

CHINA'S MILITARY MODERNIZATION AND ITS IMPLICATIONS FOR THE UNITED STATES

HEARING
BEFORE THE
U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION

ONE HUNDRED THIRTEENTH CONGRESS
SECOND SESSION

THURSDAY, JANUARY 30, 2014

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**UNITED STATES-CHINA ECONOMIC AND SECURITY REVIEW
COMMISSION**

WASHINGTON: 2014

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The Commission was created on October 30, 2000 by the Floyd D. Spence National Defense Authorization Act for 2001 § 1238, Public Law No. 106-398, 114 STAT. 1654A-334 (2000) (codified at 22 U.S.C. § 7002 (2001), as amended by the Treasury and General Government Appropriations Act for 2002 § 645 (regarding employment status of staff) & § 648 (regarding changing annual report due date from March to June), Public Law No. 107-67, 115 STAT. 514 (Nov. 12, 2001); as amended by Division P of the “Consolidated Appropriations Resolution, 2003,” Pub L. No. 108-7 (Feb. 20, 2003) (regarding Commission name change, terms of Commissioners, and responsibilities of the Commission); as amended by Public Law No. 109-108 (H.R. 2862) (Nov. 22, 2005) (regarding responsibilities of Commission and applicability of FACA); as amended by Division J of the “Consolidated Appropriations Act, 2008,” Public Law No. 110-161 (December 26, 2007) (regarding responsibilities of the Commission, and changing the Annual Report due date from June to December).

The Commission’s full charter is available at www.uscc.gov.

March 10, 2014

The Honorable Patrick J. Leahy
President Pro Tempore of the Senate, Washington, D.C. 20510
The Honorable John A. Boehner
Speaker of the House of Representatives, Washington, D.C. 20515

DEAR SENATOR LEAHY AND SPEAKER BOEHNER:

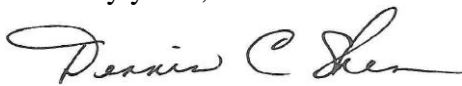
We are pleased to notify you of the Commission's January 30, 2014 public hearing on "China's Military Modernization and its Implications for the United States." The Floyd D. Spence National Defense Authorization Act (amended by Pub. L. No. 109-108, section 635(a)) provides the basis for this hearing.

At the hearing, the Commissioners received testimony from the following witnesses: Mr. Jesse Karotkin, Senior Intelligence Officer for China, Office of Naval Intelligence; Mr. Donald L. "Lee" Fuell, Technical Director for Force Modernization and Employment, National Air and Space Intelligence Center; Dr. Andrew Erickson, Associate Professor and founding member, China Maritime Studies Institute, U.S. Naval War College; Dr. James Lewis, Senior Fellow and Director of the Strategic Technologies Program, Center for Strategic and International Studies; Mr. Mark Stokes, Executive Director, Project 2049 Institute; Dr. Roger Cliff, Senior Fellow, Atlantic Council; The Honorable David Gompert, Distinguished Visiting Professor, U.S. Naval Academy; Mr. Thomas Donnelly, Resident Fellow and Co-Director of the Marilyn Ware Center for Security Studies, American Enterprise Institute. This hearing examined the inputs to China's military modernization, including financial resources and China's defense industry, and the current and future capabilities of China's military. In addition, this hearing also assessed the impact of China's military modernization on the United States and examined U.S. options.

We note that prepared statements for the hearing, the hearing transcript, and supporting documents submitted by the witnesses are available on the Commission's website at www.USCC.gov. Members and the staff of the Commission are available to provide more detailed briefings. We hope these materials will be helpful to the Congress as it continues its assessment of U.S.-China relations and their impact on U.S. security.

The Commission will examine in greater depth these issues, and the other issues enumerated in its statutory mandate, in its 2014 Annual Report that will be submitted to Congress in November 2014. Should you have any questions regarding this hearing or any other issue related to China, please do not hesitate to have your staff contact our Congressional Liaison, Reed Eckhold, at (202) 624-1496 or via email at reckhold@uscc.gov.

Sincerely yours,



Hon. Dennis C. Shea, Chairman



Hon. William A. Reinsch, Vice Chairman

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CHINA'S MILITARY MODERNIZATION AND ITS IMPLICATIONS FOR THE UNITED STATES

THURSDAY, JANUARY 30, 2014

U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION

Washington, D.C.

The Commission met in Russell Senate Office Building, Room 2118, Washington, DC at 9:00 a.m., Senator James M. Talent and Commissioner Katherine C. Tobin, Ph.D. (Hearing Co-Chairs), presiding.

OPENING STATEMENT OF COMMISSIONER KATHERINE C. TOBIN HEARING CO-CHAIR

HEARING CO-CHAIR TOBIN: Good morning, everyone. On behalf of my fellow Commissioners, I'd like to welcome you to the first hearing of our 2014 reporting cycle.

As some of you know, in November we reported to Congress on our 2013 findings, and in this very room we met with members of the House Armed Services Committee outlining all of our recommendations.

In particular, we discussed our top recommendation which was for the United States to continue to rebalance the Navy towards Asia, to deploy 60 ships in the Asia Pacific, and to rebalance U.S. homeports so that 60 percent of our ships would be in the region by 2020.

Today, we continue our focus on Asia- Pacific security issues with an impressive group of experts. We'll begin by looking closely at the current and future capabilities of the PLA.

On the first panel, we'll hear from leaders in the U.S. Naval and Air Force intelligence community.

Then with our second panel, we'll examine how China has financed its military modernization over 30-plus years. Our witnesses will brief us on the current structure of China's defense industry as well.

This afternoon, having grounded ourselves in China's military capacity and its investment in defense, we'll address the all important and critical question, which is what should the United States do given this picture? How should Congress, our diplomats, and our military proceed?

The Commission's responsibility is indeed to brief Congress, but I believe we also must inform our citizenry on this national and international security issue. So thank you all for coming.

Before I turn the microphone over to my colleague, Senator Talent, the Commission would like to thank the House Armed Services Committee Chairman Buck McKeon and the entire staff of the House Armed Services Committee for helping to provide today's hearing venue.

Senator Talent.

**PREPARED STATEMENT OF COMMISSIONER KATHERINE C. TOBIN
HEARING CO-CHAIR**

COMMISSIONER TOBIN Opening Statement

January 30, 2014 - Hearing: China's Military Modernization and Its Implications for the
United States

Good morning everyone. On behalf of my fellow Commissioners, I'd like to welcome you to the first Hearing of our 2014 Reporting cycle.

As some of you know, in November we reported to Congress on our 2013 findings and – in this very room – we met with members of the House Armed Services Committee outlining all our recommendations. In particular we discussed our top recommendation which was for the United States to continue to “rebalance” the Navy toward Asia; to deploy 60 ships in the Asia Pacific, and to rebalance US homeports so that 60 percent of our ships would be in the region by 2020.

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The Commission's responsibility is to brief Congress, but I believe we also must inform our citizenry on this national and international security issue. So thank you all for coming.

Before I turn the microphone over to my colleague, Senator Talent, the Commission would like to thank the House Armed Services Committee Chairman Buck McKeon and the entire staff of the House Armed Services Committee for helping to provide today's hearing venue.

Senator Talent:

China's National Military Structure is highly centralized, extending from the national-level Central Military Commission in Beijing down to the service headquarters and military regions. China's current military structure is administratively and operationally centered on the Chinese Communist Party. Our two witnesses are here today to tell us about the PLA Navy's and the PLA Air Force's capabilities and trends, including a close look at ballistic and cruise missile modernization as they all affect the regional balance of power.

Let me introduce our panelists for Panel 1

Mr. Jesse Karotkin is a Senior Intelligence Officer for China in the Office of Naval Intelligence. Prior to his current position, Mr. Karotkin served as Country Director for China in the Office of the Secretary of Defense for Policy where he coordinated the 2011

Annual Report to Congress on Military and Security Developments involving the PRC.

Mr. Lee Fuell is Technical Director for Force Modernization and Employment with the National Air and Space Intelligence Center (NASIC). His responsibility is to ensure the timely delivery of intelligence assessments of foreign air and space force modernization, including emerging technologies and technology transfer and force employment. Earlier in his career he was an officer in the U.S. Air Force.

Thank you both for joining us here today to provide testimony

Let me remind you, gentlemen, to keep your remarks to 7 minutes so that we have time for our question-and-answer session.

Let's start with you, Mr. Karotkin

Mr. Fuell?

**OPENING STATEMENT OF COMMISSIONER JAMES TALENT
HEARING CO-CHAIR**

HEARING CO-CHAIR TALENT: Thank you, Commissioner Tobin, and welcome to our panelists and guests.

China's military modernization presents significant challenges to American security interests in Asia. First and foremost, major elements of that modernization program, such as the DF-21D anti-ship ballistic missile and increasing numbers of advanced submarines armed with anti-ship cruise missiles, are designed to restrict America's freedom of actions throughout the Western Pacific.

The PLA is rapidly expanding and diversifying its ability to strike U.S. bases, ships and aircraft throughout the Asia-Pacific region, including those that it previously could not reach such as U.S. military facilities on Guam.

The PLA's steadily advancing regional power projection capabilities enhance Beijing's ability to use force against Taiwan, Japan, and rival claimants in the South China Sea.

This could embolden China to respond militarily to a perceived provocation or to consider preemptive attacks in a crisis involving Taiwan or China's maritime sovereignty claims.

Many of these scenarios could require the U.S. military to protect America's regional allies and partners as well as to maintain open and secure access to the air and maritime commons in the Western Pacific.

I'd like to remind you that's what this hearing is going to be about. I'd like to remind the members of our audience that all the written statements submitted for the record are available on our Web site, uscc.gov. A transcript of today's hearing also will be published on our Web site at a later date, and the testimony at this and other hearings will help to inform our Annual Report to Congress, which will be published in mid-November.

Before I turn it back to Commissioner Tobin to introduce the first panel, I'd like to remind our witnesses to please keep their remarks to seven minutes so that we have plenty of time for our questions and

answers.

**PREPARED STATEMENT OF COMMISSIONER JAMES TALENT
HEARING CO-CHAIR**

Hearing on “China’s Military Modernization and its Implications for the United States”

Thursday, January 30, 2014 Opening

Statement-Senator James M. Talent

SENATOR TALENT: Thank you, Commissioner Tobin, and welcome to our panelists and guests.

China’s military modernization presents significant challenges to U.S. security interests in Asia. First and foremost, major elements of this program—such as the DF-21D antiship ballistic missile and increasing numbers of advanced submarines armed with antiship cruise missiles—are designed to restrict U.S. freedom of action throughout the Western Pacific.

The PLA is rapidly expanding and diversifying its ability to strike U.S. bases, ships, and aircraft throughout the Asia Pacific region, including those that it previously could not reach, such as U.S. military facilities on Guam. The PLA’s steadily advancing regional power projection capabilities enhance Beijing’s ability to use force against Taiwan, Japan, and rival claimants in the South China Sea. This could embolden China to respond militarily to a perceived provocation or to consider preemptive attacks in a crisis involving Taiwan or China’s maritime sovereignty claims. Many of these scenarios could require the U.S. military to protect U.S. regional allies and partners as well as to maintain open and secure access to the air and maritime commons in the Western Pacific.

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I’d also like to remind our witnesses to keep remarks to 7 minutes so that we have time for our question-and-answer session.

Panel III: Strategic Impact of China’s Military Modernization and U.S. Options Panel

Introduction

SENATOR TALENT: Welcome back. Our final panel today discusses the strategic impact of China’s military modernization and potential U.S. responses to these developments. I would like to remind witnesses to please keep remarks to 7 minutes to ensure we have time for our question and answer session.

Mr. Mark Stokes is the executive director of the Project 2049 Institute. A 20-year U.S. Air Force veteran, he has also served as team chief and senior country director for the People's Republic of China, Taiwan and Mongolia in the Office of the Assistant Secretary of Defense for International Security Affairs.

Dr. Roger Cliff is a senior fellow at the Atlantic Council, where he researches East Asian security issues. Previously, he has worked for the Center for Strategic and Budgetary Assessments, the Project 2049 Institute, the RAND Corporation, the Office of the Secretary of Defense, and VERAC, Inc.

The Honorable David Gompert is a senior fellow at the RAND Corporation. He was principal deputy director of national intelligence from 2009 to 2010. During 2010, he served as acting director of national intelligence, in which capacity he provided strategic oversight of the U.S. Intelligence Community and acted as the President's chief intelligence advisor.

Finally, Mr. Thomas Donnelly is a resident fellow and co-director of the Marilyn Ware Center for Security Studies at the American Enterprise Institute. From 1995 to 1999, he was policy group director and a professional staff member here on the House Armed Services Committee.

Mr. Stokes, we'll start with you.

PANEL I INTRODUCTION BY COMMISSONER KATHERINE C. TOBIN

HEARING CO-CHAIR TOBIN: Thank you, Jim.

China's national military structure is highly centralized, extending from a national level Central Military Commission in Beijing down to the service headquarters and military regions. China's current military structure is administratively and operationally centered on the Chinese Communist Party.

Our two witnesses are here today to tell us about the PLA Navy's and the PLA Air Force's capabilities and trends that they see, including a close look at ballistic and cruise missile modernization as they all affect the regional balance of power.

Let me introduce our panelists for Panel One. Mr. Jesse Karotkin is a Senior Intelligence Officer for China in the Office of Naval Intelligence. Prior to his current position, Mr. Karotkin served as the Country Director for China in the Office of the Secretary of Defense for Policy where he coordinated the 2011 Annual Report to Congress on Military and Security Developments Involving the PRC.

Mr. "Lee" Fuell is Technical Director for Force Modernization and Employment with the National Air and Space Intelligence Center, NASIC.

His responsibility is to ensure the timely delivery of intelligence assessments of foreign air and space force modernization, including emerging technologies and technology transfer and force employment. Earlier in his career, he was an officer in the United States Air Force.

Thank you both for joining us here today to provide testimony. Let's start with you, Mr. Karotkin.

**OPENING STATEMENT OF JESSE KAROTKIN
SENIOR INTELLIGENCE OFFICER FOR CHINA
OFFICE OF NAVAL INTELLIGENCE**

MR. KAROTKIN: Thank you. Thank you, Commissioner Tobin, Senator Talent, and members of the Commission and staff. Thank you for the introduction and the opportunity to testify here today on China's naval modernization.

Looking back just 15 years, the PLA Navy remained largely a littoral force. The large numbers of legacy platforms were testament to a recent past when Beijing focused primarily on continental challenges and neglected the high seas.

Although China's maritime interests were rapidly expanding in the late '90s, the vast majority of its naval platforms offered very limited capability and endurance, especially in blue water. Furthermore, the force was ill-equipped to contend with a modern adversary.

Over the past 15 years, the PLAN has carried out ambitious modernization effort, producing a better-equipped and more flexible force.

During 2013 alone, over 50 naval ships were laid down, launched or commissioned, with a similar number expected this year. By 2020, about 70 percent of China's major combatants will be less than 15 years old.

The PLA Navy currently possesses about 77 principal surface combatants, more than 60 submarines, 55 medium and large amphibious ships, and roughly 85 missile-equipped small combatants.

As new ships and submarines enter the force, they have been steadily retiring legacy units. As a result, order-of-battle numbers don't really speak to the aggregate growth in capability that we're seeing.

What we're seeing is an era of larger multi-mission ships, equipped with advanced anti-ship, anti-air, and anti-submarine weapons and sensors.

Major qualitative improvements are also occurring within naval aviation and the submarine force, which are increasingly capable of striking targets several hundred miles from the Chinese mainland and beyond.

So even if order-of-battle numbers remain relatively constant through 2020, the PLA Navy will possess far more combat capability than it did at the start of the 21st century. They're building the flexibility to assume a wide range of missions both in the region and beyond.

This trend reflects Beijing's expectation that its navy must do much more than prepare for a contingency with Taiwan. This includes possible enforcement of maritime claims, protection of economic interests, as well as counter-piracy and humanitarian assistance/disaster relief missions.

In recent years, the navy has made the most demonstrable gains in anti-surface warfare. This has been a consistent focus. They've deployed advanced, long-range anti-ship cruise missiles, or ASCMs, throughout the force.

They have also made some notable gains in anti-air warfare, which is absolutely essential to expanding naval operations into the open ocean.

Although progress in anti-submarine warfare is less pronounced, there are some indications that they're committed to addressing this gap, and that they'll make progress over the next decade.

Looking at the surface force, a decade ago, China's average destroyer had a displacement that was roughly half that of the destroyers

entering service today. Furthermore, these legacy combatants had very limited offensive and defensive capabilities.

In contrast, the new LUYANG III-class guided missile destroyer that will probably enter the force this year embodies the trend towards a more flexible force that's optimized for sustained blue water operations.

In reference to the surface force, we use the term "modern" to describe a multi-mission combatant that incorporates more than a point air defense capability and can embark a helicopter. About 65 percent of China's destroyers and frigates are modern by this metric. That will rise to an estimated 85 percent by 2020.

As I mentioned, the surface force has made especially strong gains in anti-surface warfare by employing advanced, long-range anti-ship cruise missiles and over-the-horizon targeting systems.

These extended range weapons require sophisticated over-the-horizon targeting capability to realize their full potential.

China has invested in maritime reconnaissance systems at the national and tactical levels, as well as communication systems and data links that enable the exchange of critical targeting data.

China's surface force has also achieved sustained progress in shipboard air defense. Legacy destroyers and frigates that possessed at most a point air defense capability are steadily being replaced by ships equipped with medium-to-long-range area air defense missiles.

As a consequence, the surface force can operate with increased confidence outside of shore-based defenses. Additionally, one or two ships can now provide air defense for the entire task group.

The current focus isn't exclusively on blue water ships, of course. In 2012, China began producing large numbers of the new 1500-ton JIANGDAO class corvette, sometimes characterized as a "light frigate", which is optimized for medium-endurance patrols in regional waters.

It could be employed to defend China's territorial claims or conduct counter-piracy in the region, but it's not suited for major combat operations in blue water environment.

At least ten units are operational today and 30 more units may be built. These will replace older patrol crafts and frigates. The rapid construction of these JIANGDAO corvettes accounts for a significant share of the ship construction spike that we saw in 2012 and '13.

China's amphibious acquisition has also shifted towards larger, high-end ships equipped more for over-the-horizon expeditionary warfare and humanitarian assistance and disaster relief missions. I would note the three YUZHAO class amphibious LPDs that are about 20,000 tons, the largest surface ships ever built in China.

In contrast, the PLA Navy appears to have suspended all construction of lower-end tank-landing ships, LSTs, since 2006, following a spate of acquisition in the early 2000s.

Gains in the surface force aren't just coming in the form of new ships and weapons. We're also seeing a sustained increase in proficiency. I'd like to mention the Gulf of Aden deployments. This is providing naval commanders and crews with their first real experience with extended deployments and overseas logistics.

