰ The small parking areas of most forward area bases will restrict their maximum (aircraft) on the ground (MOG) capacity and, thereby, the “velocity” of unit movements into them. Standard USAF planning factors, for example, estimate that an airfield capable of handling a MOG of four C-17s will sustain a cargo throughput of around 1,130 tons per day. This is a conservative number based on C-17s carrying only 45 tons (just over half of their maximum payload) and requiring 3.5 hours on the ground for unloading and servicing.¹⁰¹ However, even if the throughput at such an airfield could be raised marginally through better load planning and shorter ground times, it takes only simple math to calculate that delivering a Stryker brigade, along with its support, would take days.

The threat environments in which transport aircraft will operate will vary as widely as the contingencies in which they are involved. Nonetheless, even in small-scale conflicts, the presence and probably use of significant threat systems must be assumed. By 2020 the arsenals

of even insurgent movements could include small arms, mortars, and rocket launchers firing terminally guided projectiles, man-portable, or robotically controlled antiaircraft missiles, remotely piloted aircraft (RPA) capable of reconnaissance and delivering weapons, and a range of lethal and nonlethal chemical and biological weapons. In mid-level conflicts, smaller states potentially could employ all the weapons above, along with over-the-horizon detection systems, commercially acquired space imagery, short- and medium-range ballistic missiles, fourth-generation fighter aircraft and weapons, swarming RPA attacks, and cyber attacks. Moreover, China or another major power could involve itself and bring in more layers of antiaccess systems.¹⁰² Thus, the term “lesser conflict” will not equate automatically to “lesser threat to airlift aircraft.” Indeed, astute enemy strategists would see clearly that shutting down the airlift stream bringing aid to their enemies would be a valuable option and vulnerable objective. If fighting for vital interests, their only dissuasions from striking the transport stream would be the limitations of their weaponry and the escalatory consequences of killing large numbers of Americans.

The general requirement imposed on US airlift forces by the probability of lesser conflicts breaking out in the Asia-Pacific will be intellectual and operational agility. Coming, as they will, in a wide variety of scale and scope, these conflicts will present airlift operators with highly variable challenges in planning, force flow management, embarkation airfield characteristics, and threat. The necessity of delivering ground forces as close to their anticipated fighting positions as possible will particularly challenge airlift personnel and the aircraft fleet they have on hand. Quite likely, getting close to those positions will require operations into secondary airfields or even unsurfaced strips. To operate into those strips, airlift operators must prepare to reduce the damage caused to them by heavy aircraft operations and/or to repair them with minimal delay to the airlift stream. These are challenges that can be as great as those imposed on planners by the requirements of major conflicts.

Maintaining Presence

In 2020 as now, US airlift forces in the Asia-Pacific will have three primary sustainment missions. The first will be the maintenance of largely scheduled networks of flights to link the far-flung US bases and outposts in the hemisphere to each other and to the American homeland. The second will be to support a probably much increased program of engagement activities, including regularly scheduled exercises, international training events, and visits. The third will be sustainment of training activities in support of hemispheric partners engaged in internal security operations.

Interestingly, while the number of US personnel deployed permanently along the Pacific Rim probably will go down in coming years, due to budget pressures and host nation political restrictions, the overall sustainment effort likely will increase. Most importantly, increases in the movement requirements of rotational deployments and an increased engagement program will offset the possible reduction in demand for airlift in support of permanent bases. The establishment of a rotational presence of US Marines at Darwin, Northern Territory, Australia, has emphasized the advantages of such deployments. They are politically attractive to partner nations. They maintain US presence and familiarity with local infrastructures and operating environments. They are relatively cheap, in that they do not involve the maintenance of base complexes or the movement and support of dependents and service units.¹⁰³ In light of these advantages, many military planners presume that rotational deployments will increase in importance.

Simultaneously, the competition between China and the United States for influence in the Asia-Pacific will increase the demand on airlift forces over coming years. Fully aware of values derived by the United States from its extensive international military exercise program, China has been increasing its own international training activities steadily for several years and will continue to do so.¹⁰⁴ The United States already is countering with increased engagement activities. In reality, the engagement competition offers benefits to all participants, in the form of increased interaction, understanding, and military readiness. Asian partner states will gain the additional advantage of receiving the knowledge and largess of the great powers, though at some political and security risk in the long run. So, despite or perhaps because of future budget pressure, USPACOM's overseas engagement programs and their demands on the airlift system likely will increase.

For the main, the US fleet is sized and postured already to handle any probable increase in presence activities. Most generate only routine airlift flows, involving scheduled or pre-planned flights along developed routes with excellent terminal facilities at their ends. CRAF aircraft carry the personnel of many exercises and often move the ground echelons of involved air units. USAF transports are involved as well, particularly in major exercises such as the annual Foal Eagle exercise in Korea. Even in that exercise, the pressure placed on the airlift fleet is modest and bearable, since it does not involve the air movement of complete land combat units and draws on both US and Korean civil airlines to lift much of the load. Thus, the NAMS should be able to handle any probable expansion of the Asia-Pacific engagement program with current and planned forces.

Humanitarian Relief

Humanitarian relief operations are a routine feature of US operations in the Asia-Pacific. Most Asian states have high population densities in their coastal regions, and they are located on the circum-Pacific seismic belt, also known as the “Ring of Fire” tectonic zone. Consequently, they are vulnerable to mass-casualty-producing earthquakes and tsunamis. Typhoons are a threat to every state in the northwest Pacific basin and create large-casualty and mass destruction events in several countries each year. Fortunately, the general peace and political stability of the Asia-Pacific has precluded the mass refugee events that afflicted Africa, the Middle East, and parts of southern Europe over past decades. Nevertheless, the US military participates in significant natural disaster relief actions every year.

For airlift planners and operators, however, humanitarian relief operations are a peacetime lesser-included case of their broader training and war-fighting tasks. The airlift fleet made available for those tasks has been more than adequate to deal with relief operations. Consequently, while the moral, diplomatic, and even military training value of such operations is obvious to most, they do not influence force structure planning in any significant way. Whatever capabilities are created to handle war will have to be adequate for peacetime relief activities.

Likely Capabilities in 2020

Of all the information relevant to the future of airlift in the Asia-Pacific, data regarding the general capabilities and condition of the airlift force is the most accessible in an unclassified format. The importance and great expense of airlift capabilities make them a matter

of continual public discussion and revelation in a continual series of official reports and plans. The openness of the record, coupled with the short planning “horizon” to 2020, therefore, makes it possible to lay out likely capabilities of the airlift system with some confidence. There is no possibility in the few years before 2020 for new aircraft to be designed. If national leaders decided to adjust the size of the military fleet, they would be constrained to either draw down existing squadrons or continue the production of existing types already coming off the line, namely the C-17A and the Lockheed Martin C-130J Super Hercules. Looking beyond 2020, of course, increases the possibility of bringing new types into development and production.

The Airlift Program of Record

Program of record (POR) simply refers to the sum total of airlift modernization plans most recently approved by the highest DOD authorities through official planning documents, guidelines, memoranda, and so on. At any one time, the general airlift POR is available in some combination of such documents, though it also is subject to frequent adjustments in keeping with ongoing shifts in overall defense policies, strategies, and funding. Congressional advocates of specific aircraft manufacturers or the bases and units that operate them also can and do adjust the actual POR significantly and more or less routinely. Examples of these individual interest adjustments in recent years have been congressional refusals to allow the retirement of some aging C-5As and continued funding of C-17A production, despite USAF public declarations that it did not want any more. Still, and despite the malleability of the airlift POR at the margins, it is possible to predict the general shape of the fleet in 2020 with some confidence.

To begin, it is important to recognize that the structure and future effectiveness of America’s airlift program rest on a substrate composed of the country’s organized military sealift components. Two organizations, the Military Sealift Command (MSC) and the US Maritime Administration (MARAD), administer those components. The MSC conducts day-to-day operations, contracting commercial shipping lines to carry cargo and operating the 17 ships in its sealift component. MSC also operates 30 ships in maritime prepositioning squadrons (MPS), which are based in the west Pacific (MPS 3) and Diego Garcia (MPS 2) in support of all four services and the Defense Logistics Agency. These ships carry sets of equipment and thousands of tons of munitions and other supplies to support deployments of USAF, Army, Marine, and Navy units. The MARAD’s Ready Reserve Fleet backs up the sealift fleet, by making some 48 ships available on 4–20 days’ notice. Over half of these are roll-on/roll-off (RORO) ships—each able to load and unload hundreds of military vehicles quickly. Two of the larger Algol-class (55,300 ton) ROROs can lift the vehicles and other equipment of a Stryker brigade. MARAD also administers a civil reserve, the Voluntary Intermodal Sealift Agreement that includes most major US-flagged shipping lines and operates much as does the CRAF.¹⁰⁵

In combination, these sealift components would serve as a sort of prefilled pipeline of materiel and units in the event of an Asia-Pacific conflict. In a major conflict, they would activate simultaneously, all along the pipeline. MPS 3 ships could arrive in the area of conflict in as little as a few days, with others filtering in over the next several weeks. They would bring supplies and equipment required by the personnel of air and ground units deploying by air. MPS 2 and MSC sealift ships would follow with more supplies and materiel. MARAD Ready Reserve ships, some having reactivated with four or five days’ notice, would then

start to arrive in as little as three weeks, carrying the equipment and supplies of major follow-on forces.

From an airlift planning perspective, the capabilities of the sealift fleet carry several implications. First, its combined capacity will dwarf that of the airlift fleet. Typically, plans anticipate that sealift will move 90 percent or more of the military cargo going forward in a major contingency. Global airlift will move only units and materiel desperately needed in the opening few weeks of a conflict. Second, global airlift's main contribution in the latter weeks and months of a protracted conflict will be to bring personnel and high-value cargos forward. Because of the shorter distances and time constraints involved, theater airlift actually may do more unit-type moves within joint operating areas than would global airlift over transoceanic distances. Certainly, this operational pattern would be consistent with historical experience and the "physics" of air transportation in the Asia-Pacific. Third, while airlift will facilitate initial defensive and airpower offensive operations in a major conflict, it will be sealift that sets the pace of subsequent stabilization and counteroffensive actions, particularly if they include land forces.

Airlift's critical role as the high-speed partner of sealift is reflected in the program of record for the AMC. As the manager of DOD global airlift operations and the provider of theater airlift augmentation to the combatant commands, AMC presents a force structure that is unmatched in its comprehensive capabilities. At the core of the airlift fleet in early 2013, AMC possesses or has access to 88 C-5s, about 218 C-17s, and 336 C-130s.¹⁰⁶ As always, the air reserve components provide a large percentage of these capabilities, accounting for around half of the airlift crews available to AMC and about 335 aircraft assigned directly to ANG and AFRC units.¹⁰⁷ Over the next several years, the C-17 fleet should grow to its planned size of 223 aircraft. The ultimate size of the C-5 fleet has been a matter of controversy for the past several years, as the USAF has tried to reduce or even eliminate older C-5As, while congressional advocates seeking to protect ARC jobs have blocked those actions.¹⁰⁸ Nevertheless, a recent AMC decision to draw down the large-aircraft fleet from an established baseline of 300 "tails" to 275 seems to indicate that the C-5 segment will shrink to around 60 planes. Most of those will be modernized as C-5Ms, which have proven significantly more capable and reliable than unmodified C-5Bs. Taken together, the 275-aircraft fleet and the CRAF should be capable of producing about 30.5 million ton-miles a day (MTM/D) of capacity.¹⁰⁹

Over the last two decades, AMC and USTRANSCOM have invested heavily in the organizations needed to control and support high-intensity airlift flows during contingencies in the Asia-Pacific and elsewhere. At the hub, the 618th Air Operations Center (Tanker-Airlift Control Center) of AMC's Eighteenth Air Force provides global airlift command and control. For crisis operations, the 621st Air Mobility Wing provides AMC with the capability to open new airlift routes or buttress existing ones rapidly. The wing, which is headquartered at McGuire AFB, New Jersey, operates six groups and over 1,500 personnel specialized in setting up expeditionary bases, protecting them, providing supporting services, and loading, unloading, and servicing airlift aircraft. In a large-scale Asia-Pacific crisis, these units would be available to augment PACAF's organic and similar 36th Contingency Response Group based at Andersen AFB, Guam. Also, airlift units deploying forward into the theater would bring along their organic logistics and cargo handling assets.

AMC, USTRANSCOM, and USPACOM also have worked steadily for decades to improve the physical infrastructure of airlift operations in the Asia-Pacific. Beginning in 1999,

the en route modernization strategy became “2 lose 1,” meaning that the long-established northern and southern Pacific airlift route structures would be enhanced so that either one could handle a major airlift flow alone. The northern route ran through Alaska to Japan and Korea, while the southern went through Hawaii to either Guam or Okinawa. A set of additional bases lay forward of the Japan-Guam axis to facilitate either overflights en route to the Indian Ocean region or the deployment of forces into Southeast Asia. In general, AMC and USTRANSCOM planners are satisfied with the laydown and general capabilities of the en route system. However, in 2009 the command issued a new plan to enhance specific capabilities of its operating facilities and support units at Guam, Saipan, Tinian, Japan, Thailand, and perhaps Vietnam.¹¹⁰ If funded, these enhancements should set an adequate foundation for foreseeable airlift operations in the 2020 timeframe and beyond. Nonetheless, regardless of the modernization actions undertaken, the Pacific en route system remains anchored to a small number of bases—with all those located west of Hawaii vulnerable to attack, and some of them offering no convenient alternate airfields should enemy action close them.

Shortfalls

Capable as it will be in 2020, the national military airlift system even now presents some capabilities shortfalls that should be of concern for commanders and planners. These shortfalls will be quantitative, the reduced lift capacity of the fleet, and qualitative, principally its advancing age, the range/payload characteristics of the Globemaster III and the Hercules, and the restricted ability of those aircraft to produce throughput at unsurfaced forward airfields. While none of these shortfalls are likely to exert a catastrophic effect on airlift operations individually, together they could impose serious limitations on the operational options of future commanders.

Even with only unclassified data and insight available to form an opinion, it is hard to escape the sense that the program of record objective for the gross capacity of the airlift fleet will fall short of requirements in a major conflict. Certainly the 30.5 MTM/D force structure goal is the smallest set since the 1960s. By 1970 the MAC fleet had reached a capacity of 34 MTM/D, and it was only just then taking delivery of its first C-5A aircraft.¹¹¹ More troubling is that the number actually is quite small in the context of the Asia-Pacific’s tyranny of distance. A notional movement requirement from California to the Philippines would be instructive here. If one-third of AMC’s global fleet was available to support the move, then it could achieve a daily throughput of about 830 tons or around 20 standard C-17 planning equivalents per day (10 MTM/D ÷ 12,000 miles round trip) under ideal conditions.¹¹² This amount of lift could move the ground echelons and support elements of a couple of USAF combat squadrons and support each day or a Stryker brigade and its support in about 18–20 days. Last, current requirements estimates are based on a host of assumptions about warning times, units to be moved, weather, attrition (usually none), air dominance, the simultaneity of other conflicts or emergencies, and so on. Consequently, such estimates are debatable the moment they surface, and they likely will fall short in the face of actual events.

Past events reinforce the notion that airlift estimates usually reflect existing force structure and budgetary restrictions at least as much as they address actual requirement expectations. In the first modern airlift requirements study, the 1981 *Congressionally Mandated Mobility*

Study, fiscal concerns clearly determined the planning bogey adopted. After determining that airlift capacity requirements in major Middle East and European conflicts would range from 73–125 MTM/D, the report recommended a “fiscally prudent” expansion of the global airlift fleet to only 66 MTM/D.¹¹³ Following the collapse of the Soviet Union, the DOD reduced even this goal to a “strategically prudent . . . [and] fiscally responsible” 48 MTM/D, even though doing so imposed a high risk of failure in basic planning scenarios.¹¹⁴ A few years later, the 1995 *Mobility Requirements Study—Bottom-Up Review Update* raised the airlift capacity goal to 51.8 MTM/D, but airlift planners knew that this number still fell well below even officially sanctioned requirements.¹¹⁵ Most recently, the *Mobility Capabilities and Requirements Study 2016 (MCRS-16)* lowered the airlift planning goal drastically, from 54 MTM/D, set in 2005, to 30.7, a number that made 20 inconveniently old C-5As and 70 doddering C-130s redundant and unnecessary to replace.¹¹⁶ While the classified status of *MCRS-16* makes a detailed analysis of its provisions impossible here, it is hard to escape a sense that its nearly 45 percent reduction in established requirements reflects budget realities as much as it does anticipated needs. In any case, Asia-Pacific planners will have to live with the effects of the realities and results of airlift force structure planning indefinitely, even if they can foresee the need for additional airlift in reasonably likely circumstances.

At the same time as the global airlift fleet likely will be smaller than Asia-Pacific commanders might wish in 2020 and after, its core C-5 and C-17 fleets will also have been wearing out faster than they can be recapitalized. The C-17 fleet component provides a case in point. The USAF began receiving the aircraft in 1991 with a plan to fly them at 1,000 hours each per year for 30 years and then replace them with a newer design. Instead, the fleet has operated at a rate of 1,300–1,400 hours per year per aircraft. The average C-17 in 2012, consequently, was about nine years old and had flown close to 12,000 hours.¹¹⁷ As Gen Arthur Lichte, commander of the AMC, reported in 2008, the projected life of the aircraft was shrinking from 30 years to 25 years because of the accelerated flight program.¹¹⁸ If the pace continues unabated, the average C-17 in the core airlift fleet will be 16 years old in 2020 and have over 21,000 hours on its air frame. About 15 of the oldest aircraft will be past the 25-year life span projected by General Lichte. The pictures at 2030 and 2040 (when AMC *plans to begin* bringing a new strategic transport online) is not likely to get better, despite possible service life extension projects.¹¹⁹ So by 2020 the global airlift fleet in all probability will fall short of actual requirements and the core fleet will be deep into middle age, with all of the maintenance and reliability challenges that entails.

Certain performance characteristics of the core airlift fleet also should give pause to Asia-Pacific airlift planners. The range-payload characteristics of both the C-17 and C-130 will limit operational options in the vast Asia-Pacific. In their designs, both aircraft reflect trade-offs in aerodynamic efficiency in return for improved short-field takeoff and landing capabilities and cargo compartments capable of handling military-type loads. Consequently, they reflect range-payload “curves” that are useable over Asia-Pacific distances but that become less so when their ranges are translated into radii of action. In many possible future scenarios, particularly when operating into damaged or austere airfields, the operational radii of transport aircraft are a better indication of their utility, since they will have to bring along their return fuel and, consequently, arrive with reduced cargo loads.

Table F-3. Operational range and radii

C-17 Range/Payload			C-130 Range/Payload		
Percentage of max load	Range (nm)	Radius (nm)	Percentage of max load	Range (nm)	Radius (nm)
100 (80 tons)	2,400	970	100 (24 tons)	800	320
50 (40 tons)	4,000	1,600	50 (12 tons)	3,200	1,280
25 (20 tons)	5,600	2,250	25 (6 tons)	3,500	1,400

Data extracted and, in some cases, interpolated from Lockheed Martin Corporation, “C-130J Super Hercules: Whatever the Situation, We’ll Be There,” n.d., http://cc-130j.ca/wp-content/pdfs/Spec_Book.pdf; and Boeing Corporation, “Backgrounder: C-17 Globemaster III,” June 2012, http://www.boeing.com/defense-space/military/c17/docs/c17_overview.pdf.

These range and radius figures perhaps have more meaning when placed in the context of actual operational distances in the theater.

Table F-4. Actual operational distances in the theater

Hawaii to Guam—3,330 nm	Guam to Taiwan—1,450 nm
Hawaii to Korea—3,875 nm	Darwin to Luzon —1,791 nm
Guam to Luzon—1,400 nm	Darwin to Tokyo—2,870 nm

Essentially, the message of these figures is that both the C-17 and particularly the C-130 would have to operate at a fraction of their capacities to transit a number of routes typical to the hemisphere. If fuel is not available at their destinations, some routes become impossible with any load. These limitations carry significant implications for commanders in the theater, since they imply that some theater air movements might not be possible to austere forward fields or where interim or mid-air refueling capabilities are not available.

Beyond the operational impacts of their range-payload curves, limitations in the ability of the core airlifters to operate into austere airfields will challenge airlift operators in 2020 and beyond. Finding airfields long enough for these aircraft to take off and land could be a problem in some operations. Both the C-17 and C-130 possess exceptional short-field capabilities for aircraft of their size and weight. A C-17 carrying an 82-ton payload and fuel for a 500 nm recovery leg, for example, can operate into fields in the 3,000–4,000 foot range.¹²⁰ C-130Js carrying 15 tons and 500 miles of fuel could get into the same fields or, if their crews threw peacetime caution to the wind, landing strips 2,000 feet long or less.¹²¹ Probably a greater challenge than finding landing strips of adequate length will be finding ones that can receive and sustain high-frequency landings and takeoffs by large aircraft. Many hard surfaced airfields in remote areas will not be strong enough to handle the weight of C-130s, let alone C-17s. Unsurfaced airfields and landing strips will be even less likely to handle even a few “traffic passes,” that is, takeoffs and landings, before suffering significant damage from rutting, potholing, and mounding. A graded soil and gravel field with a California bearing ratio (CBR) of 10, for example, will support only about 30 C-17 passes or up to 1,500 C-130 passes before requiring repairs.¹²² Softer fields of uncompacted soil, turf, and

the like will be damaged by the first landing impact of a C-17 and even by only a few from the large, low-pressure tires of a C-130.¹²³

It takes no leap of imagination to see that the runway and landing strip length and strength requirements of the Globemaster III and Hercules could undermine the flexibility and velocity of land force deployments in the future. In many lesser conflict scenarios, joint force commanders may want to deploy airborne and even mechanized forces into remote areas. Airfields in such areas, if available at all, likely will be small, weakly surfaced, and sparse. Still ground force commanders will want to use the forward-most fields available, to minimize road marches and simplify logistics. Their ability to get forward will depend directly on the characteristics of those fields and the runway requirements of the C-17 and C-130. In reality, the C-130's airfield characteristics will determine most ground force air movement options, since C-17s will tend to destroy anything less than regional airports with strong runways. If used, C-17s likely will only be used to deliver large, "outsized" items, such as tanks, transport helicopters, and bridging equipment, not transportable in C-130s.

Movements dependent on C-130s, of course, will be constrained by the plane's range/payload tradeoffs. Using the AMC standard planning load of 18 tons, for example, a day-and-night flow of a C-130J into an expeditionary field every 15 minutes would produce a throughput of 1,728 tons per day. Theoretically, such a flow could continue onto a CBR-10 runway for about a week before forcing a closure for repairs. But, if the C-130s were obliged to operate from bases in the First or Second Island Chains, their actual cabin loads could decrease sharply. In an extreme case, say operating from Guam to Luzon (1,400 miles), the C-130J cabin load would be six tons. Thus, the throughput at the forward field would reduce by two-thirds, while still causing the same wear and tear on its infrastructure. Of course, airlift operators would attempt to shorten the C-130 leg by establishing a global-theater transload base nearer to the fight. However, that option presumes that global transports will be available and able to operate at a large airport in or even inside the First Island Chain.

Perhaps not as obvious as their significance for ground operations, the airfield limitations of the core airlift fleet may also influence the conduct of air operations. Normally, airlift operations in support of combat air forces will terminate at the major air bases used by fighters and bombers—bases that in peacetime have infrastructure to accommodate at least small numbers of transport aircraft. However, if enemy attacks degrade the runway, ground movement, and parking infrastructures of these bases, they might not be able to receive transport aircraft. If attacks are frequent and accurate, air commanders also may prefer to disperse airlift ground operations either on the margins or grassy areas of airfields, or even in alternate airfields or landing areas nearby. In such cases, air commanders may not want any transports transiting their runways and parking areas, from concern about the consequences of having large aircraft break down or be destroyed at critical points and interfering with or even blocking combat operations. Once again, C-130s are better suited than C-17s for such dispersed operations. Nonetheless, Hercules also are the smallest transports in the fleet (save a limited number of Alenia C-27J Spartans), and they would be only marginally capable of bringing people and materiel over transoceanic distances, say from Hawaii to Guam, Okinawa, or Japan. Thus the airfield limitations of the core airlift fleet could place air commanders in the position of relying on their least capable aircraft and/or receiving airlift support at significant risk to their overall operations.

Mitigation Strategies

This study began as a proposal to assess Asia-Pacific force structure requirements and shortfalls in the 2020 time frame and beyond. It suggested that shortfalls would be a given and that, consequently, its main contribution would be to identify mitigation strategies and categorize them as internal or external to the resources of the DOD. Accordingly, the study began with a historical discovery of the enduring themes of airlift operations in the Asia-Pacific. These mainly have been the tyranny of distance, the distinct but overlapping operating realms of theater and global forces, and the generally small size of airlift forces in relation to the demands placed upon them. There followed a discussion of force structuring theory and practice for the national military airlift system as a baseline for understanding the practicality of future mitigation strategies. The section preceding this one qualitatively explored the likely shortfalls that could affect airlift operations in the hemisphere on and after 2020. This present section, then, gets to the end product of the report, a discussion of potential mitigation strategies.

Perhaps not surprisingly, most of the mitigation strategies identified here will be internal to the resource management purview of the DOD. They will involve changes in training focus, doctrine, and basing. This is fortunate, since former Secretary of the Air Force Michael B. Donley made it clear numerous times that the service is downsizing and that its almost exclusive capitalization priorities are continuing Lockheed Martin F-35 Lightning II fighter acquisition, bringing the Boeing KC-46 aerial refueling and strategic transport on line, acquiring essential new satellites, and developing a new long-range bomber(s).¹²⁴ At the same time, there are some external force structure changes worth considering, even in the constrained budgets of the time. These external mitigation actions could involve moderately expensive improvements in primary and austere airfields and very expensive steps to acquire aircraft to fill troublesome gaps in the capabilities of the existing fleet. All of these external strategies will be difficult and probably unaffordable, unless they can be offset by divestments or redirected investments in other areas.

As a start, the AMC should develop a roadmap that will match the material implications of the strategic rebalance to the Pacific with an intellectual rebalance or reemphasis on that hemisphere. This roadmap should produce a comprehensive and timely set of studies, doctrines, and training initiatives relevant to anticipated airlift and perhaps air mobility operations in the Asia-Pacific. Organizationally, AMC, PACAF, and their parent joint commands, USTRANSCOM and USPACOM, would have several options for managing the intellectual process. One option would be establishment of a Joint USPACOM-USTRANSCOM study group similar to the Airlift Concepts and Requirements Agency (ACRA) activated by the MAC and the Army Training and Doctrine Command in 1984. Functioning for several years as the locus of efforts to assess requirements and threats, develop doctrines, and analyze force structure improvements “to meet battlefield mobility and sustainment needs,” ACRA’s primary reports greatly influenced theater airlift planning and acquisition programs.¹²⁵ Another, less centralized approach would be to coordinate elements of existing organizations, such as the DOD-USPACOM Asia-Pacific Center for Security Studies and the Air Force Research Institute, to produce or contract the production of the necessary documents, perhaps under the oversight of an in-house or adjunct ombudsman linking the research organizations and the sponsoring commands.

Setting the agenda for such a study program will require continual discussion and review both before and after a decision to establish it in the first place. However, as an indication of its possible value added, the list below might include some of its products:

- Airlift in Antiaccess Environments: An Analysis of the Cold War and Other Experiences
- Sustaining the Charge: Airlift Operations in the Presence of Modern A2/AD
- Getting In and Getting Out: Airlift Tactics in the Presence of Modern A2/AD
- Airlift in the Asia-Pacific: How Other Nations Do It
- Theater Airlift in Dispersed Operations
- Mobile Basing Options for Theater Airlift Forces
- The Future of the Civil Reserve Airlift Fleet
- Partners: Balancing Active and Air Reserve Components in the Future
- Airlift Command and Control in the Cyber Age
- Under Attack: Airlift Tactics at Threatened Bases
- Designing the National Military Airlift System for Future Success
- Bringing Airlift Doctrine Up to Date
- Airlift Training for Modern War

The advantage of pursuing a series of smaller reports, as suggested above, is that the lower costs of utilizing part-time or adjunct civilian or in-house military researchers to do them can offset the costs of their supervisory overhead. With proper advisor support, for example, students in the advanced studies group of schools can produce valuable reports in fulfillment of their thesis requirements at no additional cost to the government.¹²⁶ Large, comprehensive reports are attractive, but they also require substantial commitments of full-time personnel to get them done.

Beyond getting the airlift community's minds around the Asia-Pacific airlift challenge, the next mitigation priority will be to address the likely quantitative shortfalls in large-scale conflicts in the future. The clear and inescapable resource limitations under which the DOD will labor for the foreseeable future must constrain thinking on these shortfall mitigations. Proposals for purchases of significant numbers of aircraft, perhaps for any aircraft, will be "nonstarters," unless matched by full and immediate offsets. There are, however, some internal actions that the DOD could take to reduce the impact of potential airlift shortfalls. Maximizing sealift is always a worthwhile approach to reducing the burden on airlift forces. USTRANSCOM and MSC planners work this issue continually, of course. Nonetheless, some options that they may or may not have pursued could include establishing a robust resupply depot at a mid-Pacific, friendly territory outside the Second Island Chain, such as the Marshall Islands, to reduce the return time for follow-on increments of supplies by sea or air and maintaining part of the Ready Reserve Fleet in a CONUS prepositioning status. This would entail identifying specific Army or Marine "likely first responder" units with specific ships, positioning those ships as close to the posts of those units and preloading their bulk supplies. In a mobilization then, deploying units would only need to roll-on their vehicles and other equipment, a task they should be able to perform with well-practiced

familiarity. Likely first candidates for such ship alignments would be brigades based in Hawaii or on the CONUS west coast.

Moving beyond adjustments to the sealift program, other actions could include positioning all forces needed to win battles for air and sea control at the First and Second Island Chains from which they initially expect to fight. Of particular emphasis, this action would entail establishing robust ground-based air defense “bubbles” over all bases, positioning and protecting all required air and naval munitions and munitions support assets, and strengthening permanent or rotational air combat forces. Tanker aircraft deployment would be an exception to this “first-fighters-forward” policy. Beyond rotational deployments needed to support training and readiness operations, all other tankers should be based well away from bases vulnerable to robust surprise attack. Additionally, planners should create room for the forward deployment of first-fight units by reducing the number of permanently deployed Army and Marine combat brigades at major base areas in the First and probably the Second Island Chains. In a major conflict with China, such units will not have roles until the air and sea battles are won, if they have roles at all. Thus, for major conflicts as well as in lesser conflicts, there will be time to bring CONUS-prepositioned and follow-on brigades forward to perform their missions.