We've also witnessed increasing complexity in training and exercises. To increase realism, multiple arms of the navy are engaging in

opposing force training. They're doing things like employing advanced training aids, and we're seeing greater year-round readiness.

Lastly, we've witnessed an expansion of operating areas both within and beyond the First Island Chain. In 2012, the surface force conducted an unprecedented seven deployments to the Philippine Sea. That was followed by nine Philippine Sea deployments in 2013.

China's increasingly modern submarine force is still optimized primarily for regional anti-surface warfare missions near major sea lines of communication. Currently, most of the force is conventionally powered without towed arrays, but equipped with increasingly long-range anti-ship cruise missiles. The force consists of five nuclear attack submarines, four nuclear ballistic missile submarines, and 53 diesel attack submarines.

In reference to the submarine force, we use of the term "modern" in reference to those submarines capable of employing anti-ship cruise missiles or submarine-launched intercontinental ballistic missiles. A decade ago, only a few of China's submarines were equipped to launch a modern anti-ship cruise missile. By 2015, approximately 70 percent of the entire submarine force will be modern and, by definition, ASCM capable.

By 2020, 75 percent of the conventional force will be modern, and 100 percent of the nuclear submarine force will be modern. So we're looking at a submarine force that's far better equipped to target our surface ships with long-range anti-ship cruise missiles.

So just like the surface force, we're seeing significant proficiency gains across the submarine force, an emphasis on more realistic training, increase in what we in naval intelligence--how we measure Chinese submarine patrols. Prior to 2008, we typically saw a handful of submarine patrols in a given year. Since 2008, we've seen that number increase significantly to over 12 patrols a year.

Overall, what we're seeing is not just improvement in--not just a qualitative improvement across the force in new ships and submarines and weapons, longer-range weapons, but also a steady improvement in the operational proficiency across the navy, and greater professionalization. That is going to lead to a much more competent force in the 2020 time frame.

**PREPARED STATEMENT OF JESSE KAROTKIN
SENIOR INTELLIGENCE OFFICER FOR CHINA
OFFICE OF NAVAL INTELLIGENCE**

**TRENDS IN CHINA'S NAVAL MODERNIZATION
US CHINA ECONOMIC AND SECURITY REVIEW COMMISSION TESTIMONY
JESSE L. KAROTKIN**

Introduction

At the dawn of the 21st Century, the People's Liberation Army Navy (PLA(N)) remained largely a littoral force. Though China's maritime interests were rapidly changing, the vast majority of its naval platforms offered very limited capability and endurance, particularly in blue water. Over the past 15 years the PLA(N) has carried out an ambitious modernization effort, resulting in a more technologically advanced and flexible force. This transformation is evident not only the PLA(N)'s Gulf of Aden counter-piracy presence, which is now in its sixth year, but also in the navy's more advanced regional operations and exercises. In contrast to its narrow focus a just decade ago, the PLA(N) is evolving to meet a wide range of missions including conflict with Taiwan, enforcement of maritime claims, protection of economic interests, as well as counter-piracy and humanitarian missions.

The PLA(N) currently possesses approximately 77 principal surface combatants, more than 60 submarines, 55 medium and large amphibious ships, and roughly 85 missile-equipped small combatants. Although overall order-of-battle has remained relatively constant in recent years, the PLA(N) is rapidly retiring legacy combatants in favor of larger, multi-mission ships, equipped with advanced anti-ship, anti-air, and anti-submarine weapons and sensors. During 2013 alone, over fifty naval ships were laid down, launched, or commissioned, with a similar number expected in 2014. Major qualitative improvements are occurring within naval aviation and the submarine force, which are increasingly capable of striking targets hundreds of miles from the Chinese mainland.

The introduction of long-range anti-ship cruise missiles across the force, coupled with non-PLA(N) weapons such as the DF-21D anti-ship ballistic missile, and the requisite C4ISR architecture to support targeting, will allow China to significantly expand its "counter-intervention" capability further into the Philippine Sea and South China Sea over the next decade. Many of these capabilities are designed specifically to deter or prevent U.S. military intervention in the region.

Even if order-of-battle numbers remain relatively constant through 2020, the PLA(N) will possess far more combat capability due to the rapid rate of acquisition coupled with improving operational proficiency. Beijing characterizes its military modernization effort as a "three-step development strategy" that entails laying a "solid foundation" by 2010, making "major progress" by 2020, and being able to win "informationized wars by the mid-21st century." Although the PLA(N) faces capability gaps in some key areas, including deep-water anti-submarine warfare and joint operations, they have achieved their "strong foundation" and are emerging as a well equipped, competent, and more professional force.

A Multi-Mission Force

As China began devoting greater resources to naval modernization in the late 1990s, virtually all of its ships, submarines were essentially single-mission platforms, poorly equipped to operate beyond the support of land-based defenses. The PLA(N) has subsequently acquired larger, multi-mission platforms, capable of long-distance deployments and offshore operations. China's latest Defense White Paper, released in 2013, noted that the PLA(N) "endeavors to accelerate the modernization of its forces for comprehensive offshore operations... [and] develop blue water capabilities." The LUYANG III-class DDG (052D), which will likely enter service this year, embodies the trend towards a more flexible force with advanced air defenses and long-range strike capability.

China has made the most demonstrable progress in anti-surface warfare (ASuW), deploying advanced, long-range ASCMs throughout the force. With the support from improved C4ISR, this investment significantly expands the area that surface ships, submarines, and aircraft are able to hold at risk. The PLA(N) has also made notable gains in anti-air warfare (AAW), enabling the recent expansion of blue-water operations. Just over a decade ago, just 20 percent of PLA(N) combatants were equipped with a rudimentary point air defense capability. As a result, the surface force was effectively tethered to the shore. Initially relying on Russian surface to air missiles (SAMs) to address this gap, newer PLA(N) combatants are equipped with indigenous medium-to-long range area air defense missiles, modern combat management systems, and air-surveillance sensors.

Although progress in anti-submarine warfare (ASW) is less pronounced, there are indications that the PLA(N) is committed to addressing this gap. More surface platforms are being equipped with modern sonar systems, to include towed arrays and hangars to support shipboard helicopters. Additionally, China appears to be developing a Y-8 naval variant that is equipped with a magnetic anomaly detector (MAD) boom, typical of ASW aircraft. Over the next decade, China is likely to make gains in ASW, both from improved sensors and operator proficiency.

China's submarine force remains concentrated almost exclusively on ASuW, with exception of the JIN SSBN, which will likely commence deterrent patrols in 2014. The type-095 guided missile attack submarine, which China will likely construct over the next decade, may be equipped with a land-attack capability. The deployment of LACMs on future submarines and surface combatants could enhance China's ability to strike key U.S. bases throughout the region, including Guam.

Naval aviation is also expanding its mission set and capability in maritime strike, maritime patrols, anti-submarine warfare, airborne early warning, and logistics. Although it will be several years before the *Liaoning* aircraft carrier and its air wing can be considered fully operational, this development signals a new chapter in Chinese naval aviation. By 2020, carrier-based aircraft will be able to support fleet operations in a limited air-defense role. Although some older air platforms remain in the inventory, the PLA(N) is clearly shifting to a naval aviation force that is equipped to execute a wide variety of missions both near and far from home.

PLA(N) Surface Force

China analysts face a perpetual challenge over how to accurately convey the size and capability of China's surface force. As U.S. Navy CAPT Dale Rielage noted in *Proceedings* last year, key differences in the type of PLA(N) ships (in comparison to the U.S. Navy) make it extremely difficult to apply a common basis for comparing the order of battle. A comprehensive tally of ships that includes hundreds of small patrol craft, mine warfare craft, and coastal auxiliaries provides a deceptively inflated picture of China's actual combat capability. Conversely, a metric based on ship displacement returns the opposite effect, given the fact that many of China's modern ships, such as the 1,500 ton JIANGDAO FFL, are small by U.S. standards, and equipped primarily for regional missions.

To accurately capture potential impact of China's naval modernization, it is necessary to provide a more detailed examination of the ships and capabilities in relation to the missions they are likely intended to fulfill. For the sake of clarity, the term "modern" is used in this paper to describe a surface combatant that possesses a multi-mission capability, incorporates more than a point air defense capability, and has the ability to embark a helicopter. As of early 2014, the PLA(N) possesses 27 destroyers (17 of which are modern), 48 frigates (31 of which are modern), 10 new corvettes, 85 modern missile-armed patrol craft, 56 amphibious ships, 42 mine warfare ships, over 50 major auxiliary ships, and over 400 minor auxiliary ships and service/support craft.

During the 1990s, China began addressing immediate capability gaps by importing modern surface combatants, weapon systems, and sensors from Russia. Never intended as a long-term solution, the PLA(N) simultaneously sought to design and produce its own weapons and platforms from a mix of imported and domestic technology. Less than a decade ago China's surface force could be characterized as an eclectic mix of vintage, modern, converted, imported, and domestic platforms utilizing a variety weapons and sensors and with widely ranging capabilities and varying reliability. By the second decade of the 2000s, surface ship acquisition had shifted entirely to Chinese designed units, equipped primarily with Chinese weapons and sensors, though some engineering components and subsystems remain imported or license-produced in-country.

Until recently, China tended to build small numbers of a large variety of ships, often changing classes rapidly as advancements were made. In the period between 1995 and 2005 alone, China constructed or purchased major surface combatants and submarines in at least different 15 classes. Using a combination of imported technology, reverse engineering, and indigenous development, the PRC has rapidly narrowed the technology and capability gap between itself and the world's modern navies. Additionally, China is implementing much longer production runs of advanced surface combatants and conventional submarines, suggesting a greater satisfaction in their recent ship designs.

The PLA(N) surface force has made particularly strong gains in anti-surface warfare (ASuW), with sustained development of advanced anti-ship cruise missiles (ASCMs) and over-the-horizon targeting systems. Most PLA(N) combatants carry variants of the YJ-8A ASCM (~65-120nm), while the LUYANG II-class (052D) destroyer is fitted with the YJ-62 (~120nm), and the newest

class, LUYANG III-class destroyer is fitted with a new vertically-launched ASCM. As these extended range weapons require sophisticated over-the-horizon-targeting (OTH-T) capability to realize their full potential, China has invested heavily in maritime reconnaissance systems at the national and tactical levels, as well as communication systems and datalinks to enable the flow of accurate and timely targeting data.

In addition to extended range ASCMs, the LUYANG III DDG, which is expected to enter the force in 2014, may also be equipped with advanced SAMs, anti-submarine missiles, and possibly an eventual land-attack cruise missile (LACM) from its multipurpose vertical launch system. These modern, high-end combatants will likely provide increased weapons stores and overall flexibility as surface action groups venture more frequently into blue water in the coming years.

Further enabling this trend, China's surface force has achieved sustained progress in shipboard air defense. The PLA(N) is retiring legacy destroyers and frigates that possess at most a point air defense capability, while constructing newer ships with medium-to-long range area air defense missiles. The PLA(N) has produced a total of six LUYANG II DDG with the HHQ-9 surface-to-air missile (~55nm), and the LUYANG III DDG will carry an extended-range variant of the HHQ-9. At least fifteen JIANGKAI II FFGs (054A), with the vertically-launched HHQ-16 (~20-40nm) are now operational, with more under construction. Sometimes referred to as the "workhorse" of the PLA(N) these modern frigates have proven instrumental in sustaining China's counter-piracy presence in the Gulf of Aden.

The new generation of destroyers and frigates utilize modern combat management systems and air-surveillance sensors, such as the Chinese SEA EAGLE and DRAGON EYE phased-array radars. While older platforms with little or no air defense capability remain in the inventory, the addition of these newer units allows the PLA(N)'s surface force to operate with increased confidence outside of shore-based air defense systems, as one or two ships can now provide air defense for the entire task group. Currently, approximately 65 percent of China's destroyers and frigates are modern. By 2020 that figure will rise to an estimated 85 percent.

The PLA(N) has also phased out hundreds of Cold War-era missile patrol boats and patrol craft as they shifted from a coastal defense orientation to a more active, offshore orientation over the past two decades. During this period China acquired a modern coastal-defense and area-denial capability with 60 HOUBEI class guided missile patrol boats. The HOUBEI design integrates a high-speed wave-piercing catamaran hull, waterjet propulsion, considerable signature-reduction features, and the YJ-8A ASCM. While not equipped for coastal patrol duties, the HOUBEI is an essential component of the PLA(N)'s ability to react at short notice to threats within China's exclusive economic zone (EEZ) and slightly beyond.

In 2012 China began producing the new JIANGDAO class corvette (FFL), which, in contrast to the HOUBEI, is optimized to serve as the primary naval patrol platform in China's EEZ and potentially defend China's territorial claims in the South China Sea (SCS) and East China Sea (ECS). The 1500-ton JIANGDAO is equipped for littoral warfare with 76mm, 30mm, and 12.7mm guns, four YJ-8 ASCMs, torpedo tubes, and a helicopter landing area. The JIANGDAO is ideally-suited for general medium-endurance patrols, counter-piracy, and other littoral duties in regional waters, but is not sufficiently armed or equipped for major combat operations in blue-

water. At least ten JIANGDAOs are already operational and thirty or more units may be built, replacing both older small patrol craft as well as some of the PLA(N)'s aging JIANGHU I frigates. The rapid construction of JIANGDAO FFLs accounts for a significant share of ship construction in 2012 and 2013.

In recent years, China's amphibious acquisition has shifted decisively towards larger, high-end, ships. Since 2007 China has commissioned three YUZHAO class amphibious transport docks (LPD), which provide a considerably greater capacity and flexibility compared to previous landing ships. At 20,000 tons, the YUZHAO is the largest domestically produced Chinese warship and has deployed as far as the Gulf of Aden. The YUZHAO can carry up to four of the new air cushion landing craft YUYI LCUA (similar to LCAC), as well as four or more helicopters, armored vehicles, and troops on long-distance deployments. Additional YUZHAOs are expected to be built, as well as a follow-on amphibious assault ship (LHA) design that is larger and with a full-deck flight deck for additional helicopters.

The major investment in a large-deck LPD signaled the PLA(N)'s emerging interest in expeditionary warfare and over-the horizon amphibious assault capability, as well as a flexible platform for humanitarian assistance/disaster relief (HA/DR) and counter-piracy capabilities. In contrast, the PLA(N) appears to have suspended all construction of lower-end tank landing ships (LST/LSM) since 2006, following a spate of acquisition in the early 2000s.

The expanded set of missions further into the western Pacific and Indian Ocean, including counter-piracy deployments, HA/DR missions, survey voyages and goodwill port visits have increased demands on PLA(N)'s limited fleet of ocean-going replenishment and service vessels. In 2013 the PLA(N) added two new FUCHI replenishment oilers (AORs) bringing the total AOR force level to seven ships. These ships constantly rotate in support of Gulf of Aden (GOA) counter-piracy deployments.

In addition, the PLA(N) recently added three state-of-the-art DALAO submarine rescue ships (ASR) and three DASAN fast-response rescue ships (ARS). Other recent additions include the ANWEI hospital ship (AH), the DANYAO AF (island resupply), YUAN WANG 5&6 (satellite and rocket launch telemetry), three KANHAI AG (SWATH-hull survey ships), two YUAN WANG 21 missile tenders (AEM), and the large DAGUAN AG, which provides berthing and logistical support to the KUZNETSOV aircraft carrier *Liaoning*.

Traditionally, anti-submarine warfare (ASW) has lagged behind ASuW and AAW as a priority for the PLA(N). Some moderate progress still continues, with more surface ships possessing modern sonars, to include towed arrays, as well as hangars to support shipboard helicopters. Given these developments, the PLA(N) surface force may be more capable of identifying adversary submarines in limited areas by 2020.

Over the past decade, China's surface force has made steady proficiency gains and become much more operationally focused. Beginning in 2009, the Gulf of Aden deployments have provided naval commanders and crews with their first real experience with extended deployments and overseas logistics. We have also witnessed an increase in the complexity of training and exercises and an expansion of operating areas both within and beyond the First Island Chain. To

increase realism, the force engages in opposing force training and employs advanced training aids. In 2012 the surface force conducted an unprecedented seven deployments to the Philippine Sea. This was followed by nine Philippine Sea deployments in 2013. Extended surface deployments and more advanced training build core warfare proficiency in ASuW, ASW and AAW. Furthermore, these deployments reflect efforts to “normalize” distant seas training in line with General Staff Department (GSD) guidelines.

China’s Aircraft Carrier Program

With spectacular ceremony in September 2012, China commissioned its first carrier, the *Liaoning*. China is currently engaged in the long and complicated path of learning to operate fixed wing aircraft from the carrier’s deck. The first launches and recoveries of the J-15 aircraft occurred in November 2012, with additional testing and training occurring in 2013. Despite recent progress, it will take several years before Chinese carrier-based air regiments are operational. The PLA’s newspaper, *Jiefangjun Bao* recently noted, “Aircraft Carrier development is core to the PLA(N), and could serve as a deterrent to countries who provoke trouble at sea, against the backdrop of the U.S. pivot to Asia and growing territorial disputes in the South China Sea and East China Sea.”

The *Liaoning* is much less capable of power projection than the U.S. Navy’s NIMITZ-class carriers. Not only does *Liaoning*’s smaller size limit the total number of aircraft it can carry, but also the ski-jump configuration significantly limits aircraft fuel and ordnance load for take offs. Furthermore, China does not yet possess specialized supporting aircraft such as the E-2C Hawkeye, which provides tactical airborne early warning (AEW). The *Liaoning* is suited for fleet air defense missions, rather than US-style, long range power projection. Although it has a full suite of weapons and combat systems, *Liaoning*’s primary role for the coming years will be to develop the skills required for carrier aviation and to train its first groups of pilots and deck crews.

China’s initial carrier air regiment will consist of the Shenyang J-15 *Flying Shark*, which is externally similar to the Russian Su-33 *Flanker D*. However, the aircraft is thought to possess many of the domestic avionics and armament capabilities of the Chinese J-11B *Flanker*. Likely armament for the J-15 includes PL-8 and PL-12 air-to-air missiles and modern ASCMs. Six J-15 prototypes are currently involved in testing and at least one two-seat J-15S operational trainer has been observed.

China is fully aware of the inherent limitations of the mid-sized, ski-jump carrier. While Beijing has provided no public information on the size and configuration of its next carrier, there is intense speculation that China may adopt a catapult launching system. Recent media reports suggest that China recently commenced construction of its first indigenously produced carrier.

Finally, as China expands carrier operations beyond the immediate region, it will almost certainly be constrained by a lack of distant bases and support infrastructure. Although commercial ports can provide some peacetime support, Beijing may eventually find it expedient to abandon its longstanding, self-imposed prohibition on foreign basing.

PLA(N) Submarine Force

China has long regarded its submarine force as a critical element of regional deterrence, particularly when conducting “counter-intervention” against modern adversary. The large, but poorly equipped force of the 1980s has given way to a more modern submarine force, optimized primarily for regional anti-surface warfare missions near major sea lines of communication. Currently, the submarine force consists of five nuclear attack submarines, four nuclear ballistic missile submarines, and 53 diesel attack submarines.