Additionally, the services should reduce the number of military dependents and civilian personnel located at First Island Chain bases. In wartime, the airlift burden of evacuating dependents is consequential; it increases aircraft ground times, distracts airlift support personnel and sponsors from their primary duties, and puts loved ones at risk. For morale purposes, personnel deployed to overseas bases for more than a year or so expect to have their families with them. Therefore, reducing the dependent counts at forward bases would involve actions at the margins. Replacing large combat brigades and their support echelons with smaller, first-fight units would be an important step. In addition, partially manning permanently deployed units, such as fighter wings and Patriot brigades with rotational reserve component flights and batteries would reduce the number of dependents, even as it improved training.

There is a range of opportunities available to address the limitations imposed on core airlift aircraft, the C-17 and C-130, by their specific airfield requirements. These could include the following:

- Developing procedures for minimizing the impact of aircraft operations on weakly surfaced and unsurfaced airfields. These procedures could include reducing aircraft sink rates at the point of landing; minimum use of braking; selective use of aluminum matting to reinforce turn points, landing areas, and takeoff start areas; use of ground tugs to minimize gouging of taxiway surfaces; and undoubtedly other techniques.
- Increasing the planned use of low-cost aerial delivery systems.
- Exploiting the operational flexibility of C-130s at forward landing sites. One action along these lines could include increasing crew ratios of forward-deployed Hercules to keep them in the air, away from vulnerable airfields, and producing lift. Adding aerial refueling and buddy-tanking capabilities in some portion of the future C-130J production run would improve their range/payload characteristics and, consequently, the flexibility of the Hercules fleet substantially. A review of the history of tracked landing gear and its applicability to C-130 soft-field operations also might be in order.

Evaluating the operational value of developing a maritime support capability for forward-deployed C-130s. The Asia-Pacific is dotted by small airfields on islands and littoral areas. In many cases, it would be possible to anchor a ship of moderate size near enough to these airfields to allow it to act as a mobile support base. A dock landing ship in the Whidbey Island-class (16,000 tons displacement), for example, could provide the necessary transportation assets (landing craft), billeting and messing facilities, repair shops, and communications suits necessary to support a squadron of C-130s operating from a bare base nearby. If equipped with the appropriate fuel-pumping and pipeline capabilities, the ship also could transfer jet fuel several miles inshore from its own bunkers or from a tanker ship alongside. Depending on circumstances, the supported C-130s would fly to other locations to pick up cargo, or the support ship could host the medium- or air-cushion landing craft and/or helicopters needed to move cargo from ships over the few miles to the airstrip. In such cases, the C-130 footprint on shore would be maintenance and servicing personnel and equipment, fuel bladders and trucks, some runway maintenance engineers, and security forces. Such a bare base could be set up in a few days and taken down in less time, particularly if its fuel bladders and pipeline could be left behind for later movement.¹²⁷

Acquiring a small number of transport aircraft able to carry outsized loads, such as heavy artillery and engineer equipment, into “C-130-type” airfields. Such aircraft would fill a valuable mobility niche for deploying ground forces and air units operating from airfields that are damaged or under threat of attack. They would allow ground forces to bring in heavy equipment up to but not including main battle tanks in weight and size at minimum risk of damaging their supporting airfields. They also would allow air units to receive critical supplies at reduced risk of having transport operations or aircraft casualties disrupt combat operations. Of course, the only aircraft available to meet these criteria over the next decade or so will be foreign designs, most notably the Antonov An-70 and the Airbus A400M Atlas. Purchasing from such sources would be politically difficult and probably impossible financially, unless accompanied by offsets from retiring or not purchasing C-130s and/or from linked purchases of US military equipment by Russia or nations within the European Union.¹²⁸

Working with smaller partner states to maintain a network of austere airports and airfields capable of sustaining operations by C-130s and even C-17s. As discussed in the preceding sections, such airfields should be located near sea anchorages capable of hosting both airlift support ships and cargo ships offloading supplies. Ideally, these airports should be paved strongly. However, even laterite or crushed coral runways will have high CBR ratios and be capable of supporting sustained airlift operations. In return for this support, the United States might assist these partner countries to develop their own airlift capabilities and/or even provide them some amount of routine airlift support by US assets gratis. Such support would be useful to these states for training and to support any commitments they might have to humanitarian relief or peacekeeping operations. For the United States, gratis airlift support would enhance access to these countries, improve training for US personnel, and perhaps enhance the training of partner states encouraged by the availability of free airlift to participate in combined exercises.

As a final mitigation issue, USTRANSCOM and USPACOM planners need to address the high cost of acquiring airlift in support of peacetime training and engagement activities. Besides being a bone of contention between the two commands, and particularly for USARPAC planners, the high cost of positioning and depositing aircraft from the CONUS

to Hawaii and westwards represents a drain on the defense budget. Of course, mitigating this issue almost certainly would *not* entail reducing the cost of aircraft flight hours to USPACOM or USARPAC. The Transportation Working Capital Fund serves to “discipline” the use of expensive airlift assets by having users pay for their airlift support rather than drawing the costs out of a large, centralized appropriation to USTRANSCOM. Rather, a reduction in airlift support costs probably will result from several initiatives, such as structuring USARPAC’s annual training schedule to make more efficient use of military and civil contract aircraft. Establishing a rotational deployment of a few C-17s and/or C-130s in the theater during busy exercise periods would reduce positioning costs and, perhaps, provide excellent training for reserve component personnel.

Concluding Thoughts

It is important to understand that the execution or nonexecution of the mitigation strategies presented in this report probably will not decide the outcome of major or lesser Asia-Pacific conflicts in 2020 or even beyond. The outcomes of those future struggles will be consequences of interconnected combat operations by air, naval, and land forces, as well as economic and political factors. Airlift support will be an adjunct to these operations, albeit a critically important one at times. However, it is equally important to understand that failures to keep airlift forces modern and prepared likely will come with a significant butcher’s bill and political risk. Delays in moving forces, materiel, and supplies forward and inabilities to get forces into critical areas quickly will constrain military operations and strategy options in ways that could increase or protract casualty rates, undermine combat power, and consequently shape outcomes in undesirable ways. In the Asia-Pacific, then, getting the sealift-airlift team “right” should be of great concern to the commanders, planners, and policy makers involved.

Also, given the unclassified nature of this report, it necessarily must be qualitative in its assessments and recommendations. Any detailed quantitative assessments of war plans, airfield capabilities or political agreements would have made this appendix classified. So this report of necessity is an informed exploration of what can be known from history, operational experience, geopolitics, unclassified discussions with current practitioners, and open-source information of military relevance.

Still, this qualitative study has its uses. Unencumbered by crushing statistical analysis, it has been free to think “big” at the strategic and operational levels about what *should be*, rather than simply what *is* or *will be*, should current policies continue on their general courses. As a broad, unclassified strategic and operational study, the report provides a better baseline for considering future airlift policies than would a reading of the collection of on-the-shelf Asia-Pacific war plans and force deployment plans sitting in safes at USPACOM and USTRANSCOM headquarters. Last, an unclassified study can be read by anyone involved in the issue. Broad readership, hopefully, will provide a useful new milestone from which to begin detailed explorations of elements of the broader airlift problem.

If this study can provide that milestone, it will be successful. No single report, qualitative or agonizingly quantitative, can be more than a step in the ongoing discourse of military airlift. The subject is too complex and entangled in an unknowable future to be encompassed in any one report, study, or book. So it has been the goal of this report to slip into the stream of airlift thought in a way that organizes thinking at a higher level and

provides a launching pad for the next round of studies. It would all be academic, did it not involve the lives of brother and sister airlifters, those of other US and allied warriors and, just perhaps, the outcomes of great events.

Notes

1. Adm Samuel J. Locklear III, commander in chief, USPACOM, "Speech to the Kokoda Foundation Australia" (address, Kokoda Foundation, Kingston, ACT, Australia, 12 November 2012), http://www.pacom.mil/commander/12_nov_12-kokoda-australia-speech.shtml.
2. *Ibid.*
3. Department of Defense (DOD), *Standard Aircraft Characteristics—C-54G*, 18 May 1950.
4. Wesley Frank Craven and James Lea Cate, ed., *The Army Air Forces in World War II*, vol. 7, *Services Around the World* (Chicago: University of Chicago, 1958; reprint, Washington DC: Office of Air Force History, 1983), 201–4.
5. George C. Kenney, *General Kenney Reports: A Personal History of the Pacific War* (New York: Duell, Sloan, and Pearce, 1949; reprint, Washington, DC: Office of Air Force History, 1997), 270, 287–94, 302, 325.
6. The conveyor belt metaphor comes from Frederick C. Thayer, *Air Transport Policy and National Security* (Chapel Hill: University of North Carolina, 1965), vii–xii.
7. Maj Gen Harold L. George, to Gen Henry H. Arnold, 17 August 1942, as quoted in Air Transport Command (ATC), Army Air Forces, *Administrative History of the Air Transport Command: June 1942–July 1944* (Washington, DC: Headquarters, Military Air Transport Service, 1945), 136; see also pages 137–9 for detailed discussion of the issue.
8. Robert F. Futrell, *Ideas, Concepts and Doctrine*, Vol. 1, *Basic Thinking in the United States Air Force 1907–1960* (Maxwell AFB, AL: Air University Press, 1971; reprint, 1989), 203; USAF, "Summary of List of Studies on Organization and Control of Air Transport," 2 February 1955, 5, an attachment to USAF Deputy Chief of Staff, Operations to the Deputy Chief of Staff, Comptroller, memorandum, subject: Formation of an Ad Hoc Committee on Airlift Resources, 15 December 1955; and Cyrus R. Smith, "Consolidation of the Air Transport Command and Naval Air Transport Service into One Air Transportation System," in *Administrative History of the Air Transport Command, March 1943–July 1944* (Washington, DC: Headquarters, Military Air Transport Service, 1945), 194.
9. Adjutant General, War Department, memorandum W95-19-42, "Air Transport Operations," 21 September 1942, supporting document, ATC, *Administrative History*, June 1942–March 1943, 12.
10. Charles E. Miller, *Airlift Doctrine* (Maxwell AFB, AL: Air University Press, 1998), 205–7.
11. There are a number of sources that capture the troop carrier cultural ethos. Among the better of the unit "memory" books is Army Air Forces, *DZ Europe: The 440th Troop Carrier Group* (Indianapolis: Hollenbeck Press, 1946), which noted that troop carrier crews faced danger every day, while Air Transport Command crews just "hauled freight." Anyone interested in the operations and character of troop carrier units should begin by reading Martin Wolfe, *Green Light!: Men of the 81st Troop Carrier Squadron Tell Their Story* (Philadelphia: University of Pennsylvania Press, 1989); and Gerald A. White, Jr., *The Great Snafu Fleet* (Bloomington, IN: Xlibris, 2000).
12. Capt Oliver La Farge to Lt Bingham, letter, "Subject: Mission of the Air Transport Command," 12 July 1943, Air Force Historical Research Agency file 300.202-2; Herman S. Wolk, *Planning and Organizing the Post-war Air Force 1943–1947* (Washington, DC: Office of Air Force History, 1984), 70; and Gen Henry H. Arnold to Gen Carl A. Spaatz, letter, 6 Dec 1945, Office of History, Military Airlift Command, Scott AFB, IL.
13. Richard I. Wolf, *The United States Air Force Basic Documents on Roles and Missions* (Washington, DC: Office of Air Force History, 1987), 173–80.
14. Cyrus R. Smith, "Consolidation of the Air Transport Command and Naval Air Transport Service into One Air Transportation System," in *Administrative History of the Air Transport Command, March 1943–July 1944* (Washington, DC: Headquarters, Military Air Transport Service, 1945), 194; and Steven L. Rearden, *History of the Office of the Secretary of Defense, Volume 1, The Formative Years 1947–1950* (Washington, DC: Historical Office, Office of the Secretary of Defense, 1984), 30–6.
15. William H. Tunner, *Over the Hump* (Washington, DC: Office of Air Force History, 1985), 228; Miller, *Airlift Doctrine*, 202–5; Minutes: Commander's Presentations conducted at Military Air Transport Service, 1

August 1950, 5–6; and Roger D. Launius, “Military Unification’s Precursor: The Air Force and Navy Strategic Airlift Merger of 1948,” *Air Power History*, Spring 1992, 22–33.

16. Historical Branch, Military Air Transport Service, *Military Air Transport Service Participation in the Korean Emergency: Pacific Airlift (June–December 1950)*, 1 December 1950, 12; and James K. Matthews and Robert C. Owen, *Edward J. Driscoll: Forming a Partnership for National Defense: Commercial Airlines and the Air Force; An Oral History* (Scott AFB, IL: United States Transportation Command Research Center, June 2001), 2–5.

17. Deputy Chief of Staff (DCS) Comptroller, US Air Force, *United States Air Force Statistical Digest: Fiscal Year 1951* (Washington, DC: DCS Comptroller, 18 November 1952), 69.

18. Salvatore R. Mercogliano, “Korea: The First Shot (Military Sea Transportation Service in the Korean War),” *American Merchant Marine at War* (website), 29 November 2000, <http://www.usmm.org/msts/korea.html>.

19. Roy E. Appleman, “Up to the Ch’ongch’on,” in *U.S. Army in the Korean War: South to the Nakdong, North to the Yalu* (Washington, DC: Office of the Chief of Military History, 1961), 654–7; and Annis G. Thompson, *The Greatest Airlift: The Story of Combat Cargo* (Tokyo: Dai-Nippon, 1954), 70–1.

20. Robert F. Futrell, *The United States Air Force in Korea, 1950–1953* (Washington, DC: Office of Air Force History, 1983), 77, 155, 268, 557.

21. Mercogliano, “Korea: The First Shot.”

22. William T. Y’Blood, ed., *The Three Wars of Lt. Gen. George E. Stratemeyer: His Korean War Diary* (Washington, DC: Air Force History and Museums, 1999), 376.

23. Betty R. Kennedy, Barry R. Barlow, Coy F. Cross, II, Karen M. Koenig, Roger D. Launius, John W. Leland, Jeffrey S. Underwood, and Robert C. Williford, *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command 1941–1991* (Scott AFB, IL: Military Airlift Command History Office, 1991), 124.

24. Ray L. Bowers, *Tactical Airlift*, The United States Air Force in Southeast Asia Monograph Series (Washington, DC: Office of Air Force History, 1983), 246.

25. DOD, *Annual Report for Fiscal Year 1964* (Washington, DC, Government Printing Office [GPO], 1965), 297; and DOD, *Annual Report for Fiscal Year 1965* (Washington, DC: GPO, 1966), 323.

26. Aircraft numbers from Kennedy et al, *Anything, Anywhere, Anytime*, 120–1 and 182–3.

27. Aircraft fleet composition and tonnage statistics from Dick J. Burkard, *Military Airlift Command: Historical Handbook, 1941–1984* (Scott AFB, IL: MAC Office of History, 1984), 7, 100.

28. C-124 performance characteristics taken from USAF, *Standard Aircraft Characteristics—C-124A*, July 1961, 5–7. The en route utilization rate reflected the demands of the plane’s big piston engines for things like spark-plug changes, oil changes, and general maintenance during refueling stops. Overall, when things like home base training requirements, major maintenance actions, and crew availability limitations were factored in, the overall utilization rate of the C-124 fleet was more like six to eight hours per aircraft per day.

29. Walter L. Kraus, Jose M. Matheson, Joy Gustin, and Isabel Bryant, *C-141 Starlifter (January 1959–June 1971) Narrative* (Scott AFB, IL: Military Airlift Command Office of Military History, 15 January 1973), 2, 5, 26–29, 37–39, 45, 53, 81–86, 98–99, 157–158, 163–164, 175–367. This history of the C-141 also includes detailed performance and reliability data for the C-141. For information regarding the Victory-class ships, see John Pike, “Victory Ships,” *GlobalSecurity.org*, 22 July 2011, <http://www.globalsecurity.org/military/systems/ship/victory-ships-survivors.htm>.

30. Miller, *Airlift Doctrine*, 334–5.

31. Harold K. Brown, “The Revolution in Airlift,” *Air Force and Space Digest* 51, no. 6 (June 1968): 114–5.

32. The best general study of the CRAF is Theodore J. Crackel, “History of the Civil Reserve Air Fleet” (Washington, DC: Air Force History and Museums Program, 1998); in particular see pages 171–6 for discussion of the program’s initial features. For official discussion of the program’s features, see Military Air Transport Service, “Civil Reserve Air Fleet Plan: Summary of Implementing Actions (Jan 1952–Jan 1953),” 7–9; and “Civil Reserve Air Fleet Plan,” in *History of MATS* (Scott AFB, IL: Air Mobility Command History Office, July–December 1952), 325–31.

33. Archie Berberian, *Return of the Strategic Minuteman* (Maxwell AFB, AL: Air University, December 1989), 4–5 and 13.

34. The reserve associate program is described in House, *Military Airlift: Hearings before the Subcommittee on Military Airlift*, 91st Cong., 2nd sess., January–February 1970, 6259–6269.

35. John A. Tirpak, “Integrated Total Force,” *Air Force Magazine* 91, no. 3 (March 2008): 24–9, <http://www.airforcemag.com/MagazineArchive/Documents/2008/March%202008/0308integrated.pdf>.

36. Once again, Crackel's studies remain the best available on the evolution of the second CRAF plan. However, the official lay down of the new plan's provisions can be found in House, *Hearings before Special Subcommittee on National Military Airlift of the Committee on Armed Services*, 86th Cong., 2nd sess., 8 March–22 April 1960, 196.

37. House, *Hearings before Special Subcommittee on National Military Airlift of the Committee on Armed Services*, 88th Cong., 1st sess., 1963, 6178–9; House, *Military Air Transportation: Hearings before a Subcommittee on Government Operations*, 85th Cong., 2nd sess., 1958, 2–43.

38. House, *Military Airlift: Hearings before the Subcommittee on Military Airlift*, 91st Cong., 2nd sess, 22 January 1970, 6295; House, Committee on Armed Services, *Military Airlift Hearings before the Special Subcommittee on Military Airlift*, 89th Cong., 1st and 2nd sess., November and January 1965, 6727–8.

39. Bowers, *Tactical Airlift*, 675–83 and 691.

40. Bernard W. Rogers, *Vietnam Studies, Cedar Falls—Junction City: A Turning Point* (Washington, DC: Department of the Army, 1989), 84 and 101–2; and Shelby L. Stanton, *Vietnam Order of Battle* (New York: Galahad Books, 1986), 54.

41. Stanton, *Vietnam Order of Battle*, 109.

42. John J. Tolson, *Airmobility 1961–1971* (Washington, DC: Department of the Army, 1973), 169–79.

43. DOD, *Annual Report for Fiscal Year 1965*, 27; Charles Joseph Gross, *Prelude to the Total Force: The Air National Guard 1943–1969* (Washington, DC: Office of Air Force History, 1985), 117–8 and 147–51; and Gerald T. Cantwell, *Citizen Airmen: A History of the Air Force Reserve, 1946–1994* (Washington, DC: Air Force History and Museums Program, 1994), 209–10, and 216.

44. DOD, *Annual Report for Fiscal Year 1965*, 321; and Gen Howell M. Estes, Jr., commander, Military Air Transport Service (address to the National Defense Transportation Association, Alexandria, VA, 11 August 1966), 9. The inflation adjustment is based on the US Bureau of Labor and Statistics, “CPI Inflation Calculator,” n.d., accessed 27 December 2012, http://www.bls.gov/data/inflation_calculator.htm.

45. CRAF tonnages from Senate. Committee on Commerce. *Economic Condition of the Air Transportation Industry: Hearings before the Subcommittee on Aviation*, 92nd Cong., 1st sess., February and May 1971, 1031; and Estes, address, 9.

46. Military Airlift Command, *Strategic Airlift Input to Project Corona Harvest Jan 1965–Mar 1968* (Scott AFB, IL: Air Mobility Command History Office, 1970), I-IV-15.

47. Bowers, *Tactical Airlift*, 383; MAC, *Strategic Airlift Input to Project Corona Harvest*, II-I-1–3.

48. Bowers, *Tactical Airlift*, 384–5. Subsequent research by the author indicates that this arrangement was an informal one between the commander of MAC, Gen Paul K. Carlton, and the theater command. Its existence was not widely known among C-141 crews and apparently was used only rarely. Its importance at the time and for the future was more symbolic of the progress and potential of airlift consolidation than it was for its practical impact.

49. Ray L. Bowers, “USAF Airlift and the Airmobility Idea in Vietnam,” *Air University Review*, November–December 1974, 65.

50. *Ibid.*, 66.

51. For a recent and influential discussion of the rise and decline of the *Pax Americana*, see Michael Wesley, “Asia's New Age of Instability,” *National Interest*, November–December 2012, 21–9, <http://nationalinterest.org/article/asiyas-new-age-instability-7614>.

52. Ralph A. Cossa, Brad Glosserman, Michael A. McDevitt, Nirav Patel, James Przystup, and Brad Roberts, *The United States and the Asia-Pacific Region: Security Strategy for the Obama Administration* (Washington, DC: Center for a New American Security, February 2009), 19–23, http://www.cnas.org/files/documents/publications/CampbellPatelFord_US_Asia-Pacific_February2009.pdf.

53. For a useful discussion of the military and diplomatic history of Team Spirit, see John F. Farrell, “Team Spirit: A Case Study on the Value of Military Exercises as a Show of Force in the Aftermath of Combat Operations,” *Air & Space Power Journal* 23, no. 3 (Fall 2009): 94–106, <http://www.airpower.au.af.mil/airchronicles/apj/apj09/fal09/farrell.htm>.

54. For discussions of the inner workings of the NMAS and its planning guidelines, see Robert C. Owen, “A Structural and Operational Future for Global Airlift,” *Comparative Strategy* 12, no. 4 (October–December 1993): 459–470; and Robert C. Owen, “The Airlift System: A Primer,” *Air Power Journal* 9, no. 3 (Fall 1995): 16–29.

55. For detailed discussions of the evolution of airlift forces, see Miller, *Airlift Doctrine*; and Robert C. Owen, *Air Mobility: A Brief History of the American Experience* (Washington, DC: Potomac, 2013).

56. Department of Defense and US Transportation Command, *Mobility Capabilities and Requirements Study-16, Executive Summary* (Washington, DC: DOD, 26 February 2010).

57. Ibid., 6.

58. Office of Intelligence, Security, and Emergency Response, US Department of Transportation, "Civil Reserve Air Fleet (CRAF) Monthly Allocations," for April and October 2012, accessed 13 February 2013, <http://www.dot.gov/mission/administrations/intelligence-security-emergency-response/civil-reserve-airfleet-allocations>.

59. Office of the President of the United States, Office of Management and Budget, to Heads of Executive Departments and Establishments, letter, subject: "Circular No. A-76 (Revised), Performance of Commercial Activities," 29 May 2003, 1, http://www.whitehouse.gov/omb/circulars_a076_a76_incl_tech_correction.

60. Code of Federal Regulation (CFR) *Title 32*, section 169.4.

61. DOD, *DOD Financial Management Regulation 7000.14-R, Vol IIB, Chapter 1, Annex 1, "Objectives of the Defense Working Capital Funds,"* April 2010, 1-1-1.

62. Air Mobility Command Instruction 65-602, *Transportation Working Capital Fund (TWCF) Budget Guidance and Procedures*, 23 December 2009 (as revised through 8 August 2011, 6-8 and 43-61).

63. US Transportation Command, "Charters-Special Assignment Airlift Missions (SAAMS), Joint Chiefs of Staff Exercises (JCSE), and Contingencies for the Transportation Working Capital Fund (TWC), and Non-TWCF Aircraft, 01 October 11 to 30 September 12," 1 October 2011, paragraph 4.

64. Joseph Peck, analyst, US Army, Pacific (USARPAC), Logistics (G4), Mobility, interview by author, 9 January 2013.

65. Amy McCullough, "What's Next for the AEF?" *Air Force Magazine*, September 2012, 60, <http://www.airforcemag.com/MagazineArchive/Documents/2012/September%202012/0912aef.pdf>.

66. For the first comprehensive expression of national airlift policy, including discussion of the "hard core," see DOD, "The Role of Military Air Transport Service in Peace and War," February 1960, 3, 5-6, and 11-13 in House, Committee on Government Operations, *Hearings before Military Operations Subcommittee*, 86th Cong., 2nd sess., 1960, 133-174.

67. John A. Tirpak, "Mobility Maturation," *Air Force Magazine*, June 2012, 52, <http://www.airforcemag.com/MagazineArchive/Documents/2012/June%202012/0612mobility.pdf>. For earlier reports on the C-17 aging issue, see Tony Bartelme, "C-17s' Flight Time Piles Up Faster than Air Force Expected," *Charleston Post and Courier*, 2 December 2008 (revised 22 March 2012), <http://www.postandcourier.com/article/20081202/PC1602/312029896>; and J. R. Wilson, "The State of U.S. Air Force Airlift," *Defense Media Network*, 1 June 2010, <http://www.defensemedia.network/stories/the-state-of-u-s-air-force-airlift>.

68. Evan A. Feigenbaum, "China's Challenge to Pax Americana," *Washington Quarterly* 24, no. 3 (Summer 2001): 31-43.

69. The term *Pacis Aemulus* is the author's adoption. However, for a discussion of the impacts of China's rise on American strategic calculations, see Cossa et al, *United States and the Asia-Pacific Region*.

70. The literature contains thousands of articles and books discussing the economic rise of China. The author found a particularly useful summary of that process in David Lai, *The United States and China in Power Transition* (Carlisle Barracks, PA: US Army Strategic Studies Institute, 2011), 41-50, <http://www.strategicstudiesinstitute.army.mil/pdffiles/PUB1093.pdf>.

71. DOD, *Annual Report to Congress: The Military Power of the People's Republic of China 2005* (Washington, DC: DOD, 2005), executive summary page.

72. Joachim Hofbauer, Priscilla Hermann, and Sneha Raghavan, *Asian Defense Spending 2000-2011* (Washington, DC: Center for Strategic and International Studies, October 2012), 3-4 and 44, http://csis.org/files/publication/121005_Bertea_AsianDefenseSpending_Web.pdf.

73. DOD, *Annual Report to Congress, Military and Security Developments Involving the People's Republic of China, 2012* (Washington, DC: Office of the Secretary of Defense, May 2012), iv, http://www.defense.gov/pubs/pdfs/2012_cmpr_final.pdf.

74. Oriana Skylar Mastro, "The Sansha Garrison: China's Deliberate Escalation in the South China Sea," *East and South China Seas Bulletin* 5, September 2012, http://www.cnas.org/files/documents/publications/CNAS_ESCA_bulletin5.pdf.

75. For a baseline discussion of the impact of China's rise on the security and diplomatic calculations of various Asian states, see Hofbauer et al., *Asian Defense Spending*; and Evan S. Medeiros, Keith Crane, Eric Heginbotham, Norman D. Levin, Julia F. Lowell, Angel Rabasa, and Somi Seong, *Pacific Currents: The Responses of U.S. Allies and Security Partners in East Asia to China's Rise* (Santa Monica, CA: RAND, 2008), <http://www>.

rand.org/content/dam/rand/pubs/monographs/2008/RAND_MG736.pdf. There exist numerous discussions of these issues for specific countries, but a Government of Australia white paper is particularly comprehensive and cogent and probably speaks for most Asia-Pacific states dealing with the emergence of an assertive China and the importance they attach to America's continued and offsetting presence in the region. Government of Australia, *White Paper: Australia in the Asian Century* (Canberra: Department of the Prime Minister and Cabinet, October 2012), <http://asiancentury.dpmc.gov.au/sites/default/files/white-paper/australia-in-the-asian-century-white-paper.pdf>.

University's *New Mandala* website (<http://asiapacific.anu.edu.au/newmandala>) a very useful source of current information and learned perspective.

99. DOD, *Joint Operational Access Concept*, 7.
100. Erik W. Hansen, "Evaluating the C-17 Semi-Prepared Runway Capability—An Off-Road Map" (graduate research project, Air Force Institute of Technology, 6 June 2002), 11, 28, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ada430864>.
101. USAF, Air Force Pamphlet 10-1403, *Air Mobility Planning Factors*, 12 December 2011, 16.
102. Krepinevich, *Why AirSea Battle?* 8–10; and DOD, *Joint Operational Access*, 11.
103. Sarah Serizawa, "An Australian Perspective on U.S. Rebalancing toward Asia: An Interview with Rory Medcalf," *National Bureau of Asian Research*, 30 April 2012, <http://nbr.org/research/activity.aspx?id=242>; and Gordon Arthur, "US Marine Deployment in Darwin—"Bordering on the Remarkable!," *Asia-Pacific Defence Reporter*, 31 October 2012, <http://www.asiapacificdefencereporter.com/articles/266/US-MARINE-DEPLOYMENT-IN-DARWIN-BORDERING-ON-THE-REMARKABLE>.
104. DOD, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China*, 33–6.
105. MSC data extracted from Military Sealift Command, US Navy, "Ship Inventory," n.d., <http://www.msc.navy.mil/inventory/>; and MARAD from Maritime Administration, US Department of Transportation, "National Defense Reserve Fleet Inventory for the Month Ending January 31, 2012," 8 February 2012, 4, <http://www.marad.dot.gov/documents/i120131.pdf>.
106. For authoritative projections of the airlift fleet, see Air Mobility Command, *Air Mobility Master Plan 2012*, November 2011, 50–67. Also, in September 2012 the USAF took delivery of its 214th of a planned buy of 224 C-17s. However, 46 of those aircraft were assigned to USPACOM (16), the ANG (17) and AFRC (13), and an Air Force flight test squadron, and the Air Education and Training Command operated several others.
107. ANG, "Air National Guard Snapshot," n.d., <http://www.ang.af.mil/shared/media/document/AFD-120830-019.pdf>; and AFRC, "Air Force Reserve Snapshot," February 2013, <http://www.afrc.af.mil/shared/media/document/AFD-110413-008.pdf>.
108. Sydney J. Freedberg, Jr., "Exclusive: HASC Try to Protect Air Guard May Mess Up C-5 Plans, Association Warns," *Breaking Defense*, 1 June 2012, <http://breakingdefense.com/2012/06/01/exclusive-house-attempt-to-protect-air-guard-and-reserve-may-mess/>.
109. Tirpak, "Mobility Maturation," 49.
110. Information in this paragraph is largely extracted from Air Mobility Command, *Air Mobility Command Global En Route Strategy White Paper* (Scott AFB, IL: AMC, March 2009 and revised July 2010), 13–19, 20 (map).
111. Aircraft fleet composition and tonnage statistics from Dick J. Burkard, *Military Airlift Command Historical Handbook, 1941–1984* (Scott AFB, IL: MAC Office of History, 1984), 7, 100.
112. The standard planning cabin load of C-17s is 45 tons. See USAF, Air Force Pamphlet 10-1403, *Air Mobility Planning Factors*, 12 December 2011.
113. Maj Duncan McNabb, HQ MAC/XPPB, point paper, Subject: "Congressionally Mandated Mobility Study (CMMS)," 12 February 1986; Maj Thomas R. Mikolajcik, AFXOFL, point paper, Subject: "Congressionally Mandated Mobility Study (CMMS)," 30 April 1981, 1; and John Shea, former assistant director, Plans, Military Airlift Command, interview by the author, 8 August 1990, Tape 3A, index 409.
114. Joint Chiefs of Staff, *Mobility Requirements Study* (Unclassified), vol. 1, 23 January 1992, ES-2–ES-6 and I-2.; and Christopher J. Bowie, Fred L. Frostic, Kevin N. Lewis, John Lund, David Ochmanek, and Philip Propper, *The New Calculus: Analyzing Airpower's Changing Role in Joint Theater Campaigns* (Santa Monica, CA: RAND, 1993), xix, http://www.rand.org/content/dam/rand/pubs/monograph_reports/2005/MR149.pdf.
115. Sandy Detering, HQ AMC/XPDIJ, point paper, 6 July 1995; and John Borsi, HQ AMCSAF, "Mobility Requirements Study bottom-Up Review Update," 30 March 1995, 2.
116. DOD, *Executive Summary: Mobility Capabilities and Requirements Study* (Washington, DC: DOD, 26 February 2010), 3–6; John A. Tirpak, "The Double Life of Air Mobility," *Air Force Magazine*, July 2010, 31, <http://www.airforcemag.com/MagazineArchive/Documents/2010/July%202010/0710mobility.pdf>; and Jack Jackson, *Mobility Capabilities and Requirements Study 2016 Accreditation Report: Volume I: Summary*, Institute for Defense Analyses, IDA Paper P-4475 (Alexandria, VA: IDA, September 2009), 1–10, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA509833>.

117. James Dunnigan, "C-17 Died for Our Sins," *Strategy Page* (blog), 11 January 2011, <http://www.strategypage.com/dls/articles/C-17-Died-For-Our-Sins-1-11-2011.asp>.

118. John A. Tirpak, "Airlift on Thin Ice," *Air Force Magazine*, October 2008, 33–4, <http://www.airforcemag.com/MagazineArchive/Documents/2008/October%202008/1008airlift.pdf>.

119. AMC, *AMC Master Plan 2012*, 29.

120. Boeing Corporation, "Backgrounder: C-17 Globemaster III," June 2012, 1, http://www.boeing.com/defense-space/military/c17/docs/c17_overview.pdf; and US General Accounting Office to Congressman John Conyers, letter, 7 September 1993, 4–5.

121. Lockheed Martin Corporation, "C-130J Super Hercules: Whatever the Situation, We'll Be There," n.d., 27–8, http://cc-130j.ca/wp-content/pdfs/Spec_Book.pdf. In routine operations, C-130 pilots normally allow the aircraft to accelerate through takeoff speed to three-engine minimum-control airspeed (MCA) before lifting off. Doing this lengthens the takeoff roll significantly, but it also ensures positive aircraft control if an engine fails. In wartime, pilots can disregard this procedure, lift off at actual takeoff speed, and pray they do not lose an engine before they get to three-engine MCA.

122. California Bearing Ratio is the measure of the hardness or penetrability of an unpaved surface. The standard is a surface covered with crushed California limestone, which equates to a CBR of 100. CBRs of less than 10 equate to wet sand, soil, or tilled fields.

123. C-130 and C-17 performance and effects on weakly surfaced and unsurfaced airfields have been studied many times. The data in this paragraph was extracted from the Air Force Civil Engineer Support Agency, "Engineering Technical Letter 97-9; Criteria and Guidance for C-17 Contingency and Training Operations on Semi-Prepared Airfields," 25 November 1997, 10; and Lockheed Martin Corporation, "C-130J Super Hercules," 18.

124. John A. Tirpak, "A 10-Year Plan," *Air Force Magazine*, April 2012, 23, <http://www.airforcemag.com/MagazineArchive/Documents/2012/April%202012/0412plan.pdf>.

125. William R. Richardson and Thomas M. Ryan, memorandum of understanding, Subject: "Development of Joint Airlift Concepts and Doctrine," 16 August 1984, 1; Military Airlift Command and US Army Training and Doctrine Command, Airlift Concepts and Requirements Agency (ACRA), *Qualitative Intratheater Airlift Requirements Study*, 1985, xviii; and Military Airlift Command, Deputy Chief of Staff of Plans, "Advanced Tactical Transport (ATT) Concept Paper," November 1985.

126. The advanced studies group schools are intensive graduate programs aimed at producing exceptionally qualified, mid-career military operational and strategic planners. They include the USAF School of Advanced Air and Space Studies, the Army School of Advanced Military Studies, and the USMC School of Advanced Warfighting.

127. For DOD guidance on the need to establish agile and deceptive bases in severe A2/AD threat environments, see DOD, *JOAC, Version 1.0*, 18–20.

128. The need for an aircraft capable of carrying outsized loads into very short and minimally developed airfields is a long-established mobility requirement. This requirement drove the C-14/C-15 development programs in the 1970s and more recently appeared as a recommendation of the Defense Science Board in DOD, *Report of the Defense Science Board Task Force on Mobility* (Washington, DC: DOD, September 2005), 86–7 and 118.

Appendix G

North Korea's Military Capabilities and Strategy as the Kim Jong-il Era Ends

Looking Ahead to 2020

Bruce E. Bechtol

North Korea was a constant source of news from 2009 through 2011 and continuing in 2012 after the death of the “Dear Leader,” Kim Jong-il. His health issues in 2009 led to a plethora of pondering press pieces all over East Asia and in the United States. Indeed, questions about how long the Dear Leader would continue to live also led to international curiosity about the regime succession process in North Korea and the apparent plans for Kim to be succeeded by his third and youngest son, Kim Jong-un. Nevertheless, while these questions caught the fancy of the international press (as well as scholars who focus on East Asian matters), the issues that truly made North Korea a constant and focused source of news and concern for East Asia and the rest of the world were associated with Pyongyang’s violent military provocations against its neighbor to the south. Twice in 2010, North Korea’s unprovoked acts of military violence against South Korea (Republic of Korea [ROK]) brought the Korean Peninsula into the headlines all over the world. These acts also raised concerns over North Korean military capabilities and the strategy that Pyongyang employs with regards to its armed forces, the world’s fifth largest and arguably most unpredictable fighting force.¹

North Korea’s obvious lack of hesitation to use force raises a variety of national security questions—not the least of which is, how has North Korea’s strategy for use of its military forces changed in recent years? It is my belief, based on the evidence, that North Korea and its very large army is facing a variety of sustainment and modernization issues. Indeed, I would also assess that the North Korean military faces morale and welfare issues that continue to have an impact on its readiness to conduct warfare. However, in this appendix, I will address exactly how the military, in which North Korea operates in more of a state of flux than most people realize, has adjusted to these issues. I will also address how North Korea has gradually, but quite clearly, changed the focus of its forces in order to meet the challenges of sustainment, aging equipment, and a prosperous, militarily well-equipped neighbor to the south. Along those lines, it is also my intention to address recent advances (since the mid-2000s) North Korea has initiated in its military forces that directly threaten the ROK-US alliance and the ROK-US ability to defend the South Korean landmass. The

While recent events in Korea have rendered some material in this annex out-of-date, the research conducted by Bruce Bechtol contained in this appendix formed the basis for some of the conclusions in this study. As such, the editors felt that for purposes of completeness the annex should be included in this work. His analysis, current as of fall 2012, is included without substantive update from the form presented for the Asia-Pacific study analysis. Some excerpts in this annex were previously published in Bruce E. Bechtol Jr., “Maintaining a Rogue Military: North Korea’s Military Capabilities and Strategy at the End of the Kim Jong-il Era,” *International Journal of Korean Studies*, 16, no. 1, (Spring/Summer 2012): 160–91. Other excerpts were previously published in Bruce E. Bechtol Jr., “Developments in the North Korean Asymmetric Threat: Missiles and Electronic Warfare Missiles and Electronic Warfare,” *International Journal of Korean Studies*, 16, no. 2 (Fall/Winter 2012): 107–29. The author would like to thank Dr. Hugo Kim, the editor of the *International Journal of Korean Studies*.

focus of this appendix will be nonnuclear forces, though ballistic missiles are tied directly to these forces as a platform for a nuclear weapon.

Because the succession process has played such a major role in the North Korean governmental infrastructure and the power structure of the government is so tied into the military in North Korea, I will address the often unpredictable and often highly unusual process of the planned handover of power from father to third son in Pyongyang. Additionally, I will examine how this will affect military readiness and the stability of the military command structure now that Kim Jong-il is dead. Finally, I will address how the South Korean military and its US allies have reacted to and planned for changes occurring in the North Korean military and government.

Issues Facing the North Korean People's Army

Always in the background of any discussion about the readiness and capabilities of the North Korean military, North Korea's longstanding economic problems raise serious questions and are often cited by East Asian analysts as a reason why the army would not be able to fight effectively in a war with South Korea.² The North Korean military has not been able to add as many upgrades to its forces as Pyongyang would prefer, and this situation has existed since 1990, when the Soviet Union cut off subsidies of military equipment and fuel.³

It is against the backdrop of a country that is struggling to feed its people and simply provide fuel and power nationwide that one should address the issues for the North Korean military. The military is the best-fed and most efficient institution in North Korea. However, in recent years reports have begun to seep out about morale, efficiency, and readiness issues in some units of the military. According to a Chinese source who visited North Korea and reported to the South Korean press in early 2011, a new issue that has arisen is the illicit proliferation of South Korean movies and dramas among officers and troops. Reportedly, the army is taking this very seriously and cracking down on those caught watching these films—largely because of the morale issue that this creates.⁴ In other reports from 2011, soldiers are seen stealing food from local villagers, and the government appears to be providing some units with less than normal rations—even by North Korean standards.⁵ Recent testimony from defectors also alleges that in some units—sometimes even key units like tank battalions—malnourishment exists.⁶ Moreover, an ongoing lack of fuel has reportedly led some units in the north of the country to suffer from extreme cold in the wintertime and sometimes from a lack of food. Interestingly, this is not where the most important units are stationed, which may be an important issue.⁷

It is important to note that all of the reports coming out of North Korea that point to isolated incidents of food shortages or fuel shortages in the military are anecdotal. Indeed, there is no evidence to indicate that these reports are anything other than isolated incidents in units (at least for the most part) that are not of high military significance. Nevertheless, these reports do give one pause for reflection. One must ask the question, how has a military that has more than one million men on active duty been able to maintain its military readiness and capabilities in the face of food and fuel shortages that have gone on in one form or another for more than 20 years? How does a military that is no longer supplied for free with the latest military equipment and systems, as it was during the Cold War by the Soviet Union, able to present a credible, threatening stance against its neighbor to the south? In addition and perhaps as importantly, has the regime made the very necessary adjustment

in strategy that will allow the North Korean military to go “toe-to-toe” with the ROK-US alliance in combat?

Strategy in the Late Kim Jong-il Era: Focus on Asymmetric Forces

As analysts and policy makers were discussing the decline of the capabilities of the North Korean military because of economic woes in the 1990s, the North Koreans were making a much focused, highly involved transition to asymmetric forces.⁸ This transition began in the mid- to late 1990s and has evolved to the point that it can be assessed to be complete—though still evolving. In fact, as articulated earlier, North Korea continues to engage in violent acts of provocation, displays of brinkmanship (such as missile tests), and bombastic rhetoric that have resulted in Americans placing the isolated rogue state at the top of the list of whom they see as the greatest threat. According to a *Christian Science Monitor* and TechnoMetrica Market Intelligence poll released in December of 2010, Americans rated only al-Qaeda as a higher threat to the United States.⁹

This asymmetric strategy continues to be a very credible, deadly threat, even as North Korea struggles to maintain the capabilities of its slowly declining—though large and very well armed—traditional conventional forces. In fact, in his confirmation hearings before the ROK national assembly, South Korean Defense Minister Kim Kwan-jin remarked that North Korea’s asymmetrical forces (strategic weapons, submarines, and special operations forces) “were increasingly becoming a serious threat to the South Korean military.” He further stated that “an additional attack by the North using its asymmetrical strengths is the most serious threat as of now.”¹⁰

In compelling congressional testimony given during 2010, Assistant Secretary of Defense for Asian and Pacific Affairs and retired US Marine Corps lieutenant general Wallace “Chip” Gregson stated, “As North Korea’s conventional military capability slowly deteriorates, the unconventional threat it poses only increases, posing new challenges to the U.S.-ROK Alliance.” Commenting on how resource constraints have affected North Korea’s strategy, General Gregson further stated, “Other nations possess material capabilities that match or exceed what North Korea possesses, but North Korea poses a unique threat because of its proven willingness to match resources and capabilities with provocative, unpredictable behavior, and its continued export of illicit items to other states that seek to harm the U.S. and our allies and friends around the world. The danger posed by North Korean weapons and military strength are amplified greatly by the regime’s willingness to dedicate its meager resources to maximizing its lethality.” General Gregson made perhaps the most cogent, accurate assessment stated in recent times regarding the North Korean military strategy and the threat that it poses: “North Korea’s decline in conventional military terms has led to an evolution in the nature of the North Korea threat, not a diminution of it. North Korea has adapted to the U.S.-ROK alliance’s conventional military superiority by developing tactics and weapons systems that equip them with offensive capabilities that avoid confronting the greatest military strengths of the alliance, in an attempt to compete on what it likely perceives as a more favorable playing field.”¹¹

The statements by high-level officials in both the United States and South Korea reflect a concern for a North Korean strategy that has evolved to a degree of lethality that is highly threatening to security in Northeast Asia. However, this leads one to ask the question, what comprises the asymmetric threat? It also leads one to ask, if there have been serious con-

straints on North Korean military acquisition, what are the advances Pyongyang has made? I believe these are questions that are answered very easily. North Korea's evolving asymmetric threat is comprised of three key components: long-range artillery, special operations forces, and ballistic missiles. While North Korea also uses asymmetry in other aspects of its armed forces, these are the three key columns that form the hub of a threat that has been developed, honed, and maintained since the mid- to late 1990s.

If one is to analyze the first component of the “tripod” that forms the North Korean multi-headed asymmetric threat, long-range artillery, the results are quite interesting. US and South Korean estimates state that North Korea has more than 13,000 artillery and multiple rocket launcher (MRL) systems.¹² A thousand of these systems, perhaps more, fall into the “long-range” category. They consist of long-range 170 millimeter (mm) self-propelled guns, augmented by long-range 240 mm multiple rocket launchers. Between 250 and 400 of these systems have the ability to hit Seoul with their ordnance, and many are located in hardened artillery sites (HART), which have been constructed very close, often within 5 kilometers (km), to the Demilitarized Zone (DMZ). Estimates state that there are as many as 500 of these HARTs positioned in locations from which they could hit Seoul or surrounding areas with little to no warning. The locations are within the North Korean 2nd and 5th Corps along the DMZ. The artillery deployed to these locations primarily sits in the main invasion corridors into South Korea—the Kaesong-Munsan corridor and the Chorwon Valley corridor (fig. G-1). Perhaps as importantly, an estimated 5–20 percent of rounds provided to forward artillery units would be equipped with chemical munitions—thus, quite literally turning North Korean long-range artillery systems along the DMZ into weapons of mass destruction.¹³ Press reports based on data released by the South Korean government assess that North Korea has approximately 5,000 tons of chemical agents that could contaminate an area up to four times the size of Seoul, which means the long-range artillery North Korea has deployed along the DMZ presents a planning nightmare for ROK and US military staffs.¹⁴

Reports from 2010 and 2011 indicate that North Korea has deployed more artillery systems along the DMZ. According to multiple sources, Pyongyang has added perhaps as many as 100 systems along the DMZ—primarily MRLs. Some of these are shorter-range systems that would target smaller cities and towns in Kyonggi-do, the province surrounding Seoul. However, at least some of these systems are likely the long-range 240 mm MRLs, which means in recent years Pyongyang has actually added to the lethality of the weapons systems it has deployed along the DMZ that are capable of causing panic and mass casualties in Seoul. North Korea may now have 200 or more of these long-range MRL systems deployed where they can hit Seoul and 200 more of the 170 mm guns also deployed where they can do the same. In addition, Pyongyang has added to the survivability of its artillery systems deployed along the DMZ. Press reports, citing ROK Ministry of National Defense (MND) officials, state that at several artillery sites, the North Koreans have built tunnels into hills and/or mountains. The systems would fire their ordnance from behind the hill or mountain and then “scoot” back into the tunnel, making it more difficult for ROK or US counterbattery fire and/or ground-attack aircraft to take them out.¹⁵

An analysis of the second tripod of North Korea's asymmetric threat, ballistic missiles, shows an evolving, ever-improving threat. North Korea's ballistic missiles threaten not only South Korea and Japan, but also regions much farther away. North Korea received its

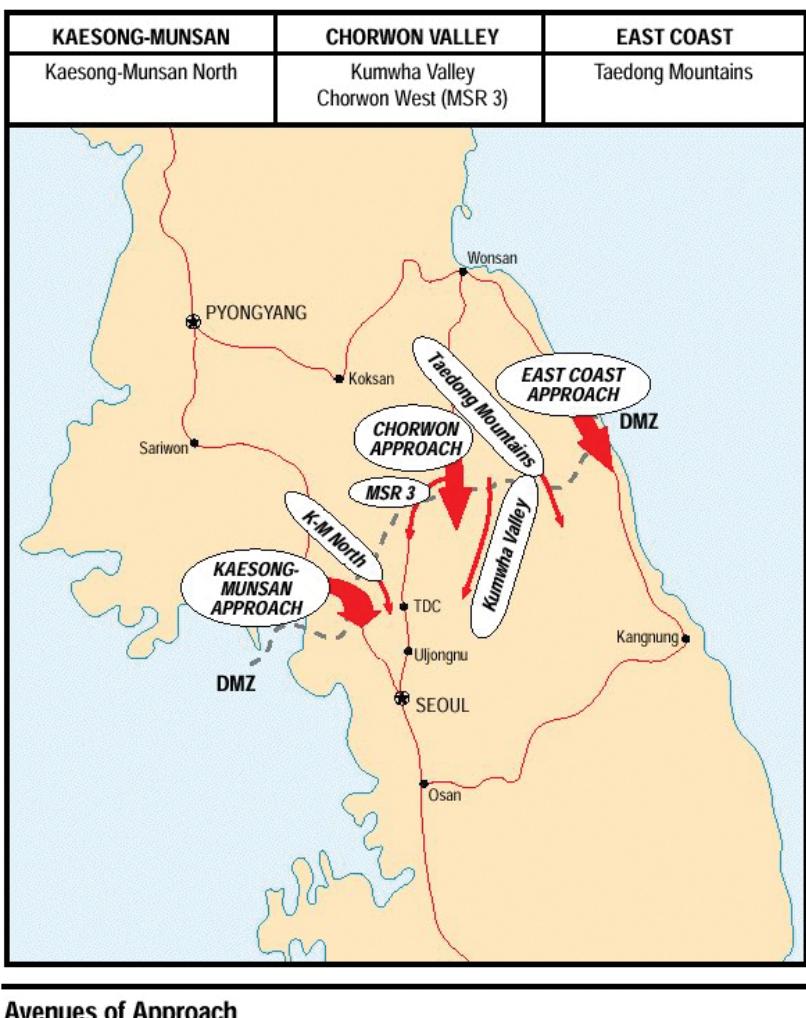


Figure G-1. Korean invasion routes. (Marine Corps Intelligence Activity, *North Korean Country Handbook* [Quantico, VA: USMC, May 1997], 52, <http://www.fas.org/nuke/guide/dprk/nkor.pdf>.)

first ballistic missiles in the form of the R-300 Elbrus/SS-1c Scud-B from Egypt, delivered as early as 1976.¹⁶ Pyongyang was able to build on technology from the SCUD-B to later develop the SCUD-C and, in following years, the SCUD-D (the latter has a range of more than 700 km).¹⁷ In 2006 the North Koreans conducted missile tests that showed they had also apparently built and deployed an extended-range SCUD with a range of 850 km.¹⁸ The North Koreans have also developed, deployed, and successfully test-launched the No Dong missile, which has a range of 1,300 to 1,500 km, making it capable of striking Japan. Analysts believe North Korean engineers developed the No Dong missile from SCUD technology.¹⁹ The development of the missiles described above means that with SCUDs, North Korea can literally target every single inch of the landmass of South Korea. With the No Dong missile, North Korea can target key nodes in Japan, including Tokyo. North Korea continues to hone the capabilities of the SCUD and No Dong missile systems.

North Korea also has other short-range missiles that rate discussion. Key among these missiles is a variant of the Soviet SS-21 Scarab that boasts an extended range. North Korea probably acquired this missile from Syria in the late 1990s. Soon after acquiring the missile, well-known for its deployment facing allied forces in Europe during the Cold War, the North Koreans engineered their own indigenously produced version of the system, identified as the KN-02 Toksa (Viper). The tactical, mobile missile has a range of at least 120 km and can target US and ROK bases south of Seoul.²⁰ The KN-02 is “road mobile,” which means it deploys on a truck-mounted, transporter-erector-launcher (TEL). The KN-02 uses solid fuel, which means it can deploy faster and its crews can load and fire more rapidly than other, less modern systems.²¹ Pyongyang has conducted several test firings of this missile, and analysts have stated that such tests appeared to be successful.²²

There is another missile that the North Koreans have developed successfully in the past 10 years, but this missile has received far less publicity. This missile is called the BM-25 Musudan—also known as the Taepo Dong X. The North Koreans based the Musudan on the technology of the Soviet-engineered SS-N-6 Serb, one of the former Soviet Union’s submarine-launched ballistic missiles. Pyongyang does not have submarines capable of launching such a missile. Thus, the North Koreans converted the missile so that it could be deployed from TELs and, reportedly, at fixed sites. Perhaps the most ominous thing about the missile is that it has the range up to 4,000 km, giving it the capability to hit Guam.²³ The public got its first look at the Musudan in 2010, during a military parade in Pyongyang.²⁴ Just as disturbing, some analysts reportedly believe that the Musudan is capable of carrying a nuclear warhead.²⁵ By 2010 the North Koreans had apparently deployed so many Musudan missiles that they decided to form a new, independent missile division to keep up with this new capability.²⁶ The deployment of these missiles appears to have changed the South Korean assessment on the number of North Korean ballistic missiles. In March 2010 the South Korean Minister of National Defense reportedly stated that North Korea had about 1,000 ballistic missiles, an increase over previous estimates of 800 ballistic missiles, and this was apparently a direct reference to an assessment regarding the Musudan missile.²⁷ US intelligence officials reportedly have assessed that North Korea is developing a road-mobile intercontinental ballistic missile (ICBM)—possibly a variant of the Musudan.²⁸

Of course, the SCUD missiles can target all of South Korea, the No Rodong can target key nodes in Japan, and the Musudan can target US sovereign territory on Guam. All of these systems have been test launched successfully in one form or another. The Musudan has not been test launched from North Korea, but Iran successfully tested the missile, having acquired the missile from North Korea in 2006.²⁹ The North Koreans continue development of the Taepo Dong 1 and Taepo Dong 2 systems, but to date, these three-stage missiles have not proven to be successful in test launches conducted in 1998, 2006, and 2009 (I will discuss the attempted missile launch of 2012 later). Once these missiles prove successful, they will potentially have the capability to target Alaska and Hawaii (fig. G-2).³⁰ Of course, as North Korea continues to develop its short-range, medium-range, and long-range ballistic missiles, it also continues to develop the facilities from which test launches of these missiles will occur. A facility at Tongchang-ni is now ready to go, representing a significant upgrade over facilities where other missile launches have occurred, principally the facilities at Musudan. Tongchang-ni was the site of North Korea’s missile launch of 2012.³¹



Figure G-2. North Korean ballistic missile capabilities. (Ministry of National Defense, Republic of Korea, 2010 Defense White Paper [Seoul: Ministry of National Defense, 2011], 35, http://www.mnd.go.kr/user/mnd_eng/upload/publictn/PBLICTNEBOOK_201308080718210240.pdf.)

North Korea chose to conduct yet another missile test launch in the spring of 2012. The North Koreans formally announced that they would conduct a “satellite launch” on 16 March 2012, calling the launch platform the Unha-3, when in reality it was the same three-stage, long-range ballistic missile platform commonly known as the Taepo Dong 2. Pyongyang’s state-sponsored propaganda outlet, Korea Central News Agency (KCNA), announced the launch. The regime informed the International Civil Aviation Administration and the International Maritime Organization that the first stage of the rocket would land in the water approximately 140 km west of the Byeonsan Peninsula in South Korea, and the second stage would land approximately 190 km east of the Philippines. Moreover, they stated that the launch was to be from the new, previously unused, North Korean facility at Tongchang-ri.³² The North Koreans formally announced that the launch would occur sometime during a five-day period from 12–16 April 2012.³³

The Tongchang-ri site, near the west coast, is interesting because it is an upgrade from the facilities that North Korea has used for long-range missile launches in the past, that is, Musudan, on the east coast. The facilities at Tongchang-ri have some similarities to the Iranian launch facility at Shahid Hemrat, east of Tehran. Reportedly, the static rocket motor test stand at Tongchang-ri looks much like the one located in Iran, indicating probable collaboration on launch facilities between the Iranians and the North Koreans (the North Koreans had been building the site at Tongchang-ri for at least 10 years and may have aided the Iranians in some of their construction as well). Missiles launched from the site at Tongchang-ri also can achieve a higher altitude before passing maritime ballistic missile defense platforms like the US Aegis-equipped ships, increasing survivability in a potential conflict. There are other advantages as well to the new site, including an underground pipe-

line equipped with a fuel tank beside the launch pad, which can hide fueling operations from potential satellite coverage.³⁴

On 19 March 2012 it was revealed that South Korean and US officials planned to search for debris from the first stage after it fell into the waters west of South Korea, though these waters are known to be quite muddy—making debris searches difficult to conduct.³⁵ South Korean and US officials also reportedly believed that the North Koreans had been planning the launch since 2011. North Korean officials told US officials during bilateral talks held days before Kim Jong-il's death that Pyongyang intended to launch a satellite in commemoration of Kim Il-sung's 100th birthday. During the bilateral talks, US special envoy Glyn Davies warned Kim Kye-gwan, the North Korean first vice foreign minister, that such a launch, which the United States and South Korea considered a missile test in reality, would be a violation of bilateral agreements. Following this exchange, the North Koreans reached an agreement with the United States that involved US food aid going to North Korea in exchange for a moratorium on missile launches and an opening of nuclear facilities for inspection. Despite this, several days after reaching an agreement (announced on 29 February 2012), the North Koreans announced the upcoming launch of a satellite, thus breaking the agreement and creating puzzlement in diplomatic circles on both sides of the Pacific.³⁶

On 21 March 2012, aircraft flying on routes between the Philippines and Japan were cautioned for the days that the North Korean launch was scheduled. Routes going from the eastern coast of Mindanao in the Philippines to the Kyushu island chain and routes going north of Manila were affected. Seoul also announced that aircraft flights would be affected, specifically airline flights leaving Cheju Island bound for Beijing.³⁷ Of note, North Korea announced that its upcoming missile launch was to launch a satellite called Kwangmyongsong-3 into orbit. It further announced that the alleged satellite would broadcast remote data in the UHF band and video in the X-band, according to the International Telecommunications Union.³⁸ In an apparent response to North Korea's intentions to carry out the launch, South Korea announced efforts to deter Pyongyang's launch of the Taepo Dong 2 missile, with ROK government officials stating they would refer the incident to the UN Security Council (UNSC) if the launch went forward.³⁹ Japan also took action very quickly. The Japanese government announced it would mobilize MIM-104F (PAC-3) Patriot ballistic missile defense forces and deploy three Aegis-equipped ships in reaction to the launch, stating that falling debris from the missile was the key concern. If the launch were to go as planned, it would fly over Okinawa Prefecture.⁴⁰

By 26 March 2012 North Korea had moved the missile by special train from the factory to the launch site at Tongchang-ni. According to a statement by Col Lee Bung-woo of the South Korean Joint Chiefs of Staff office, “North Korea has transported the body of its long-range missile to Dongchang-ri and is making preparations inside a building for the blast-off.”⁴¹ The reactions of the international community were by this time starting to mount. A senior US official reportedly stated that debris from the rocket could cause casualties, raising concerns for both the South Koreans and the Japanese.⁴² By 29 March 2012 the North Koreans had reportedly initiated several key preparations. According to “38 North,” a website run by the US-Korea Center at the Johns Hopkins University School of Advanced International Studies,

The mobile launch pad is seen sitting on tracks next to the gantry tower. All the work platforms have been folded back and the crane on top is at a 45 degree angle relative to the pad, indicating that equipment is being loaded onto the gantry. At the base of the gantry there are

numerous small objects on the pad and several people. There is also a plate under the mobile launch stand to cover the entrance into the flame trench that is still in place and will be removed prior to launch. A crew appears to be cutting brush away from the concrete in the brown dirt area that extends from in front of the pad up the right side. . . . At the two largest propellant storage buildings to the right of the launch pad, containing large tanks to supply the Unha-3's first stage, trucks can be seen delivering fuel and oxidizer to small tanks.⁴³

By 30 March 2012 the North Koreans had begun assembly work on the first- and second-stage rocket for the long-range missile, according to South Korean officials. North Korea announced that the Kwangmyongsong-3 satellite to be mounted on the top of the three-stage missile would weigh 100 kilograms (kg). In an unprecedented move, the North Koreans also announced that they would invite international observers to the launch. Both South Korea and the United States announced that they would decline this invitation.⁴⁴ Also on 30 March, the Obama administration announced that it had dropped plans to provide 240,000 metric tons of food aid to North Korea because of the planned launch, which Washington viewed as a direct violation of the 29 February 2012 agreement. Pres. Barack Obama stated that the launch could also lead to further economic sanctions against North Korea.⁴⁵ In a likely reaction to the North Korean refusal to halt launch preparations, the United States dispatched a sea-based X-Band radar to track North Korean operations.⁴⁶ The first of three Japanese Aegis-equipped destroyers left port on 31 March, and PAC-3 ballistic missiles systems left their home bases bound for deployment in preparation for the North Korean missile launch on the same day.⁴⁷

By 1 April 2012 analysis of intelligence imagery detected a mobile radar trailer with a dish antenna (likely radar tracking equipment) at the Tongchang-ni site. The mobile trailer and its accompanying equipment was likely brought to the site in order to recover important telemetry data from the missile's engines and guidance system and to ensure that it remained on the correct trajectory.⁴⁸ The technology the North Koreans have used thus far in attempting to perfect a three-stage missile appears to be rather primitive when compared to other nation-states that have already launched a similar platform. While there is some disagreement regarding the actual composition of the missile, many analysts agree that the first stage (the bottom) appears to be a "cluster" of No Dong engines. This is the stage needing the most power as the missile launches. The second stage appears to be comprised of a Musudan missile or key parts and the engine of a Musudan missile. The third stage is of unknown composition, though some analysts have said that it seems similar to the top stage of the Iranian Safir-2 platform, which was likely designed by the Iranians with a great deal of help from the North Koreans. The Taepo Dong 2 launched in 2012 was approximately 32 meters long.⁴⁹

By 2 April 2012 the Pentagon had activated its global missile defense shield in reaction to North Korea's imminent long-range missile launch. According to national security reporter Bill Gertz, "The measures include stepped-up electronic monitoring, deployment of missile interceptor ships, and activation of radar networks to areas near the Korean peninsula and western Pacific. . . . Current U.S. missile defense systems include networks of radar and space tracking gear, including ground- and sea-based radar, Aegis ships, and long-range interceptor missiles based in Alaska and California. A total of 30 three-stage interceptors are deployed. . . . [Furthermore] the initial phases of the U.S. missile defense activation include stepped-up intelligence gathering by spy satellites and RC-135 Cobra Ball aircraft based at Kadena Air Base in Okinawa, Japan."⁵⁰ By 4 April 2012 the South Korean govern-

ment had also confirmed that it intended to send at least two Aegis-equipped ships to the waters near the west coast and the south coast of the Korean Peninsula. By this time, South Korea, the United States, and Japan had all dispatched Aegis-equipped ships to waters where they could track the missile or possibly shoot it down if necessary.⁵¹

On 8 April 2012 South Korean press sources confirmed that media from around the world had arrived in Pyongyang. North Korea's official propaganda agency, KCNA, confirmed that more than 20 media outlets had arrived in the isolated country, including the Associated Press, Cable News Network, Reuters, Agence France-Presse, British Broadcast Corporation, Kyodo News, and Japan Broadcasting Corporation (NHK).⁵² On the same day, North Korea had moved all three stages of the missile into position on the launch pad in full view of foreign news agencies.⁵³ Meanwhile, North Korea's announced plans for an imminent missile launch prompted several Asian airlines to adjust further their routes during the scheduled time window. Philippine Airlines announced that about a dozen of its flights would fly routes away from the missile's flight path, as did two South Korean airlines. Japan Airlines and All Nippon Airways announced that they would alter flight paths on routes between Tokyo to Manila, Singapore, and Indonesia.⁵⁴ On 10 April Ryu Kum-chol, the deputy director of North Korea's space development department, announced that North Korean engineers were ready to complete the assembly of the missile by adding the satellite payload. He also announced that debris from the missile in its flight path posed "no danger to countries in the region."⁵⁵ On 11 April engineers were observed pumping fuel into the missile, which was mostly covered with a green tarp.⁵⁶

According to press reports, days before North Korea actually conducted the test launch of the Taepo Dong 2, a secret US delegation made a one-day visit to Pyongyang—apparently in the hope of convincing the North Koreans to cancel the launch. According to a diplomatic source quoted in the press, Sydney Seiler, a member of the White House National Security Council staff, and Joseph DeTrani, the director of the National Counter-Proliferation Center, departed on 7 April 2012 aboard a USAF Boeing-737 that carried them from Guam to Pyongyang.⁵⁷ Their mission was unsuccessful.