In reference to the submarine force, the term “modern” applies to second generation submarines, capable of employing anti-ship cruise missiles or submarine-launched intercontinental ballistic missiles. By 2015 approximately 70 percent of China’s entire submarine force will be modern. By 2020, 75 percent of the conventional force will be modern and 100 percent of the SSN force will be modern.

Currently, most of the force is conventionally powered, without towed arrays, but equipped with increasingly long range ASCMs. Submarine launched ASCMs with ranges well in excess of 100nm not only enhance survivability of the shooter, but also enable a small number of units to hold a large maritime area at risk. A decade ago, only a few of China’s submarines were equipped to launch a modern anti-ship cruise missile. Given the rapid pace of acquisition, well over half of China’s nuclear and conventional attack submarines are now ASCM equipped, and by 2020, the vast majority of China’s submarine force will be armed with advanced, long-range ASCMs.

China’s small nuclear attack submarine force is capable of operating further from the Chinese mainland, conducting intelligence, surveillance and reconnaissance (ISR), as well as ASuW missions. Currently, China’s submarines are not optimized for either anti-submarine warfare or land attack missions.

Like the surface force, China’s submarine force is trending towards a more streamlined mix of units, suggesting the PLA(N) is relatively satisfied with recent designs. For its diesel-electric force alone, between 2000 and 2005, China constructed MING SS, SONG SS, the first YUAN SSP, and purchased 8 KILO SS from Russia. While all of these classes remain in the force, only the YUAN SSP is currently in production. Reducing the number of different classes in service helps streamline maintenance, training and interoperability.

The YUAN SSP is China’s most modern conventionally powered submarine. Eight are currently in service, with as many as 12 more anticipated. Its combat capability is similar to the SONG SS, as both are capable of launching Chinese-built anti-ship cruise missiles, but the YUAN SSP also possesses an air independent power (AIP) system and may have incorporated quieting technology from the Russian-designed KILO SS. The AIP system provides a submarine a source of power other than battery or diesel engines while still submerged, increasing its underwater endurance, thereby reducing its vulnerability to detection.

The remainder of the conventional submarine force is a mix of SONG SS, MING SS, and Russian-built KILO SS. Of these, only the MING SS and four of the older KILO SS lack an

ability to launch ASCMs. Eight of China's 12 KILO SS are equipped with the SS-N-27 ASCM, which provides a long-range anti-surface capability out to approximately 120nm. Although China's indigenous YJ-82 ASCM has a much shorter range, trends in surface and air-launched cruise missiles suggest that a future indigenous submarine-launched ASCM will almost certainly match or exceed the range of the SS-N-27.

China is now modernizing its relatively small nuclear-powered attack submarine force, following a protracted hiatus. The SHANG SSN's initial production run stopped after just two launches in 2002 and 2003. After nearly 10 years, China resumed production with four additional hulls of an improved variant, the first of which was launched in 2012. These six submarines will replace the aging HAN SSN on nearly a 1-for-1 basis over the next several years. Following the completion of the improved SHANG SSN, the PLA(N) will likely progress to the Type 095 SSN, which may provide a generational improvement in many areas such as quieting and weapon capacity, to include a possible land-attack capability.

Perhaps the most anticipated development in China's submarine force is the expected operational deployment of the JIN SSBN in 2014, which would mark China's first credible at-sea second-strike nuclear capability. With a range in excess of 4000nm, the JL-2 submarine launched ballistic missile (SLBM), will enable the JIN to strike Hawaii, Alaska, and possibly western portions of CONUS from East Asian waters. The three JIN SSBNs currently in service would be insufficient to maintain a constant at-sea presence for extended periods of time, but if the PLA Navy builds five units as some sources suggest, a continuous peacetime presence may become a viable option for the PLA(N).

Historically, the vast majority of Chinese submarine operations have been limited in duration. In recent years however, leadership emphasis on more realistic training and operational proficiency across the PLA appears to have catalyzed an increase in submarine patrol activity. Prior to 2008, the PLA(N) typically conducted a very small number of extended submarine patrols, typically fewer than 5 or 6 in a given year. Since that time, it has become common to see more than 12 patrols in a given year. This trend suggests the PLA(N) seeks to build operational proficiency, endurance, and training in ways that more accurately simulate combat missions.

PLA(N) Air Forces

The capabilities and role of the PLANAF have steadily evolved over the past decade. As navy combatants range further from shore and more effectively provide their own air defense, the PLANAF is able to concentrate on an expanded array of missions, including maritime strike, maritime patrols, anti-submarine warfare, airborne early warning, and logistics. Both helicopters and fixed wing aircraft will play an important role in enabling fleet operations over the next decade. Additionally, in the next few years the PLANAF will possess its first-ever sea-based component, with the *Liaoning* CV.

Every major PLA(N) surface combatant currently under construction is capable of embarking a helicopter, increasing platform capabilities in areas such as over the horizon targeting, anti-submarine warfare, and search and rescue (SAR). The PLA(N) operates three main helicopter

variants: the Z-9, the Z-8, and the *Helix*. In order to keep pace with the rest of the PLA(N), the helicopter fleet will almost certainly expand in the near future.

The PLA(N)'s primary helicopter, the Z-9C, was originally obtained under licensed production from Aerospatiale (now Eurocopter) in the early 1980s. The Z-9C is capable of operating from any helicopter-capable PLA(N) combatant. It can be fitted with the KLC-1 search radar, dipping sonar, and is usually seen with a single lightweight torpedo. A new roof-mounted electro-optical (EO) turret, unguided rockets, and 12.7 mm machine gun pods have been observed on several Z-9Cs during counter piracy deployments. There are now approximately twenty operational Z-9Cs in the PLA(N) inventory and the helicopters are still under production. An upgraded naval version of the Z-9, designated the Z-9D, has been observed with ASCMs.

Like the Z-9, the Z-8 is a Chinese-produced helicopter based on a French design. In the late 1970s, the PLA(N) purchased and reverse engineered the SA 321 Super Frelon. This medium lift helicopter is capable of performing a wide variety of missions but is most often utilized for SAR, troop transport, and logistical support roles. It is usually observed with a rescue hoist and a nose radome and typically operates unarmed. The Z-8's size provides a greater cargo capacity compared to other PLA(N) helicopters, but is limited in its ability to deploy from most PLA(N) combatants. An AEW variant of the Z-8 has been observed operating with the *Liaoning*.

In 1999, the PLA(N) took delivery of an initial batch of eight Russian-built Ka-28 *Helix* helicopters. The PLA(N) typically uses the Ka-28 for ASW. They are fitted with a search radar, dipping sonar and can employ sonobuoys, torpedoes, depth charges, or mines. In 2010 China also ordered nine Ka-31 *Helix* AEW helicopters.

Fixed-wing Aircraft

Over the last two decades, the PLANAF has significantly upgraded its fighters and expanded the type of aircraft it operates. As a consequence, it can successfully perform a wide range of missions including offshore air defense, maritime strike, maritime patrol/antisubmarine warfare, and in the not too distant future, carrier-based operations. A decade ago, this modernization was largely reliant on exports from Russia, however, the PLANAF has recently benefited from the same domestic combat aircraft production that has propelled earlier PLAAF modernization.

Historically, the PLA(N) relied on older Chengdu J-7 variants and Shenyang J-8B/D *Finback* fighters for the offshore air defense mission. These aircraft were limited in range, avionics, and armament. The J-8 is perhaps best known in the West as the aircraft that collided with a U.S. Navy EP-3 reconnaissance aircraft in 2001. In 2002, the PLA(N) purchased 24 Su-30MK2, making it the first 4th generation fighter fielded with the navy. These aircraft feature an extended range and maritime radar systems, enabling the Su-30MK2 to strike enemy ships at long distances, while still maintaining a robust air-to-air capability.

Several years later, the PLA(N) began replacing older J-8B/Ds with the newer J-8F variant. The J-8F featured improved armament such as the PL-12 radar-guided air-to-air missile, upgraded avionics, and an improved engine with higher thrust. Today, the PLA(N) is taking deliveries of modern domestically produced 4th generation fighter aircraft such as the J-10A *Vigorous Dragon*

and the J-11B *Flanker*. Equipped with modern radars, glass cockpits, and armed with PL-8 and PL-12 air-to-air missiles, PLA(N) J-10A and J-11B aircraft are among the most modern aircraft in China's inventory.

For maritime strike, the PLA(N) has relied on the H-6 *Badger* for decades. The H-6 is a licensed copy of the ex-Soviet Tu-16 *Badger*, which can employ advanced ASCMs against surface targets. As many as 30 *Badgers* likely remain in service with the PLA(N). Despite the older platform design, Chinese H-6 *Badgers* benefit from upgraded electronics and payloads. Noted improvements include the ability to carry a maximum of four ASCMs, compared with two on earlier H-6D variants. Some H-6s have been modified as tankers, increasing the PLA(N)'s flexibility and range. The JH-7 *Flounder*, with at least five regiments fielded across the three fleets also provides a maritime strike capability. The JH-7 is a domestically produced tandem-seat fighter/bomber, developed as a replacement for obsolete Q-5 *Fantan* light attack aircraft and H-5 *Beagle* bombers. The JH-7 can carry up to four ASCMs and two PL-5 or PL-8 short-range air-to-air missiles, providing it with considerable payload for maritime strike missions.

In addition to combat aircraft, the PLANAF is expanding its inventory of fixed-wing Maritime Patrol Aircraft (MPA), Airborne Early Warning (AEW), and surveillance aircraft. The Y-8, a Chinese license-produced version of the ex-Soviet An-12 *Cub*, forms the basic airframe for several PLA(N) special mission variants. As the navy pushes farther from the coast, long-range aircraft play a key role in providing a clear picture of surface and air contacts in the maritime environment.

Internet photos from 2012 suggest that the PLA(N) is also developing a Y-8 naval variant, equipped with a MAD (magnetic anomaly detector) boom, typical of ASW aircraft. This ASW aircraft features a large surface search radar mounted under the nose and multiple blade antennae on the fuselage for probable electronic surveillance. It also appears to incorporate a small EO/IR turret and an internal weapons bay forward of the main landing gear. The aircraft appeared in a primer yellow paint scheme, suggesting that it remains under development.

Unmanned Aerial Vehicles

In recent years China has developed several multi-mission UAVs for the maritime environment. There are some indications the PLA(N) has begun to integrate UAVs into their operations to enhance situational awareness. For well over a decade, China has actively pursued UAV technology and they are emerging among the worldwide leaders in UAV development. China's latest achievement was the unveiling of their first prototype unmanned combat aerial vehicle (UCAV), the *Lijan*, which features a blended-wing design as well as low observable technologies.

The PLA(N) will probably employ significant numbers of land and ship based UAVs to supplement manned ISR aircraft and aid targeting for various long-range weapons systems. UAVs will probably become one of the PLA(N)'s most valuable ISR assets in on-going and future maritime disputes and protection of maritime claims. UAVs are ideally suited for this mission set due to their long loiter time, slow cruising speed, and ability to provide near real-time

information through the use of a variety of onboard sensors. The PLA(N) has been identified operating the Austrian Camcopter S-100 rotary-wing UAV from several combatants. Following initial evaluation and deployment of the Camcopter S-100, the PLA(N) will likely adopt a domestically produced UAV into ship-based operations.

Naval Mines

China has a robust mining capability and currently maintains a varied inventory estimated at over 50,000 mines. China also has developed a robust infrastructure for naval mine related research, development, testing, evaluation, and production. During the past few years China has gone from an obsolete mine inventory, consisting primarily of pre-WWII vintage moored contact and basic bottom influence mines, to a robust mine inventory consisting of a large variety of mine types including moored, bottom, drifting, rocket propelled and intelligent mines. China will continue to develop more advanced mines in the future, possibly including extended-range propelled-warhead mines, anti-helicopter mines, and bottom influence mines equipped to counter minesweeping efforts.

Maritime C4ISR (Command, Control, Computers, Communication, Intelligence Surveillance and Reconnaissance)

China's steady expansion of naval missions beyond the littoral, including counter-intervention missions are enabled by a dramatic improvement in maritime C4ISR over the past decade. The ranges of China's modern anti-ship cruise missiles extend well beyond the range of a ship's own sensors. Emerging land-based weapons, such as the DF-21D anti-ship ballistic missile, with a range of more than 810nm are even more dependent on remote targeting. Modern navies depend heavily on their ability to build and disseminate a picture of all activities occurring in the air and sea.

For China, this provides a formidable challenge. In order to characterize activities in the "near seas," China must build a maritime and air picture covering nearly 875,000 square nautical miles (sqnm). The Philippine Sea, which could become a key interdiction area in a regional conflict, expands the battlespace by another 1.5 million sqnm. In this vast space, many navies and coast guards converge along with tens of thousands of fishing boats, cargo ships, oil tankers, and other commercial vessels.

In order to sort through this complex environment and enable more sophisticated operations, China has invested in a wide array of sensors. Direct reporting from Chinese ships and aircraft provides the most detailed and reliable information, but can only cover a fraction of the regional environment. A number of ground-based coastal radars provide overlapping coverage of coastal areas, but their range is limited.

To gain a broader view of activity in its near and far seas, China requires more sophisticated sensors. The skywave over-the-horizon radar provides awareness of a much larger area than conventional radars by bouncing signals off the ionosphere. China also operates a growing array of reconnaissance satellites, which allow observation of maritime activity virtually anywhere on the earth.

Conclusion

The PLA(N) is strengthening its ability to execute a range of regional missions in a “complex electromagnetic environment” as it simultaneously lays a foundation for sustained, blue water operations. Over the next decade, China will complete its transition from a coastal navy to a navy capable of multiple missions around the world. Current acquisition patterns, training, and operations provide a window into how the PLA(N) might pursue these objectives.

Given the pace of PLA(N) modernization, the gap in military capability between the mainland and Taiwan will continue to widen in China’s favor over the coming years. The PRC views reunification with Taiwan as an immutable, long-term goal and hopes to prevent any other actor from intervening in a Taiwan scenario. While Taiwan remains a top-tier priority, the PLA(N) is simultaneously focusing resources on a growing array of potential challenges.

China’s interests in the East and South China Seas include protecting its vast maritime claims and preserving access to regional resources. Beijing prefers to use diplomacy and economic influence to protect maritime sovereignty, and generally relies on patrols by the recently-consolidated China Coast Guard. However, ensuring maritime sovereignty will remain a fundamental mission for the PLA(N). PLA(N) assets regularly patrol in most of China’s claimed territory to conduct surveillance and provide a security guarantee to China’s Coast Guard.

In the event of a crisis, the PLA(N) has a variety of options to defend its claimed territorial sovereignty and maritime interests. The PLA(N) could lead an amphibious campaign to seize key disputed island features, or conduct blockade or SLOC interdiction campaigns to secure strategic operating areas. China’s realization of an operational aircraft carrier in the coming years may also enable Beijing to exert greater pressure on its SCS rivals. Recent acquisitions speak to a future in which the PLA(N) will be expected to perform a wide variety of tasks including assuring the nation’s economic lifelines, asserting China’s regional territorial interests, conducting humanitarian assistance and disaster relief, and demonstrating a Chinese presence beyond region waters.

OPENING STATEMENT OF DONALD L. "LEE" FUELL TECHNICAL DIRECTOR FOR FORCE MODERNIZATION AND EMPLOYMENT NATIONAL AIR AND SPACE INTELLIGENCE CENTER

MR. FUELL: Good morning, Ms. Tobin, Senator Talent, Commissioners, colleagues. Also thank you very much for the opportunity today to share our views with you on the modernization of China's air and missile forces.

Since a NASIC witness last appeared before you in 2011, modernization of China's air and missile forces has progressed at a steady pace. While we would not characterize air and missile modernization as accelerated, the totality of their modernization efforts are significant.

People's Liberation Army Air Force, or PLAAF, modernization appears to be focused on improving capabilities across the air power spectrum for missions such as power projection, strike, electronic warfare, air and missile defense, early warning and reconnaissance. Of particular

concern to us is the decidedly offensive nature of many of their modernization programs, such as the H-6K bomber and associated standoff weapons like the YJ-63, KD-88, and CJ-20 air-launched cruise missiles.

The PLA's Second Artillery Corps is making similar steady progress in modernizing its ballistic missile inventory. Second Artillery modernization focuses on expanding its inventory of medium-range ballistic missiles capable of conducting precision conventional strikes on land targets and ships, as the aforementioned DF-21D, as far from China's shores as the First Island Chain.

In addition, the Second Artillery is developing new conventional intermediate-range ballistic missiles that we believe will be able to reach targets in the Second Island Chain such as Guam.

The Second Artillery also continues to modernize its nuclear delivery forces by both enhancing its silo-based ICBMs and adding more survivable mobile systems like the CSS-10 family of road-mobile, solid-propellant missiles. The CSS-10 MOD 2 has a range in excess of 11,200 kilometers, which will allow it to reach most targets in the continental United States.

New precision-guided munitions and missiles emerge frequently and will continue to do so as Chinese investment in these capabilities remains high. The public unveiling of many of these weapons, as well as new fighter aircraft, like the well-publicized J-20 and J-31, may give the impression that air and missile modernization has accelerated, but we have not actually seen acceleration of individual weapon programs. They're just moving at a steady pace.

We believe the Chinese have intentionally showcased the rollout of many of their new systems like those fighters to give the perception of accelerated modernization, which we believe is consistent with the Chinese concept of "weishe", often translated as "deterrence," but more broadly encompassing things like dissuasion, intimidation and coercion for their regional partners and us.

I'd like to focus the remainder of my oral remarks on how we believe China may employ its air and missile forces against Taiwan, in the South China Sea, and against us if we choose to intervene in any of those types of conflicts. Our written statement will address many more of your other questions and expands on these remarks.

PLA operational literature describes several campaigns the Chinese might execute against Taiwan. The two large-scale Taiwan campaigns most mentioned are the Joint Blockade Campaign and the Joint Island Invasion Campaign.

For a joint blockade of Taiwan, the air and missile forces would be tasked with strikes against Taiwan defenses, as well as missions to enforce the blockade, such as enforcing a no-fly zone. Second Artillery missile attacks would lead the way, followed by PLAAF air strikes and accompanied by cyber attacks, special operations, and other unconventional warfare.

Additionally, air and missile forces would support the attainment of PLA superiority in information and maritime domains by attacking Taiwan command capabilities and providing some level of air cover for PLA Navy operations.

An island invasion of Taiwan would include the missions described above but also require the PLAAF to provide air cover to the amphibious units as they transit the strait and to strike Taiwan forces in support of the PLA on-island operations. The on-island support would not be analogous to U.S.-style close air support but rather pre-planned air interdiction attacks against Taiwan forces as needed.

A South China Sea conflict will stress the ability of the PLA to project air power, by which I include their ballistic missiles, in a sustained fashion. Limited aerial refueling capabilities, as well as a limited number of other support aircraft, will greatly limit the PLAAF's capability to maintain presence over the expanse of the South China Sea.

Depending on the nature of the conflict, the PLAAF would likely be called upon to conduct suppression strikes in conjunction with the Second Artillery and provide limited air cover for navy units. These strikes would likely include medium-range ballistic missiles and H-6 bombers employing cruise missiles against pre-planned targets. Fighter air cover will be possible for short periods during the most critical phases of the campaign, but it's not likely to be sustainable for long periods.

With regard to Chinese military responses to U.S. intervention in either of these cases, we've seen a little bit of a sea change in their thinking on that. Recent Chinese operational literature describes a more nuanced approach to counter-intervention that seeks to strike a balance between supporting the main campaign and deterring the powerful enemy--that usually means us in the literature--and striking at them if necessary with the need to avoid an expansion of the conflict.

This newer literature reflects a departure from past PLA writings which placed more emphasis on preemptive attacks to counter a U.S. intervention. We feel that this demonstrates to some degree a growing confidence within the PLA that they can more readily withstand an initial U.S. involvement than in years past.

Should the PRC decide U.S. intervention is having or likely to have a significant impact on the success of their campaign, the PLAAF and Second Artillery would be tasked with strikes against U.S. forces and facilities. Such attacks would employ significant numbers of available Chinese combat assets and would be well-planned and rehearsed.

It's likely they would be accompanied by cyber attacks on U.S. military and other government networks. Chinese writings, although not specifically directed at the U.S., discuss the importance of attacks on logistics, supply depots, air bases and ports by air, ballistic and/or cruise missiles, special forces and other means.

Chinese analysts note the importance of military facilities on Okinawa and Guam, and these assets and their supporting infrastructure are likely high priority targets of the PLAAF and Second Artillery.

Regarding joint operations, over the last several years, the PLA has made significant progress establishing joint command architectures and investigating joint processes. However, despite these developments, we judge true joint interoperability remains a work in progress for the PLAAF and Second Artillery.

We would characterize their operations more as deconflicted and time phased--I use the term "synchronized by stopwatch" sometimes--

rather than true tactically integrated. Nonetheless, recent exercises seem to indicate the PLA recognizes the need to continue develop joint commanders and improve joint processes.

This concludes my prepared oral remarks and I'm looking forward to your questions. Thank you very much.

**PREPARED STATEMENT OF DONALD L. "LEE" FUELL
TECHNICAL DIRECTOR FOR FORCE MODERNIZATION AND EMPLOYMENT
NATIONAL AIR AND SPACE INTELLIGENCE CENTER**

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE

U.S. – CHINA ECONOMIC AND SECURITY REVIEW COMMISSION

SUBJECT: Broad Trends in Chinese Air Force and Missile Modernization

STATEMENT OF: Mr. Lee Fuell
Technical Director for Force Modernization
& Employment
National Air & Space Intelligence Center

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2014 Mr Lee

Fuell

**Technical Director for Force Modernization &
Employment National Air & Space Intelligence Center**

Broad Trends in Chinese Air Force and Missile Modernization

How would you characterize PLA Air Force modernization over the past five years? Has it accelerated during this time?

PLA Air Force (PLAAF) modernization is progressing at a steady pace. While, we would not characterize the modernization as accelerated, the totality of PLAAF modernization is significant. The goal of PLAAF modernization is to improve capability to conduct offensive and defensive operations such as strike, air and missile defense, power projection, and early warning and reconnaissance. The key areas of emphasis include increased introduction of 4th generation multirole aircraft and the new H-6K bomber to increase PLAAF strike capabilities, as well as developing 5th generation fighters. To meet reconnaissance and early warning goals the PLAAF has fielded several Airborne Early Warning (AEW), Electronic Warfare, and command-and-control systems, such as the KJ2000 MAINRING and have fielded several Unmanned Air Vehicles (UAVs). To address their power projection deficiency, they have purchased a limited number of used IL-76 from Russian and are developing the Y20 heavy lift transport aircraft, and the Y9 medium-lift transport.

We should not take a “symmetric” view of PLAAF modernization in which we directly compare their developments to ours. We believe the Chinese are not trying to match the U.S. system vs. system, but are pursuing more of a system-of-systems approach that exploits what they perceive to be adversary weaknesses or exploitable vulnerabilities.

How would you characterize PLA ballistic and cruise missile modernization over the past five years? Has it accelerated during this time?

Similarly, PLA ballistic and cruise missile development is progressing at a steady pace. The PLA is expanding its conventional medium range ballistic missiles (MRBMs) to increase the range at which it can conduct precision strikes against land targets and naval ships (including aircraft carriers) operating far from China’s shores out to the first island chain. The PLA is developing conventional intermediate-range ballistic missiles (IRBM) at a steady pace, to increase its capability for near-precision strike out to the second island chain.

The PLA also continues to field air- and ground-launched land attack cruise missiles (LACMs) for stand-off, precision strikes at a steady pace. Air-launched cruise missiles include the YJ-63, KD-88, and the CJ-

20. In the sense that China is developing a large number of new precision guided weapons, whereas 10 year ago they had very few, there has been an acceleration in modernization. New precision guided munitions and conventional missiles continue to emerge and will continue for the foreseeable future as Chinese investment in these technologies remains high.

Nevertheless, the pace of development of individual systems has not accelerated.

Strategy and employment

How would China likely employ the PLA Air Force in various Taiwan contingencies and in contingencies in the South China Sea?

We'll answer this question in terms of three possible scenarios:

1. Taiwan

PLA operational literature describes several campaigns the Chinese might execute against Taiwan. The chosen military campaign will dictate PLAAF employment concepts, although many of the missions are not particular to any single campaign. The two large-scale Taiwan campaigns most often mentioned in PLA writings are blockade or island invasion. For a joint blockade of Taiwan, the PLAAF would be tasked with strikes against Taiwan defenses (described by the Chinese as the “counter-blockade system” and this includes Taiwan airfields, ground-based air defenses, coastal defense cruise missiles, and C4ISR facilities), as well as missions to enforce the blockade, such as enforcing a “no-fly zone.” The airstrikes would be preceded by missile attacks by the Second Artillery, as well as cyber attacks, special operations, and other unconventional warfare. Additionally, the PLAAF would support the attainment of PLA superiority in the information and maritime domains by attacking Taiwan command capabilities and providing some level of air cover for PLA Navy (PLAN) operations.

These blockade missions are in addition to the primary PLAAF mission of airspace defense of China. This mission is accomplished primarily using their Surface to Air Missiles (SAM) and fighter forces, but other PLA services contribute to the effort with electronic warfare, civil air defense, denial and deception, and other measures aimed at resisting precision strike operations. This core mission remains a strength within the PLAAF, especially in areas of strategic importance, such as Beijing, Shanghai, and along the Taiwan Strait.

An island invasion of Taiwan would include the missions described above, but also require the PLAAF to provide air cover to the amphibious units as they transit the strait and to strike Taiwan forces in support of PLA on-island operations. This on-island support would not likely be U.S.-style close air support (CAS), but rather pre-planned air interdiction attacks against Taiwan forces as needed. In addition, PLA airborne forces are subordinate to the PLAAF, so an island invasion would include airborne operations, probably designed to secure a Taiwan airfield or other important facility

2. South China Sea

A South China Sea conflict, particularly one at far reaches such as the Spratly Islands, will stress the ability of the PLAAF to project airpower in a sustained fashion. Limited aerial refueling capabilities, as well as a limited number of other “high demand-low density” assets such as Command, Control, Communications, Computers, Intelligence Surveillance and Reconnaissance (C4ISR) and support aircraft, greatly limits the PLAAF's capability to maintain presence over

the expanse of the South China Sea.

Depending on the contingency, the PLAAF would likely be called upon to conduct suppression strikes and to provide limited air cover for navy units. The strikes would likely include H-6 bombers employing cruise missiles against pre-planned targets. Fighter air cover will be possible for short periods during the most critical points of a campaign, but is not likely to be sustainable for long periods. As such, the PLA Navy could provide organic air defense and, as their aircraft carriers become operational in the out years, fighter cover.

3. Counter-Intervention

With regard to the Chinese military responses to U.S intervention in either of these cases (i.e. Taiwan or South China Sea conflicts), recent Chinese operational literature describes the need for a balanced approach that is tied to the main campaign objectives. This approach seeks to strike a balance between supporting the main campaign by deterring the “Powerful Enemy” and striking at them if necessary, with the need to avoid an expansion of the conflict. This newer literature reflects a departure from past PLA writings that heavily focused on the need for pre-emptive operations against U.S. intervention, and we feel that this demonstrates, at least to a degree, a growing confidence within the PLA that they can more readily withstand U.S. involvement (i.e., achieve their main campaign objectives) than in years past. This isn’t to say the PRC might not still feel compelled to conduct preemptive actions against U.S. intervention, particularly in the cyber domain or other less “kinetic” ways; however, the PLA appears to be developing

a more mature viewpoint on the broad application of military operations against the U.S. This means that, during a major campaign, the PLA will look to focus its operations primarily against Taiwan (or other adversary) and look to deter U.S. intervention or limit the effects of the intervention.

Should the PRC decide U.S. intervention is having, or is likely to have, a significant impact on the success of their campaign, the PLAAF and Second Artillery would be tasked with strikes against U.S. forces and facilities. Such attacks would employ significant numbers of available Chinese combat assets and would be well planned and rehearsed. It is likely that they would be accompanied by cyber attacks on

U.S. military and other government networks. The speed, reach, and increasing technical sophistication of China’s air and missile forces would make them crucial parts of such an operation. Chinese writings, although not specifically directed at the U.S., discuss the importance of attacks on logistics, supply depots, air bases, and ports by air, ballistic and/or cruise missiles, special forces, and other means. The use of these weapons against potential U.S. assets reinforces China’s anti-access strategies. Chinese analysts note the importance of military on Okinawa and Guam, and these assets and their supporting infrastructure are likely high priority targets of the PLAAF and Second Artillery.

Will equipping ballistic missiles with multiple independently targetable reentry vehicles (MIRVs) change China’s missile strategy?

Mobile missiles carrying MIRVs are intended to ensure the viability of China’s strategic deterrence. MIRVs provide operational flexibility that a single warhead does not. Specifically, they enable more efficient targeting, allowing more targets to be hit with fewer missiles, more

missiles to be employed per target, or a larger reserve of weapons held against contingency. China is likely to employ a blend of these three as MIRVs become available, simultaneously increasing their ability to engage desired targets while holding a greater number of weapons in reserve. We judge China won't pair MIRVs with conventional payloads, as they already have multiple conventional strike options, and the cost of development and deployment of this capability likely exceeds the benefits.

What role do land attack cruise missiles (LACMs) have in China's missile strategy?

Combining long stand-off distances with high accuracy make cruise missiles an excellent tool to reach targets difficult to engage with many other classes of weapons. Because there is an overlap in the kinds of targets China is likely to engage with either ballistic missiles or cruise missiles, LACMs provide key operational and planning flexibility. These weapons are likely to reduce the burden on ballistic missile forces, as well as creating somewhat safer strike opportunities for Chinese aircrew, allowing them to engage from much longer distances and/or from advantageous locations of their own choosing. This in turn will complicate their adversary's air and missile defense problem. Combining cruise missiles with ballistic missile attacks on the same target further complicates the defensive problem. Fundamentally, LACMs are yet another component of China's complex arsenal, and could be used as a flexible tool for engaging a range of targets.

Weapons

What capabilities does the PLA Air Force have and what capabilities is it currently developing? How many aircraft does the PLA Air Force have and what aircraft is it currently developing?

The PLA Air Force and PLA Navy have approximately 2,300 operational combat aircraft. An additional 1450 older fighters, bombers, and trainer aircraft are employed for training, research, and development. The two arms also possess 475 transports and 100 surveillance and reconnaissance aircraft.

In addition to the J-20 and advanced fighter concept fifth generation aircraft, four new versions of China's 4th generation fighters are under development. The Chinese are also modernizing their existing fleet of 2nd, 3rd, and 4th generation aircraft. The Chinese have begun fielding the H-6K and have attack Unmanned Air Vehicles (UAVs), both fielded and in development. To achieve a modernized military, China has been developing a wide range of UAVs including long-range and low-observable systems that are capable of conducting reconnaissance and strike missions. As mentioned earlier, a number of transport aircraft are also under development. They are also developing multiple new trainers to replace aging 2nd generation fighters that are used in this role.

How far can these aircraft fly without refueling?

An increasing number of Chinese aircraft are capable of operating over water at ranges from 300-500 nautical miles (nm) from the coast of China without refueling. The fighter offering the greatest range, and which can reach the first island chain, is the Flanker series of aircraft

purchased from Russia. Chinese bombers such as the H-6K can range farther out from the mainland, threatening.

With what type of radar are they equipped?

The PLAAF probably plans to integrate Active Electronically Scanned Array (AESA) technology on the fifth generation and on current fourth generation fighters providing instantaneous target updates, up to 10 times more processing power for greater detection range, large search volumes, an ability to stare at a target or electronically steer the radar beam, and track multiple targets simultaneously. These features combined provide faster target acquisition time and more accurate target position data. AESA also offers one practical way of achieving a low-observable capability. AESA radar air-to-ground modes are extremely effective at long range target detection and generate accuracies under 10 feet.

Advanced 4th generation fighters have passive electronically scanned array (ESA) radars, providing long-range radar detection and electronically scanned radar beams that enable the radar to track many targets. The end result is reduced pilot workload, automatic target acquisition, and highly accurate target position for air combat engagements. Air-to-ground modes with pinpoint accuracy for precision-guided weapon delivery are also available.

What is the range and capability of their missiles?

China has a rapidly maturing capability to design and produce medium range launch-and-leave air-to-air missiles and has fielded the active-radar guided PL-12. China's next generation of missiles will reflect the country's growing technology base.

China will field a short-range air-to-air missile that utilizes an imaging infrared seeker and digital processing that enhances seeker lock-on range, expands the operational launch envelope, and better allows the air-to-air missiles (AAM) that may utilize an imaging infrared seeker and digital processing to enhance seeker lock on range. Short-range infrared air-to-air missiles will also be highly maneuverable; when combined with the use of helmet-mounted sights, pilots will be able to launch missiles against almost any target the pilot can visually spot. To cue a missile against a target, the pilot simply looks in the direction of the target (which may fall outside the field-of-view of the aircraft's on-board sensors), and presses a button to lock onto the target.

What is the electronic warfare capability of these aircraft?

The PLAAF heavily emphasizes electronic warfare as a key component of air combat and is equipping a substantial number of their more modern aircraft with digital radio frequency memory (DRFM) jammers. DRFM jammers enable instantaneous “smart jamming” responses by potentially automatically selecting jamming waveforms to counter a specific threat. DRFM jammer employment could improve fighter aircraft survivability by disrupting or denying the opposing fighter’s radar from tracking.

How would you assess China’s ability to produce advanced platforms and equipment for the PLA Air Force? How dependent is China on foreign technology and designs in building military aircraft?

China’s aviation industries have advanced and they have a solid base for producing modern 4th generation fighters and bombers. China’s aviation industry has invested in high-precision and technologically advanced manufacturing technologies. In addition, commercial joint ventures provide a ready conduit for raw materials and manufacturing technology. China’s latest tactic is the outright purchase of companies to ensure ready access to desired technologies. The largest impediment has been the lack of systems engineering and advance management techniques, although this is improving.

The lack of funding prior to 2000 combined with the lack of experienced personnel within China’s aircraft engine industry has forced a reliance on foreign sourcing for dependable, proven aircraft engines. The Chinese are now making huge investments into their aircraft engine industry..

What are the PLA’s ballistic and cruise missile capabilities and what ballistic and cruise missile capabilities is the PLA developing? How many ballistic missiles does the PLA have?

The Second Artillery is expanding its conventional MRBM force and developing IRBMs to extend the targeting distance for conventional precision or near-precision strikes.

Short-Range Ballistic Missiles (< 1,000 km): The Second Artillery had more than 1,100 SRBMs at the end of 2012, a modest increase over the past year. This number reflects the delivery of additional missiles and the fielding of new systems. To improve the lethality of this force, the PLA is also introducing new SRBM variants with improved ranges, accuracies, and payloads.

Medium-Range Ballistic Missiles (1,000-3,000 km): The PLA is fielding conventional MRBMs to increase the range at which it can conduct precision strikes against land targets and naval ships (including aircraft carriers) operating from China’s shores out to the first island chain. The DF-21D is based on a variant of the DF-21 (CSS-5) medium-range ballistic missile (MRBM). has a range exceeding 1,500 km, and is armed with a maneuverable warhead.

Intermediate-Range Ballistic Missiles (3,000-5,000 km): The PLA is developing conventional intermediate-range ballistic missiles (IRBM), increasing its capability for near-precision strike out to the second island chain. The PLA Navy is also improving its over-the-horizon (OTH) targeting capability with sky wave and surface wave OTH radars, which can be used in conjunction with reconnaissance satellites to locate targets at great distances from China (thereby supporting long-range precision strikes, including employment of anti-ship ballistic missiles (ASBMs)).

The Second Artillery continues to modernize its nuclear forces by enhancing its silo-based intercontinental ballistic missiles (ICBMs) and adding more survivable mobile delivery systems. In recent years, the road-mobile, solid-propellant CSS-10 Mod 1 and CSS-10 Mod 2 (DF-31 and DF-31A) intercontinental-range ballistic missiles have entered service. The CSS-10 Mod 2, with a range in excess of 11,200 km, can reach most locations within the continental U.S.

Which of the PLA's missiles can carry nuclear warheads?

China currently relies on its CSS-2 IRBM and CSS-5 Mod 1 and Mod 2 MRBMs for regional nuclear deterrence. The CSS-3, CSS-4, and CSS-10 Mod 1/Mod 2 ICBMs are utilized as a strategic nuclear deterrent force.

Which of the PLA's ballistic missiles is likely to be equipped with MIRVs? How many warheads will each missile likely carry?

No conclusive information is available at this time.

What is the range of the PLA's LACMs?

The PLA has ground- and air-launched LACMs that can strike targets within the first island chain. Some bomber-launched LACMs can strike targets in the second island chain.

How is the PLA improving the mobility of its ballistic missiles?

China is improving the mobility of its ballistic missile systems by developing more survivable, road-mobile delivery systems. However, China continues to maintain a limited number of silo-based nuclear ICBMs.

How is the PLA upgrading its missile systems? Do these qualitative upgrades rely on imported technologies?

China is working on a range of technologies that could be used to counter ballistic missile defense systems, including maneuverable reentry vehicles (MaRVs), MIRVs, decoys, chaff, jamming, thermal shielding, and anti-satellite (ASAT) weapons. China's official media also

cite numerous Second Artillery training exercises featuring maneuver, camouflage, and launch operations under simulated combat conditions, which are intended to increase survivability. Together with the increased mobility and survivability of the new generation of missiles, these technologies and training enhancements strengthen China's nuclear force and enhance its strategic strike capabilities. Further increases in the number of mobile ICBMs and the beginning of Ballistic Missile Submarine (SSBN) deterrence patrols could enable the PLA to implement more sophisticated command-and-control systems and processes that safeguard the integrity of nuclear release authority for a larger, more dispersed force. I do not have additional information available regarding upgrades via imported technologies.