On 13 April 2012 the North Koreans conducted their fourth test of a long-range ballistic missile. The Taepo Dong 2 (called Unha-3 by the North Koreans) launched at 7:39 a.m. Korean time. The missile launch did not go well. The platform apparently exploded approximately two minutes after launch, and the missile broke into about 20 pieces—all of which fell into the ocean about 165 km southwest of Seoul. The cause of the failure may have been a fuel leakage or a flawed engine in the first stage rocket. Some analysts believe the North Koreans may have intentionally aborted the flight because of a problem with the staging system. Other possibilities also exist. The missile launch may have failed because the first stage propellant failed to separate from the rest of the system. Most analysts agree that the failure was possibly a result of a flaw in the first stage of the missile. By 17 April 2012 South Korean ships searching for debris from the missile off the west coast of the Korean Peninsula were ready to shut down operations, with no debris reportedly found. Lt Gen Patrick J. O'Reilly (US Army), commanding general of Washington's ballistic missile defense program, remarked later that month that he saw little progress in North Korea's program. Meanwhile, another, apparently duplicate, missile remained near Tongchang-ni at an assembly plant.⁵⁸

Immediately following North Korea's failed launch of the Taepo Dong 2, the UNSC condemned the action. According to US Ambassador to the UN Susan Rice, "Members of

the Security Council deplored this launch which is in violation of Security Council resolutions 1718 and 1874. Members of the Security Council agreed to continue consultations on an appropriate response in accordance with its responsibilities given the urgency of the matter.”⁵⁹ The United States also immediately announced that it was nullifying its previous deal with North Korea to provide food aid in return for a moratorium on ballistic missile launches—in addition to canceling other previously agreed upon actions.⁶⁰ In response to the UNSC’s condemnation, the North Korean foreign ministry defiantly issued a statement that said in part, “Firstly, we resolutely and totally reject the unreasonable behavior of the UNSC to violate the DPRK’s [Democratic People’s Republic of Korea, or North Korea] legitimate right to launch satellites.” The North Korean statement also tersely dismissed the actions taken by the United States, saying in part, “We have thus become able to take necessary retaliatory measures, free from the agreement. The U.S. will be held wholly accountable for all the ensuing consequences.”⁶¹

According to sources in the Japanese press, the United States sought to gain more sanctions against Pyongyang as a result of the launch, and submitted a list to the UNSC of at least 17 North Korean entities. The United States sought to freeze the assets of these entities, with the aforementioned list reportedly growing to 40 entities.⁶² On 3 May 2012 the UNSC imposed sanctions on three North Korean state-owned companies, Green Pine Conglomerate, Korea Heungjin Trading Company, and Amrogang Development Banking Corporation—a drastically shortened list at the insistence of China.⁶³ In my view, the sanctions, though much less than Washington would have preferred, were an important international action and added to sanctions the United States had imposed during 2010 that I will address later.

The results of North Korea’s supposed satellite launch on 13 April 2012 are important and should be addressed. First, it was not simply a satellite launch as claimed by the North Koreans. The technology for a three-stage ballistic missile or a platform for a satellite is exactly the same—only the payload is different: satellite or warhead.⁶⁴ Thus, the threatening and provocative nature of the event and the negative international reaction were understandable. Another important aspect is the fact this was the first launch to occur from the facility at Tongchang-ni, though this improved facility does not yet apparently give the North Koreans the ability to conduct a covert long-range missile launch—key for warning time of US ballistic missile defense systems. When compared to other launches conducted in 1998, 2006, and 2009, key differences are that North Korea invited the international press to attend the event and publicly and openly admitted that the launch was unsuccessful.

The political aspects of the context surrounding the launch are important as well. This launch showed that Kim Jong-un was continuing the policies his father had planned before Jong-il’s death, and the test launch was one of the very first examples that this would happen. According to former acting Assistant Secretary of State Evans Revere, the North Koreans informed him during July 2011 that they had “the sovereign right to launch a satellite and we will never give up that right no matter what.”⁶⁵ This probably indicates that Pyongyang had begun plans to conduct a long-range missile launch at least as early as mid-2011. Other political aspects demonstrated this transition of power from father to son and the continuation of existing policy. As I said in a press piece March 26, 2012, “There may still be some confusion within the ‘new’ government in North Korea with Kim Jong-un as its leader.”

Reportedly, during bilateral talks just days before Kim Jong-il’s death, US officials, when notified of plans for a test-launch, told the North Koreans that a ballistic missile launch (no

matter what the “purpose”) would violate UNSC Resolution 1874 and breach agreements. And yet the North Koreans went ahead with a new deal for inspections and a moratorium on ballistic missile testing. Then they announced the “satellite test launch” soon thereafter, showing either obvious confusion in the decision-making process or a sudden decision reversal. Perhaps the North Korean succession process is not proceeding as “smoothly” as many have assumed. The launch was a carryover of Kim Jong-il’s policy, so it is a reasonable assessment to assume that it would have occurred if he were still alive. However, the diplomatic confusion that ensued under his son’s regime would not have occurred under the elder Kim.

The last, and perhaps most compelling, aspect of the test launch conducted during April 2012 is related to proliferation. According to press sources, a 12-member Iranian delegation arrived in North Korea to observe the launch. The Iranians were engineers from the Shahid Hemat Industrial Group (SHIG) and were in North Korea to watch all of the launch and prelaunch activities. The engineers reportedly were there to exchange information regarding the high-thrust engines and separation technology for a three-stage missile. In keeping with past exchanges between Iran and North Korea, observers believe Tehran helped to fund the launch in exchange for valuable data for use in their own programs. SHIG is in charge of Iran’s Shahab-3 medium-range ballistic missile (MRBM) program (among others). The Shahab-3 is Iran’s version of the North Korean-built No Dong and has long been under US sanctions.⁶⁶ A future successful launch of the Taepo Dong missile system will mean hundreds of millions of dollars (or more) in sales from North Korea to Iran. However, even before that happens, the sale of development technology between Pyongyang and Tehran continues to be mutually beneficial for both nations.

On 12 December 2012, North Korea once again conducted a test launch of the Taepo Dong 2. The North Koreans essentially followed the same timeline as indicated above for the test launch that occurred in April 2012, and the reaction of the international community (including military readiness) was also almost exactly the same. This time, however, the North Koreans were successful. Reports indicate that the missile (satellite platform) went through all three stages and successfully launched a satellite into space. North Korea has now proven that it can successfully launch a three-stage ballistic missile.⁶⁷ This is a major step forward for the DPRK. North Korea must now overcome three main issues in coming years. First, it must be able to launch the missile by avoiding a preemptive strike—a difficult measure right now for the North Koreans, since everything is out in the open and the Americans could destroy the missile well before launch. The North Koreans will need to develop a mobile launcher and/or a covert site where US intelligence cannot detect launch preparations ahead of time. Second, the North Koreans must be able to place a nuclear payload on the missile. It is unclear if the North Koreans have stabilized the platform to the point that they could place a nuclear warhead on the missile. In fact, it is unlikely that they have been able to do so yet. Their big challenge now will be fitting a nuclear warhead to a Taepo Dong 2. If they are unable to do so, the likely alternative is a chemical payload—a much easier proposition. Third, the North Koreans must proliferate the missile to Iran. The Taepo Dong 2 is so big that it would likely have to ship to Iran in stages if transported by aircraft. Because of the Proliferation Security Initiative (PSI), it will be difficult to fly aircraft to Iran without having to pass through the airspace of nations that would force it down. One alternative, of course, is to fly through China and then south to Iran. The question remains whether the Chinese will allow this, as they did with highly enriched uranium parts and No Dong missiles going back and forth to Pakistan during the 1990s until 2002. Alternatively,

the North Koreans could use maritime means to transport the missiles to Iran. This has proven to be dicey at times as well—largely, again, because of PSI. However, the North Koreans have proven to be quite clever in their use of tactics, techniques, and procedures for getting around international counterproliferation efforts.

North Korea's missile programs have all proven to be successful and have been widely deployed and proliferated, including now the Taepo Dong program, for which the saying “the fifth time worked” applies. North Korea is apparently developing yet another long-range missile—this one perhaps capable of being deployed and launched from a mobile TEL. In December 2011 Bill Gertz broke the story that North Korea was developing a new ICBM—perhaps a variant of the already developed, deployed, tested, and proliferated Musudan missile, which has a range of 4,000 km. Then-Secretary of Defense Robert Gates may have first spoken of this, stating in a June 2011 speech in Singapore that “with the continued development of long-range missiles and potentially a road-mobile intercontinental ballistic missile and their continuing development of nuclear weapons, . . . North Korea is in the process of becoming a direct threat to the United States.”⁶⁸

The missile described above was apparently the model put on display in a parade in Pyongyang during April 2012. While many analysts said that the missile appeared to be a “mock-up,” North Korea has never displayed missiles in parades that were not either in development or already deployed. Rumor has it that the missile is equipped with boosters that would give it a maximum range of 6,200 miles, meaning it could hit the continental United States and may be of longer range than the Musudan missile on which it may have originally been modeled. However, arguments remain about whether the missile displayed was in actuality an MRBM, like the Musudan, or in fact an ICBM. Of interest, the TEL upon which the missile was displayed appeared to be of Chinese design, which would put Beijing in violation of UNSC-imposed sanctions. The 16-wheel TEL appears to be of a design consistent with the one produced by the 9th Academy of China Aerospace Science and Industry Corporation. A Chinese firm, suspected to be Hubei Sanjiang, may have sold the designs or the chassis for the vehicle to the North Koreans, “not realizing” it was a dual-use technology. The Chinese government denied allegations that it had violated UN sanctions. According to press reports, a Chinese firm sold eight of the vehicles to North Korea. The vehicles are equipped with US-manufactured diesel engines and have German-made transmissions. US officials have reportedly voiced their concerns about the unconfirmed proliferation to Chinese officials.⁶⁹ In congressional testimony, Secretary of Defense Leon Panetta commented on Chinese assistance to North Korea's missile program, stating in part, “I'm sure there's been some help coming from China. I don't know, you know, the exact extent of that. . . . But clearly there's been assistance along those lines.” He declined to give more details because of “the sensitivity of that information.”⁷⁰

From the South Korean perspective, the third and perhaps most ominous leg of the tripod of the North Korean asymmetric threat is the special operations forces (SOF). North Korean SOFs are the best trained, best fed, and easily the most indoctrinated of all DPRK military forces. North Korean SOFs have a variety of missions and thus a wide variety of units. These units can be organized by brigade or battalion, all the way down to special two- or three-man “teams.” Most of the SOF units fall under a variety of commands, which often work closely together during exercises or live operations. There are units subordinate to the Light Infantry Training Guidance Bureau (sometimes called the 11th Corps), the Reconnaissance General Bureau, Army corps and divisions, or Korean People's Navy/Air Force.

Most official estimates place strength at more than 25 brigades and five independent reconnaissance battalions, though those numbers have probably grown significantly since 2006.⁷¹

North Korean SOF can insert into South Korea in a variety of ways. They can paratroop from one of the 300 Antonov AN-2 single-engine biplane utility aircraft in North Korea's air inventory or via helicopter. Additionally, their SOF are able to use a variety of maritime insertion means such as submarines, air-cushion vessels, and semisubmersibles and are also capable of entering the South via tunnels dug under the DMZ.⁷² A defector report attributed to a former North Korean military officer states that, between 2004 and 2007, the DPRK built 800 bunkers or more close to or right on the DMZ. According to the former North Korean military officer, the contents of the bunkers include military equipment sufficient to arm up to 2,000 men. The defector also stated that South Korean military uniforms and name tags were stocked in the bunkers so that North Korean forces could disguise themselves prior to infiltration. The caches also include small arms that would be very effective at the tactical level such as 60 mm mortar shells.⁷³ Evidence at least partially confirming the former North Korean officer's assertions came to light in late 2010, when North Korean SOF troops were spotted training in military uniforms with the same camouflage pattern as that seen on uniforms issued to South Korean troops.⁷⁴

According to a report authored by retired brigadier general Lee Won-seung of the Korea Advanced Institute of Science and Technology and released to the South Korean press, North Korea's SOF have been trained to infiltrate and strike more than 90 percent of important targets in South Korea. The report was partially based on defector testimonies of former North Korean SOF and on the military drills in which the defectors participated. The South Korean Ministry of National Defense now places the numbers for SOF in North Korea at around 200,000 men. General Lee also stated that North Korean SOF "have been trained to conduct composite operations, such as major target strikes, assassinations of important figures and disruptions of rear areas in South Korea."⁷⁵ High-ranking North Korean defector Hwang Jang-yop stated in testimony that "each North Korean special forces unit has been assigned a specific target in South Korea, usually strategic objectives such as missile bases and airfields. The units will be delivered to their targets by parachute or hovercraft."⁷⁶ Military training by SOF during the winter of 2010–11 was at typical high levels. According to press reports, "Light infantry soldiers march 20 km for 10 hours with a 35 kg gear bag. On the way to the mountains, they train [in] attacking, ambushing, infiltrating, and camping. When they arrive at the assembly place, they would have a martial arts match between units to have actual experience."⁷⁷

There have been interesting developments in the command and control of North Korean SOFs in recent years. According to several reports, Kim Jong-il's longtime friend and close confidant O Kuk-ryol was moved from his position as head of the Operations Department, a North Korean organization based roughly on a combination of the Soviet *Komitet Gosudarstvennoy Bezopasnosti* intelligence agency and the latter's Russian successor the *Glavnoye Razvedyvatel'noye Upravleniye*, to a key position on the National Defense Commission. When he moved, his organization apparently moved with him and combined with the elite Reconnaissance Bureau—a military SOF organization. To quote one of the press sources, "The General Bureau of Reconnaissance which Oh was placed at the head of is a gigantic organization, the result of a merger between the former Reconnaissance Bureau, the Operations Department, of which Oh was formerly in charge, and the No. 35 Office, which previously carried out overseas spy and international terrorist operations. . . . Combining

the Reconnaissance Bureau of the People's Army with the Operations Department and the No. 35 Office of the Central Committee unifies spy operations, undercover and direct military attacks in one office.”⁷⁸ General Oh is thus now—either directly or indirectly—in control of all North Korean SOF. According to North Korean defector Kim Seong-min, North Korea’s 200,000 SOF troops are trained and equipped to “damage South Korea’s reputation by creating an internal commotion, and paralyze the country’s command structures to facilitate a (Pyongyang-led) forced unification of the Korean Peninsula.”⁷⁹

Since 2006, North Korea has also been able to augment the troop strength of its SOF by converting several conventional divisions to light infantry divisions, presumably subordinating SOF to either their geographical corps or the 11th Corps. According to a South Korean military source in 2008, “The North Korean military recently activated several light infantry divisions that are affiliated with frontline and rear corps.”⁸⁰

If one is to discuss how North Korea’s asymmetric capabilities would be used in an actual full-scale conflict, it is useful to turn to the analysis of Kim Duk-ki of the South Korean navy. Although Kim maintains Pyongyang can apply these tactics on a more limited scale to provocations, he assesses key aspects of a likely scenario when he states, “Moreover, the North will launch an offensive with its diverse collection of missiles (including the recently developed KN-01 and KN-02) and long-range artillery against the strategic center of the ROK, inflicting terror and realizing its threats to make Seoul an ocean of flames.” Kim further develops the scenario by pointing to the fact that Pyongyang may think it can win a victory by simply taking Seoul: “The North Korean regime will conduct a rapid front-and-rear combined operation to seize and conquer the Greater Seoul Metropolitan Area while carefully monitoring the ROK’s and international community’s response. Furthermore, it will infiltrate the South by deploying special operations units by land, sea, and air in multiple ways not only to disturb and disperse ROK forces but also to conquer Seoul and use it for bargaining leverage.”⁸¹

Other Recent Military Developments in North Korea

As articulated above, North Korea has focused on modernizing, resourcing, and training its three-headed asymmetric military forces’ capability: long-range artillery, ballistic missiles, and SOF (North Korea also has nuclear capabilities). The evidence is clear. Each one of these types of forces has increased in numbers, improved its command and control, and modernized its equipment in recent years. Thus, even as some of North Korea’s conventional capabilities have slowly eroded because of resource constraints, their asymmetric forces have actually grown in capability.

Nevertheless, even as North Korea has increased the capabilities of its asymmetric forces, the DPRK has also made some important upgrades and acquisitions that improve the capabilities of other forces and create a real threat to the ROK-US alliance. One example of this is the recently confirmed fielding and deployment of the “Storm Tiger” tank, the North Korean variant of the Soviet T-72 system—a significant upgrade over the T-62 tank that the North Koreans had previously fielded in key units.⁸² Another important development has been the fielding of infrared antiaircraft missiles. In 2011 the South Korean Ministry of National Defense Board of Audit and Inspection revealed that the North Korean 9K38 Igla man-portable infrared homing surface-to-air missile and AA-11 Archer short-range air-to-air missile use medium-range infrared waves that are not easily diverted by South Korean

flares or chaff. The new antiaircraft missiles can even threaten South Korea's most advanced aircraft—the F-15K Slam Eagle multirole fighter.⁸³ Additionally, North Korea's newest long-range antiaircraft missile, known as the KN-06, has a longer range (possibly 150 km) and is more advanced than previous systems.⁸⁴

North Korea has also made important advances in its naval capabilities—particularly advances that will enhance its ability to threaten South Korea in waters off the west coast. Pyongyang has reportedly now deployed a new version of its most advanced mini-sub: the Sang-O. The newer version has better performance, higher underwater speed, and a body that is five meters longer than the previous version. North Korea has enhanced its mini-sub fleet with the addition of these newer versions and has conducted drills with them off both coasts of the Korean Peninsula. According to recent reports, another mini-sub, known as the “Daedong-B,” is an advanced infiltration submarine with a special ramp to offload special forces and is equipped with torpedo launch tubes. Observers first noted this submarine during North Korean training exercises in 2010.⁸⁵ Perhaps the most ominous new naval development in North Korea is the construction of a new hovercraft base being built at a port near the town of Koampo—less than 35 miles from South Korean islands off the west coast of the Korean Peninsula. The base is said to be able to accommodate up to 70 hovercraft, each of which is capable of traveling at speeds of up to 90 km per hour with a full platoon of elite naval infantry commandos aboard. Once the base is complete, North Korean troops could reach South Korean sovereign territory on the hovercraft in 30 to 40 minutes. The high speed of the naval craft will make reaction by South Korean forces a difficult proposition. North Korea has approximately 130 Kongbang-class hovercraft. However, they have never before been deployed so close to border areas with the South.⁸⁶

In a development that was likely directly related to the construction of the new naval base at Koampo, reports in September 2011 indicated that the North Koreans had also deployed approximately 3,000 elite troops from one of their amphibious sniper brigades at nearby Pipagot naval base. During 2011, the troops were detected in combined arms training with both air and naval units, conducting large-scale landing exercises on Cho Island, off the west coast of the Korean Peninsula. The exercises apparently consisted of both amphibious landings using hovercraft and paratroop drills using AN-2 aircraft.⁸⁷ Of note, the amphibious troops (naval infantry) deployed in 2011 to a location where they could easily marry up with the hovercraft that would deploy to Koampo naval base are exactly the kind of troops that would be used in an attack on one of the five ROK-occupied islands that sit in or near the Northern Limit Line, a disputed maritime demarcation line between the two Koreas in the Yellow Sea. Thus, the threat of a future NKPA SOF attack on one of these islands is very real.

While not commonly thought of as an asymmetric capability, cyber warfare is something into which the North Koreans have now apparently decided to dab their toes. In 2011 the authorities confirmed that the North Koreans were behind massive cyber attacks that targeted dozens of South Korean government agencies and military entities. The attacks have been so effective that the South Korean government has actually been compelled to chart out a national cyber security strategy. South Korea's most prominent intelligence organization, the National Intelligence Service, will reportedly lead the effort.⁸⁸ North Korea has also been pinpointed as being responsible for the jamming of global positioning systems (GPS)—military and civilian—in South Korea during 2011. North Korea has also reportedly offered up its GPS jammer system for sale to nations in the Middle East.⁸⁹

Beginning as early as 30 April 2012, North Korea once again stepped up its GPS-jamming operations against targets in South Korea. By 3 May 2012 the jammers had interfered with at least 250 civilian aircraft flights. The North Koreans reportedly purchased the GPS-jamming equipment from the Russians, and analysts believe the systems are effective to a range of up to 150 miles.⁹⁰ By 4 May 2012 North Korean GPS-jamming systems had also interfered with the navigation systems of at least 120 ships, including South Korean coast guard craft, fishing boats, and passenger vessels. An unclassified order of battle indicates North Korea has an electronic warfare (EW) regiment in Pyongyang and several battalions with the same mission near the DMZ. North Korea may have as many as 5,000 personnel engaged in EW operations. According to Lee Sang-wook of South Korea's Electronics and Telecommunications Research Institute, the interference caused by North Korea during the spring of 2012 was more advanced and of a larger scale than the 2011 operations.⁹¹ By 10 May 2012 at least 687 aircraft had been affected by the GPS jamming systems, including aircraft from several foreign countries transiting into South Korea. Typically, civilian aircraft simply switched to alternate navigation systems when the jamming occurred. The North Koreans likely targeted civilian aircraft because they use equipment that is easier to jam. Military navigation systems are far more difficult to jam, though the disruption of civilian aircraft and ships can have a profound impact on both commerce, and in wartime, support to military operations.⁹²

North Korea apparently ceased its GPS-jamming operations against the South approximately 14 May 2012. While the jamming operations did not affect military operations and no casualties or damage was confirmed, it did have an impact on civilian flight patterns in and around Seoul and, to a greater extent, on maritime civilian craft (particularly craft operating near the west coast) that are more reliant on GPS systems for navigation. South Korea at the time was essentially unable to do anything to stop the EW attacks on GPS navigational systems operating in its territory except to file an official protest letter with the International Civil Aviation Organization.⁹³ While unconfirmed, the North Korean GPS-jamming operations may have resulted in the crash of a remotely piloted aircraft (RPA) near Inchon on 10 May 2012. The RPA's GPS system went out on that day, and it crashed into a control van, killing an engineer and two "remote pilots."⁹⁴

Jamming operations in 2012 prove that military cyber and EW operations are likely to continue under Kim Jong-un, just as they did under his father. North Korea's EW and cyber warfare capabilities have the potential to present a significant threat during a conflict with South Korea. As ROK navy captain Kim Duk-ki states when describing a likely scenario of attack during a large-scale North-South conflict, "It is expected that the North Korean regime will first conduct a simultaneous and multifarious cyber offensive on the Republic of Korea's society and basic infrastructure, government agencies, and major military command centers while at the same time suppressing the ROK government and its domestic allies and supporters with nuclear weapons. If the North succeeds in developing and deploying its EMP [electromagnetic pulse] weapons, it will be able to paralyze electronic functions as well."⁹⁵

Regime Succession Process: Its Impact on the Military

Four key institutions dominate the North Korean government: the military establishment, the party, the security services, and the inner circle of the Kim family regime. In fact, when one addresses the government of North Korea and the power brokers within it, it is prudent not to think of a hierarchical system of power sharing, as one sees in democracies

or even in communist governments such as China. Rather, it is better to judge the power system in North Korea as that of several key institutions, feeding into what has always been one man in power since December 2011, Kim Jong-il (fig. G-3). While Kim Jong-il took advice from trusted leaders in each of these institutions, he wielded absolute power over them. Thus, as North Korea goes through the important process of succession from Kim Jong-il, to Kim Jong-un, it is important to analyze the impact that this is having and will continue to have on the military.

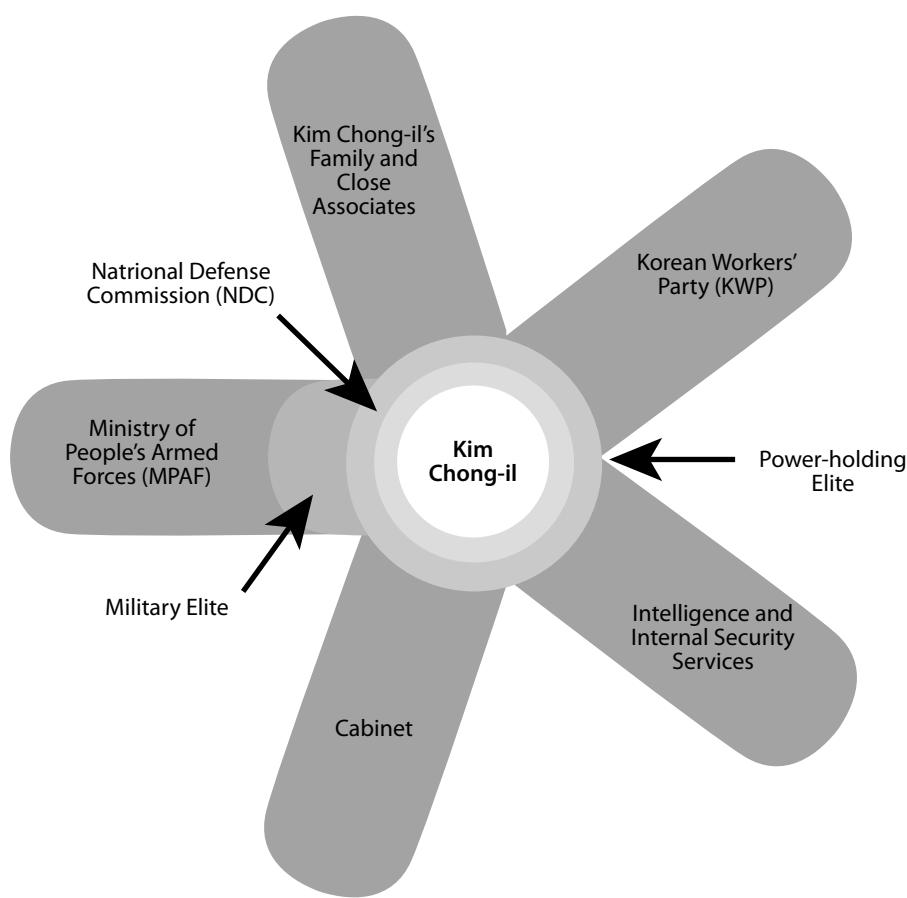


Figure G-3. Kim Jong-il's power circle. (Reprinted from Joseph S. Bermudez, Jr., *North Korea's Strategic Culture* [Washington, DC: Defense Threat Reduction Agency, Advanced Systems and Concepts Office, 31 October 2006], 10, <http://www.fas.org/irp/agency/dod/dtra/dprk.pdf>.)