Organization

Where are the PLA Air Force's aircraft based?

PLA Air Force (PLAAF) aircraft are deployed throughout the entire country, while the PLA Navy Air Force's (PLANAF) assets are stationed principally along the eastern and southern coasts. Combined, the two arms have over 2,300 combat aircraft, of which over 500 are modern or modernized. Aircraft are deployed asymmetrically, relative to China's threat and risk calculus, with particularly heavy concentrations amassed around Beijing, Shanghai, in the northeast, and along the southeastern coast.

More than 500 combat aircraft operate from permanent bases which afford them the ability to conduct operations in and around Taiwan without aerial refueling, and hundreds of additional aircraft could be deployed using China's ample military, civil, and reserve airfield network. To support large-scale deployments, China has worked hard to refine its civil-military mobilization support system and infrastructure: there are more than 50 airfields available to support a Taiwan contingency, for example.

Which PLA Air Force units and aircraft are responsible for patrolling and monitoring the air defense identification zone that China declared in November 2013?

China is not likely to maintain a constant aerial presence with either fighters or support aircraft. Instead, they will use their generally excellent and dense ground-based radar coverage to maintain awareness throughout the air defense identification zone (ADIZ), with command posts directing aircraft to respond from ground alerts as necessary. Additionally, Chinese maritime assets of various types are likely to be a near-constant presence in and around the ADIZ.

Active monitoring and management of the ADIZ requires shared efforts among coastal units, regional command posts particularly in the Nanjing Military Region, and command elements in Beijing. China has already monitored tens of thousands of flights through the ADIZ, including many it has identified as foreign warplanes, and has on many occasions sent its own military aircraft into the ADIZ in response.

Ultimately, the Ministry of National Defense is responsible for ADIZ enforcement, which effectively places a very broad range of assets on the table.

We believe it likely that a mix of PLAAF and PLANAF units, deployed along or near the coast, are tasked with operations in the ADIZ, and have fighter aircraft like FLANKER and FIREBIRD at requisite steady-state levels of alert to support “emergency identification” missions. The PLAAF and PLANAF are both quite capable of scrambling fighter aircraft quickly. These forces are not limited to fighter- interceptor aircraft though, and will be augmented as necessary by special support aircraft such as airborne warning and control like the KJ-2000, as well as specialized reconnaissance aircraft. However, China’s possible plans do not affect our basic policy of rejection of the ADIZ.

Where are the PLA’s ballistic missiles deployed?

The majority of China’s short-range ballistic missiles are deployed opposite Taiwan. Smaller contingents of both conventional and nuclear missile units are dispersed throughout China in order to deter enemy attack and offer protection to potentially volatile, vulnerable borders, particularly with India and North Korea. However, many of these units are mobile, and could be moved with very little warning.

What kind of additional missile units is the Second Artillery Corps forming? What role are these new units likely to play in China’s missile strategy?

The Second Artillery continues to modernize its nuclear forces by enhancing its silo-based ICBMs, while simultaneously adding more survivable mobile delivery systems. In recent years, China’s first road- mobile ICBMs have entered service, and a MIRV-capable road-mobile system may enter development in the near future. In addition, the PLA is fielding conventional MRBMs to increase the range at which it can conduct precision strikes against land and maritime targets (to include aircraft carriers) operating far from China’s shores. Finally, China is developing conventional IRBMs, increasing its capacity for long range near-precision strike. Thanks to these developments, China’s emerging missile strategy will be marked by increased shooter survivability, enhanced operational flexibility, and significantly greater reach and precision.

Personnel, training, and joint operations

What are the strengths and weaknesses of the training of personnel and of exercises conducted by the PLA Air Force and the Second Artillery Corps?

The PLAAF and Second Artillery continue to be forces in a period of great transition, and they have made great strides over the past decade in increasing their survivability and lethality. In addition to the modernization efforts described above, these services have invested in operationalizing their increasing capabilities and professionalizing their personnel. A major thrust of this advancement has been in the area of improved training, and the PLA writ-large has worked to make training as realistic as possible to ensure their personnel are prepared for actual combat. Lack of recent actual combat experience is certainly a significant limitation in preparing the Chinese for the “fog of war.” Along with these great strides remain continuing challenges.

PLAAF

The PLAAF has worked diligently at improving their aircrews and we judge they are professional and well-trained. One strength of PLAAF training includes the number and scope of their exercises, and recent years have seen the PLAAF executing increasingly large and complex training events. For example, the annual RED SWORD exercises feature multi-day, large-scale events that include all branches of the PLAAF in opposing force scenarios. These events are undoubtedly improving PLAAF combined arms capabilities and better preparing them for combat. Additionally, PLAAF training is characterized by a significant focus on information superiority, particularly in the realms of electronic attack and protection. As a result, electronic warfare (what Chinese term “complex electromagnetic conditions”) and other elements of information warfare are prominent in practically all PLAAF training.

While the PLAAF has made great strides in training over the past several years, some key deficiencies remain. The most glaring is the limited joint training the PLAAF conducts, and this is covered in more detail in the next section on joint operations. Beyond limitations in joint training, tactical training continues to lag the best Western militaries. PLAAF tactical thinking appears to emphasize electronic warfare and scripted (and relatively basic) air combat methods over developing pilots who maximize the capabilities of their weapons systems. For example, we judge most PLAAF training events remain heavily scripted, with little autonomy save for an elite cadre of pilots. These events likely fall short of preparing the pilots for the tactical realities of modern air combat. To their credit, PLAAF leadership has identified this deficiency and the PLAAF appears to be addressing it. One outcome of this shift in thinking has been the creation of the Golden Helmet Air Competitions, which pit fighter pilots against each other in a reportedly free-play format that rewards cutting-edge skills and innovation. Events like these are likely to result in improvements in PLAAF tactical training over the coming years. Most significant, however, has been the PLAAF efforts at training with other countries’ air forces. Since 2010, the PLAAF has deployed 4th generation fighters to exercises with Turkey and Pakistan. While rudimentary in nature and scope, the PLAAF will continue to expand on these events as a way to access more advanced training concepts.

Second Artillery Corps

In many ways, the training burdens on Second Artillery soldiers are somewhat less than their PLAAF counterparts. One key dependency inherent to missile warfare is targeting: effective and timely target selection is an absolutely critical part of the kill chain. We have little insight into this key phase, but it is quite possible that, as with overall joint integration, it may represent an overall structural weakness, and training at the unit level may not help address it.

Conversely, we do believe that Second Artillery assets routinely conduct realistic drills to practice the other key elements of operations, namely setting up and tearing down equipment, executing road marches, and solving logistical challenges. In many ways, Second Artillery training is preparing its forces for the very tasks they will face in warfare.

and increasingly modern C4ISR architecture To what degree are the PLA Air Force and the Second Artillery Corps successfully recruiting and retaining high-quality personnel?

Over the past two decades, China's rapid urbanization and development from an agrarian economy to a manufacturing center has limited the PLA's ability to recruit and retain highly-skilled members. In particular, the PLA continues to struggle developing and retaining quality aircrew, with numerous reforms of the pilot training process currently ongoing to ensure and control the quality of pilot trainees. Additionally, selection processes for some engineering positions in the Second Artillery continue to be highly competitive, though most sources indicate a dearth of highly-skilled technical personnel across all levels of the Chinese military. Adjustments to urban recruitment quotas, shortened conscription durations, a new Non-commissioned officer (NCO) corps, and the 2013 implementation of a summer conscription cycle all serve to decrease interference with semester-based school schedules needed to facilitate recruitment of increasingly technologically skilled personnel.

How capable are the PLA Air Force and the Second Artillery Corps of operating jointly with other services?

Over the past several years the PLA has made significant advances in establishing joint architecture and investigating joint processes. The PLA has developed and fielded a robust, and this modernization has allowed for more joint execution. In order to cultivate their joint processes and command flows, the PLA has conducted several large-scale training events aimed at working out the best joint practices. The best example of this was the Lianhe (Joint Operations) series of exercises conducted from 2008-2010 that featured rotating leadership across the three armed services (PLA, PLAAF, PLAN) for each year's event.

Increasingly, the PLAAF has emphasized the planning and execution of joint fires execution of joint operations. The shift toward joint operations accelerated in the early 2000s when PLAAF officers began to assume key joint billets, including membership on the Chinese Communist Party's (CCP's) Central Military Commission (CMC) and other key positions within the PLA General Departments. Specific to PLAAF and Second Artillery training, the Chinese press has described several joint firepower exercises involving the two services over the past several years. For instance, in the summer of 2009 the PLAAF and Second Artillery conducted one of the first large-scale joint live-fire exercises involving elements from four missile brigades and two PLAAF air divisions.

Given the advancements in command-and-control infrastructure and the emphasis on joint training events, we judge the PLAAF and Second Artillery have attained a moderate level of capability to conduct pre-planned joint fires against fixed targets in the Pacific Theater. Joint firepower planning is accomplished

by a Firepower Coordination Center that coordinates the air and theater missile campaign against key targets in order to achieve strategic and theater objectives. Firepower cells would contain PLA Air Force, Second Artillery, special operations, and ground and navy force elements that would carry out necessary liaison with their respective services. Beyond pre-planned strikes, attempts at conducting structured attacks between the Second Artillery and other services against fleeting or "pop-up" targets of opportunity would likely cause

considerable difficulties, except in certain tactical situations.

Beyond joint fires conducted between the PLAAF and Second Artillery, we judge that true joint interoperability remains largely a work in progress for the PLA. Multi-service operations involving the PLAAF and Second Artillery with the other services are likely to be characterized by deconflicted operations, as opposed to being tactically integrated. For example, operations involving the PLAAF and PLAN would likely consist of the PLAAF providing coincident air cover for PLAN units, and their actions would be deconflicted with naval aviation by location and timing. Jointness will largely be executed via well-deconflicted, time-phased operations of high precision; however, due to a lack of practiced interoperability, their efficiency will decline as they have to react to a dynamic environment and rapidly changing battlespace conditions. Recent exercises, such as Mission Action 2013, indicate the PLA continues to work on developing joint commanders and establishing joint procedures, and that they have not fully promulgated and implemented joint operational constructs such that they would be confident using them in wartime.

PANEL I QUESTION AND ANSWER

HEARING CO-CHAIR TOBIN: Great. Thank you both. Just a reminder to those in the audience, that this incredible testimony, the detail will be available, as Senator Talent said, on the Web for those of you to read it closely because there's a lot of meat in there.

Senator Talent, do you want to kick off the questions?

HEARING CO-CHAIR TALENT: Yes, I'll ask a quick one. Mr. Karotkin, thanks to you and ONI, by the way, not only for your being here today but your help with the Commission in general.

You mentioned the Chinese light frigate--and thank you for continuing to use of the term "frigate." I love it, and I wish we did it. And you were kind of saying, look, it's not really a blue water ship, but I want to make a distinction here. You're not saying that it's not an operationally relevant vessel in the East and South China Sea; right? Because it is?

MR. KAROTKIN: Exactly. We would say it's critically relevant for those missions, that this is precisely the type of ship that they're going to be replacing older, you know, patrol combatants that aren't quite as seaworthy. The JIANGDAO is able to carry helicopters.

It's much more seaworthy, much more capable of executing those sovereignty missions in the South China Sea and the East China Sea, precisely where they would be using it, I think, in regional contingencies. It's not the type of ship that would be operating, for example, probably in the Gulf of Aden.

HEARING CO-CHAIR TALENT: Yes.

MR. KAROTKIN: That was the distinction--

HEARING CO-CHAIR TALENT: Or maybe probably even around Guam, but we would see it within the First Island Chain.

MR. KAROTKIN: Exactly.

HEARING CO-CHAIR TALENT: Thank you.

HEARING CO-CHAIR TOBIN: Great. Dr. Wortzel.

COMMISSIONER WORTZEL: Gentlemen, thank you for really great testimony. I have questions for both of you. I'll ask them quickly and give you a chance to respond.

For Mr. Karotkin, what does the shift from LSTs to LPDs suggest to you about a change in naval posture toward more expeditionary approach with a force insertion capability?

For Mr. Fuell, Admiral Locklear last week discussed the test of an ultra-high-speed missile vehicle by China. Tell us about hypersonic missiles and reentry vehicles being developed by China and describe the countermeasure options available to U.S. forces.

And then you mentioned road mobile vessels but don't mention rail mobile missiles and multiple warhead systems, but General Yesin last year, the former head of the Russian Strategic Missile Forces, identified from publicly available French satellite imagery a rail and cave signature indicative of a rail mobile system. What are your center's views on this

development?

MR. KAROTKIN: Okay. I'll take the first question first. Thank you, Commissioner Wortzel.

Well, the YUZHAO class LPD, as I mentioned, is obviously a very large ship. It can carry up to four of the new air-cushion landing craft, YUYI LCUA, which is similar to one of our LCACs, as well as four or more helicopters, armored vehicles, and troops on long-distance deployments. They've used it in the Gulf of Aden already.

This shift to higher-end amphibious ships suggests an emphasis on over-the-horizon expeditionary warfare, perhaps, you know, projecting power beyond the region in the future. It's also a very flexible ship. I think in the foreseeable future, we would see this thing possibly utilized for humanitarian assistance and disaster relief missions.

That's obviously, you know, following the Asian tsunami, I think Beijing was probably self-conscious of its inability to really offer significant assistance with the United States and other countries. I think this capability will help remedy that.

What's interesting--you also frame that in contrast to the lack of LST production, and for those who are thinking about China's priorities for a Taiwan contingency, you know, it begs the question, "Why are they not cranking out large numbers of, you know, simple LSTs that would be, you know, theoretically useful for a cross-strait invasion?"

And I think there are probably a couple of reasons why they're not cranking out large numbers of those, you know, smaller transport ships. I think, first and foremost, they probably would utilize a lot of logistics and dock space to maintain them, and I think also given the current status of cross-strait relationships, things are very stable right now between Beijing and Taipei, and probably nothing would do more to--

COMMISSIONER WORTZEL: Let's give Mr. Fuell a chance to respond.

MR. KAROTKIN: Oh, certainly. I'll turn it to you, Lee.

MR. FUELL: Dr. Wortzel, it's good to see you again. The reference to Admiral Locklear's comments about the ultra-high-speed weapon, the Chinese have talked about a recent successful test of a hypersonic glide vehicle, which is basically a ballistic missile launch system that gets the target or gets the payload fast and high, pitches over, dives to hypersonic speed, and then basically just glides to the target.

At this point, we think that's associated with their nuclear deterrent forces. Of great concern would be if they were to apply the same technology and capability with a conventional warhead or even just without a warhead because of the kinetic energy that it has in combination with their theater ballistic missiles, you know, in a theater role.

The hypersonic vehicles of any kind, whether they're glide vehicles or cruise missiles, are extremely difficult to defend against because just the time is so compressed between initial detection, being able to get a track, being able to get a fire control solution, and then just being able to

have a weapon that can intercept them in some way just because of the speed at which they're moving.

If that's combined with more traditional ballistic missile attacks forcing a target to defend against very high aspect warheads coming in this way at the same time they have to defend against low altitude, very high speed targets coming in this way, it makes the defense problem orders of magnitude worse for the defender.

Countermeasures to that are really beyond my expertise. That's more the blue acquisition side of the Air Force or the OSD/AT&L folks might be better able to talk to that.

On the rail mobile ICBM issue, we've not seen the Chinese pursue the rail option. They seem to like the road option more, and their road infrastructure I think better suits them, you know, for mobility, for more mobile options. They are very--we believe they're very concerned about our ability to find and kill TELs so the roads give more ability to flush out and go to hide sites and things like that and get to launch locations.

MIRVs at this point in China appear also to be only associated with the nuclear deterrent forces. Conventional warheads are accurate and maneuverable as they are, and there's enough of them that they can present a problem.

COMMISSIONER WORTZEL: Thank you.

HEARING CO-CHAIR TOBIN: Commissioner Wessel.

COMMISSIONER WESSEL: Thank you, Madam Chair, for putting this together, and I thank the witnesses for their testimony. It's very helpful.

I've served on the Commission for awhile, actually since its inception. I'm somewhat surprised year by year that Chinese capabilities seem to often exceed our analytical capabilities.

Mr. Fuell, you talked about how it is going apace, not necessarily accelerating, but it appears that, there you mentioned offensive capabilities. Three to five years ago, I think, if we were to jump to today, we'd be surprised by the level of acquisition, development, and deployment capabilities of the Chinese.

What I'm trying to understand is, are our analytical capabilities keeping apace with China's development?

Several years ago, we would have thought it was almost only in a defensive posture. You're now talking, Mr. Fuell, about potential offensive capabilities. Their power projection is greater, you know, Gulf of Aden and all the various things. Their capabilities are getting to be world class at the same time that our resources are being stressed and strained, both by deployments as well as budgetary pressures.

What does this mean for the U.S.?

MR. FUELL: Well, first of all, on your point about being surprised by their level of acquisition and proficiency, I think from my perspective, for the last ten years or so, we've been seeing them on track with what we thought they were going to be doing.

Obviously, we're not going to be 100 percent right all the time, but broadly speaking, I think we've got a pretty good handle on where they're going and where they've come from.

We've watched China since the Persian Gulf War of 1991 conduct what I believe to be--and this is all available in their open strategic writings, operational level writings--a very intellectually honest self-evaluation of their own capabilities and intellectually honest evaluation of modern warfare from the Gulf War to Allied Force to the Iraq War in 2003 and learned some important lessons from that, and most of what the Chinese do is really just, in my domain, is applying kind of traditional air power theory, most of it developed by us, just they use a different tool set than we use to do that.

So I'm not particularly surprised by their offensive capability. It's something that we have seen our customer audience be a little bit surprised by in the last five years or so, but it's something we've been tracking for awhile and seeing that.

I remember coming back from Air War College in 2003 to NASIC and learning about some developments in ground-launch cruise missile area, and it was like, okay, we've got to get on this. They're changing their whole way of thought. They're literally transforming the PLA from a low-tech defensive force to what they aspire to be. They called it their aspiration to become a strategic air force.

The PLA Air Force service strategy talks about combined offensive and defensive air and space operations, and that's been published since about 2006.

COMMISSIONER WESSEL: And I appreciate that being one of your customers.

[Laughter.]

COMMISSIONER WESSEL: And we report, as you know, to the Congress.

MR. FUELL: Yes.

COMMISSIONER WESSEL: You mentioned that maybe the customers haven't caught up.

Are you satisfied from a personal, not your official, posture with how your customer is assessing and responding to this at this point in time?

MR. FUELL: I believe I am now.

COMMISSIONER WESSEL: Now. Okay.

MR. FUELL: The Chinese military capability is, in many ways, reminiscent of my days as a lieutenant and a junior civilian when we were worried mostly about the Soviet Union.

And so we've got a lot of people in the military these days that are in mid-level, field-grade level positions, that came in after 9/11, whose major experience has been counterinsurgency warfare in Iraq and Afghanistan. So we're involved and some of those old gray beards like me are sort of involved in taking on an adult education effort with our customers and our services and our department in helping them kind of reunderstand and recalibrate to a high-tech, near-peer competitor with a force-on-force

potential.

COMMISSIONER WESSEL: Mr. Karotkin, any comments?

MR. KAROTKIN: Well, I think, I mean certainly I think all the Commissioners can probably appreciate the difficulty of keeping pace against an intelligence target like China given the rate of Chinese investment and the level of developments that we're seeing.

We're certainly not enjoying the luxury of a 12-percent annual growth in our intelligence budgets each year, and I don't say that as a defense so much. It's just to underscore the point that I think you all know well, that it's a very challenging target. There's a lot they're doing.

I guess in defense of the intelligence community, customers do tend to have long memories in those instances where the community has ever underestimated a threat, and there are instances I could cite in a classified environment where perhaps we've overestimated the pace of developments, and those are quickly forgotten.

So I think if we did a concerted scrub of forecasts over the past decade, we'd probably come up with a mixed bag that maybe doesn't undersell, entirely undersell the pace of Chinese developments.

COMMISSIONER WESSEL: Appreciate it. Points well taken. Thank you.

HEARING CO-CHAIR TOBIN: Commissioner Slane.

COMMISSIONER SLANE: I want to thank both of you for your time. It's been very, very helpful.

As a follow-up to Commissioner Wessel's question, for the United States to stay ahead of the Chinese military modernization, do both of you see some sort of naval/air arms race?

MR. KAROTKIN: Well, you know, I'm reluctant to speak--you know, as an intelligence professional, I'm reluctant to speak towards the blue capabilities. But certainly, the focus of China's naval modernization or at least an important focus of that modernization is centered on that A2/AD capability, what the Chinese would call counter-intervention, and it certainly complicates the environment year by year in which U.S. forces would have to operate.

I would say certainly from the perspective of regional states, if you're Vietnam, the Philippines, Malaysia, looking out at the awe-inspiring pace of Chinese f developments, there's certainly elements of strategic competition or a security dilemma that I think are affecting the region. So, yes, in my personal opinion, I think it will drive investment in capabilities and counter-capabilities among those who feel the need to operate in that counter-intervention environment.

MR. FUELL: Given the size of China as a nation and, as Jesse mentioned, their growth in defense spending and their ability, if they choose to do it, to make economic tradeoffs in favor of defense versus other spending they have to do, a materiel versus materiel or a system v. system arms race with the Chinese is probably unlikely with us.

What it appears from their doctrine, or their equivalent doctrine

that we've seen, is the Chinese have made a concerted effort to not try to compete with us on sort of a weapon system by weapon system manner, but instead are pursuing more of an integrated system-of-systems approach that allows them to exploit what they perceive to be weaknesses or gaps and seams in their adversaries' organizational structure and capabilities.

So I think what we as intelligence professionals would see would be a need for us to do similar kind of thinking, and we are doing it, about the Chinese and look for those kind of exploitable vulnerabilities. It's not so much--I don't think of it as a materiel arms race. I think it was an intellectual arms race, a military intellectual arms race. We need to be able to out-think them.

COMMISSIONER SLANE: Thank you.

HEARING CO-CHAIR TOBIN: Commissioner Brookes.

COMMISSIONER BROOKES: Thank you.

Mr. Karotkin, I noticed in your oral testimony--I don't think we've had an opportunity to review your written testimony--you didn't mention aircraft carriers. So perhaps you could talk about that.

Also, if you--we'll probably have to go to a second round on that. Mr. Fuell, will the H-6K have nuclear-capable cruise missiles? And also in terms of this new I think you called it an intermediate-range ballistic missile that could reach out to the Western Pacific, what other major targets outside the United States are within that threat ring? So, in other words, you know, Russia, India, things along that line, if you guys have looked at that.

I have some additional questions, but I think that will cover my time.

MR. FUELL: On the nuclear issue with the H-6K, we're not really aware of a nuclear mission, air or missile nuclear mission outside the Second Artillery at this point. It's certainly feasible, but I can't say that they would be doing it.

COMMISSIONER BROOKES: What about gravity weapons?

MR. FUELL: No, not that I'm aware of.

Within, other than the Second Island Chain, you know, Guam or Saipan or Tinian, that kind of range ring, depending on where the Chinese choose to base the new missiles, could very well cover most of the Indian subcontinent and a large part of Russia.

At the risk of being a little bit too U.S.-centric in our thinking, we do see pretty good indications that China's primary drivers for military modernization are along their eastern and southeastern axes.

The Taiwan problem now, traditionally for years, and then it's becoming more the South China Sea problem. So I think that's where they're thinking and that's what they're targeting for, and it's quite possible they may be even over point designing themselves for that mission.

MR. KAROTKIN: And so with regards to the Chinese aircraft carrier, I did include about a full page in my written testimony regarding the status of aircraft carrier developments. As you all know, it was commissioned in September of 2012, and we saw the initial launches and

recoveries of J-15 aircraft shortly thereafter.

I conveyed in my remarks that it will take several years before they have an operational air wing aboard that carrier. Right now, they're in the midst of a very challenging period that any carrier-capable navy goes through of learning how to operate aircraft aboard a carrier. We're dealing with a very small number--about six--test aircraft that are operating with the carrier right now. So the next step will be to get, you know, an entire air wing trained up and ready to go with those J-15s.

So I think they do have a road ahead of them, and it will take several years before that initial carrier is operational. It's going to be a carrier with some combat capability, limited combat capability, but I think from the navy's perspective most useful as a stepping stone into the era of carrier operation. And I think I'm most interested in and probably many of you are most interested in not what the Liaoning is going to be able to do but what those follow-on domestic carriers are going to be capable of.

COMMISSIONER BROOKES: Okay. What can you say publicly about new constructions?

MR. KAROTKIN: Well, we've certainly seen the media reports that I think you've seen as well in recent weeks suggesting that Chinese government officials have acknowledged construction or an initial construction of their first domestically- built carrier.

I think, you know, if that is, in fact, true, that would be in line with our expectations of when they would start bending metal and starting to put together the initial pieces of that first carrier.

As you know, they have a very robust domestic shipbuilding capability, both military and on the commercial side, so we don't doubt that they'll be able to do that.

COMMISSIONER BROOKES: Thank you.

HEARING CO-CHAIR TOBIN: Commissioner Chairman Shea.

CHAIRMAN SHEA: Thank you both for being here and for your very interesting testimony. I think we've encountered each other before but, again, thank you.

Just a quick question or a couple, two questions. Does China have a submarine-launched nuclear ballistic missile capability?

My understanding is that the intelligence community believed that China would have initial operational capability by late 2013. Well, it's January 2014, and I was wondering if you could shed some light on that?

That's the first question. The second question may be for Mr. Karotkin. Could you share with us your views on what happened with the incident involving the USS Cowpens?

MR. KAROTKIN: Let me first speak in regards to your first question with the Jin SSBN and its JL-2 weapon system, this has been a long-road for the Chinese to get this system operational, and there's not a whole lot I can say, I think, in an unclassified environment other than the fact that we would expect the Jin and its JL-2 weapons system to begin patrols this year, that we're probably looking at sometime in the very near

future for China to begin Jin JL-2 patrols.

CHAIRMAN SHEA: So they have two legs of the nuclear, of the triad, potentially, this year?

MR. KAROTKIN: That's right. That's what I can speak to, the naval, the naval side of things.

But in terms of the Cowpens incident, I mean I think this really underscores the challenge the Chinese face in their effort to assert special rights within their EEZ and to affect U.S. surveillance activity, and what we consider normal, legitimate naval operations in international waters.

This was an incident where I think you had closed--again, I don't know how much I can say. I'm concerned about overstepping in an unclassified environment.

CHAIRMAN SHEA: I understand. Don't overstep.

MR. KAROTKIN: But I think, you know, we had a situation where China was perhaps trying to balance their concern over providing space for this new aircraft carrier and keeping potential eyes away from the carrier and their operations with an attempt to manage that relationship with the United States.

CHAIRMAN SHEA: Let me ask you this. This is sort of a follow-up to Commissioner Wessel's and Commissioner Slane's comment. In our report of 2013, we say that China, by the year 2020, will have approximately 310 to 340 surface combatants and submarines, most of them modern. In your testimony today, I think it was 85 percent of the surface combatants will be of modern variety.

We try to convey a sense of urgency to our consumers, which is Congress. What is it like in the intelligence community when you look at that information? As I understand it, that would be a larger fleet, naval fleet, than the United States, and the United States has global responsibilities, while China is--basically, its focus is closer to home.

We try to convey a sense of urgency to Congress in our report. Is there a sense of urgency within the intelligence community about these developments?

MR. KAROTKIN: Yes, there's a deep sense of urgency, and I think it's shared across the intelligence community. And, again, as I mentioned in my testimony, not just about the numbers, but more so about the sophistication of these developments and the modernity.

These are systems--when we say the word "modern," I think some folks mistakenly assume that we're saying modern in relation to what China had ten years ago. In many cases, these modern surface combatants and modern weapon systems are modern by any international standards, that they're on par with what you'd see in a modern Western navy.

So we're deeply concerned about what that means in a surface-ship-to-surface-ship engagement in the Western Pacific.

Lee, anything to add?

CHAIRMAN SHEA: Thank you.

HEARING CO-CHAIR TOBIN: Great. And I have a question for

each of you. Let me start with Mr. Fuell.

You mentioned several times in your testimony that the PRC is deploying mobile MIRVs. Back in the '80s when nuclear warfighting was closely analyzed as an art, when you were in the Air Force probably, MIRVs were considered the most inherently destabilizing systems because they could strike one side with multiple hits at multiple fixed points. And because they were so hard to hit once they got moving, it forced the other side to have to do a first strike. So there was destabilizing once any country, including our own, had mobile MIRVs.

Has any thought been given by the PRC to that destabilizing nature of the systems that they're fielding now?

That's my question for you, and I'll hold before I ask Mr. Karotkin.

MR. FUELL: I'm afraid I'm going to have to do the stereotypical intel weasel-word answer for that: Chinese nuclear doctrine and thinking is really not part of our analytic focus at the National Air and Space Intelligence Center.

But to the extent that I understand what they're doing there from my colleagues at DIA's Defense Counterproliferation Center, the Chinese are concerned about destabilization, but they're primarily concerned about a survivable, reliable second strike deterrent capability.

So with concern about U.S.--we see a lot of concern in their press about the U.S. development of advanced conventional weapons that they assert can have strategic effects analogous to nuclear weapons, decapitation strikes on countries, et cetera, without using nuclear weapons.

So I would suggest that perhaps--and I'm speculating a little bit out of my realm--because the Chinese ICBM force is relatively small, the MIRVs, by MIRVing them, it gives a small ICBM force a greater deterrent capability than it would with single warheads.

Otherwise, the only other option would be to go to a larger number of launch vehicles and base them and disperse them more widely across the country to keep them survivable. So I would suggest that perhaps survivability and assured second strike might be what might be behind a lot of the Chinese thinking about MIRVs.

HEARING CO-CHAIR TOBIN: You were very careful with your wording on the pace that they're modernizing.

MR. FUELL: Right.

HEARING CO-CHAIR TOBIN: Where are the MIRVs and their deploying of MIRVs? Are they at an equal pace or are those--

MR. FUELL: They're in the very early days of that. So the timing on getting those into the field, the pace of that, is something we don't have a good handle on at this point.

HEARING CO-CHAIR TOBIN: So that's an issue for us to watch?

MR. FUELL: It's something to be watched. Yes, ma'am.

HEARING CO-CHAIR TOBIN: Mr. Karotkin, if I'm thinking of

the ships, which you've laid out, and the modernization of the ships, and then I'm thinking of the navy as human capital, can you give me a picture of not just today but ten to 20 years from now? Because we've got one-child policy, what's the demographic, what's the human capital, what's the training and capacity that we can expect?

Having grown up in a Navy family, it's not just the ships; it's the force. And what can you explain or share with us about that?

MR. KAROTKIN: That's a great question, Dr. Tobin. The demographic problem in China affects obviously a large number of issues, bureaucracies. I mean you have fewer productive members of society earning, generating, you know, GDP. You have a growing elderly population that will need to be supported.

So I would suspect that the navy leadership, like the broader PLA leadership, is thinking about that in terms of a resource issue, right, that there's going to be perhaps pressure in the out-years to sustain the sort of growth that they--the budgetary growth--that the military has become accustomed to.

In terms of manpower requirements, when we talk about a shrinking pool of 20-somethings, I don't think that's as large a concern. I say that in part because as the military becomes more technical in China, the demand, the greatest demand is for educated, you know, technical competency, not large numbers of folks.

In fact, in most areas, the PLA has actually been shrinking in terms of personnel amid this modernization. So the pressure on the navy in the next couple decades is going to be for highly-trained, you know, college graduates, technical experts rather than large numbers of folks to kind of man the ship.

MR. FUELL: I think one of the challenges that the PLA faces with the growth of the Chinese economy and the growth of something that's sort of semi-analogous to private sector, of industry in their economy, is that for the last decade or so, for the first time in its history, the PLA has had to sort of embark into a competitive hiring kind of mode, tried to compete with the private sector to obtain those technically skilled and highly- educated personnel. It really recognizes that it needs to transform too for 21st century warfare.

So they have some challenges there in terms of getting the kind of raw material into the PLA that they really need. It's across the military, I think.

HEARING CO-CHAIR TOBIN: Yes. And particularly in your arena, in the high technology world.

MR. FUELL: Very much. Very much so. You know, the whole Second Artillery Corps, for example, that's largely warfare by engineering with calculations and computers and everything calculated out and planned and executed. So, yes, that's true.

HEARING CO-CHAIR TOBIN: Great. I'm ready to start a second round of questions. Let's start with you, Peter.

COMMISSIONER BROOKES: Thank you.

Mr. Karotkin, could you--actually, it's a question for both of you, and it will push a little bit in terms of time--but could you identify the PLA Navy's current strengths like in three different strengths and three different weaknesses? And the same thing for the PLAAF, Mr. Fuell? What are their strengths today? Where are their vulnerabilities and weaknesses? And the same thing for the air force.

Thank you.

MR. KAROTKIN: Okay. Well, if I could, speaking first to the strengths within the navy, I would--I want to highlight first their missile program for their long-range ASCMs. There's been a lot of emphasis on anti-surface warfare capability. And this is anti-surface warfare capability across the force. The Chinese surface ships, submarines and aircraft are all being equipped with increasingly long-range ASCMs, which, you know, often doesn't get the kind of headlines that the DF-21D tends to receive, but it's critically important when you think about the area that one individual submarine or one individual surface ship can hold at risk in the Pacific.

So the anti-surface warfare capability is one critical gain. Anti-air warfare capability is another, the fact that in the last decade--and this is, I would say, secondary to anti-surface warfare. Anti-air warfare has been kind of the second-tier priority, if you will, that is allowing these ships, as I mentioned in my testimony, to move farther beyond the littoral.

Just a decade ago, Chinese surface ships were really tethered to land where they could enjoy the benefit of land-based defenses. So that's another strength.

I would say the third strength we're seeing is operational proficiency. And this is maybe a more recent gain, but the emphasis on training that we've seen from a leadership over the last five years is really being implemented.

We're seeing more consistent operations throughout the year. It is no longer these kind of peaks and valleys of naval proficiency that we used to see with the conscription cycle. You see a navy that's demonstrating readiness year-round. So those are the strengths.

In terms of weaknesses, I would say the PLA across the board hasn't mastered combined warfare between the navy and the air force. There are slow steps in that direction, but they haven't mastered it.

I would say another area of weakness is the anti-submarine warfare. Their submarines, in particular, are equipped for anti-surface warfare. When it comes to hunting down adversary submarines in open ocean and blue water, the PLA Navy simply isn't there yet today.

MR. FUELL: In terms of the PLAAF, I'm going to include the Second Artillery, if you don't mind, in the answer. It's kind of hard to talk about those two separately.

First, let me qualify my answer by saying we spend quite a lot of time in the intelligence community thinking explicitly about that question, and I think we have a pretty good handle on some of that at a classified

level. I would prefer to not help the Chinese too much.

COMMISSIONER BROOKES: Yes.

MR. FUELL: In terms of strength in the air and missile forces, the primary thing is just their sheer size and the volume, the capacity of firepower that they're building out to that they can bring to bear in an area.

That kind of dominates pretty much everything else they're doing. Although they are, you know, technically modernizing, it really is a capacity issue.

In terms of weaknesses, I would echo what Jesse said about jointness. We don't believe they've progressed to the point of operational and tactical agility that the nature and pace and speed of air combat requires. It's still a very high-power distance index culture and very top-down, centralized command kind of military, which works fine for preplanned operations where you're controlling the scope and pace and scale of what's happening. But if your operations kind of go off the rail and you've got to react to that in some way, I would consider that probably to be the PLAAF and the Second Artillery's most significant weakness.

COMMISSIONER BROOKES: Thank you.

HEARING CO-CHAIR TOBIN: Commissioner Wessel.

COMMISSIONER WESSEL: Let me ask two questions, and I understand that you maybe have limited ability in this forum to answer.

One, you know we've seen significant targeting of assets here in the United States through cyber incursions, et cetera, both from a denial capability and logistics support, as well as acquisition of technologies or knowledge. How would you rate the threat at this point?

MR. FUELL: It's very concerning. It is very concerning. We think when we look at Chinese military developments, particularly the rollout of the J-20 and the J-31, you know, we can see where we believe that exfiltration of data from U.S. cleared defense contractors has helped them kind of solve some problems without having to repeat the same kind of extensive engineering analysis and design that we had to go through and just apply some things that we or the Russians have done, although with the Russians, it's more licit acquisition than illicit technology. So it is a significant concern for us.

MR. KAROTKIN: I mean I would agree, and certainly they see cyber as one important element of several in rapidly modernizing the navy, both, you know, investment and indigenous R&D capabilities, reverse engineering of foreign systems and, of course, cyber. And they've cast a very wide net to go after relevant naval technologies, especially among defense contractors. So there are certainly signs that some of that is making its way into Chinese designs.

COMMISSIONER WESSEL: And are we to understand that for every defensive measure there is a workaround within a matter of days. Are we applying adequate resources to this problem, again understanding that we're going to have to constantly go forward?

You know, I still see people here in Washington who never think

they're going to be targeted, you know, "no one is my system." Do you have any increasing confidence in our ability to approach this issue more aggressively?

MR. KAROTKIN: I personally can't speak to the protection of classified or defense contractor networks. It's not in my lane.