Within the North Korean system, Kim Jong-il was the chairman of the National Defense Commission, which in many ways is the de facto most powerful decision-making body in the country.⁹⁶ Kim was also head of the party, which he ran through a key entity known as the Organization and Guidance Department (OGD)—even controlling promotions in the military.⁹⁷ The security services within the country are highly redundant, precisely for security reasons, and, as I will discuss later, hold a key role in the power broker process in North Korea. Finally, the Kim family inner circle, dominated by Kim relatives and longtime, abso-

lutely loyal family friends, plays a key role. Kim Jong-il conducted a focused effort to bring his third son to power within all of these governmental power-brokering institutions.

The power process in North Korea received a substantial jolt when Kim Jong-il died in December 2011. North Korean television formally announced his death on 19 December 2011.⁹⁸ North Korean media also immediately announced that the military and the people pledged to follow Kim Jong-un's leadership to "carry on the legacy" of the DPRK.⁹⁹ Kim Jong-un reportedly issued his first military order before the announcement of his father's death—ordering military units to cease exercises and return to base—thus, signaling his control of one of the key institutions in North Korea (even though Kim Jong-un was not yet officially designated the Supreme Commander).¹⁰⁰ In an important follow-up to Kim Jong-un's first military order, he was then announced as being the supreme commander of North Korea's military in state-run outlets at the end of December 2011. The official report said in part, "The dear respected Kim Jong-Un . . . assumed the supreme commandership of the Korean People's Army at the behest of leader Kim Jong-Il on October 8."¹⁰¹ Since Kim Jong-un took over from his deceased father in December 2011, it is important to consider how that process evolved before his father's death and what it means for North Korea's future.

The succession process in North Korea has occupied a hugely important aspect of North Korean activity since at least 2009 and until Kim Jong-il's death in December 2011. At the center of the storm sat Kim Jong-un, the heir apparent and the individual that propaganda frequently referred to as the "young general." In fact, a defector-based nongovernmental organization (NGO) reported in 2010 that a key museum in Pyongyang had even opened up a permanent exhibition on Kim Jong-un—one of many moves designed to promote his place in the Kim cult of personality that his father and grandfather had created.¹⁰² Kim Jong-un was appointed to the powerful post of vice chairman of the Central Military Commission in 2010, and some analysts believe that this rapid rise to an important military post was moving much more rapidly than his father's rise during Kim Il-sung's reign.¹⁰³

Kim Jong-il in some ways militarized the party, placing key military figures in powerful positions within it.¹⁰⁴ Thus, the fact that Kim Jong-un was placed in a key military position is extremely important. Military units reportedly initiated propaganda campaigns designed to tout the supposed glories of Kim Jong-un.¹⁰⁵ Kim Jong-un was also appointed to a key position within the party in 2009.¹⁰⁶ As in many communist societies, group photos show who is in key positions of power, one's position in the photo demonstrating the extent of one's power in the regime. In an official group photo published by the North Korean media in 2010, Kim Jong-un sat next to his father, along with his aunt (Kim Kyong-hui) and key military and party members.¹⁰⁷

Further evidence that the propaganda campaign supporting Kim Jong-un's military leadership abilities was ongoing was revealed in 2011, when a military document proclaiming his role in the planning of the attacks on South Korean forces was discovered in China and given to the South Korean press. These attacks included the sinking of the Cheonan navy ship and the artillery attack on Yonpyeong Island.¹⁰⁸ Additionally, in an important development that was reportedly revealed during an intelligence briefing to the South Korean National Assembly in 2011, Kim Jong-un was reported to be occupying a key position of power within the State Security Department and playing a key role among other institutions that wield power in North Korea.¹⁰⁹ Meanwhile, Kim Jong-un's supporters were said to be filling mid-level posts in government in order to help with a smooth transition of power. According to South Korean national intelligence chief Won Sei-hoon, "Kim Jong-un took the

director position of the North's Ministry of Public Security and others, including the son of O Kuk-ryol, vice chairman of the National Defense Commission, are filling up positions under Jong-un. They are Jong-un's core of power.”¹¹⁰ An elite group of children of North Korea's highest leadership are said to occupy key areas of the North Korean government. This new, younger group, known as the “Bonghwajo,” are filling positions within the General Bureau of Reconnaissance, the Ministry of People's Armed Forces, the Central Prosecutors' Office, and other key entities.¹¹¹

The military in North Korea has been affected as much as, if not more than, other key institutions in the country by the disruptions and shuffling of positions of power. As has been the case for the entire life of the North Korean regime, family name means everything. The sons of well-known and powerful former or retired leaders in the North Korean military continue to ascend to powerful positions within the military infrastructure.¹¹² Top military officers also continued to dominate the security services during the transition. These security services represent another key institutional power base vital for controlling the government. North Korean general Lee Myong-su, a member of the most powerful military entity in the country, was selected to lead one of the key security services and was also seen with Kim Jong-il conducting on-site inspections a few months before the elder Kim passed away.¹¹³

Meanwhile, in August 2011 North Korea's defense minister, Kim Yong-chun, was sidelined in the succession process from father to son according to members of the South Korean government who reported the results of an intelligence briefing to the press. According to an official (who declined to be named), “I believe Minister Kim's weakening position is due to generational conflicts and rivalries between his forces and Kim Jong-un's loyalists within the military.”¹¹⁴ Key figures believed to be supporting Kim Jong-un's succession (and now his leadership) were Gen Ri Yong-ho (the chief of staff of the North Korean People's Army), and Kim Yong-chol, then an SOF general, and now the director of the Reconnaissance General Bureau. Both are said to be personally close to Kim Jong-un.¹¹⁵ Kim Jong-gak, who until early 2012 was the first vice-director of the powerful General Political Bureau, is also an individual who reportedly is helping Kim Jong-un to consolidate his power base.¹¹⁶

It is important to note that two separate organizations within the North Korean military are political in orientation. The first of these (fig. G-4) is the General Political Bureau (GPB), which has political officers in units at every level in the North Korean People's Army but operates in a separate chain of command. The second (fig. G-4) is the Military Security Command (MSC). The MSC comes directly under the State Security Department and has military officers monitoring activities in nearly every military unit in North Korea.¹¹⁷ Thus, in the North Korean military, there are literally three separate chains of command, and a commander in any unit has two political officers outside his or her own chain looking over every move.

Toshimitsu Shigemura, a professor of international culture and communications at Waseda University in Japan, explains this highly controlled, very rigid system of monitoring everything that every officer does, stating that “North Korean military personnel are divided into two groups: field soldiers that engage in combat operations and political soldiers that supervise field soldiers. Political soldiers are tasked with providing ideological education to field soldiers as well as detecting a planned coup d'état.”¹¹⁸ Cheong Seong-chang, a

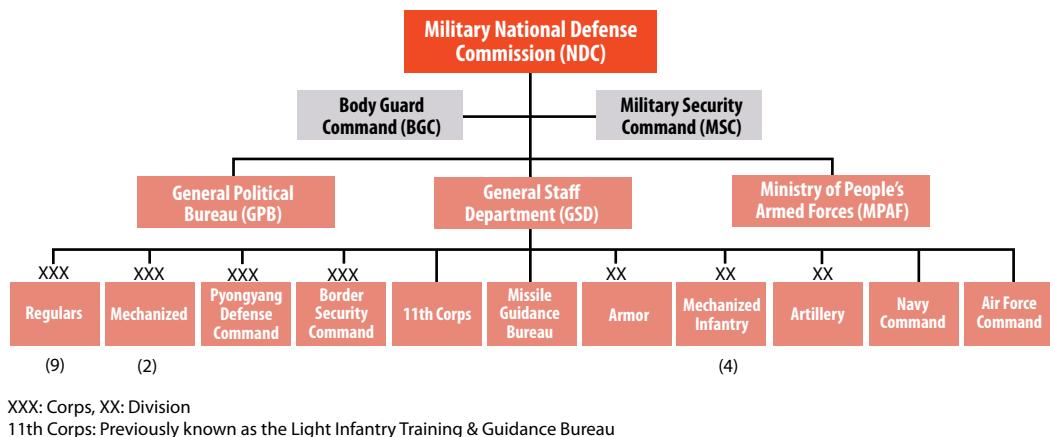


Figure G-4. North Korea's military command organization. (Ministry of National Defense, Republic of Korea, 2010 *Defense White Paper* [Seoul: Ministry of National Defense, 2011], 29, http://www.mnd.go.kr/user/mnd_eng/upload/pblictn/PBLICTNEBOOK_201308080718210240.pdf.)

scholar at the Sejong Institute in South Korea, expands on this when he states, “Military commanders are not even allowed to congregate in small numbers of threes or fours, lest they plan for factional power.”¹¹⁹ Thus, the constant shuffling of officers within key positions in the military brings about the possible scenario of eventual instability.

As the disruptions and shuffling in military positions occurred in the military during 2010 and 2011, similar disorder occurred throughout the government, raising again the potential for instability in the future, as Kim Jong-il’s death creates change in the leadership. Executions in 2010 tripled in number over the previous year, and many of these executions (at least 60) were public. Border guards were reportedly given orders to shoot to kill as defectors tried to cross into China; those caught reading South Korean propaganda leaflets, routinely distributed via balloon by South Korean NGOs, were punished in the extreme—including some executions.¹²⁰

Several senior North Korean officials began dying under mysterious circumstances beginning in 2010. Although he was not previously known to have been ill, news reports claimed Park Jung-sun, the first vice minister of the OGD (the most powerful entity in the party), died of lung cancer in 2011. Lee Yong-cheol, another high-ranking party official, died in a mysterious “car crash” in 2010, as did Lee Jeh-gang, another powerful party official. Lee Jeh-gang was noted for having been in a power struggle with Kim Jong-il’s brother-in-law, Chang Song-taek, adding to the mystery of the deaths.¹²¹ Two senior officials, Kim Yong-sam and Mun Il-bong, were executed in 2010; it appears that both were used as scapegoats for failed economic and security policies. In 2011 Ryu Kyong, a high-ranking official in the powerful State Security Department, was purged—again perhaps because of succession issues and the perception that he was not absolutely loyal to those who backed Kim Jong-un. Finally, in what also appears to be a move related to the succession process, at least 30 officials who participated in talks between the two Koreas were either executed or experienced traffic accidents during the 2010–11 time frame.¹²² Moreover, at least some of this appeared to be related to a focus on putting younger men in key positions within the security services, the military, and the party.¹²³

In the early months of 2012, the North Korean government showed that it would continue to carry out Kim Jong-il's policies—sometimes in rather grisly ways. Reportedly, when Kim Jong-un found out that the assistant chief of staff of the Ministry of the Peoples Armed Forces was drunk during the mourning period for Kim Jong-il, he ordered the military to execute the individual and “to leave no trace of him behind down to his hair.” The official was then executed using a mortar round, literally blowing him to pieces. During this early mourning period for Kim Jong-il, the younger Kim reportedly purged dozens of military officers.¹²⁴

The North Korean government moved quickly during early 2012 in an attempt to consolidate Kim Jong-un's power and to surround him with handpicked individuals who were absolutely loyal. In April, Kim Jong-gak, the first vice-director of the all-powerful GPB, was named defense minister.¹²⁵ The GPB monitors activities of the military, so the move was likely made in order to ensure loyalty among military officers to Kim Jong-un (Kim Jung-gak was handpicked by Kim Jong-il to look after his son). In addition, Kim Jong-un was named “first secretary” of the Korea Workers Party, with Kim Jong-il being deemed the “eternal” general secretary of the party. In quick order, Kim Jong-un was also officially named the chairman of the Central Military Commission and the “first chairman” of the National Defense Commission (NDC), the de facto most powerful ruling body in the country. His deceased father was named the “permanent chairman” of the NDC.¹²⁶ Kim Jong-un also had other titles bestowed on him during April 2012, but those listed above were the most important. By April 2012 he had most of the titles bestowed on him that it took his father several years to officially acquire. Other key shuffling of positions occurred during April 2012 as well. Two key players under the Kim Jong-il regime were promoted to the title of vice marshal: Choe Ryong-hae and Hyon Chol-hae. Choe is directly descended from a man who fought with Kim Il-sung as a partisan, while Hyon Chol-hae was a vice director of the GPB and a key player in keeping the military loyal to Kim Jong-un. Both had been closely associated with Kim Jong-il.¹²⁷ Choe was also appointed to the NDC, along with Gen Kim Won-hong, where they joined Lee Myong-su and other existing members, ensuring that the NDC was manned by individuals from all of the key institutions in the country: the military, the party, the security services, and of course, loyal Kim family members.¹²⁸ The shuffling in the NDC was likely intended to ensure that the new regime carried on the policies and wishes of the Kim Jong-il regime and kept his son in power. In another key move, Kim Jong-un's uncle, Chang Song-taek, assumed the vice directorship of the NDC.¹²⁹

Because of the shuffling of positions, purges, and appointments of younger officials to key positions throughout the North Korean government, the potential for instability now that Kim Jong-il is dead is very real—including in the military. In fact, Sohn Kwang-ju, a scholar at the Kyonggi Research Institute in South Korea, assessed that the succession process by 2011 was far inferior to the one that occurred when Kim Jong-il inherited power from his father. Oh Gyeong-seob of the Sejong Institute addressed the military's role in the succession process and ensuring subsequent stability when he stated that “Kim Jong-eun's most important political foothold will be the military, and it will only be through reliance on military force in the same manner as his father that his regime will be stabilized.”¹³⁰ However, most analysts see Kim Jong-un's power, at least for now, as being far weaker than his father, and thus, now that Kim Jong-il is dead, his chances of holding on to power—or even maintaining stability in the country—are at best questionable. As Yoo Ho-yeol, a professor of North Korean Studies at Korea University states, “The abrupt emergence of Kim Jong-un is directly linked to Kim Jong-il's health, and chances are that a situation that the

27-year-old successor cannot cope with will soon develop.”¹³¹ This statement was made in October of 2011. Now that Kim Jong-il has in fact passed away, hopes that he would hang on for several years—and thus enhance the succession process—have disappeared.

So what does all of this uncertainty mean for the future of North Korea and ultimately the North Korean threat? In summer 2011, South Korean Defense Minister Kim Kwan-jin told reporters in South Korea that North Korea’s “inner society is not in a normal condition and anything could happen.”¹³² According to a source in North Korea, reporting to an NGO in the South, the purging of many high-level officials and others has caused unrest in the DPRK’s “cadre society.” Sections of the elite thus felt increasingly betrayed because of the large number of purges and even executions that have occurred, presumably because of succession issues.¹³³ Many analysts agreed that the North Korean government’s ability to bring about a stable succession process depended on Kim Jong-il’s health and how long he was able to live. Kim suffered a stroke in 2008, had chronic renal failure from diabetes, and supposedly suffered from cardiovascular disease. His death in 2011 brought about even more uncertainty.¹³⁴

As long as the elder Kim was alive, many expected that he would rule, even if bedridden—not a sound formula for stability. As Kim Yong-hyun, an expert at Dongguk University in Korea, has been quoted as saying, “Should Kim Jong-il be able to maintain his health and continue to lead the state affairs for the next three to five years, chances are that the succession scheme will become quite stable. . . . But, should his health deteriorate rapidly, there could be instability which stems from the possible conflict within the elite group in the North and other influence from outside to shake up the succession process.”¹³⁵ Since his death, some experts expect the emergence of a ruling triumphant composed of Kim Jong-un; Chang Song-taek; Kim Jong-il’s sister, Kim Kyong-hui; and perhaps the military—despite the public showing of Kim Jong-un as the absolute leader.¹³⁶ Whether a triumphant or a gradual move to absolute rule by Kim Jong-un is the plan, there is no doubt that the transition to power for him is much more difficult than it was for his father following the death of Kim Il-sung. It was no cakewalk for Kim Jong-il either, as he did not actually take over all positions of leadership formally until 1997, but his power was fully consolidated.¹³⁷

In fact, Kim Jong-un may be able to hang on for a few years, but there remains a chance that the country could collapse as the military splinters from purges and resource constraints and the party and security services vie for power because of a lack of strong central authority. Thus, it is important when one considers the threat from North Korea as it stands at the end of the Kim Jong-il era, to consider it a two-headed threat: a military that clearly managed to adjust to resource constraints and was able to reinvent itself as an army that focused on asymmetric forces, and a government—including the military—that in many ways was fighting to stave off instability, collapse, and ultimately absorption by the South. It is these two threats for which the ROK-US alliance has had to prepare, and both threats present compelling challenges for military planners.

Defending against North Korean Aggression: ROK-US Alliance Capabilities

South Korea has not been idle in its response to North Korean aggression and military developments. While the Roh Moo-hyun administration (in power before Pres. Lee Myung-bak was elected president of South Korea) put many cuts and reforms into place that were

unrealistic—and in my view, dangerous for the national security of South Korea—beginning in 2009 (under Pres. Lee Myung-bak), the MND focused on responding effectively to the threats posed by North Korea. In 2011 the Defense Ministry called for a 6.6 percent increase in its budget for 2012 because of capabilities exhibited by North Korea. The MND also began undertakings such as constructing a war-gaming center, planning to increase its annual weapons exports from the United States to \$4 billion, and doubling the amount of workers in the defense ministry by 2020 (for more self-reliance). The focus on maintaining a strong military, being able to answer to North Korea's asymmetric capabilities, and acquiring weapons and programs necessary for more self-reliant national defense (while maintaining a close relationship with South Korea's key ally, the United States) is important examples of a Lee Myung-bak defense policy that aimed to reinvigorate South Korea's defense infrastructure.¹³⁸

In fall 2010, in response to the asymmetric and traditional conventional force capabilities from North Korea that threaten the South, Seoul finalized plans to develop an advanced tactical communications and data system for its military. It is scheduled to be fielded by 2014. The military also planned to develop a medium-altitude RPA to be deployed by 2014, with 30 units scheduled to be deployed at the division level. The first of four advanced Boeing E-737 early warning and control aircraft arrived and deployed in South Korea in August 2011.¹³⁹ By March 2011 the ROK air force had acquired and placed into service 47 advanced F-15K fighter aircraft, and in 2010 the US DOD approved plans for South Korea to acquire the "stealth" version of the F-15. The moves were important, because the ROK air force has warned of a shortage of fighter aircraft that will occur in coming years as it is forced to replace antiquated McDonnell Douglas F-4 Phantom II and Northrop F-5A/B Freedom Fighter and F-5E/F Tiger II jets with newer, more advanced aircraft.¹⁴⁰

In regard to the ROK-US response to North Korean asymmetric threats, particularly SOF-generated attacks and provocations, by 2011 the alliance had developed new counter-measures and plans designed to be more effective.¹⁴¹ In 2011 plans were made to respond to North Korea's growing SOF presence near the DMZ by strengthening guard posts near the border area with sound tracking devices and sniper rifles, among other improvements. South Korea also initiated plans for deployment of elite special warfare troops near the border, with a primary mission of countering North Korean SOF.¹⁴² During April 2012 the ROK Army 1st Corps and the US Army 2nd Infantry Division signed a pact that will increase interoperability in joint and combined drills. The memorandum of understanding advances intelligence sharing between these two key combat units through the use of RPAs and mobile radar systems.¹⁴³ In a related earlier development in March 2011, dealing with issues of command and control of key forces, Seoul and Washington agreed to delay the planned movement of most US troops to a base south of Seoul until 2016.¹⁴⁴

In recent years South Korea has also made a concerted effort to address shortfalls relating to its capability to combat another North Korean asymmetric capability: ballistic missiles. In 2011 the United States and South Korea signed an agreement to engage in bilateral cooperation in developing Seoul's ballistic missile defense (BMD) system. South Korea is looking to complete its own missile defense system by 2015. Despite this, and perhaps for very sensitive political reasons, South Korea continues to oppose joining the US-led global missile defense system. Many of the systems and updates that the South Koreans plan to initiate are inferior in both technology and numbers to those of Japan. Japan has already initiated plans for advanced Patriot BMD systems near key bases and population centers all over the country. In addition, Japan will be fitting all six of its Aegis-equipped destroyers with more of the

advanced RIM-161 Standard Missile 3 (SM-3) missile interceptor systems. The two BMD systems are designed to go after incoming missiles at different levels and altitudes. Of utmost importance, Japan has also joined in the US-led global missile defense system.¹⁴⁵ South Korean policy makers would be wise to consider the Japanese example, because North Korean missiles pose a far greater threat to South Korea than to Japan.

An alternative to upgrading indigenous BMD or joining the US-led BMD system currently in place is for South Korea to increase the range of missiles that can strike targets deep in North Korea. Using this school of thought, South Korea would be able to ensure it struck targets deep in North Korea if Pyongyang attacked using SCUDs and/or other missiles. In fact, this is a plan the government in Seoul has put forward and some think tanks in South Korea have embraced. During 2012 government officials and others in South Korea stated that a range of 800 km is needed for South Korean missiles to meet the North Korean threat. Under current agreements with the United States, South Korea is limited to 300 km in range for its ballistic missiles.¹⁴⁶ Unfortunately, this plan would still not protect South Korea's military bases and population centers from a North Korean ballistic missile attack. However, there have been reports that the United States and South Korea may be close to reaching a compromise on this.¹⁴⁷ If adjustments are not made, the potential for hundreds of thousands of casualties in Seoul and other major cities from a missile attack would continue.¹⁴⁸ The best answer to the North Korean ballistic missile threat is for South Korea to acquire advanced PAC-3 BMD systems to protect its bases and cities and SM-3 BMD systems for its Aegis-equipped ships.

In regard to the South Korean response to the third pillar of North Korea's asymmetric capability—long-range artillery—many challenges remain. Before 2005, the counterfire mission against North Korean long-range artillery fell primarily to the US Army's 2nd Infantry Division. The Americans manned and maintained 30 multiple-launch rocket systems and 30 M109A6 Paladin self-propelled howitzers. In 2005, as part of the shift of several defense responsibilities on the Korean Peninsula between South Korean and US forces, the responsibility for this key mission shifted to the South Korean army.¹⁴⁹ South Korean radar systems utilized to respond to North Korean long-range artillery attacks have been reported to be too few in number and susceptible to numerous breakdowns. South Korea had 20 US-made artillery radar systems and six imported from Sweden as of 2011. However, the Swedish systems broke down 78 times between late 2009 and 2010, and the US-made systems had malfunctioned more than 150 times over a five-year time period. In 2011 experts claimed that the South Korean army needed at least 10 more radar systems in order to be truly effective against a North Korean attack. The radars are extremely important because the North Koreans can fire their artillery and then retreat into caves and tunnels; thus, speedy location of the source of artillery fire is essential to any counterfire mission. While airpower can make up for some of these deficiencies, immediate improvement of South Korea's artillery counterfire capability is a vital component for improving national defense against one of North Korea's key asymmetric threats.¹⁵⁰

The ROK-US alliance has taken careful steps to ensure that it is also ready for something quite different than an attack from North Korea led by Pyongyang's asymmetric forces: collapse and/or instability of the DPRK. In October 2010 plans reflecting a variety of scenarios were made public for responding to sudden change in North Korea, due to the perceived instability caused by the regime succession process. These plans of course included responding to the complete collapse of the DPRK. An unidentified ROK official told the press,

“South Korea and the United States assessed that uncertainty in the North has grown higher during the course of the power succession to Kim Jong-un. . . . It is my understanding that Seoul and Washington have decided to specify scenarios of sudden changes in the North due to the leadership succession and reflect them in Conplan [Conceptual Plan] 5029.”¹⁵¹ In a joint communiqué issued following high-level talks between defense officials from Washington and Seoul, instability was specifically mentioned as a scenario for which the combined militaries of the two countries must be “prepared to effectively respond.”¹⁵²

In 2011 during one of two large-scale exercises conducted annually, named Key Resolve/Foal Eagle, South Korea and the United States reportedly conducted drills designed to prepare for a sudden change in North Korea and for North Korean provocations. Scenarios that are said to have been addressed included a civil war in North Korea, instability due to Kim Jong-il’s death, and/or issues relating to Kim Jong-un being unable to maintain control.¹⁵³ In later exercises that same year, reports indicated that US and South Korean specially trained units participated in drills designed to enhance capabilities for detecting and destroying North Korean weapons of mass destruction, which would likely be a key mission in response to the collapse or instability scenarios.¹⁵⁴ In winter 2012, during the exercise dubbed Key Resolve, South Korean and US forces again conducted drills designed to prepare for sudden change in North Korea, according to sources in the South Korean press.¹⁵⁵ There were even unsubstantiated reports that South Korea and the United States had drawn up plans focused on avoiding a clash should China intervene in the event of North Korean collapse or instability.¹⁵⁶

Conclusions

In the last days of Kim Jong-il, North Korea certainly presented compelling challenges to the ROK-US alliance. These challenges became even more compelling with Jong-il’s death. North Korea’s concerted and largely successful efforts to build up its asymmetric capabilities presented challenges that called for upgrades in ROK and US military systems, improved planning, and personnel changes. Indeed, while many of these challenges were acknowledged and acted upon, the North Korean military threat continued to create a climate of a “Cold War in miniature” on the Korean Peninsula, as the DPRK continued to use its asymmetric forces for provocations and brinkmanship designed to terrorize and intimidate the South Korean populace. As IHS Jane’s senior analyst Alexander von Rosenbach stated, “The South Korean army is half the size of North Korea’s million-man army, whose soldiers would be determined fighters despite being poorly trained and equipped. While nuclear capabilities are often on the spotlight, it is their inventiveness and the sheer size of the military and traditional capabilities that are the bigger threat.”¹⁵⁷ Of course, the threat of instability, leading to scenarios such as civil war, collapse, or even an explosion that could lead to war, remained an equally ominous threat—one for which the militaries of South Korea and the United States needed to plan.

Notes

1. For more details on the size of North Korea’s military, see Ben Anderson, “North Korea: Suspicious Minds,” *Frontline*, January 2003, <http://www.pbs.org/frontlineworld/stories/northkorea/thestory.html>.

2. For an example of analysis that claims resource constraints negatively impact North Korean military readiness and capabilities, see “North Korea Downsizes to Remain Competitive,” *Strategy Page* (blog), 30 December 2010, <http://www.strategypage.com/htmw/htlead/articles/20101230.aspx>.
3. Stephan Haggard and Marcus Noland, *Hunger and Human Rights: The Politics of Famine in North Korea* (Washington, DC: US Committee for Human Rights in North Korea, 2005), 14, http://works.bepress.com/cgi/viewcontent.cgi?article=1004&context=marcus_noland.
4. “N. Korean Military’s Morale Weakening,” *Chosun Ilbo*, 6 July 2011, http://english.chosun.com/site/data/html_dir/2011/07/05/2011070500529.html.
5. Lee Seok Young, “AWOL and Hungry Soldiers Making Trouble,” *DailyNK*, 21 September 2011, <http://www.dailynk.com/english/read.php?cataId=nk01500&num=8197>; and Mark Willacy, “N Korean Children Begging, Amy Starving,” *ABC News* (Australia), 15 July 2011, <http://www.abc.net.au/news/2011-06-27/n-korean-children-begging-army-starving/2772472>.
6. “Former N.K. Soldiers Testify about Worsening Food and Rights Conditions,” *Yonhap*, 21 February 2011, <http://english.yonhapnews.co.kr/northkorea/2011/02/21/35/040100000AEN20110221009500315F.HTML>.
7. Im Jeong Jin, “Military First, but Still No Heating on Bases,” *DailyNK*, 24 January 2011, <http://www.dailynk.com/english/read.php?cataId=nk01500&num=7290>.
8. For a discussion of how economic woes affected the military in North Korea during the 1990s, see Daniel A. Pinkston, “North Korea’s Foreign Policy towards the United States,” *Strategic Insights* 5, no. 7 (September 2006), http://cns.miis.edu/other/pinkston_strategic_insights_sep06.pdf.
9. Howard LaFranchi, “Al Qaeda? North Korea? Who Americans See as the Greatest Security Threat,” *Christian Science Monitor*, 8 December 2010, <http://www.csmonitor.com/USA/Foreign-Policy/2010/1208/Al-Qaeda-North-Korea-Who-Americans-see-as-greatest-security-threat>.
10. “N.K. Overwhelmingly Superior to S. Korea in Asymmetrical Forces: Gov’t Data,” *Yonhap*, 5 December 2010, <http://english.yonhapnews.co.kr/national/2010/12/05/26/030100000AEN2010120500200315F.HTML>.
11. Senate, *Statement for the Record by Wallace “Chip” Gregson, Assistant Secretary of Defense for Asian & Pacific Security Affairs, Department of Defense*, submitted to the Senate Armed Services Committee, 16 September 2010, <http://web.archive.org/web/20121215033158/http://www.armed-services.senate.gov/statemnt/2010/09%20September/Gregson%202009-16-10.pdf>.
12. Jim Garamone, “Thurman Wants to Bolster Ties with South Korea,” *Armed Forces Press Service*, 30 June 2011, <http://8tharmy.korea.army.mil/20110630thurman-garamone.asp>.
13. Joseph S. Bermudez Jr., “North Korea’s Long Reach in Profile,” *Jane’s International Defense Review*, 1 November 2003.
14. “N. Korea Capable of Producing up to 1.25 Million Chemical Bombs: Expert,” *Yonhap*, 13 October 2010, <http://english.yonhapnews.co.kr/news/2010/10/13/020000000AEN20101013007600315.HTML>.
15. For details regarding deployment of new artillery systems, their capabilities, and measures taken to improve survivability, see “N. Korea Deploys More Multiple-Launch Rockets: Source,” *Yonhap*, 3 December 2010, <http://english.yonhapnews.co.kr/national/2010/12/02/9/030100000AEN20101202009300315F.HTML>; Kim Min-seok, “North Repositions Artillery: Sources,” *Korea JoongAng Daily*, 3 August 2010, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2924081>; “N. Korea Adds More Multi-Rocket Launchers along Border with S. Korea: Source,” *Yonhap*, 19 September 2010, <http://english.yonhapnews.co.kr/northkorea/2010/09/19/65/040100000AEN20100919000500315F.HTML>; Associated Press, “Report: North Korea Boosts Multiple-launch Rockets,” *FoxNews.com*, 2 December 2010, <http://www.foxnews.com/world/2010/12/02/report-north-korea-boosts-multiple-launch-rockets/>; and Kwon Hyuck-chul, “Military Responds to Tokyo Shimbun’s Prediction of Strike on Gyeonggi Province,” *Hankyoreh*, 4 December 2010, http://english.hani.co.kr/arti/english_edition/e_northkorea/452167.html.
16. Joseph S. Bermudez Jr., *A History of Ballistic Missile Development in the DPRK*, CNS Occasional Paper No. 2 (Monterey, CA: Center for Non-Proliferation Studies, Monterey Institute of International Studies, 1999), <http://cns.miis.edu/opapers/op2/op2.pdf>.
17. “Syria Improves Its SCUD D Missile with Help from North Korea,” *Geostrategy-Direct*, 22 February 2006, 18.
18. Kim Min-seok and Brian Lee, “Pyongyang Reportedly Tests New Scud,” *Korea JoongAng Daily*, 18 July 2006, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2753063>.
19. Wisconsin Project on Nuclear Arms Control, “North Korea’s Nuclear-Capable Missiles,” *Risk Report* 2, no. 6 (November–December 1996), <http://www.wisconsinproject.org/countries/nkorea/nukemiss.html>.