MR. FUELL: It's the same here. Unfortunately, we experience a lot of degradation of our own unclassified networks, for example, because of the security measures as they're added. So that, you know, the exfiltration by the Chinese or anyone else for that matter sort of has a first-order effect and a second-order effect. First, they're getting data, but, secondly, they're kind of forcing us to do things that make it harder for us to do our business as well.

COMMISSIONER WESSEL: Thank you.

HEARING CO-CHAIR TOBIN: Senator Talent.

HEARING CO-CHAIR TALENT: Thank you.

I was intrigued. Mr. Karotkin, you said--you can both comment on this--that the intelligence community does feel a deep sense of urgency--I wrote that down--about what's happening.

Let me describe to you how this looks to me and then tell me whether you see anything wrong with how I'm evaluating it. We know that they are rapidly building up and developing capabilities, which are explicitly--being honest about it--designed to prevent the United States military from having access, in particular, to their near seas. I mean that's the goal. It's very purposeful, and they seem to be doing it I mean rather well. There are weaknesses, but they're very honest about them.

That tells me that they have to be at least contemplating doing something in the near seas that they know we not only would not like but might even be willing to use the American military to prevent, right, because I can't see another reason why they would be doing that, you know, which suggests that they are contemplating something which they recognize as being inconsistent with how America is defining its vital national interests in the region.

So when you say you have a deep sense of urgency, is that the kind of reasoning process that you may be going through and the reason why you feel that urgency? Is there something wrong with the way I just evaluated that?

And I understand that certainty is not possible and motives are often mixed; right? I mean I get it that there are nuances to why leaderships do things. But would you care to comment on that?

MR. KAROTKIN: I mean certainly, for example, the Chinese have never renounced the use of force against Taiwan. And, you know, when they look at the ways things could trend in the Taiwan scenario, certainly the United States has given indication that it's in our national interests to--you know, I don't want to speak to policy. But China is obviously concerned that our military could frustrate their ambitions. I think that is a critical, at the centerpiece, what they might call the main strategic, you know, direction as

developing these capabilities to frustrate U.S. intervention in a Taiwan scenario.

I think as the Chinese look at disputes with their neighbors, Japan over the Senkakus, with the Philippines, potentially with Vietnam in the South China Sea, I certainly don't think that military action is China's first preference in the near future. But should things escalate--and they certainly appreciate the U.S.-Japan alliance and they realize what a war with Japan would mean over the Senkakus and the implications that would have.

Quite frankly, looking back ten years, there was an understanding that the Chinese military simply was not prepared to conduct naval operations against a sophisticated navy like the United States.

MR. FUELL: Or defend against sophisticated air operations by an adversary like the United States. I can't say that I would believe that there's evidence the Chinese are simply contemplating and, you know, sort of have a plan to do something militarily.

Our sense is that their air and missile modernization has been driven by a very real recognition, as Jesse said, of inadequacy in the past and a belief that they need viable military capability and capacity in the event of a military conflict. And I believe that the indications we have tell us that they believe that we'll do what actually Congress gave us a mandate to do in 1986 in the Taiwan Relations Act, to resist militarily any attempt to compel unification.

So their planning assumption, from a strategic level on down, I think, is that we will do that. So, therefore, they feel that they need to be prepared, and from 1990 on, they realized they were not prepared.

HEARING CO-CHAIR TALENT: Yes. I made my comment as value-neutral as I could. In other words, they're defining their interests in a way that they see as potentially consistent with how we're defining our interests, and so they're preparing the power they need to be able to stand up from their point of view for their interests. And so it sounds like you see it basically the same way. Thank you.

MR. FUELL: And my deep sense of urgency is, to an extent--it's not directly analogous, but I think a lot about 1914 in Europe when I look at the China and U.S. competition now, and I think, you know, World War I was a war that nobody really wanted, but it happened anyway.

HEARING CO-CHAIR TALENT: We have time. Can I ask a follow-up?

HEARING CO-CHAIR TOBIN: Yes, absolutely.

HEARING CO-CHAIR TALENT: Because you mentioned 1914. One of my concerns is that, as I understand it, in the late 1930s, and there are people on this panel who know this area better than I do, the United States followed a policy vis-a-vis the Japanese where we effectively presented ourselves as an obstacle to what they were trying to achieve but didn't do it in such a way that effectively deterred them.

In other words, from their point of view, we were provoking them without deterring them. And that's an analogy that I'm a little bit

concerned about, that we may be doing the same thing: doing enough to let them know, "yeah, you're right, there is a conflict," but not enough to actually deter them from avenues that could lead to something pretty bad.

You want to comment on that? And then I thank you, Katherine.

MR. FUELL: I would agree with that, sir. There's a very thin line between deterrence and provocation, and it's a very tough intellectual problem.

HEARING CO-CHAIR TOBIN: Commissioner Wortzel.

COMMISSIONER WORTZEL: You guys have done a great job here so far.

MR. FUELL: Thank you.

[Laughter.]

MR. FUELL: So far.

COMMISSIONER WORTZEL: Mr. Karotkin, what classes of Chinese submarines are equipped with air-independent propulsion, and is that an indigenous development or was it acquired through foreign acquisition? If foreign acquisition, from what country or group of countries?

And then the second question I have is-- really I think both of you may have to wrestle with this--how are the Central Military Commission and the Second Artillery going to handle command and control and weapons release when the navy begins to operate its ballistic missile submarines?

MR. KAROTKIN: Challenging questions to answer in this environment, but I would say that, to answer your first question, the Yuan SSP is China's only AIP-equipped submarine. It's China's most modern conventionally-powered submarine. They have eight in service, and we expect probably about 12 more to be produced.

So the AIP is an important addition to the conventional submarine force. It allows them to have greater discretion as to when and where they're going to snorkel so they can operate off that AIP system to kind of keep them submerged and quiet for longer periods of time, and, you know, reducing their vulnerability to detection.

So an AIP-equipped submarine with a long-range anti-ship cruise missile is a very potent force in the region. And in terms of the nature of that AIP system, I think that's something that probably would be better addressed in another setting.

In terms of command and control of nuclear weapons between the Second Artillery and the navy, that's also an issue where, you know, I think probably I can't say very much about other than my expectation that command and control of nukes will always be kind of closely held at the highest level, probably within the Politburo Standing Committee, and any decision, you know, made on the use of that nuclear force would emanate from that level.

MR. FUELL: I would just add to that that the Chinese certainly, clearly, have stated they believe information superiority is the prerequisite for military success in other domains. So they, because of that, invest very heavily in their command-and-control systems architectures, and they're

investing in technologies to make those even more secure for the future.

On the issue of weapons release, there's a significant difference between the deterrence relationship between the U.S. and China compared to the Cold War with the Soviet Union where we were very explicit with each other about if this happens, then that will happen.

Major General Yao Yunzhu, who's been one of their chief nuclear theorists--she was previously with the National Defense University. Now she's the chair or head of their U.S. Relations Bureau--Harvard educated among other places--literally said that the Chinese value ambiguity.

We, the Americans, are looking for unambiguous, clear, deterrent, "if this happens, then that will happen" kind of thinking; whereas, they believe with a smaller force and the second strike, intended for second strike assurance, that ambiguity is to their advantage. So they're unambiguous about the value of ambiguity--

[Laughter.]

MR. FUELL: --in their nuclear relationships. In an area of nuclear command and control, weapons-release area is something they're intentionally ambiguous about.

HEARING CO-CHAIR TOBIN: Okay. I have another question, and I think largely, Mr. Karotkin, you'll be answering it, but, Mr. Fuell, if you can comment, too.

You've painted the picture for China and their fleet, or fleets, and described their growth and modernization. Tell me what we know about Japan and their shipbuilding because I've heard that they're doing more investing along naval lines.

And Vietnam, if you could speak to either of those, and the equivalent, if you have any comment on the air force of both of those countries?

MR. KAROTKIN: I really, Commissioner Tobin, I really can't say much about either Japan or Vietnam. It's really outside of my portfolio, which is strictly China.

You know, I can say from the Chinese perspective, they certainly have a great deal of respect for Japanese naval capabilities, and the Chinese are undoubtedly concerned about the potential for growth in Japan and a less-constrained policy in terms of using naval force.

When it comes to Vietnam, also there's not a whole lot I can say, and I apologize, but we certainly do see evidence of Vietnamese acquisition of platforms that could be used. You could argue very much in a counter-intervention role perhaps Vietnam could use some of its new platforms against China, much the same way China seeks to execute counter-intervention against the United States.

And what I'm saying is Vietnam could acquire submarines or surface ships that effectively don't go toe to toe with the Chinese but could dramatically raise the cost of China challenging Vietnam over the Spratleys, for example.

MR. FUELL: As Jesse said, the China--I'm sorry--the Japan and

Vietnam issues are, while not necessarily outside my portfolio, they're outside our resource limitations to invest an analytic effort into and follow on a regular basis.

You know, the JASDF, Japanese Air Self-Defense Force, just from open source reading and by historical background, it's a very professional force, but a small force, about a generation behind the USAF in technology, the F-15 being their primary fighter, for example, although they're looking to move beyond that.

The press obviously indicates that Japan is having some of its own internal debate about militarization and remilitarization, and that is something that we should watch play out.

Vietnam--not really seeing anything. I mean their air force is so small. They've acquired some SU-30 fourth-generation fighters from Russia, but they would be I think overwhelmed in any conflict with China over say the South China Sea resources, for example.

HEARING CO-CHAIR TOBIN: Great.

MR. KAROTKIN: If I can add just one thing, a topic that hasn't come up, Dr. Tobin, in regard to regional balances? The growth of the Chinese Coast Guard is one thing that, you know, while not a military capability, I think is important to the regional dynamic.

We're seeing growth across the coast guard that's even much more dramatic, I would say, than the growth of the PLA Navy. They're rapidly acquiring blue-water capable, or distance-sea capable, long endurance coast guard ships that really dwarf the capability that you see elsewhere in the South China Sea with the exception of Vietnam has somewhat of a capable coast guard. Really no one else is able to contend with China's coast guard.

Japan, of course, has a very modern and effective coast guard. But this is a capability--this is really the front line of Chinese efforts to press its maritime claims in an area where if we see friction in the South China Sea, it's likely to begin with these civilian coast guards. As you know, the coast guard was recently reorganized with these coast guard assets.

HEARING CO-CHAIR TOBIN: Thank you. Thank you both. And we have Commissioner Brookes.

COMMISSIONER BROOKES: Yes, thank you.

As I look at what we talked about this morning, the word "asymmetry" kind of falls away to me or increasingly falls away. We've talked about China's asymmetric efforts for a long time. But it seems like with what they're building that they're going strength on strength.

So where is the--is there asymmetry still in China, in China's strategy? I mean if you're building surface ships that could oppose other nations' surface ships, if you're building aircraft carriers that could oppose other aircraft carriers? I mean I worked in this building a number of years ago, and I recall being told by some senior Navy officials that China will never build an aircraft carrier--

[Laughter.]

COMMISSIONER BROOKES: --when they bought the Varyag. Because of their asymmetric strategy, they would never try to oppose American strength on this issue. And where we are today, as somebody who's been looking at this for 15 or 16 years, in a number of capacities, it seems like they are actually building a navy that's similar to ours.

So is asymmetry a good term to be using when we talk about Chinese defense strategy and especially their modernization programs?

MR. KAROTKIN: Certainly over the long term, we're going to see a navy that looks more similar to the United States in terms of larger combatants that are capable of blue-water operations. So, yes, I understand what you're saying. There's a trend over the long term towards a navy that looks much more like our own.

You know, I would--the distinction between the Chinese carrier, I would say that the Chinese carrier, the Liaoning, is much--has very little in common with a U.S. Nimitz-class carrier. It's much smaller, much less capable of power projection, I would say, not designed for power protection but really to kind of provide air coverage over a limited area, still asymmetrical in the sense that it would be the United States bringing naval power to the region.

And we're looking at a navy that with a smaller number of--for example, a conventional submarine could hold a much higher value U.S. surface asset at risk. So there certainly is, you know, our logistics at risk. So there certainly is an element of asymmetry to that.

But I don't dispute your larger point about the trend in Chinese development. It's not really accurate to characterize it as a David versus Goliath scenario.

COMMISSIONER BROOKES: I mean we could be seeing the Chinese could go in the direction of building a lot of small patrol boats with anti-ship cruise missiles to take out high-value American targets. But they seem to be building capital ships. And so I just, to me--you're the experts--but to me it seems like we're seeing a trend.

Mr. Fuell?

MR. FUELL: In my domain, the asymmetry, I think, is still very much there, and it's there in the Second Artillery Corps. Because of the Intermediate Nuclear Forces Treaty, we stepped away from intermediate range theater-ballistic missiles and ground-launch cruise missiles in the 1980s. The Chinese are not signatories to that treaty.

They've pursued those capabilities and developed them over the years. They're very difficult to defend against, especially when they're used in conjunction with each other, and that's what we see the Second Artillery and PLAAF, we think, training to do, and the other asymmetry is if you look at the weapon systems versus weapon systems view, you'll see very similar types of things. The asymmetry comes in how they use them and how we think they intend to use them.

In my remarks, I mentioned emphasis on attacking air bases,

ports, logistics facilities, and also command and control facilities. It appears to us that the Chinese in air power would perhaps prefer not to confront the tactically and technically most sophisticated air force in the world, the U.S. Air Force, on a system v. system, airplane versus airplane, "giant furball in the sky" kind of manner, but instead would prefer to attack our infrastructure that is required to generate air operations.

COMMISSIONER BROOKES: Which the targets that would be the same for the United States Air Force.

MR. FUELL: Exactly.

COMMISSIONER BROOKES: I think your point has been taken. There are capability asymmetries as well as doctrinal asymmetries. So you're saying it's more in doctrinal but not in capabilities?

MR. FUELL: Well, it's in both, but it's not--

COMMISSIONER BROOKES: And we're talking about the PLAAF now. I take your point about the Second Artillery.

MR. FUELL: Oh, okay. No.

COMMISSIONER BROOKES: But what about the PLAAF?

MR. FUELL: PLAAF, probably more symmetrical, yes.

COMMISSIONER BROOKES: Thank you.

HEARING CO-CHAIR TOBIN: I think we have one other question. Commissioner Wessel.

COMMISSIONER WESSEL: Just one quick question because you just raised the question of arms control agreements. Are there any regimes we should be seeking to negotiate with the Chinese on to try and avoid the kind of problems that may arise. And would there be any chance that China would want to negotiate?

MR. KAROTKIN: Again, the next panel may be probably much happier to speak on policy issues and recommendations before I step into that quagmire.

But I would say generally speaking, from a Navy perspective, I think we would value the sorts of agreements that would create predictability in our interaction with Chinese ships, whether that's in the EEZ or beyond, but an understanding that we respect the security and the safety of those ships and their personnel and the aircraft and the airmen and men and women at sea.

I think that's a critical element of our engagement with the Chinese and something we're still kind of consistently pushing to achieve in that relationship.

MR. FUELL: With the growing sophistication of Chinese air defense capabilities and, for example, the imposition of this new Air Defense Identification Zone out over the Senkaku Islands, anything, any agreements I think that increase transparency and military-to-military engagement with the PLA and the PLAAF over those kinds of issues, and where we can talk about rules of engagement and identification procedures and freedom of navigation would probably be a good thing. Beyond that, you're getting into the realm of national policy which is a little bit over my head.

COMMISSIONER WESSEL: Thank you.

HEARING CO-CHAIR TOBIN: As is the case with excellent testimony, we want to continue talking, but I think you've got us started, and our staff will follow up with any further questions we have as we move through the year and build our case for the Report to Congress.

I think we've concluded. Thank you so much. We'll be looking, as you noted, Mr. Karotkin, at policy a little more broadly next. We're going to break a little early. I think we could reconvene, Senator Talent, at five of 11, just to get going and give the next panel a little more time. It's 10:20.

Should we--one of our next panelists is here, but we don't have the second.

HEARING CO-CHAIR TALENT: Oh, we don't have the second.

HEARING CO-CHAIR TOBIN: Yes.

HEARING CO-CHAIR TALENT: Okay. Well, why don't we take a five-minute break and then we can see if the second panelist has arrived after that?

HEARING CO-CHAIR TOBIN: Yes. That's a good idea.

PANEL II INTRODUCTION BY COMMISSIONER KATHERINE C. TOBIN

HEARING CO-CHAIR TOBIN: Our next panel examines inputs to China's military modernization, including financial resources, and takes a look at the structure of China's defense industry.

Dr. Andrew Erickson is an Associate Professor in the Strategic Research Department at the United States Naval War College and is a founding member of the China Maritime Studies Institute at the U.S. Naval War College.

He has testified with this Commission before in 2007 and 2013. Welcome back, Dr. Erickson.

And then we have Dr. James Lewis who is a Senior Fellow at the Center for Strategic and International Studies where he writes on technology, security and the international economy. He has worked at both the Departments of State and Commerce as a Foreign Service Officer. He also led a long-running Track II dialogue on cybersecurity with China. We'll want to hear a good bit about that, Dr. Lewis.

He is internationally recognized as an expert on technology and strategy. Currently he's examining international security and governance in cyberspace.

He too has testified and informed our Commission in 2002, 2005, and 2008. Welcome back to you, too, sir.

Before we begin, a quick reminder to keep your comments close to seven minutes so that we have time for questions, and we'll start with you, Dr. Erickson.

OPENING STATEMENT OF ANDREW ERICKSON ASSOCIATE PROFESSOR AND FOUNDING MEMBER, CHINA MARITIME STUDIES INSTITUTE U.S. NAVAL WAR COLLEGE

DR. ERICKSON: Commissioner Tobin, Senator Talent, Commissioners, thank you very much for this opportunity to support the Commission's important work.

My testimony today reflects my personal views, not those of the U.S. Navy. Here is a summary of the more detailed findings that with your permission I'm submitting for the record.

By any measure China already has the world's second-largest defense budget. Unlike the globally dispersed U.S. military, China's People's Liberation Army concentrates its capabilities primarily in its immediate region.

This dynamic works strongly in Beijing's favor vis-à-vis its strategic priorities and it conserves resources.

Fundamentally different American and Chinese military approaches prevent simple comparison of their overall forces from

explaining their relative capabilities regarding peacetime influence or operational scenarios where it matters most: the contested Yellow, East and South China Seas and the airspace above them.

To further Beijing's unresolved island and maritime claims there, the PLA has acquired growing numbers of increasingly capable weapons. It strives to strengthen its personnel's ability to wield them effectively.

China's military finances. This past March, China announced a 2013 defense budget of \$114 billion. While this does not reflect all China's defense-related spending, the same is true, albeit sometimes to a lesser degree, for all nations, including the United States.

Official statements are general but reflect the basic reasons for Chinese defense spending increases: to compensate for past austerity; develop and deploy new systems; support growing long-distance operations; attract and retain qualified personnel; afford price increases; and place more spending "on the books."

Even inflation-adjusted, the PLA budget's growth rate far exceeds those of Western militaries and China's neighbors. This already gives China sufficient funding to develop formidable regional military capabilities but not a top-caliber global force like America's.