20. James Dunnigan, "Dirty Little Secrets: North Korea's SS-21 Missiles," *Strategy Page* (blog), 12 May 2005, <http://www.strategypage.com/dls/articles2005/2005512213718.asp>.
21. Paul Kerr, "North Korea Increasing Weapons Capabilities," *Arms Control Today* 35, December 2005, http://www.armscontrol.org/act/2005_12/Dec-NKweapons.
22. "N. Korea's Missile Is Upgraded Version of Russia's SS21," *Yonhap*, 4 May 2005, <http://english.yonhapnews.co.kr/search1/2603000000.html?cid=AEN20050504004000315>.
23. Alon Ben-David, "Iran Acquires Ballistic Missiles from DPRK," *Jane's Defence Weekly*, 4 January 2006.
24. "Press Gets 1st Look at N. Korean Mid-Range Missile," *Chosun Ilbo*, 11 October 2010, http://english.chosun.com/site/data/html_dir/2010/10/11/2010101101060.html.
25. "N. Korea's Latest IRBM Believed to Be Able to Carry Nuclear Warhead: Expert," *Yonhap*, 23 December 2010, <http://english.yonhapnews.co.kr/national/2010/12/23/46/0301000000AEN20101223004200315F.HTML>.
26. "N. Korea Sets Up Special Missile Division"; Jung Sung-ki, "NK Creates Mid-Range Ballistic Missile Unit," *Korea Times*, 9 March 2010, http://www.koreatimes.co.kr/www/news/nation/2010/03/205_62096.html; and Bruce Klingner, "New North Korean Missile Unit Reflects Growing Missile Threat," *Heritage Foundation Report*, 11 March 2010, <http://www.heritage.org/Research/Reports/2010/03/New-North-Korean-Missile-Unit-Reflects-Growing-Missile-Threat>.
27. Jack Kim, "North Korea Has 1,000 Missiles, South Says," *Reuters*, 17 March 2010, <http://www.reuters.com/article/2010/03/17/us-korea-north-missiles-idUSTRE62G1ZC20100317>.
28. Bill Gertz, "North Korea Making Missile Able to Hit U.S.," *Washington Times*, 5 December 2011, <http://www.washingtontimes.com/news/2011/dec/5/north-korea-making-missile-able-to-hit-us/>.
29. "Iran Develops Missile with 4,000-KM Range," *Middle East Newsline*, 2 March 2006, <http://www.menewsline.com/article-13744-IRAN-DEVELOPS-MISSILE-WITH-4-000.aspx>; and Charles P. Vick, "The Operational Shahab-4/No-dong-B Flight Tested in Iran for Iran & North Korea Confirmed," *GlobalSecurity.org*, 2 May 2006, http://www.globalsecurity.org/wmd/library/report/2006/cpvick-no-dong-b_2006.htm.
30. The Taepo Dong I failed to enter successfully its third stage in 1998, while the Taepo Dong II blew apart and fell into the sea while attempting to go from its first stage to its second stage in 2006. For more details of these two launches, see David Ensor, Barbara Starr, Kyra Phillips, Elise Labott, Justine Redman, Atika Shubert, Sohn Jie-Ae, Stan Wilson, and Ed Henry, "U.S. Officials: North Korea Tests Long-Range Missile," *CNN.com*, 5 July 2006, <http://www.cnn.com/2006/WORLD/asiapcf/07/04/korea.missile/>. For analysis of the 2009 Taepo Dong launch, see "North Korea's Missile Flew 500 Miles Further Than It Was Expected," *Pravda*, 13 April 2009, http://english.pravda.ru/world/asia/13-04-2009/107390-North_Korea_missile-0; "N. Korea Rocket 'Flew Farther Than Previously Thought,'" *Chosun Ilbo*, 13 April 2009, http://english.chosun.com/site/data/html_dir/2009/04/13/2009041361006.html; and Julian E. Barnes and Greg Miller, "North Korea Shows Progress in Mastering Missile Technology," *Los Angeles Times*, 6 April 2009, <http://www.latimes.com/news/nationworld/world/la-fg-north-korea-missile6-2009apr06,0,4471509.story>.
31. Steve Herman, "New North Korean Space Launch Site Appears Completed," *VOA News*, 15 February 2011, <http://www.voanews.com/content/new-north-korean-space-launch-site-appears-completed-116291839/135114.html>; Asia News Network, "N. Korea Finishes New Missile Facility: Reports," *Korea Herald*, 20 February 2011, <http://www.asiaone.com/News/Latest+News/Asia/Story/A1Story20110220-264443.html>; and "N. Korea Lays Tracks to New Missile Site," *Chosun Ilbo*, 25 July 2011, http://english.chosun.com/site/data/html_dir/2011/07/25/2011072500862.html.
32. N. Korea Tells Int'l Agency of Rocket Launch Plan," *Chosun Ilbo*, 19 March 2012, http://english.chosun.com/site/data/html_dir/2012/03/19/2012031900617.html; Song Sang-ho, "N. K. Says Will Launch 'Satellite' in Mid-April," *Korea Herald*, 16 March 2012, <http://www.koreaherald.com/national/Detail.jsp?newsMLId=20120316001167>; and "DPRK Announces Another 'Satellite' Launch," *NK News*, 16 March 2012, <http://www.nknews.org/2012/03/dprk-announces-another-satellite-launch/>.
33. Martyn Williams, "Exclusive: North Korea's Expected Rocket Trajectory," *North Korea Tech* (blog), 21 March 2012, <http://www.northkoreatech.org/2012/03/21/exclusive-north-koreas-expected-rocket-trajectory/>.
34. For details regarding the launch site and similarities to Iran's facilities, see Kim Hee-jin and Lee Hyun-taek, "North's Rocket Launch Site Said to Be Similar to Iran's," *Korea JoongAng Daily*, 20 March 2012, <http://korea.joongangdaily.joinsmsn.com/news/article/article.aspx?aid=2950149>.
35. "S. Korea, US to Recover Debris of NK Rocket," *KBS News*, 19 March 2012, http://rki.kbs.co.kr/english/news/news_Po_detail.htm?No=89001&id=Po.
36. For details regarding North Korea's missile launch plans and the puzzling agreement with the United States that was broken just days later, see "N. Korean Rocket Launch 'Long and Carefully Planned,'" *Chosun Ilbo*, 22 March 2012, http://english.chosun.com/site/data/html_dir/2012/03/22/2012032201436.html; and Kim Yoon-mi,

“N. K. Told U.S. about Satellite Plan Last Year,” *Korea Herald*, 21 March 2012, <http://www.koreaherald.com/view.php?ud=20120321000992>.

37. Martyn Williams, “Air Traffic Warned of Rocket Drop Zone,” *North Korea Tech* (blog), 21 March 2012, <http://www.northkoreatech.org/2012/03/22/air-traffic-warned-of-rocket-drop-zone/>; and “Seoul Diverts Flight Paths Due to N. Korea’s Rocket Plan,” *Chosun Ilbo*, 21 March 2012, http://english.chosun.com/site/data/html_dir/2012/03/21/2012032100648.html.

38. Martyn Williams, “Exclusive: DPRK Satellite to Send Data, Video,” *North Korea Tech* (blog), 20 March 2012, <http://www.northkoreatech.org/2012/03/20/itu-confirms-dprk-satellite-launch-plans/>; and Tom Phillips, “North Korea Rocket Launch: Satellite Successfully Sent into Orbit,” *Telegraph* (UK), 12 December 2012, <http://www.telegraph.co.uk/news/worldnews/asia/northkorea/9738806/North-Korea-rocket-launch-satellite-successfully-sent-into-orbit.html>.

39. “S. Korea to Refer NK Missile Launch to UN Security Council,” *Donga Ilbo*, 21 March 2012, <http://english.donga.com/srv/service.php3?biid=2012032160438>.

40. “Japan to Deploy 3 Aegis Ships to Intercept Falling N. Korean Rocket,” *Kyodo News*, 24 March 2012.

41. Choe Sang-hun, “North Korea Moves Rocket to Launching Pad,” *New York Times*, 25 March 2012, <http://www.nytimes.com/2012/03/26/world/asia/north-korea-moves-rocket-to-launching-pad.html>.

42. Matthew Pennington, “US: Debris from NKorea Rocket Risks Casualties,” *Associated Press*, 29 March 2012, <http://www.highbeam.com/doc/1A1-b71133397839486ba1757c7c824aa9e0.html>.

43. “North Korea Begins Launch Pad Preparations for April Rocket Launch: A 38 North Exclusive,” 38 North (blog), 29 March 2012, <http://38north.org/2012/03/tongchang0329/>.

44. Park Byung-soo, “North Korea’s Rocket Launch Plans Moving Forward,” *Hankyoreh Ilbo*, 30 March 2012, http://english.hani.co.kr/arti/english_edition/e_northkorea/526036.html.

45. Paul Richter, “No Free Launch, Obama Tells North Korea,” *Los Angeles Times*, 30 March 2012, http://latimesblogs.latimes.com/world_now/2012/03/obama-to-.html; and Associated Press, “NKorea Says US Breaking Nuclear Deal over Rocket,” *Seattle Times*, 31 March 2012, http://seattletimes.com/html/nationworld/2017878971_apasnkoreausrocketlaunch.html.

46. “US Dispatches Advanced Radar ahead of NK Rocket Launch,” *KBS News*, 31 March 2012, http://rki.kbs.co.kr/english/news/news_In_detail.htm?No=89291&id=In.

47. “Destroyers, Missiles Leave for Okinawa ahead of N. Korean Launch,” *Asahi Shimbun*, 31 March 2012, http://ajw.asahi.com/article/behind_news/politics/AJ201203310027.

48. For details regarding the progress made on the North Korean missile launch preparations by 1 April 2012, see “New Evidence on Advanced Preparations for DPRK Rocket Launch: 38 North Exclusive,” 38 North (blog), 1 April 2012, <http://38north.org/2012/04/tongchang0401/>.

49. For details and analysis regarding the three stages of the Taepo Dong 2, its “genesis,” and the technology associated with it, see Mike Wall, “North Korea’s Rocket Technology Explained: An Observer’s Guide,” *Space.com*, 2 April 2012, <http://www.space.com/15130-north-korea-rocket-missile-technology.html>; Larry Shaughnessy, “North Korea’s Rocket Began Life Underwater,” *Security Clearance* (blog), 4 April 2012, <http://security.blogs.cnn.com/2012/04/04/north-koreas-rocket-began-life-underwater/>; and Greg Thielmann, “Long-Range Ballistic Missile Development: A Tale of Two Tests” (threat assessment brief, Arms Control Association, Washington, DC, 10 May 2012), http://www.armscontrol.org/files/TAB_Long-Range-Ballistic-Missile-Development-A-Tale-of-Two-Tests.pdf.

50. Bill Gertz, “Red Alert: Pentagon Activates Missile Defenses for North Korean Launch,” *Free Beacon*, 2 April 2012, <http://freebeacon.com/red-alert/>.

51. For details regarding the deployments of Aegis-equipped ships to waters where they could monitor the North Korean Taepo Dong 2 launch of 2012, see Jeong Yong-soo and Kim Hee-jin, “Aegis Destroyers Keep Eye on Sky for North Rocket,” *Korea JoongAng Daily*, 4 April 2012, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2950948>.

52. “Foreign Journalists Arrive in N. Korea to Cover Rocket Launch,” *Yonhap*, 8 April 2012, <http://english.yonhapnews.co.kr/national/2012/04/08/65/030100000AEN20120408000500315F.HTML>.

53. Associated Press, “North Korea Moves Rocket into Position for Launch,” *Guardian* (UK), 8 April 2012, <http://www.guardian.co.uk/world/2012/apr/08/north-korea-rocket-positioned-launch>.

54. Associated Press, “North Korea’s Rocket Plans Prompt Asian Airlines to Change Flight Paths,” *CBS News*, 9 April 2012, http://www.cbsnews.com/8301-202_162-57411313/north-koreas-rocket-plans-prompt-asian-airlines-to-change-flight-paths/.

55. Agence France-Presse, "North Korea Set to Install Satellite on Rocket, Official," *Defense War News Updates*, 10 April 2012, <http://defensewarnewsupdates.blogspot.com/2012/04/dtn-news-korean-peninsula-on-high.html>.

56. Jean H. Lee, Associated Press, "Live Feed at Command Centre Shows NKorea Rocket Covered as Engineers Pump Fuel into Carrier," *Yahoo! News*, 11 April 2012, <http://news.yahoo.com/live-feed-command-centre-shows-nkorea-rocket-covered-043720189.html>.

57. "U.S. Officials in Secret Visit to N. Korea before Rocket Launch," *Chosun Ilbo*, 24 May 2012, http://english.chosun.com/site/data/html_dir/2012/05/24/2012052400631.html; and Agence France-Presse, "US Officials 'Flew to N Korea' before Rocket Launch," *Daily Times* (Pakistan), 25 May 2012, http://www.dailytimes.com.pk/default.asp?page=2012%5C05%5C25%5Cstory_25-5-2012_pg4_4.

58. For details about the failed North Korean Taepo Dong 2 launch of 13 April 2012 and the context surrounding what occurred, see "North Korean Rocket Launch Fails," *BBC News*, 13 April 2012, <http://www.bbc.co.uk/news/world-asia-17698438>; "N. Korea Rocket Could Fly 10,000 km," *Chosun Ilbo*, 16 April 2012, http://english.chosun.com/site/data/html_dir/2012/04/16/2012041601302.html; Kim Young-jin, "North Korea May Have Aborted Launch," *Korea Times*, 7 May 2012, http://www.koreatimes.co.kr/www/news/nation/2012/05/113_110490.html; Park Bang-ju, "North Rocket Didn't Separate: Expert," *Korea JoongAng Daily*, 24 April 2012, <http://korea.joongangdaily.joins.com/news/article/article.aspx?aid=2951910>; Park Bang-ju, "North Likely to Launch Another Rocket, Says Expert," *Korea JoongAng Daily*, 16 April 2012, <http://koreajoongangdaily.joins.com/news/article/Article.aspx?aid=2951497>; "North Korean Rocket Boosters Fail to Separate," *KBS News*, 16 April 2012, http://rki.kbs.co.kr/english/news/news_Po_detail.htm?No=89653&id=Po; and "Navy Set to End Search for Debris from N. Korean Rocket," *Korea Times*, 17 April 2012, http://www.koreatimes.co.kr/www/news/nation/2012/04/205_109121.html.

59. Margaret Besheer, "UN Security Council Condemns North Korea Rocket Launch," *VOA News*, 12 April 2012, <http://www.voanews.com/content/un-security-council-condemns-north-korea-rocket-launch-147343395/179340.html>.

60. Lee Chi-dong, "U.S. Cancels Food Aid for N. Korea: White House," *Yonhap*, 14 April 2012, <http://english.yonhapnews.co.kr/national/2012/04/14/52/0301000000AEN20120414000400315F.HTML>.

61. For context and more details on the North Korean foreign ministry's statement in response to UN and US actions, see "N. Korea Denounces UNSC Move, Declares End to Feb. 29 Deal," *Yonhap*, 17 April 2012, <http://english.yonhapnews.co.kr/national/2012/04/18/26/0301000000AEN20120418000200315F.HTML>.

62. For details regarding the American list of proposed sanctions presented to the UNSC, see Michinobu Yanagisawa, "U.S. Seeks Asset Freeze," *Yomiuri Shimbun*, 19 April 2012, <http://web.archive.org/web/20120715153708/http://www.yomiuri.co.jp/dy/world/T120418005891.htm>.

63. For details on the sanction imposed on North Korea by the UNSC in May 2012, see Louis Charbonneau, "U.N. Committee Sanctions 3 North Korea Companies: Rice," *Reuters*, 2 May 2012, <http://www.reuters.com/article/2012/05/02/us-korea-north-un-idUSBRE84116Z20120502>.

64. For the technical aspects detailing exactly how the technology for a three-stage missile and a "satellite platform" that the North Koreans claimed their Taepo Dong 2 test-launches were designed to carry was exactly the same except for the payload, see Charles P. Vick, "Taepo-dong 2 (TD-2), NKSL-X-2," *GlobalSecurity.org*, 20 March 2007, <http://www.globalsecurity.org/wmd/world/dprk/td-2.htm>.

65. To read an in-depth interview Evans Revere gave to the Japanese press regarding contacts he had with the North Koreans before the long-range ballistic missile test-launch of 2012, see Takashi Oshima, "INTERVIEW /Evans Revere: North Korea's Launch Plan Started Last Summer," *Asahi Shimbun*, 9 April 2012, http://ajw.asahi.com/article/asia/korean_peninsula/AJ201204090045.

66. Donald Kirk, "Why Iranian Engineers Attended North Korea's Failed Rocket Launch," *Christian Science Monitor*, 18 April 2012, <http://www.csmonitor.com/World/Asia-Pacific/2012/0418/Why-Iranian-engineers-attended-North-Korea-s-failed-rocket-launch>; and Kforce Government Solutions, "Nightwatch 20120417," *Nightwatch*, 16 April 2012, http://www.kforcegov.com/NightWatch/NightWatch_12000074.aspx.

67. Associated Press, "North Korean Satellite in Orbit after Rocket Launch," *Canadian Broadcasting Corporation*, 13 December 2012, <http://www.cbc.ca/news/world/story/2012/12/13/north-korea-rocket-satellite.html>.

68. Gertz, "North Korea Making Missile Able to Hit U.S."

69. For details regarding the sketchy capabilities of the new missile, its accompanying TEL, and the questions regarding Chinese proliferation, see Associated Press, "N Korea Shows Off New Missile at Military Parade," *Yahoo! News*, 15 April 2012, <http://news.yahoo.com/nkorea-shows-off-missile-military-parade-054632037.html>; S. Smithson, "Analysts: China Broke Sanctions If N. Korea Using Its Missile Launcher," *Washington Times*, 16 April 2012, <http://www.washingtontimes.com/news/2012/apr/16/experts-china-likely-gave-n-korea-illegal-missile-/>; Hao Zhou, "China

Denies Selling Launcher to N. Korea,” *Global Times* (China), 19 April 2012, <http://web.archive.org/web/20120423183349/http://www.globaltimes.cn/NEWS/tabid/99/ID/705780/China-denies-selling-launcher-to-NKorea.aspx>; Agence France-Presse, “UN Probes Claim China Broke N Korea Sanctions: Report,” *Google News*, 18 April 2012, <http://www.google.com/hostednews/afp/article/ALeqM5issdHPy5iiVrNeEv1ezO6WehnIWw?docId=CNG.c48edd1d1dea9c6d92f8c17aefcd2f24.4a1>; Agence France-Presse, “US Raises China’s Alleged Aid for N. Korean Missile,” *Yahoo! Finance*, 21 April 2012, <http://sg.finance.yahoo.com/news/us-raises-chinas-alleged-aid-192241775.html>; Matt Spetalnick, “Chinese Firm Suspected in Missile-Linked Sale to North Korea: U.S. Official,” *Reuters*, 21 April 2012, <http://www.reuters.com/article/2012/04/21/us-korea-north-china-usa-idUSBRE83K0GP20120421>; and Song Sang-ho, “Chinese Firm Sold 8 Military Vehicles to N. Korea: Report,” *Korea Herald*, 27 April 2012, <http://view.koreaherald.com/kh/view.php?ud=20120427000923&cpv=0>.

70. Missy Ryan, “China Assisting North Korean Missile Program: U.S. Defense Secretary,” *Reuters*, 19 April 2012, <http://www.reuters.com/article/2012/04/19/us-usa-northkorea-china-idUSBRE83I1JQ20120419>.

71. Harry P. Dies, Jr., “North Korean Special Operations Forces: 1996 Kangnung Submarine Infiltration,” *Military Intelligence Professional Bulletin* 30, no. 4 (October–December 2004): 29–34, <http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=21584720-22b8-40f8-8e23-48c6f00ce31e%40sessionmgr11&vid=2&hid=10>; and Ministry of National Defense, Republic of Korea, *2010 Defense White Paper* (Seoul: Ministry of National Defense, 2011), http://www.mnd.go.kr/user/mnd_eng/upload/pblictn/PBLICTNEBOOK_201308080718210240.pdf.

72. “North Korean Special Operations Forces and the Second Front,” *Special Operations.com*, 2000, http://www.specialoperations.com/Foreign/North_Korea/Second_Front.htm.

73. Song-Wu Park and Sarah Jackson-Han, “North Korea’s Underground Bunkers,” *Radio Free Asia*, 16 November 2009, <http://www.rfa.org/english/news/korea/bunkers-11162009134509.html>; and “N. Korea ‘Planned to Invade South Despite Sunshine Policy,’” *Chosun Ilbo*, 18 November 2009, http://english.chosun.com/site/data/html_dir/2009/11/18/2009111800451.html.

74. “N. Korean Special Forces Dressed in S. Korean Uniforms,” *Yonhap*, 28 December 2010, <http://english.yonhapnews.co.kr/national/2010/12/28/90/0301000000AEN20101228003000315F.HTML>.

75. “N. Korea’s Special Forces Capable of Striking Most Targets in S. Korea,” *Yonhap*, 7 June 2011, <http://english.yonhapnews.co.kr/national/2011/06/07/76/0301000000AEN20110607005200315F.HTML>.

76. National Intelligence Service, Republic of Korea, “Hwang Jang-yop Speaks: Testimonies of North Korean Defectors,” January 1999, <http://www.fas.org/irp/world/rok/nis-docs/hwang1.htm>.

77. “N. Korean Special Force Trains Shooting on High-Speed Train,” *Korea Times*, 14 February 2011, http://www.koreatimes.co.kr/www/news/nation/2011/02/113_81352.html.

78. Park Sung-kook, “Tasks of the General Bureau of Reconnaissance,” *DailyNK*, 7 May 2010, <http://www.dailynk.com/english/read.php?cataId=nk02900&num=6341>.

79. “N. Korea Commands 195,000 troops for Terror Attacks on S. Korea: Defector,” *Yonhap*, 27 July 2011, <http://english.yonhapnews.co.kr/northkorea/2011/07/27/39/0401000000AEN20110727010300315F.HTML>.

80. Jin Dae-woong, “N. Korea Augments Special Warfare Units,” *Korea Herald*, 4 April 2010, <http://www.koreaherald.com/national/Detail.jsp?newsMLId=20080101000011>.

81. Kim Duk-ki, “The Republic of Korea’s Counter Asymmetric Strategy: Lesson from ROKS Cheonan and Yeonpyeong Island,” *Naval War College Review* 65, no. 1 (Winter 2012), 58, <http://www.usnwc.edu/getattachment/8e487165-a3ef-4ebc-83ce-0ddd7898e16a/>.

82. Kim Deok-hyun, “N. Korea Deploys New Battle Tanks, Boosts Special Forces,” *Yonhap*, 30 December 2010, <http://english.yonhapnews.co.kr/national/2010/12/30/89/0301000000AEN20101230005300315F.HTML>.

83. “N. Korean Infrared Missiles Threaten S. Korean Fighters,” *Chosun Ilbo*, 7 April 2011, http://english.chosun.com/site/data/html_dir/2011/04/07/2011040701179.html; and “F-15K’s Vulnerable to N. Korean Infrared Missiles,” *Korea Times*, 19 July 2011, http://www.koreatimes.co.kr/www/news/nation/2011/07/113_91160.html.

84. “N. Korea Successfully Test Fired Short-Range Missile,” *Chosun Ilbo*, 14 June 2011, http://english.chosun.com/site/data/html_dir/2011/06/14/2011061400518.html; and Jeong Yong-soo and Christine Kim, “North Test-Fires Missiles off Coast,” *Korea JoongAng Daily*, 8 June 2011, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2937286>.

85. For details on confirmed new North Korean submarine capabilities, see “N. Korea Builds Up Submarine Force,” *Chosun Ilbo*, 21 March 2011, http://english.chosun.com/site/data/html_dir/2011/03/21/2011032100584.html; “N. Korea Tests New Submarine in Naval Drills,” *Yonhap*, 6 April 2011, <http://english.yonhapnews.co.kr/national/2011/04/06/29/0301000000AEN20110406003300315F.HTML>; and Lee Young-jong and Christine Kim,

"North's New Midget Subs Are Torpedo Equipped," *Korea JoongAng Daily*, 7 December 2010, <http://korea.joongangdaily.joins.com/news/article/article.aspx?aid=2929318>.

86. For details about the hovercraft naval base in Koampo, North Korea, see "N. Korean Hovercrafts Can Launch Surprise Attack on South," *Korea Times*, 3 April 2011, http://www.koreatimes.co.kr/www/news/nation/2011/04/117_84366.html; and David Axe, "North Korea Preps Hovercraft Assault Force," *Wired Magazine*, 3 February 2011, <http://www.wired.com/dangerroom/2011/02/north-korea-hovercraft-assault/>.

87. For details regarding the 2011 deployment of North Korean elite naval infantry to Pipagot and the military drills they conducted, see "N. Korean Troops May Raid S. Korean Islands in West Sea," *Korea Times*, 20 September 2011, http://www.koreatimes.co.kr/www/news/nation/2011/09/113_95113.html; and David Axe, "North Korea Is Prepping a Hovercraft Invasion Force," *War Is Boring* (blog), n.d., <https://medium.com/war-is-boring/dd7f112aa9ef>.

88. For details on North Korean cyber attacks since 2009, see "March DDoS Attack Was N. Korean Cyber War Drill: US Experts," *Dong-a Ilbo*, 9 July 2011, <http://english.donga.com/srv/service.php3?biid=2011070995138>; "N. Korea Masterminded March Cyber Attacks: Police," *Yonhap*, 6 April 2011, <http://english.yonhapnews.co.kr/techscience/2011/04/06/94/0601000000AEN20110406003800315F.HTML>; and Lee Youkyung, "S. Korea Charts Out National Cyber Security Strategy," *Yonhap*, 8 August 2011, <http://english.yonhapnews.co.kr/news/2011/08/08/0200000000AEN20110808006500320.HTML>.

89. "South Korean Defense Chief Confirms North Korea behind GPS Jamming Last Week," *Indonesia KataKami*, 9 March 2011, <http://indonesiakatakami.wordpress.com/2011/03/09/south-korean-defense-chief-confirms-north-korea-behind-gps-jamming-last-week/>; "N. Korea Still Jamming GPS Signals," *Chosun Ilbo*, 10 March 2011, http://english.chosun.com/site/data/html_dir/2011/03/10/2011031000575.html; and "GPS Jammers in Action," *Strategy Page* (blog), 13 September 2011, <http://www.strategypage.com/htmw/htecm/20110913.aspx>.

90. Martyn Williams, "DPRK Jamming GPS Signals, Says Seoul," *North Korea Tech* (blog), 3 May 2012, <http://www.northkoreatech.org/2012/05/03/dprk-jamming-gps-signals-says-seoul/>; Daniel Piper, "North Korea Accused of Jamming Signals of Hundreds of Civilian Flights," *FoxNews.com*, 2 May 2012, <http://www.foxnews.com/world/2012/05/02/north-korea-accused-jamming-signals-hundreds-commercial-jets/>; and Agence France-Presse, "North Korea Jamming Affects Flights-Seoul Official," *Business Recorder* (Pakistan), 2 May 2012, <http://www.brecorder.com/top-news/1-front-top-news/55704-north-korea-jamming-affects-flights-seoul-official.html>.

91. Shin Hyon-hee, "GPS Jamming Highlights N. K. Cyber War Threat," *Korea Herald*, 8 May 2012, <http://view.koreaherald.com/kh/view.php?ud=20120508001326&cpv=0>; and "122 Ships Affected by Suspected N. Korean GPS Jamming," *Yonhap*, 4 May 2012, <http://english.yonhapnews.co.kr/national/2012/05/04/50/0302000000AE N20120504005000315F.HTML>.

92. Mok Yong-jae, "No Sign of End to GPS Jam," *Daily NK*, 14 May 2012, <http://www.dailynk.com/english/read.php?cataId=nk00100&num=9225>; "N. Korea's Jamming Is Terrorism Pure and Simple," *Chosun Ilbo*, 11 May 2012, http://english.chosun.com/site/data/html_dir/2012/05/11/2012051101175.html; and "N. Korean GPS Jamming Threatens Passenger Planes," *Chosun Ilbo*, 10 May 2012, http://english.chosun.com/site/data/html_dir/2012/05/10/2012051000917.html.

93. Chung Hee-hyung, "Seoul Defenseless against N. Korea's GPS Jamming," *Korea Times*, 15 May 2012, http://www.koreatimes.co.kr/www/news/nation/2012/05/116_111042.html; "NKorea Stops Sending Out GPS Jamming Signals against S. Korea: Source," *Yonhap*, 15 May 2012, <http://english.yonhapnews.co.kr/northkorea/2012/05/15/90/0401000000AEN20120515003000315F.HTML>; and "S. Korea to Protest against N. Korea's Electronic Jamming Signals," *Yonhap*, 9 May 2012, <http://english.yonhapnews.co.kr/national/2012/05/09/76/0301000000AEN20120509005200315F.HTML>.

94. Chris Pocock, "UAV Crash in Korea Linked to GPS Jamming," *Aviation International News*, 1 June 2012, <http://www.ainonline.com/aviation-news/ain-defense-perspective/2012-06-01/uav-crash-korea-linked-gps-jamming>.

95. Kim, "The Republic of Korea's Counter Asymmetric Strategy," 58.

96. "NK Politics/Regime: National Defense Commission," *KBS World*, 31 October 2008, http://world.kbs.co.kr/english/event/nkorea_nuclear/general_03f.htm.

97. Kim Sung Chull, *North Korea under Kim Jong Il: From Consolidation to Systemic Dissonance* (Albany: State University of New York Press, 2006), 89–91.

98. "N. Korean Leader Dies at 69 after Decades of Iron-Fist Rule," *Yonhap*, 19 December 2011, <http://english.yonhapnews.co.kr/national/2011/12/19/41/0301000000AEN20111219005700315F.HTML>.

99. "NK Military, People, Pledge to Follow Kim Jong-un's Leadership: KCNA," *Korea Times*, 19 December 2011, http://www.koreatimes.co.kr/www/news/nation/2011/12/12/120_101112.html.

100. "North Korea: Kim Jong-un 'Issued First Military Order before Father's Death Was Announced,'" *Telegraph* (UK), 21 December 2011, <http://www.telegraph.co.uk/news/worldnews/asia/northkorea/8970079/North-Korea-Kim-Jong-un-issued-first-military-order-before-fathers-death-was-announced.html>.

101. Agence France-Presse, "Kim Jong-un Assumes 'Supreme Commandership' of North Korea's Army: State Media," *National Post* (Canada), 30 December 2011, <http://news.nationalpost.com/2011/12/30/kim-jong-un-assumes-supreme-commandership-of-north-koreas-army-state-media/>.

102. Kim Se-jeong, "N. Korea Creating Personality Cult around Next Leader Kim Jong-un," *Korea Times*, 20 October 2010, http://www.koreatimes.co.kr/www/news/nation/2010/10/116_74912.html.

103. Chong Song-chang, "Kim Jong-un's Power Succession Officialized at the 3rd Conference of the Workers' Party of Korea," *Sejong Commentary* No. 196 (Sejong Institute, Seongnam, ROK, 30 September 2010).

104. Brent Choi, "[Viewpoint] Pondering the New Political Option," *Korea JoongAng Daily*, 11 October 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2926964>.

105. Im Jeong-jin, "People's Army Starts Kim Jong-eun Campaign," *DailyNK*, 6 October 2010, <http://www.dailynk.com/english/read.php?catald=nk01500&num=6876>.

106. Lee Young-jong, "Path of Succession in North Growing Clearer by the Day," *Korea JoongAng Daily*, 6 October 2009, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2910930>.

107. "What Group Photo Says about New N. Korean Power Elite," *Chosun Ilbo*, 1 October 2010, http://english.chosun.com/site/data/html_dir/2010/10/01/2010100101010.html.

108. "Kim Jong-un 'Masterminded Attacks on South Korea,'" *Chosun Ilbo*, 3 August 2011, http://english.chosun.com/site/data/html_dir/2011/08/03/2011080300499.html.

109. Christine Kim and Lee Young-jong, "Kim Jong-un in Charge of Intelligence: Source," *Korea JoongAng Ilbo*, 21 April 2011, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2935144>; and "Kim Jong-il's Son 'Effectively Control Security Forces,'" *Chosun Ilbo*, 13 April 2011, http://english.chosun.com/site/data/html_dir/2011/04/13/2011041300546.html.

110. Kim Seung-hyun and Kim Mi-ju, "Jong-un's Allies Getting Positions, Says Spy Chief," *Korea JoongAng Daily*, 20 April 2011, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2935088>.

111. Mok Yong Jae, "North Korea's 'Princelings' Unveiled," *DailyNK*, 18 April 2011, <http://www.dailynk.com/english/read.php?catald=nk00400&num=7587>.

112. "N. Korea Promotes Power Elite ahead of Anniversary," *Chosun Ilbo*, 14 April 2011, http://english.chosun.com/site/data/html_dir/2011/04/14/2011041400679.html.

113. Kim Yong Hun, "Lee Myung Su Covers Many Security Bases," *DailyNK*, 18 April 2011, <http://dailynk.com/english/read.php?catald=nk00400&num=7548>.

114. "N. Korea's Defense Minister Sidelined in Hereditary Succession Process: Official," *Yonhap*, 11 August 2011, <http://english.yonhapnews.co.kr/northkorea/2011/08/11/0401000000AEN20110811005000315.HTML>.

115. Kiyohito Kokita, "North Korean 'New Military' Led by Hard-Line General," *Asahi Shimbun*, 8 December 2010, <http://web.archive.org/web/20101211100104/http://www.asahi.com/english/TKY201012070215.html>; on Gen Kim Yong Chol, see also his biography at <http://nkleadershipwatch.wordpress.com/leadership-biographies/lt-gen-kim-yong-chol/> as of October 8, 2013; and Yoshihiro Makino, "New Military' Close to Jong Un Rises in North Korea," *Asahi Shimbun*, 30 October 2010, <http://web.archive.org/web/20101031154424/http://www.asahi.com/english/TKY201010290317.html>.

116. "N. Korean Heir-Apparent Wields Command over Defense, Security Issues: Source," *Yonhap*, 21 September 2011, <http://english.yonhapnews.co.kr/northkorea/2011/09/21/83/0401000000AEN20110921009100315F.HTML>.

117. Joseph S. Bermudez, Jr., "SIGINT, EW, and EIW in the Korean People's Army: An Overview of Development and Organization," in *Bytes and Bullets: Information Technology, Revolution, and National Security on the Korean Peninsula*, ed. Alexandre Y. Monsourov (Honolulu: Asia Pacific Center for Security Studies, 2005), 272, <http://www.apcss.org/Publications/Edited%20Volumes/BytesAndBullets/CH13.pdf>.

118. Toshimitsu Shigemura, "Will Chance Come for [Japan's] Diplomacy to Resolve Abduction Issue?; Forecast of Future of North Korea, Shaken over Who Will Succeed Kim Jong-il," *Seiron* (in Japanese), 30 November 2008, 138–43.

119. Kim Ji-hyun, "[Herald Interview] Views Mixed on Post-Kim North," *Korea Herald*, 1 January 2008, <http://www.koreaherald.com/view.php?ud=2009010100001>.

120. "N. Korean Regime Intensifies 'Reign of Terror,'" *Chosun Ilbo*, 13 January 2011, http://english.chosun.com/site/data/html_dir/2011/01/13/2011011300997.html; and "N. Korea Holds Public Execution over S. Korean Propaganda," *Chosun Ilbo*, 24 January 2011, http://english.chosun.com/site/data/html_dir/2011/01/24/2011012401103.html.

121. Kim So Yeol, "Cloak and Dagger on the Pyongyang Streets?" *DailyNK*, 24 January 2011, <http://www.dailynk.com/english/read.php?cataId=nk00400&num=7288>.

122. For detailed information about purges, executions, and "mysterious" deaths in 2010 and 2011, see "Senior N. Korean Apparatchiks Executed," *Chosun Ilbo*, 4 April 2011, http://english.chosun.com/site/data/html_dir/2011/04/04/201104040443.html; "N. Korea Purges Deputy Spy Chief," *Chosun Ilbo*, 20 May 2011, http://english.chosun.com/site/data/html_dir/2011/05/20/2011052000884.html; and "N. Korea Purges 30 Officials Involved in Inter-Korean Talks," *Donga Ilbo*, 15 July 2011, <http://english.donga.com/srv/service.php3?biid=2011071598898>.

123. For details on how younger individuals were being granted key posts within the security services in 2011, see Lee Beom Ki and Lee Seok Young, "Younger Men Taking over Security World," *DailyNK*, 21 June 2011, <http://www.dailynk.com/english/read.php?cataId=nk01500&num=7853>.

124. "Kim Jong-un's Barbaric Purge of 'Unsound' Military Brass," *Chosun Ilbo*, 22 March 2012, http://english.chosun.com/site/data/html_dir/2012/03/22/2012032200933.html.

125. Associated Press, "North Korea Names New Defense Minister amid Rocket Row," *FoxNews.com*, 10 April 2012, <http://www.foxnews.com/world/2012/04/10/north-korea-names-new-defense-minister-amid-rocket-row/>.

126. For a synopsis of the key positions that Kim Chong-un was appointed to during April 2012, see Choe Sang-hun, "As Rocket Launching Nears, North Korea Continues Shift to New 'Supreme Leader,'" *New York Times*, 11 April 2012, <http://www.nytimes.com/2012/04/12/world/asia/young-north-korean-leader-kim-jong-un-chosen-as-head-of-ruling-party.html>; "Kim Jong-un Named First Chairman of National Defense Commission," *Yonhap*, 13 April 2012, <http://english.yonhapnews.co.kr/northkorea/2012/04/13/040100000AEN20120413007700315.html>; and Associated Press, "Kim Jong-un Named as Top Political Official," *Tulsa World*, 12 April 2012, http://www.tulsaworld.com/news/article.aspx?subjectid=13&articleid=20120412_13_A6_CUTLIN494889.

127. Kim So Yeol, "The Rise and Rise of Choi Hyong Rae," *Daily NK*, 11 April 2012, <http://www.dailynk.com/english/read.php?cataId=nk00100&num=9095>.

128. "N. Korea Appoints New Members to Defense Commission," *Yonhap*, 14 April 2012, <http://view.koreaherald.com/kh/view.php?ud=20120414000063&cpv=0>.

129. "JST on Political Bureau Presidium?" *North Korea Leadership Watch* (blog), 8 January 2013, <http://nkleadershipwatch.wordpress.com/2013/01/08/jst-on-political-bureau-presidium/>.

130. "Kim Far Behind in Succession Stakes," *DailyNK*, 29 June 2011, <http://dailynk.com/english/read.php?cataId=nk00100&num=7891>.

131. Yoo Ho-yeol, "Kim Jong-il Succession Could Mean Crisis or Opportunity," *Chosun Ilbo*, 4 October 2010, http://english.chosun.com/site/data/html_dir/2010/10/04/2010100401232.html.

132. Kim Yong Hun, "There Is Still a Possibility of Uprising in North Korean Society," *DailyNK*, 21 July 2011, <http://www.dailynk.com/english/read.php?num=7967&cataId=nk00300>.

133. For in-depth analysis about the disruptions within elite elements of North Korean society during the transition period that began in earnest during 2010, see Kim Yong Hun, "Kim Jong Nam Standing on the Highway," *DailyNK*, 22 September 2011, <http://www.dailynk.com/english/read.php?cataId=nk00100&num=8203>.

134. "Doctors Identify Kim Jong-il's 3 Main Health Problems," *Chosun Ilbo*, 14 February 2011, http://english.chosun.com/site/data/html_dir/2011/02/14/2011021401098.html.

135. Song Sang-ho, "N. K. Succession Appears Smoother than Expected," *Korea Herald*, 28 September 2011, <http://www.koreaherald.com/national/Detail.jsp?newsMLId=20110928000820>.

136. "How N. Korea's Fate Hangs on Kim Jong-il's Health," *Chosun Ilbo*, 19 February 2011, http://english.chosun.com/site/data/html_dir/2011/02/19/2011021900214.html; and Associated Press, "Committee of Advisers May Help Kim Jong Un," *Yahoo! News*, 21 December 2011, <http://news.yahoo.com/committee-advisers-may-help-kim-jong-un-123418271.html>.

137. For more analysis on the differences in the succession process between Kim Chong-il and Kim Chong-un, see Oh Kongdan, "The Death of Kim Jong-il," *Brookings Institution Analysis*, 19 December 2011, http://www.brookings.edu/opinions/2011/1219_north_korea_oh.aspx.

138. For details on South Korean efforts to reverse national defense mistakes made by the Roh administration and budget adjustments that ensued as a result, see "Military Reform 2020 Seeing Gradual Elimination," *Dong-a Ilbo*, 4 October 2010, <http://english.donga.com/srv/service.php3?biid=2010100466248>; Lee Chi-dong, "S. Korea Unveils Vision for Defense Industry," *Yonhap*, 19 October 2010, <http://english.yonhapnews.co.kr/national/2010/10/19/46/030100000AEN20101019004200315F.HTML>; and "Defense Industry Requests Budget Increase for Better

Combat Readiness,” *Yonhap*, 7 July 2011, <http://english.yonhapnews.co.kr/national/2011/07/07/52/0301000000AEN20110707000400315F.HTML>.

139. For more details of planned and ongoing ROK acquisitions of command and control systems and intelligence collection aircraft, see “Three Firms Chosen to Develop Advanced Military Communications Network,” *Yonhap*, 20 October 2010, <http://english.yonhapnews.co.kr/national/2010/10/20/63/0301000000AEN20101020005100315F.HTML>; and Jung Sung-ki, “Korean Air to Develop UAV for Division Operations,” *Korea Times*, 13 September 2010, http://www.koreatimes.co.kr/www/news/nation/2011/08/205_72981.html.

140. “Air Force Gets Two More F-15K Jets,” *Yonhap*, 14 March 2011, <http://english.yonhapnews.co.kr/national/2011/03/14/44/0301000000AEN20110314008800315F.HTML>; Jung Sung-ki, “US Approves Sale of Stealthy F-15 to South Korea,” *Korea Times*, 12 September 2010, http://www.koreatimes.co.kr/www/news/nation/2010/09/205_72945.html; and Song Sang-ho, “Seoul Accelerates Stealth Fighter Program,” *Korea Herald*, 3 March 2011, <http://www.koreaherald.com/view.php?ud=20110302000858>.

141. Evan Ramstead, “U.S., Seoul, Make Plans to Respond to Attacks,” *Wall Street Journal*, 8 July 2011, <http://online.wsj.com/article/SB10001424052702303544604576431470481160628.html>.

142. For more information about ROK military measures taken to counter North Korean SOF, see “Frontline Defenses to Be Beefed Up,” *Chosun Ilbo*, 6 April 2011, http://english.chosun.com/site/data/html_dir/2011/04/06/2011040601083.html.

143. “S. Korean, U.S. Militaries Sign Pact to Bolster Joint Drills,” *Yonhap*, 27 April 2012, http://www.koreatimes.co.kr/www/news/nation/2012/05/113_109824.html.

144. Yonhap News Service, “Korea Confirms Delay of U.S. Base Relocation,” *Korea Herald*, 29 March 2011, <http://media.daum.net/foreign/englishnews/view.html?cateid=1047&newsid=20110329183307759&p=koreaherald>.

145. For details on ROK-US missile defense cooperation and ongoing Japanese-US BMD efforts, see Hwang Doo-hyong, “U.S., S. Korea Sign Agreement on Missile Defense System Development: Pentagon,” *Yonhap*, 16 April 2011, <http://english.yonhapnews.co.kr/national/2011/04/16/13/0301000000AEN20110416000100315F.HTML>; “S. Korea, U.S. Conduct Joint Study on Missile Defense System,” *Yonhap*, 15 April 2011, <http://english.yonhapnews.co.kr/national/2011/04/15/0301000000AEN20110415007500320.HTML>; Kyodo News, “Japan to Deploy Missile Interceptors Nationwide on North Korea Threat,” *Free Republic*, 9 December 2010, <http://www.freerepublic.com/focus/f-news/2641150/posts>; and Mainichi News, “U.S. Tells Japan of 2-yr Delay in Development of Missile Interceptor,” *Zimbio*, 17 September 2011, <http://www.zimbio.com/Missile+Shield/articles/g-Vh59mRNYZ/tells+Japan+2+yr+delay+development+missile>.

146. John Power, “Should S. Korea Increase Its Missile Range?” *Asia One*, 24 April 2012, <http://www.asiaone.com/News/AsiaOne+News/Asia/Story/A1Story20120424-341667.html>.

147. During spring 2012, South Korean president Lee Myung-bak made public statements that the 300 km limit for South Korean missile range is not sufficient, see Christian Oliver, “South Korea Out to Extend Missile Range,” *Financial Times*, 21 March 2012, <http://www.ft.com/cms/s/0/ad35d806-7333-11e1-9014-00144feab49a.html#axzz1w8iX13PF>.

148. For more information on numbers and locations of US Patriot batteries deployed on the Korean Peninsula to protect US bases, see “U.S. to Withdraw Patriot Missiles from Gwangju,” *Chosun Ilbo*, 24 August 2006, http://english.chosun.com/site/data/html_dir/2006/08/24/2006082461011.html.

149. Kim Min-seok and Brian Lee, “Key Defense Mission to Go to Korean Military,” *Korea JoongAng Daily*, 10 April 2005, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2553210>.

150. For details about North Korea’s long-range artillery capabilities and the weaknesses in South Korea’s ability to counter them, see “S. Korea Lacks Radar to Detect N. Korean Artillery,” *Chosun Ilbo*, 22 August 2011, http://english.chosun.com/site/data/html_dir/2011/08/22/2011082201021.html; and “S. Korea Must Bolster Its Defense against N. Korean Artillery,” *Chosun Ilbo*, 22 August 2011, http://english.chosun.com/site/data/html_dir/2011/08/22/2011082201024.html.

151. Kim Min-seok, “War Plan by U.S. and Seoul Needs Updating, Upgrade,” *Korea JoongAng Daily*, 5 October 2010, <http://koreajoongangdaily.joins.com/news/article/article.aspx?aid=2926768>.

152. US Secretary of Defense Robert M. Gates and ROK Minister of National Defense Kim Tae Young, “Joint Communiqué: The 42nd U.S.-ROK Security Consultative Meeting,” *U.S. Defense News*, 8 October 2010, <http://www.defense.gov/news/d20101008usrok.pdf>.

153. “S. Korea-U.S. Drill to Prepare for Regime Collapse in N. Korea,” *Chosun Ilbo*, 15 February 2011, http://english.chosun.com/site/data/html_dir/2011/02/15/2011021500290.html.

154. "S. Korea, U.S. to Practice Destroying N. Korean WMDs," *Chosun Ilbo*, 8 August 2011, http://english.chosun.com/site/data/html_dir/2011/08/08/2011080800747.html.
155. "S. Korea, U.S. Practice Stabilizing N. Korea in Civil War," *Chosun Ilbo*, 8 April 2012, http://english.chosun.com/site/data/html_dir/2012/04/06/2012040600891.html.
156. "CONPLAN 5029 Cedes Control to U.S. and China in N. Korean Emergency," *Hankyoreh*, 30 July 2011, http://english.hani.co.kr/arti/english_edition/e_northkorea/489727.html.
157. Kim Yoon-mi, "Powers Rushing to Ensure Stability in Korea," *Korea Herald*, 30 December 2011, <http://www.koreaherald.com/national/Detail.jsp?newsMId=20111230000424>.

Appendix H

Asia-Pacific-Related Futures Studies and War Games

Dr. Karen W. Currie

Introduction

In this appendix, I explore other research within the Department of Defense (DOD) related to this Air Force Research Institute (AFRI) study on the Asia-Pacific region. In this exploration, I focus on two questions. The first asks whether other US Air Force (USAF) organizations, other military services, research agencies, or academic organizations were engaged in futures studies projects similar to the one AFRI is currently conducting, regarding the most effective use of airpower in the Asia-Pacific theater to meet combatant commanders' needs to the year 2020. The second asks if others were conducting studies related to but not specifically identical to this effort.

Information on unclassified futures studies and futures war games taking place in 2011 or later concerning the Asia-Pacific area was requested from the military services and professional military education schools, other DOD organizations, federal agencies, and civilian think tanks. More than 40 different agencies and individuals were contacted. A civilian staffer of the Future Concepts Division (HQ USAF/A8XC) stated that he was not aware of any studies being conducted that mirrored the AFRI research question.¹ An extensive search for similar studies did not discover any directly related to the thesis question explored in this work. However, an extensive literature search for these studies and of current events was conducted. This appendix summarizes the findings from that search, including the key strategic studies and policy documents relating to the Asia-Pacific theater of operations, doctrine, war games, exercises, and future studies examining the years 2020 and beyond. Activities are listed alphabetically within category.

Studies/Doctrine/Policy

- AirSea Battle. The Departments of the Navy and the Air Force developed a new operational concept called AirSea Battle (ASB) in response to a tasking by then-Secretary of Defense Robert Gates in 2009. ASB is designed to counter emerging antiaccess/area-denial (A2/AD) challenges and to ensure a coordinated response by all components of US and allied forces. Increasing proliferation of advanced weapons technology potentially places the global commons at risk, posing serious challenges to traditional US national security interests. According to ASB project office leaders, “the central idea of ASB is an unprecedented level of joint integration leading to air and naval forces that can launch networked, integrated attacks-in-depth to disrupt, destroy, and defeat an adversary’s A2/AD capabilities.”² The Center for Strategic and Budgetary Assessments

(CSBA) published a report in May 2010 describing how developing A2/AD capabilities would increase risks for US power projection operations in areas such as the Western Pacific Theater of Operations, for example. The unclassified CSBA report began the public dialogue on ASB concepts that continues to the present.³ In an effort to defuse the controversy, then-Air Force Chief of Staff Norton Schwarz stated in May 2012 that ASB is “agnostic with regard to specific regions of the world.”⁴

- Air War College (AWC) Grand Strategy Program (GSP). The GSP, limited to 12 competitively selected students, is a more academically rigorous program than the standard AWC course. The GSP program during academic year 2013 focused its student research efforts on the overall question, “What are the strategic implications of the recent US strategic rebalancing towards Asia?” Instructors assigned each GSP student a 5,000-word professional studies paper on some aspect of that overarching question. The students graduated in May 2013, and the more important papers will be available online in late 2013 or early 2014.⁵
- Blue Horizons. The USAF Center for Strategy and Technology (CSAT) runs the Blue Horizons ongoing study program. CSAT finished a look at future USAF-required capabilities and associated enabling technologies in 2011, using an alternative futures approach for its analysis. Two of the futures, *Discord or “Harmonious Society”? China in 2030* and *Resurgent Russia in 2030: Challenge for the USAF*, deal specifically with the Asia-Pacific region.⁶ Synthesized in the *Executive Summary*, the fundamental conclusions of the CSAT study were for the USAF to develop capabilities with greater range and persistence; increase investments in unmanned architectures; increase investment in defensive technologies, including those against directed energy and cyber-attack; and improve the effectiveness and speed of the acquisition system to keep pace with the dynamic and rapidly changing capabilities of potential adversaries.⁷
- *Capstone Concept for Joint Operations: Joint Force 2020* (CCJO-JF2020). The purpose of the CCJO-JF2020 is to guide joint force development toward the achievement of Joint Force 2020 in order to meet the strategic priorities and missions required by the new defense strategy established in *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (see below). Through the establishment of operating priorities and a description of future joint force operations, the CCJO-JF2020 defines the broad materiel and nonmateriel capabilities required to overcome future challenges. It introduces the concept of *globally integrated operations*, in which globally postured joint force elements combine quickly with other organic and friendly units across domains and organizational boundaries to provide needed capabilities.⁸ Gen Martin Dempsey, US Army, chairman of the Joint Chiefs of Staff (CJCS), approved the CCJO-JF2020 on 10 September 2012.⁹
- *Global Trends 2030: Alternative Worlds*. Every four years, the National Intelligence Council (NIC) publishes a report about the projected state of the world for the next 15 years or so. The NIC published *Global Trends 2030: Alternative Worlds* in December 2012. Mathew Burrows, the lead author, briefed draft versions of the report to audiences of security strategists across the United States and abroad, asking for their feedback. In addition, the team invited the public to provide comments through a website set up by the NIC for this purpose. Each week during the summer of 2012, various

think tanks hosted a blog on the NIC website, providing a different author to write about a specific theme (e.g., “the role of the United States in 2030”) and moderate a discussion.¹⁰

- Pacific Air Forces (PACAF) Strategy Working Group. Led by the PACAF Strategy and Plans Office (13 AF/A5XC), this group developed a strategy to “outline how USAF will contribute to national goals in the Asia-Pacific region through 2030.”¹¹ The strategy includes an increased focus on partnership building; preparation for humanitarian assistance and disaster relief efforts; building expeditionary access; integration of air, missile, and cyber defense architectures with allies and partners; and operationalizing Air-Sea Battle principles including A2/AD capabilities. Other key initiatives include synchronizing component major command (CMAJCOM), numbered air force, and wing efforts along with harmonizing precision engagement with allies and partners and establishing priorities for the best use of PACAF and Headquarters Air Force (HAF) resources. Overall, this strategy describes how PACAF contributes as a service/functional component to US Pacific Command (USPACOM) and as a CMAJCOM to HAF. The PACAF Strategy Working Group includes representatives from PACAF, USPACOM, HAF, the office of the Secretary of the Air Force, and other strategy specialists. In conclusion, “The priority is to deter aggression, but should deterrence fail, our actions must set the theater for contingency operations.”¹²
- Project 2049 Institute. A 501(c)(3) organization, the Project 2049 Institute performs forward-looking research on five topics critical to Asia’s future:
 - Democracy and governance
 - Alliances, coalitions, and partnerships
 - Nontraditional security (terrorism, pandemic disease control, natural disasters, and environmental and energy security)
 - China studies
 - Asia and the world¹³

In addition to research papers, policy briefs, and monographs, the institute produces “futuregrams,” short memos addressing future-oriented, strategic topics related to Asia.¹⁴

- *Quadrennial Defense Review (QDR)*. Congress requires the DOD to conduct a review of defense strategy every four years: “The Secretary of Defense shall every four years, during a year following a year evenly divisible by four, conduct a comprehensive examination (to be known as a ‘quadrennial defense review’) of the national defense strategy, force structure, force modernization plans, infrastructure, budget plan, and other elements of the defense program and policies of the United States with a view toward determining and expressing the defense strategy of the United States and establishing a defense program for the next 20 years.”¹⁵ DOD presented the most recent QDR to Congress on 1 February 2010.¹⁶ One of the six key missions articulated by the 2010 QDR was to “deter and deflect aggression in anti-access environments.” Related initiatives included improvements to long-range strike, forward basing, and presence of US forces abroad.¹⁷ The 2010 QDR also directed the United States, as one of its regional

emphases, to “work with allies and key partners to ensure a peaceful and secure Asia-Pacific region.”¹⁸ Preparation for the 2014 *QDR* is currently under way. In one of his initial actions as secretary of defense, Chuck Hagel directed Deputy Secretary of Defense Ashton Carter and the CJCS, Gen Martin Dempsey, to lead a Strategic Choices and Management Review (SCMR), which was completed in the summer 2013. Briefed to the press by Secretary Hagel on 31 July 2013, the SCMR details hard choices that decision makers will have to make in the face of continued budgetary pressures.¹⁹ This review will serve as a foundation for the 2014 *QDR*, according to Secretary Hagel.²⁰

- RAND Project: China’s SE Asia Policy and Its Impact on USAF Posture. David Frelinger and Eric Heginbotham are leading an effort “to understand the nature of evolving U.S.–China strategic competition in Southeast Asia (SEA) and the South China Sea (SCS).” This project seeks to draw upon the ASB construct and do an extensive examination of airfield requirements and basing for potential conflict and counterterrorism scenarios. RAND initiated the project in October 2011 and provided an interim brief to HQ USAF/A8X on 25 April 2012.²¹
- *Sustaining US Global Leadership: Priorities for 21st Century Defense*. In January 2012, Pres. Barack Obama issued his defense strategic guidance, characterized by the statement, “We will of necessity rebalance toward the Asia-Pacific region.”²² In addition, the strategic guidance states that the joint force will need to “recalibrate its capabilities and make selective additional investments” in 10 primary missions, including projecting power despite A2/AD challenges with specific reference to the asymmetric capabilities of China and Iran.²³
- “USPACOM Strategic Guidance.” According to its mission statement, USPACOM, “together with other U.S. Government agencies, protects and defends the United States, its territories, Allies, and interests; alongside Allies and partners, promotes regional security and deters aggression; and, if deterrence fails, is prepared to respond to the full spectrum of military contingencies to restore Asia-Pacific stability and security.” One of its guiding principles is to focus “on the strategic level of leadership, engagement, planning, and warfighting. [Its] strategic behavior [is] shaped and informed by an analysis and assessment effort that seeks to understand the complex and dynamic Asia-Pacific security environment by concentrating on the five Focus Areas.” The “USPACOM Strategic Guidance” lists the following focus areas:
 - Strengthen and Advance Alliances and Partnerships
 - Mature the U.S.–China Military-to-Military Relationship
 - Develop the U.S.–India Strategic Partnership
 - Remain Prepared to Respond to Korean Peninsula Contingency
 - Counter Transnational Threats²⁴
- *U.S. Force Posture Strategy in the Asia Pacific Region: An Independent Assessment*. The Center for Strategic and International Studies (CSIS) conducted an independent assessment of US force posture strategy for the Asia-Pacific region as required by the 2012 National Defense Authorization Act. CSIS presented the written report to DOD on 27 June 2012, and its authors testified before the Subcommittee on Readiness,

House Armed Services Committee, on 1 August 2012.²⁵ After conducting more than 250 interviews throughout the USPACOM area of responsibility (AOR), the report's authors concluded that the United States and China have a stake in each other's success: "A key point here is that U.S. strategy is *not* to prepare for a fight with China."²⁶ With a focus on cooperation and the use of national power beyond just military forces, the study recommends enhanced partnership building with the Chinese as well as with existing allies and partners. Recommendations specifically relevant to the USAF include improving survivability of forward-deployed forces, making force posture and basing more efficient through consolidation and realignment of units, and enhancing lift and logistics to support a revamped DOD strategic guidance for USPACOM activities.²⁷

War Games/Exercises

- AWC Global Challenge War Game. Global Challenge is a six-day unclassified war game conducted at the strategic and operational levels. All AWC students participate in this capstone event, which faculty mentors direct and adjudicate. Global Challenge 2013 included a scenario related to the Pacific theater of operations.²⁸ In addition, students in the AWC Grand Strategy Program described above participated in a series of war-gaming practicums that culminated in an Office of the Secretary of Defense (OSD) Office of Net Assessment–sponsored war game.²⁹
- AWC Futures Game. AWC held the Futures Game from 3 to 8 June 2012, at Carlisle Barracks, PA, to test the concepts generated by Unified Quest 2012 (see below). The Futures Game, a computer-based simulation, consisted of two scenarios. The unclassified scenario was based on the Middle East; the classified scenario featured the Pacific region. The participants assigned to the strategic working group analyzed how the tactical outcomes could be used to develop doctrine to deal with future threats to the Army.³⁰
- Expeditionary Warrior (EW) 2012 (USMC) (Title 10 War Game). Set in 2024 in a fictional West African nation, EW12 was designed to test joint and service capabilities regarding joint force access and entry and follow-on operations. Held at the Westin Hotel in Washington, DC, 5–9 March 2012, the unclassified, seminar-style war game consisted of 180 participants who represented all five US armed services, the Joint Staff, OSD, US Central Command, US Special Operations Command, and 14 partner nations.³¹ The participants were organized into four blue cells that considered identical research questions. Concepts tested included the Joint Operational Access Concept, Marine Corps Amphibious Capabilities Working Group, and AirSea Battle. The ultimate objective was to create actionable issues for flag-level consideration. On the final day, participants were reorganized to evaluate EW12 by war-fighting function: command and control/command relationships, fires/intelligence, maneuver/force protection, and logistics. Insights developed from EW12 were incorporated into the Marine Corps Service Campaign Plan.³²
- Future Capabilities War Game 2013 (FG13). The FG is one of two chief of staff, United States Air Force (CSAF) Title 10 war games. Established by former CSAF Gen Ronald Fogleman (retired) in 1996, the FG occurs in March of odd years to explore what

capabilities and force structure will be needed by the USAF 20–25 years into the future. FG13 pitted two Blue (USAF) forces in parallel games against a Red adversary using an adapted OSD defense planning scenario. One Blue force was the USAF Programmed Force Extended, while the other Blue force was the Alternative Force. FG13 examined the potential for the Alternative Force structure to meet the objectives of the joint force commander in a future war.³³ The Alternative Force was assumed to be “affordable, technically feasible, and operationally balanced across all Air Force missions.”³⁴ Approximately 210 players/participants, from the US services, Australia, Canada, the United Kingdom, OSD, other government agencies, the science and technology community, industry, and think tanks, participated in FG13 at the LeMay Center Wargaming Institute (LCWI) at Maxwell AFB, AL. FG outcomes are usually briefed to the CSAF and include insights on future strategy, programmed/planning force, and acquisition.³⁵ For FG13, this process enabled the USAF to “backcast” from the future on specific issues including basing, missile threats, execution speed, and threats to air.³⁶ The war game and scenario are classified Secret. The Alternate Force structure was developed by the USAF Materiel Command–sponsored Future Game 2013 Alternate Forces Workshop. Taking place at LCWI on 9–14 September 2012, the workshop focused on agile combat-support issues and generated a number of different concepts that were used to generate the Alternate Force.³⁷

- Global (US Navy Title 10 War Game). Naval War College (NWC) conducts the Global war game for one week each year at the direction of the Chief of Naval Operations. The game is classified Secret in odd years and is unclassified in even years. The purpose is to study manning, training, and equipping implications for the Navy.³⁸
- Indo-Pacific War Game 2012. Hosted by the NWC from 26–30 March 2012, the US intelligence community and USPACOM sponsored this war game. It was classified at the Secret/Restricted (NOFORN) level.³⁹
- Joint Land, Air, and Sea Strategic Exercise (JLASS-EX). Held each year in April, JLASS-EX is a five-day exercise conducted at the operational and strategic levels of war. Students and faculty from the Air War College, Army War College, Marine Corps War College, Naval War College, National War College, the Dwight D. Eisenhower School for National Security and Resource Strategy, and the National Intelligence University search for military and diplomatic solutions to specific challenges to US national security taking place 10 years in future.⁴⁰ The five-day exercise in April is the culmination of a two-term distributed exercise conducted at each of the home-station senior service schools.⁴¹ JLASS-EX 2013 included a Pacific theater-related scenario.⁴²
- Pacific Partnership 2012 (US Navy). Beginning as a military-led humanitarian response to the 2004 tsunami in Southeast Asia, Pacific Partnership 2012 included 13 partner nations, 28 nongovernmental organizations, four US agencies, and a joint DOD effort. The annual US Navy Pacific Fleet–led humanitarian civic assistance deployment visited Cambodia, Indonesia, the Philippines, and Vietnam in 2012. More than 49,000 people received medical assistance, Navy veterinarians treated livestock, and Navy Seabees built or repaired 13 community and health clinic buildings. The Pacific Partnership team of 1,200 military and civilian professionals worked together with the goal of preparing for the next humanitarian disaster response in the area.⁴³

- Rim of the Pacific 2012 (RIMPAC). The commander, US Pacific Fleet, hosts the RIMPAC exercise every two years around the Hawaiian Islands, including the Pacific Missile Range Facility. Taking place from 27 June to 7 August 2012, RIMPAC was the world's largest live-fire international maritime exercise, involving 22 nations, more than 40 ships and submarines, and more than 200 aircraft. For the first time, RIMPAC 2012 included a humanitarian/disaster relief component, with participation from US civilian hospitals. The scenario depicted a tsunami hitting the fictional republic of Chi-anti. RIMPAC gave participants practice in cooperating to ensure the safety and security of the world's sea-lanes. USAF participation in RIMPAC 2012 included Fairchild Republic A-10 Thunderbolt II fixed-wing close air support aircraft executing "sink exercises" against decommissioned ship targets, Boeing B-52 Stratofortress long-range bombers forward-deployed from Guam performing low-level, naval-mining runs and providing close-air support, and Boeing C-17 Globemaster III transports executing supply drops.⁴⁴ Some nations sent only troops, while New Zealand and Russia—despite somewhat strained relations from past maritime incidents—both provided ships.⁴⁵ During a September 2012 visit to China, then-US Secretary of Defense Leon Panetta invited China to send a ship to RIMPAC 2014.⁴⁶ In January 2013 the US Pacific Fleet formally invited China to participate in RIMPAC for the first time. Deputy Secretary of Defense Ashton Carter announced Chinese acceptance of the invitation on 20 March 2013. The precise nature of the Chinese participation in RIMPAC 2014 is unclear at this writing.⁴⁷
- Schriever War Game 2012 International Game (SW12 IG). The USAF Space Command war game, held 19–26 April 2012 at Nellis AFB, NV, depicted counterpiracy operations around the Horn of Africa led by NATO and Australian forces. The war game gave participants experience in protecting space assets and integrating their use throughout the national and international security establishment. Results from the game are classified, but an unclassified version of the report was published in late 2012.⁴⁸
- Theater Security Cooperation Exercises (Pacific AOR).
 - Ulchi Freedom Guardian (ROK)⁴⁹
 - Keen Edge (Japan)⁵⁰
 - Commando Sling (Singapore)⁵¹
 - Cope Tiger (Thailand)⁵²
 - Cope North (Japan)⁵³
 - Talisman Sabre (Australia)⁵⁴
 - Red Flag Alaska (Multiple)⁵⁵
- Unified Engagement (UE) 2014. UE is a biannual futuristic tabletop war-gaming exercise. The exercise alternates between the Pacific and European theaters. PACAF will host the next UE, scheduled for the Pacific region in 2014.⁵⁶
- Unified Quest (USA) (Title 10 War Game). The Army Chief of Staff's annual future study play is designed to prepare the Army to meet future national security challenges.

- Unified Quest outcomes will be used to inform “near-term programmatic, policy, doctrine and strategy decisions impacting the Army of 2020.”⁵⁷

Other Studies

In addition to the official studies being conducted on the future security environment, a number of scholars and military strategists have written on the likely trends and possible scenarios of future interaction between the United States and the Asia-Pacific region—for example, James Canton, George Friedman, and Neyla Arnas. None of these authors specifically addresses USAF involvement in the region.⁵⁸ Andrew Krepinevich, in *7 Deadly Scenarios: A Military Futurist Explores War in the 21st Century*, describes how the Chinese developed and implemented technology to challenge US access to space and cyberspace and developed significant A2/AD capabilities in order to gain control over Taiwan.⁵⁹ Essentially the only USAF capability mentioned by Krepinevich was long-range strike.⁶⁰ A RAND study, *Conflict with China: Prospects, Consequences, and Strategies for Deterrence*, explored the consequences of potential conflict scenarios with China over the next 30 years and provided a list of “priority capabilities” for direct defense and threat of escalation. These capabilities included tactical air, long-range airstrike and missiles, ballistic missile defense, offensive and defensive cyber war, and antisatellite capabilities.⁶¹

Conclusion

An investigation of studies and war games regarding the future use of airpower in the Asia-Pacific area has shown that there is *most likely* no other unclassified study in progress or recently completed similar to the one conducted by AFRI. It is, however, impossible to be sure. There are many organizations at the service and DOD level engaged in conducting or sponsoring studies and activities related to strategic planning for future events and environments. A diversity of approaches encourages creative thinking, but some confederation of ideas would be beneficial to make the best use of resources devoted to future strategic planning. Apparently, there is no initiative at the USAF or DOD level to keep track of defense futures projects or their outcomes.

How can this wealth of ideas on future US involvement in the Asia-Pacific area be organized into some kind of coherent policy input? Perhaps the approach taken by a military futures scholar, Sam Tangredi, might be useful. He conducted a meta-analysis of 40 studies of national security environments projected for the years 2010 to 2035. He discovered 18 points of consensus and 10 points of divergence. Two of the points of consensus are particularly relevant to this discussion: a regional power will challenge the United States (most likely candidates are China, Russia, and Iran), and “regional powers will use anti-access/area denial strategies.”⁶²

Defense planners need a methodology for organizing and evaluating the outcomes of studies and war games related to the future security environment. The first

step, however, must be to facilitate information sharing on future strategic planning projects and war games. To accomplish this objective, the USAF should undertake the following initiatives. With some innovative approaches, the USAF can probably accomplish these initiatives with existing resources.

- Establish a clearinghouse for unclassified defense futures initiatives to stimulate the cross flow of similar ideas and to prevent duplication of effort. AFRI, in partnership with HQ USAF/A8XS, should issue an annual call for topics—similar to the call for research topics issued by the Air University Research Board. Each major command, field operating agency, and auxiliary unit should be required to submit a concise summary of all unclassified defense futures initiatives undertaken within the past 12 months or planned for the next 12 months. All projects, whether accomplished by organic or contract resources, should be reported. The summary of each project should include:
 - brief description;
 - objectives;
 - authorizing or directing law or policy directives, if any;
 - time frame of study or war game;
 - participants; and
 - project principals, with contact information.
- The project director could upload the required information to a webpage dedicated to this clearinghouse. The webpage could be CAC-protected and open to registered users.
- Develop and implement a process for tracking the outcomes and measuring the impacts of USAF-sponsored futures projects. The information could be managed and accessed using the same online database described above.
- Establish a method for “crowd-sourcing” ideas related to defense futures projects. For example, researchers conducting the USAF 2025 futures project in 1995–1996 issued a worldwide call for ideas on future air, space, and information technologies; nearly 1,400 ideas were submitted via a web page.⁶³ More recently, the Defense Advanced Research Projects Agency solicited ideas for designing a new Marine amphibious vehicle, after the design proposed by General Dynamics Corporation was deemed too expensive. Through a series of design challenges, designers competed for the top prize of two million dollars.⁶⁴ At the very least, the USAF could use social networking techniques to collect information on current defense-related futures projects in order to provide situational awareness for those planning and conducting similar studies.

Information sharing is critical to the success of defense futures initiatives at the service level. If the relevant policies and procedures existed, answering the question posed by this appendix might have taken only minutes, at least in regard to the activities of USAF organizations. As it is, because there is no central repository of information on defense futures studies, we are “driving in the dark,” to borrow Richard Danzig’s description of national security predictions.⁶⁵

Notes

1. Mark Willis, chief, Analysis Branch, Future Concepts Division, Directorate of Strategic Planning, DCS, Strategic Plans and Programs (HQ USAF/A8XC), to author, e-mail, 23 July 2012.
2. Philip Dupree and Jordan Thomas, "Air-Sea Battle: Clearing the Fog," *Armed Forces Journal* 149, no. 10 (June 2012): 10–2.
3. Jan Van Tol, Mark Gunzinger, Andrew Krepinevich, and Jim Thomas, *AirSea Battle: A Point of Departure Concept* (Washington, DC: Center for Strategic and Budgetary Assessments, May 2010), ix, <http://www.csbaonline.org/wp-content/uploads/2010/05/2010.05.18-AirSea-Battle.pdf>.
4. Gen Norton A. Schwartz, CSAF, "Air-Sea Battle: A Global Concept" (lecture, The Brookings Institution, Washington, DC, 16 May 2012), http://www.brookings.edu/events/2012/05/16-air-sea-doctrine#ref-id=20120516_schwartz.
5. Col Ray O'Mara, AWC/DES, to AWC AY13 Students, e-mail, 11 May 2012. Those interested in searching through the Grand Strategy papers can do so on the Muir S. Fairchild Research Information Center website at <http://www.au.af.mil/au/aul/lane.htm>.
6. John P. Geis II, Scott E. Caine, Edwin F. Donaldson, Blaine D. Holt, and Ralph A. Sandfly, *Discord or "Harmonious Society"? China in 2030* (Maxwell AFB, AL: Air University Press, February 2011); Theodore C. Hailes, Ronald Buckley, David Blanks, Mark Butler, Phillip Preen, and Michael Tarlton, *Resurgent Russia in 2030: Challenge for the USAF* (Maxwell AFB, AL: Air University Press, September 2009).
7. John P. Geis II, Christopher J. Kinnan, Ted Hailes, Harry A. Foster, and David Blanks, *Blue Horizons II: Future Capabilities and Technologies for the Air Force in 2030* (Maxwell AFB, AL: Air University Press, July 2009).
8. Joint Chiefs of Staff, *Capstone Concept for Joint Operations: Joint Force 2020* (Washington, DC: Department of Defense [DOD], 10 September 2012), iii, http://www.defenseinnovationmarketplace.mil/resources/JV2020_Capstone.pdf.
9. Kevin Baron, "Dempsey Calls for Faster, Flexible Force in 'Joint Force 2020' Capstone," *The E-Ring* (blog), 27 September 2012, http://e-ring.foreignpolicy.com/posts/2012/09/27/dempsey_calls_for_faster_flexible_force_in_joint_force_2020_capstone.
10. Peter Feaver, "What Should Global Trends 2030 Say about the Role of the United States?" *Shadow Government* (blog), 18 June 2012, http://shadow.foreignpolicy.com/posts/2012/06/18/what_should_global_trends_2030_say_about_the_role_of_the_united_states.
11. Byron Hall, PACAF Strategy Talking Paper, PACAF/A5X, 11 September 2012.
12. Ibid.
13. Project 2049, "Research Focus," 2012, http://project2049.net/research_focus.html.
14. Project 2049, "Publications," 2012, <http://project2049.net/publications.html>.
15. US Code 10, Armed Forces, Sec 118 (a): *Quadrennial Defense Review*.
16. DOD, "2010 Quadrennial Defense Review (QDR) Fact Sheet," 1 February 2010, http://www.defense.gov/qdr/QDR_FACT_SHEET_Feb_2010.pdf.
17. DOD, *Quadrennial Defense Review Report* (Washington, DC: DOD, February 2010), viii, 2.
18. Ibid., 64.
19. Chuck Hagel, secretary of defense, "Statement on Strategic Choices and Management Review" (speech, Pentagon Press Briefing Room, Washington, DC, 31 July 2013), <http://www.defense.gov/speeches/speech.aspx?speechid=1798>.
20. Chuck Hagel, secretary of defense, to Ashton Carter, deputy secretary of defense, et al., "Strategic Choices and Management Review," memorandum, 15 March 2013; and Paul McLeary, "Army's Problems Go Deeper than SCMR," *Air Force Times*, 1 August 2013, <http://www.airforcetimes.com/article/20130801/NEWS05/308050006/Army-s-problems-go-deeper-than-SCMR>.
21. RAND Corporation, "Fiscal Year 2012 Research Agenda," 27 April 2012, <http://www.rand.org/paf/agenda/stratdoc.html>.
22. DOD, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: DOD, January 2012), 2.
23. Ibid., 4.
24. Robert F. Willard, commanding admiral, USPACOM, "United States Pacific Command Strategic Guidance," n.d., <http://www.pacom.mil/about-uspacom/strategic-guidance.shtml>.
25. House, *United States Force Posture in the United States Pacific Command Area of Responsibility: Hearing before the Subcommittee on Military Readiness, House Armed Services Committee*, 112th Cong., 2nd sess., 1 August 2012, 43–59.

26. Ibid., 44, 46.
27. Ibid., 46, 49.
28. Col Frank E. Fields, AWC/DEW, to the author, e-mail, 25 June 2012.
29. Air War College, "Master of Strategic Studies and Diploma Program," 2011, 9–10, http://www.au.af.mil/au/awc/documents/awc_catalog_2011-2012.pdf.
30. Raymond J. Piper, "Future Games Gives Leaders Tools to Chart Army's Future," *Official Homepage of the US Army*, 8 June 2012, http://www.army.mil/article/81464/Future_Games_gives_leaders_tools_to_chart_Army_s_future/.
31. USAF representatives were HQ USAF/A5XS and HQ USAF/A8XC.
32. Message, MARADMIN 262/12, Commandant of the Marine Corps, to Headquarters Marine Corps and Marine Corps Forces staffs, 11 May 2012, <http://www.marines.mil/News/Messages/MessagesDisplay/tabid/13286/Article/110600/marine-corps-service-campaign-plan-2012-2020-mcscp-2012.aspx>. The actual plan was signed by the secretary of the Navy on 2 May 2013. See <http://www.defense.gov/news/marinecorpswisimplementationplan.pdf>.
33. Lt Col Steve Webber, military deputy division chief, Air Force Future Concepts Division, Headquarters, USAF, "Bullet Background Paper on the US Air Force Future Capabilities Game (FG)," July 2012.
34. Michael Barzelay and Colin Campbell, *Preparing for the Future: Strategic Planning in the U.S. Air Force* (Washington, DC: Brookings Institution Press, 2003), 194.
35. Webber, "Bullet Background Paper."
36. Lt Col Steve Webber, military deputy division chief, Air Force Future Concepts Division, Headquarters, USAF, "Future Capabilities Wargame 2013 (FG13) Mission Brief," version 12 (PowerPoint presentation, Future Capabilities Wargame 2013, 20 June 2012), slides 2 and 4.
37. Samuel J. Bolen, director, FG13, LeMay Center, Air University, interview with author, 7 August 2012; and Samuel J. Bolen, director, FG13, LeMay Center, Air University, to the author, e-mail, 10 April 2013. AFI10-2305 is the prescribing directive for the Futures Wargames. It was rescinded on 14 October 2010 but has not been updated and is still used as the basis for the FG.
38. US Naval War College, "Global 2011 Title X War Game," n.d., <http://www.usnwc.edu/wargaming/Global2011.aspx>.
39. LCDR Nicholas Miller and Prof. Shawn Burns, US Naval War College, to prospective attendees, letter, subject: Indo-Pacific War Game 2012, n.d., http://www.usnwc.edu/getattachment/9d65cb9a-0c81-4b3b-bcb9-94d41dec4e7a/Indo-Pacific_Admin_Letter1.pdf.
40. "Future Joint Leaders Wrestle with Fictional World in Crisis," *Maxwell-Gunter Dispatch*, 12 April 2013, 1.
41. "Future Joint Leaders Wrestle with Mock Crisis," Maxwell AFB (website), 13 April 2012, <http://www.maxwell.af.mil/news/story.asp?id=123297924>.
42. Col Frank E. Fields, AWC/DEW, to the author, e-mail, 25 June 2012.
43. Michael Feddersen, "USNS Mercy Arrives in Hawaii for Port Visit," *Pacific Partnership 2012* (website), 2 September 2012, <http://www.cpf.navy.mil/news.aspx/030056>.
44. William Cole, "By Air, As Well As by Sea," *Honolulu Star-Advertiser*, 1 August 2012, 1, <http://www.staradvertiser.com/s?action=login&f=y&id=164553646&id=164553646>.
45. Jeanette Steele, "Pacific Nations Seeking 'Insurance' at War Games," *Union-Times San Diego*, 23 July 2012, <http://www.utsandiego.com/news/2012/Jul/22/concerns-about-china-loom-over-war-games/>; William Cole, "Military, Hospital Collaborate during 'Tsunami' at RIMPAC," *Honolulu Star-Advertiser*, 21 July 2012, <http://www.stripes.com/news/navy/military-hospitals-collaborate-during-tsunami-at-rippac-1.183567?localLinksEnabled=false>; and RIMPAC 2012 Combined Information Bureau, "RIMPAC 2012," 3 July 2012, <http://www.cpf.navy.mil/rippac/2012/>.
46. Kevin Baron, "Pentagon 'Hopeful' China Will Join RIMPAC," *The E-Ring* (blog), 24 September 2012, http://e-ring.foreignpolicy.com/posts/2012/09/24/pentagon_hopeful_china_will_join_rippac.
47. William Cole, "China to Join RIMPAC in 2014," *Honolulu Star-Advertiser*, 1 April 2013, <http://www.staradvertiser.com/archives/?arMonth=4&arDay=1&arYear=2013>.
48. NATO, *Schriever Wargame 2012 International, HQ SACT Report* (Brussels, Belgium: NATO, December 2012).
49. Public Affairs Office, Yongsan Army Garrison, Republic of Korea, "CFC Announces Ulchi Freedom Guardian 2013," 10 August 2013, http://www.usfk.mil/usfk/Uploads/210/Press_Release_--_Announce_UFG_10_Aug.pdf.
50. Katrina R. Menchaca, "U.S., Japan Service Members Come Together for Keen Edge 2012" (press release, 374th Airlift Wing Public Affairs, Yokota AB, Japan, 29 January 2012), <http://www.yokota.af.mil/news/story.asp?id=123287852>.

51. Kaleb Snay, "Airmen Deploy for Commando Sling" (press release, 35th Fighter Wing Public Affairs, 27 March 2012), <http://www.pacaf.af.mil/news/story.asp?id=123295255>.
52. Marc V. Schanz, "COPE TIGER: US Forces Go to 'War' with the Thai and Singaporean Air Forces in an Ever More Important Large-Force Exercise," *Air Force Magazine*, June 2012, <http://www.airforcemag.com/MagazineArchive/Pages/2012/June%202012/0612cope.aspx>.
53. Joshua Gray, "Cope North 2013 Kicks Off on Guam" (press release, Cope North 2013 Combined Information Bureau, 4 February 2013), <http://www.pacaf.af.mil/news/story.asp?id=123334915>.
54. Department of Defence, Government of Australia, "Talisman Saber 2013," 2013, <http://www.defence.gov.au/opex/exercises/ts13/>.
55. Brian Everstine, "Spared from Sequestration Cuts, Red Flag-Alaska Wraps Up: Exercise Brings Korean, Japanese Forces Together," *Air Force Times*, 25 August 2013, <http://www.airforcetimes.com/article/20130825/NEWS/308250005/Spared-from-sequestration-cuts-Red-Flag-Alaska-wraps-up>; and Pacific Air Forces Command Brief, 25.
56. Pacific Air Forces Command Brief, 26.
57. Army Capabilities Integration Center, "Unified Quest 2012 Intent," 24 April 2012, <http://web.archive.org/web/20120429210324/http://www.arcic.army.mil/unified-quest.html>.
58. James Canton, *The Extreme Future: The Top Trends That Will Reshape the World for the Next 5, 10, and 20 Years* (New York: Dutton, 2006), 301–29; Robert S. Ross, "China," in *Fighting Chance: Global Trends and Shocks in the National Security Environment*, ed. Neyla Arnas (Washington, DC: National Defense University Press, Potomac Books, 2009), 185–96; Michael Krepon, "South Asia," in *Fighting Chance: Global Trends and Shocks in the National Security Environment*, ed. Neyla Arnas (Washington, DC: National Defense University Press, Potomac Books, 2009), 225–39; Neyla Arnas, ed., "Summarizing the Trends and Shocks" and "Appendix: Summary of Possible Shocks," in *Fighting Chance: Global Trends and Shocks in the National Security Environment* (Washington, DC: National Defense University Press, Potomac Books, 2009), 281–82, 296; and George Friedman, *The Next Decade: Where We've Been . . . And Where We're Going* (New York: Doubleday, 2011), 166–93.
59. Andrew F. Krepinevich, *7 Deadly Scenarios: A Military Futurist Explores War in the 21st Century* (New York: Bantam Books, 2009), 169–209.
60. *Ibid.*, 208.
61. James Dobbins, David C. Gompert, David A. Shlapak, and Andrew Scobell, *Conflict with China: Prospects, Consequences, and Strategies for Deterrence* (Santa Monica, CA: RAND, 2011), 1–8, <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA551039>.
62. Sam J. Tangredi, *Futures of War: Toward a Consensus View of the Future Security Environment, 2010–2035* (Newport, RI: Alidade Press, 2008), 17, 61.
63. 2025 Support Office, Air University, Air Education and Training Command, USAF, "Historical Background: Fact Sheet," November 1996, <http://csat.au.af.mil/2025/INTRO.PDF>.
64. James R. Hagerty, "Tapping Crowds for Military Design," *Wall Street Journal*, 16 August 2012, 3; <http://online.wsj.com/article/SB1000087239639044423104577591600693135044.html>.
65. Richard Danzig, *Driving in the Dark: Ten Propositions about Prediction and National Security* (Washington, DC: Center for a New American Security, October 2011), 28, http://www.cnas.org/files/documents/publications/CNAS_Prediction_Danzig.pdf.

Abbreviations

A2/AD	antiaccess/area-denial
AAF	Army Air Forces
ACRA	Airlift Concepts and Requirements Agency
AD	active duty
AFDD	Air Force doctrine document
AFRC	Air Force Reserve Command
AFRI	Air Force Research Institute
AMC	Air Mobility Command
ANG	Air National Guard
AOR	area of responsibility
APEC	Asia-Pacific Economic Cooperation
ARC	air reserve component
ASB	AirSea Battle
ASEAN	Association of Southeast Asian Nations
ASP	ASEAN Surveillance Process
ASUS	air support squadron
ATC	Air Transport Command
AWC	Air War College
BMD	ballistic missile defense
BP	building partnerships
BPC	building partnership capacity
C2	command and control
CA	civil affairs
CBO	Congressional Budget Office
CBR	California bearing ratio
CCJO-JF2020	Capstone Concept for Joint Operations: Joint Force 2020
CCP	Chinese Communist Party
CFR	Code of Federal Regulations
CIC	Canadian International Council
CINCPAC	commander in chief, US Pacific Command
CJCS	chairman of the Joint Chiefs of Staff
C-MAJCOM	component major command
CMO	civil-military operation
CNA	computer network attack
CONUS	continental United States
CRAF	Civil Reserve Airlift Fleet
CRS	Congressional Research Service
CSAF	chief of staff, United States Air Force
CSAS	Common Service Airlift System
CSAT	Center for Strategy and Technology
CSBA	Center for Strategic and Budgetary Assessments

CSIS	Center for Strategic and International Studies
CSTO	Collective Security Treaty Organization
DIME	diplomatic, informational, military, and economic
DLIELC	Defense Language Institute English Language Center
DLPT	Defense Language Proficiency Test
DOD	Department of Defense
DPP	Democratic Progressive Party
DPRK	Democratic People's Republic of Korea
EASL	English as a second language
EU	end user
EU	European Union
EW	electronic warfare
EW12	Expeditionary Warrior 2012
FDI	foreign direct investment
FG13	Future Capabilities Wargame 2013
FID	foreign internal defense
FOL	forward operating location
FY	fiscal year
GAO	Government Accountability Office
GDP	gross domestic product
GPB	General Political Bureau
GPS	Global Positional System
GSP	Grand Strategy Program
HA/DR	humanitarian assistance / disaster relief
HAF	Headquarters Air Force
HART	hardened artillery site
HN	host nation
HQ AETC	Headquarters Air Education and Training Command
ICBM	intercontinental ballistic missile
ICJ	International Court of Justice
ICS	industrial control system
ICT	information and communication technology
IHS	International Health Service
IISS	International Institute for Security Studies
IMF	International Monetary Fund
IP	Internet Protocol
IPv6	Internet Protocol version 6
ISP	Internet service provider
ISR	intelligence, surveillance, and reconnaissance
IT	information technology

IW	irregular warfare
JB	joint base
JBICI	Japan Bank for International Cooperation Institute
JCA	joint capability area
JFC	joint force commander
JLASS-EX	Joint Land, Air, and Sea Strategic Exercise
JOAC	<i>Joint Operational Access Concept</i>
JP	joint publication
JTF	joint task force
KCNA	Korea Central News Agency
kg	kilogram
km	kilometer
LCWI	LeMay Center Wargaming Institute
LOC	line of communication
MAC	Military Air Command
MARAD	Maritime Administration
MATS	Military Air Transport Service
MCRS	<i>Mobility Capabilities and Requirements Study</i>
MILF	Moro Islamic Liberation Front
mm	millimeter
MND	Ministry of National Defense
MOG	maximum on the ground
MPS	maritime prepositioning squadron
MRBM	medium-range ballistic missile
MRL	multiple rocket launcher
MSC	Military Sealift Command
MSC	Military Security Command
MTM/D	million ton-miles per day
MTT	mobile training team
NATO	North Atlantic Treaty Organization
NATS	Naval Air Transport Service
NDC	National Defense Commission
NDS	National Defense Strategy
NGO	nongovernmental organization
NHK	Japan Broadcasting Corporation
NIC	National Intelligence Council
NIST	National Institute of Standards
nm	nautical mile
NMAS	national military airlift system
NMS	National Military Strategy
NSR	Northern Sea Route

NSS	National Security Strategy
NWP	Northwest Passage
ODI	outward direct investment
OECD	Organisation for Economic Co-operation and Development
OEM	original-equipment manufacturer
OGD	Organization and Guidance Department
OS	operating system
OSD	Office of the Secretary of Defense
PACAF	Pacific Air Forces
PLA	People's Liberation Army
PN	partner nation
POR	program of record
PPP	purchasing power parity
PRC	People's Republic of China
PSI	Proliferation Security Initiative
<i>QDR</i>	<i>Quadrennial Defense Review</i>
RAAF	Royal Australian Air Force
REE	rare earth element
RIMPAC	Rim of the Pacific
ROK	Republic of Korea
RORO	roll-on/roll-off
RPA	remotely piloted aircraft
S&T	science and technology
SCMR	Strategic Choices and Management Review
SEA	Syrian Electronic Army
SFA	security force assistance
SHIG	Shahid Hemat Industrial Group
SIPRI	Stockholm International Peace Research Institute
SLL	Strategic Language List
SOF	special operations force
SSP	state-to-state partnership
START	Strategic Arms Reduction Treaty
TAC	Tactical Air Command
TEL	transporter-erector-launcher
TRL	technology readiness level
TTP	tactics, techniques, and procedures
TWCF	Transportation Working Capital Fund
UN	United Nations

UNSC	UN Security Council
UPI	United Press International
USAF	United States Air Force
USARPAC	United States Army, Pacific Command
USCC	United States-China Economic and Security Review Commission
USEUCOM	United States European Command
USNORTHCOM	United States Northern Command
USPACOM	United States Pacific Command
USSOUTHCOM	United States Southern Command
USTRANSCOM	United States Transportation Command
VoIP	Voice-over-Internet Protocol
WIPO	World Intellectual Property Organization
WMD	weapon of mass destruction
WWW	World Wide Web



RESEARCH
OUTREACH  ENGAGEMENT