Developing capabilities necessary to project significant power and wage high-intensity warfare farther away would yield significantly less "bang" for a significantly larger "buck."

Inter-service budget competition. PLA budgeting by and within service remains uncertain. China is increasing emphasis on the roles, missions and capabilities of its navy, air force and Second Artillery. As the ground forces gradually diminish in relative power, inter-service resource rivalry--a time-honored tradition in all militaries--will likely intensify.

Factors affecting China's economic and military funding trajectories. China's current economic model appears unsustainable. China's leaders know what economic reforms are needed, but it remains unclear to what degree they can actually implement them.

Domestic challenges portend China's version of an historically prevalent "S-curved" national trajectory slowdown. Meanwhile, manifold factors increase PLA costs: new systems are costlier to build, operate and maintain; organizational reform; rising salaries and benefits; proliferating entitlements and retirees.

Approaching leading-edge capabilities yields diminishing returns. Here the PLA is on a demanding treadmill that has stressed other major militaries. By deploying advanced technologies, China ups the ante for regional competition. Wielding asymmetric weapons writes potential adversaries a potent playbook.

Domestic challenges facilitate funding claims by China's internal security forces, which according to the U.S. Department of Defense have an official budget already exceeding that of the PLA.

As resource competition intensifies, leaders' ability to allocate increasingly scarce funds will face unprecedented tests.

Analytical challenges. China's military opacity makes it difficult to assess: how much exactly China spends on its military, particularly in specific areas; how far that money goes given China's often lower cost structure; as well as resulting products' quality and performance.

Even at announced budgetary levels, China may be able to afford tremendous armaments development. But productivity and quality remain uncertain, especially in certain areas.

Given these challenges, Department of Defense estimates merit particular attention. DoD's estimate of China's "total actual military-related spending" fell from approximately 3.25 times Beijing's official figure in 2002 to 1.13 to 1.70 times in 2011.

This ratio did climb back to 1.27 to 2.02 for 2012, adding up to 135 to 215 billion as opposed to China's then official defense budget of 106.7 billion.

The Department of Defense acknowledges that "it is difficult to estimate actual PLA military expenses."

Together with adjusting for inflation, as well as macro level data and strategic trends, this suggests that China's defense spending is: among the world's highest, in both absolute and growth rate terms; increasingly "on the books"; affording the PLA significant capabilities; likely sustainable, for the next few years at least; and capable of being raised substantially in the near future should Beijing prioritize this.

Policy recommendations. With the world's second-largest defense budget, China should be more forthcoming about its capabilities. Given its emphasis on the United Nations, which it states to have paramount importance, China should move from submitting merely a Simplified Reporting Form to the U.N. to a Standardized Reporting Form, as the U.S. and most other industrial democracies already do.

More specific information and evidence concerning categories of spending included in the official PLA budget would help better determine what proportion of spending it actually reflects.

This could help reduce uncertainty about whether Beijing was effectively hiding a significant proportion of military spending. Budget breakdowns by and within service would yield valuable indicators regarding PLA development priorities and capabilities.

Meanwhile, China's hardware deployments, personnel structure, and national health and wealth suggest medium and long-term trends.

In closing, here are the larger questions that should be answered accordingly:

How long can China's rapid growth last?

During this time, how can the U.S. prevent China from using force, or even the threat of force, to harm regional peace or the norms that sustain it?

What capabilities and partnerships does the U.S. need to do so?

How can Washington implement the most time-sensitive of these measures promptly?

credibly? How can the U.S. demonstrate required presence and capacity

And finally, how can the U.S. sustain necessary investment?

Thank you for your attention, and I look forward to your questions.

**PREPARED STATEMENT OF ANDREW ERICKSON
ASSOCIATE PROFESSOR AND FOUNDING MEMBER,
CHINA MARITIME STUDIES INSTITUTE
U.S. NAVAL WAR COLLEGE**

**Testimony before the U.S.-China Economic and Security Review Commission
Hearing on China's Military Modernization and its Implications for the United States
30 January 2014**

Prof. Andrew S. Erickson, Ph.D., Naval War College¹

By any measure, China already has the world's second largest defense budget. Unlike the globally-distributed U.S. military, the People's Liberation Army (PLA) focuses its military capabilities primarily in its immediate region, while seeking only gradually to expand its operational reach. This dynamic works strongly in China's favor vis-à-vis its core strategic priorities, and conserves resources. Fundamentally different American and Chinese military approaches prevents simple comparison of their overall forces from explaining their relative capabilities regarding peacetime influence or operational scenarios where it matters most: the contested Yellow, East, and South China Seas and the airspace above them. The PLA has acquired growing numbers of increasingly-capable weapons with this geographically-proximate theater in mind, and is striving to strengthen its personnel's ability to wield them effectively to further its unresolved island and maritime claims there. Yet critical uncertainties remain concerning Beijing's capabilities and intentions, both today and in the future. This testimony will therefore address:

1. The nature and state of China's military finances
2. Sources of opportunity and competition among China's services and other national spending priorities
3. Factors affecting the trajectory of underlying economic growth, which funds PLA development
4. How Chinese military resources, spending, and results should be evaluated given Beijing's increasing but still-limited transparency

1. China's Military Finances

¹ The ideas expressed here are those of the author alone, and do not represent the policies or estimates of the U.S. Navy or any other U.S. government organization. They draw on Adam Liff and Andrew Erickson, "Demystifying China's Defence Spending: Less Mysterious in the Aggregate," *The China Quarterly* 216 (December 2013): 805-30; Erickson and Liff, "China's Military Development, Beyond the Numbers," *The Diplomat*, 12 March 2013; Erickson and Liff, "A Player, but No Superpower," *Foreign Policy*, 7 March 2013. The author thanks several reviewers for helpful suggestions.

Annual multibillion-dollar defense budget increases suggest strong Chinese interest in furthering core strategic objectives, with those closest geographically to China prioritized. Every March, China announces its official defense budget for the forthcoming fiscal year. Beijing's rapid rise in national power across the board, together with its limited willingness to release specifics concerning military spending, ensure that this event attracts considerable attention worldwide. This past March, China announced a 2013 defense budget of 720.2 billion yuan (roughly \$US114 billion). This continues a trend of double-digit spending increases in *nominal* terms since 1989 (2010 was the sole exception, perhaps because of priorities adjustment in the wake of the global financial crisis).

While China's official defense budget does not reflect all of China's defense-related spending, the same is true (albeit sometimes to a lesser degree) for all nations, including the United States. Typically sweeping in generality, official statements nevertheless reflect the basic reasons for increases in Chinese defense spending: to

- compensate for past austerity, including revenues lost when the PLA was largely removed from commercial business
- modernize China's military
- develop and deploy new platforms and weapons systems, particularly with anti-access/area denial (A2/AD) capabilities, all increasingly networked with information technologies
- support growing long-distance operations per "New Historical Missions"
- attract and retain qualified personnel, many of whom have more lucrative civil sector options
- afford increases in the price of goods and commodities
- improve management, accounting, and place more spending "on the books"

Even inflation-adjusted, however, the PLA budget's growth rate far exceeds those of Western militaries, including many of Washington's traditional allies. Their budgets are typically either stagnating (including that of the U.S., when war expenditures are factored out and recent spending limitations are factored in), or declining absolutely (as in most of Europe). The major exception is Japan, whose defense budget rose in 2013, for the first time in 11 years, at an extremely modest nominal growth rate of 0.8% compared to China's 10.7%.

China's rapid economic growth and technological development have also facilitated military spending far outpacing, and the acquisition of capabilities that are in most cases vastly superior to, those of China's neighbors. Association of Southeast Asian Nations (ASEAN) member states' defense spending is rising too, but from a far lower base. According to SIPRI, China's official nominal 2011 defense spending was 4.28 times greater than that of the ten ASEAN states combined, even though expenditures as a percentage of GDP were virtually equal.²

² Ron Matthews and Alma Lozano, "Evaluating Motivation and Performance in ASEAN Naval Acquisition Strategy," in Geoffrey Till and Jane Chan, eds., *Naval Modernisation in South-East Asia: Nature, Causes and Consequences* (New York: Routledge, 2014), 57.

There is no robust Chinese equivalent to America's growing debate today as to whether maintaining current defense spending levels should be a national priority given the opportunity costs. Instead, many Chinese support spending even more of Beijing's rising tax revenues on the PLA. They believe it can be augmented somewhat without harming China's rapid economic growth. In fact, military development is widely regarded as essential to furthering the Chinese leadership's nationalist objective of achieving the "great rejuvenation of the Chinese nation."

This already gives China sufficient funding to develop formidable military capabilities for use on its immediate periphery and in its general region, but not to develop a top-caliber globally-deployed force like that of the U.S. For navies in particular, attack is generally cheaper than defense. By largely, if decreasingly, focusing on potential conflicts in and over China's borders and immediate terrestrial and maritime periphery, the PLA has rapidly exploited its geographical proximity and the vulnerabilities of its potential adversaries' military technologies and force structures, potentially placing them on the costly end of a capabilities competition. This approach affords China asymmetric capabilities that are disproportionately efficient in asserting its interests, even though its overall defense spending still remains a distant second to America's. For instance, while it is difficult to determine the cost of a DF-21D anti-ship ballistic missile (ASBM), even many such missiles would likely be far cheaper than the U.S. aircraft carrier they are designed to disable. One Chinese source estimates the cost of the DF-21D and its launcher at \$5-10.5 million per unit.³ Based on this figure, Capt. Henry Hendrix, USN, emphasizes that even at an upper estimate of \$11 million, China could produce 1,227 DF-21Ds for the cost of a U.S. *Ford*-class carrier. Hendrix adds that only one ASBM would have to penetrate U.S. defenses to produce a mission kill, a prospect that could impose significant risk.⁴

By contrast, developing the capabilities necessary to project significant power and wage high- or even medium-intensity warfare further from China would require greatly-increased spending on new platforms, weapons, and supporting infrastructure; as well as enhanced training, operations, and maintenance. Such investments are likely to be increasingly inefficient, providing significantly less "bang" for a significantly larger "buck." Political capital would be vital to achieve and maintain overseas access. China currently lacks useful military allies (North Korea being the technical but burdensome exception), and its defense industry must produce the entire range of weapons and equipment that the PLA uses.

For the next few years, China's military spending appears likely to be economically-proportionate and hence sustainable. Even during particularly-rapid defense spending increases over the last ten years, official defense spending has remained relatively constant and low as a percentage of the overall economy, accounting for just 1.3-1.5 percent of GDP. Even calculating off high-end foreign estimates of China's actual military budgets yields estimates of only 2-3 percent of GDP. This is not only lower than U.S. defense spending as a percentage of GDP, it is also lower by several-fold than even the low-end estimates of the Soviet Union's unsustainable, consumer-sector-stifling defense spending in terms of GDP at the height of the Cold War.

³ Qiu Zhenwei and Long Haiyan, op. cit. "China's Anti-Ship Ballistic Missile Program: Checkmate for Taiwan?" *The Taiwan Link*, 17 June 2009, http://thetaiwanlink.blogspot.com/2009/06/chinas-anti-ship-ballistic-missile_17.html.

⁴ Henry Hendrix, *At What Cost a Carrier?* (Washington, DC: Center for a New American Security, March 2013), 8, http://www.cnas.org/files/documents/publications/CNAS%20Carrier_Hendrix_FINAL.pdf.

China's rate of official defense spending growth has been roughly on a par with GDP growth, remaining largely in single-digits when inflation is factored in. These parameters suggest that while core national defense objectives are secondary only to regime continuity and domestic stability in Beijing's priorities, marginal military developments beyond these foundational imperatives take a back seat to economic development. China's leaders have internalized Soviet lessons on the dangers of military over-prioritization and strategic overextension, and appear determined not to repeat them. Particularly since the 1980s, they have coordinated military spending with economic trends.

2. Prospects for Inter-Service Budget Competition

Unfortunately, no data concerning the actual breakdown of China's military budget by-service or within-service are presently available. But general prioritization and trends may be seen inductively from new Chinese hardware. What this all means in practice can be seen readily in Beijing's actual military developments since the late 1990s. China is developing a formidable set of military capabilities to ensure stability on its borders, and to attempt to shape territorial and maritime claims in its favor immediately beyond. It is pursuing an A2/AD-heavy approach by developing weapons systems and employment patterns designed to threaten foreign forces should they intervene in sensitive disputes on China's periphery. The goal is to deter such intervention in the first place and convince China's neighbors that they must settle disputes on Beijing's terms.

China is also developing power projection platforms such as aircraft carriers, and sending destroyers and frigates on naval diplomacy and non-traditional security missions, but these longer-range developments are happening gradually and do not represent high-end combat capabilities against another great power. Beijing can afford these efforts without making them the centerpiece of its investment.

China is thereby increasing emphasis on the roles, missions, and capabilities of the PLA Navy (PLAN), PLA Air Force (PLAAF), and Second Artillery Force (SAF), enhancing potential for inter-service rivalry. Growing Chinese external interests appear to be eroding the ground forces' still-preeminent power. Possible restructuring of the Military Regions—including reorientation in favor of a more outward-looking posture—appears to be under consideration, but doubtless faces considerable organizational complexity and resistance. The PLA has thus far declined to make a definitive announcement.⁵

As the ground forces gradually diminish in relative power, competition among the “three services and one branch”—a time-honored tradition in all militaries—will likely intensify. If defense spending increases slow down, or reverse, this will be even more severe. Each strives to develop in new domains, and can claim vital capabilities. With the most external geopolitical orientation and operations, the PLAN would seem—at least in theory—to have a strong claim to a growing piece of the budget pie. Moving from its current Near Seas-specific three-fleet structure, as some Chinese analysts have suggested, toward a two-ocean Pacific and Indian Ocean navy would demand more and better vessels. Yet the PLAAF is also striving to control

⁵ Tao Shelan, “Chinese Military Clarifies ‘The Establishment of a Joint Operational Command’: Unfounded], China News Network, 5 January 2014, http://news.cnr.cn/native/gd/201401/t20140105_514574004.shtml.

China's burgeoning military space assets, a circum-global capability vital to supporting information-age warfare. The SAF, since 1993, has assumed responsibility for both nuclear and conventional ballistic missiles and long-range, ground-launched land attack cruise missiles. Seven times more numerous than their nuclear counterparts, SAF conventional missiles represent one of China's most potent A2/AD capabilities. The SAF likewise seeks space responsibilities. Fielding a substantial operational nuclear ballistic missile submarine (SSBN) force might also generate friction between the PLAN and SAF.

3. Factors Affecting China's Economic and Military Funding Trajectories

One of the greatest challenges facing Xi Jinping and the economic reforms he envisions is that even as comprehensive implementation remains challenging over the next few years, larger structural factors are already beginning to slow China's economic growth overall. China's national power growth trajectory may be facing slowdown and dissipation. Beijing's leaders know *what* economic reforms are needed, but it remains unclear *how*, *when*, and *to what degree* they can actually *implement* them without assuming unacceptable political risks. This fundamental question remains unanswered.

The economic model that propelled China through three decades of meteoric growth appears unsustainable. China already suffers from acute domestic problems, including resource (water) constraints, environmental degradation, corruption, urban-rural division, and ethnic and religious unrest; these may grow further and be combined with looming demographic and gender imbalances to strain both China's economic development and internal stability. An additional risk factor is the global economy's potential to change (e.g., move away from concentrated, labor-intensive manufacturing) faster than China can adjust. These problems could combine with rising nationalism to motivate Chinese leaders to adopt more confrontational military approaches, particularly concerning unresolved claims in the Yellow, East, and South China Seas. Rather than portending an impending "collapse," however, these factors may herald China's version of the same slowdown in national trajectory that has afflicted great powers throughout history. This has direct implications for PLA development.

History suggests that great powers tend to follow an "S-curved" trajectory in which the very process of growth and development sows the seeds for its eventual abatement. Initial territorial and institutional consolidation and infrastructure development underwrites rapid growth, fueled by cheap labor and resources. Particularly impressive results may be achieved if the government promulgates and enforces effective policies in the right areas, and stays out of the way in other areas. Eventually, however, a wealthier society demands increases in wages and social spending. Improved living conditions and urbanization change social mores and individual priorities, thereby reducing birth rates while life spans lengthen and the elderly and infirm enjoy increasingly sophisticated, expensive healthcare. However morally desirable any of these trends may be, they all reduce economic and national power growth rates. Meanwhile, commitments abroad become unprofitable because of allied free-riding and collective action problems in public goods provision. GDP rarely falls in absolute terms, but growth levels out or at least slows.

While Beijing may have limited its foreign commitments for now—and even abandoned forms of foreign aid that were burdensome to an impoverished China during the Cold War—it may be

headed for rapid changes domestically. In fact, the unleashing of Chinese society in 1978 followed a century of foreign predation and internal turmoil, and three subsequent decades of abnormally constricted individual and economic possibilities. This terrible past may have disguised China's post-1978 economic boom—facilitated though it was by pragmatic policies and globalization—as a “new normal.” In fact, it is more likely an exceptionally-well-managed but unsustainable catch up period. Beijing's one-time opportunity to funnel this pent-up national potential has produced the seeds of impending slowdown: urbanization of unprecedented scale and rapidity, coupled with the world's greatest artificial demographic restriction (the “one child” policy) and dramatic internal disparities. These factors may now be sending China along the “S-curve” faster than any other major power has gone before. Any relaxation of the one child policy is probably too little, too late for averting demographic slowdown. A new Chinese Academy of Social Sciences report projects that by 2030, China will have world's highest proportion of people over 65, higher than even Japan.⁶ China is already approaching a labor shortage economy. A 2012 OECD report even forecasts that India and Indonesia will surpass China's growth rate by 2020.⁷ China may thus be further along the S-curve than many realize.

Can China achieve an economic rebalance to avoid the “middle-income trap” that typically plagues developing economies before S-curve factors develop overwhelming momentum of their own? It seems unlikely that the leadership's goal of transitioning to a domestic consumption-based economy sufficient to support a new growth model can be achieved. A true transition from government investment and manufacturing toward an innovative service economy would require reforms that vested interests—unusually potent given rapid resource-intensive development within a closed political system—are likely to block. Leaders are likely to view breaking this policy logjam as too politically risky, too close to home. The heart of the problem is that China's leaders know what they need to do from an economic standpoint, but cannot do it fully because this would undermine their authority. Faced with this dilemma, short-term stability to preserve existing power structures seems poised to prevail. Even the vigorous Xi Jinping is likely to muddle through some of the most difficult areas, leaving insufficient progress before S-curve slowdown factors become increasingly limiting.

Moreover, even if implemented with the greatest success conceivable, some of the key reforms that Xi is proposing—and many of those most likely to garner popular support sufficient for their successful implementation—can themselves strengthen potent S-curve headwinds, and will even accelerate and deepen their impact. Some challenges stem from societal patterns that the U.S. and other Western nations are already suffering from, and which even China cannot escape—and may well narrow the gap quickly, before China is well-prepared. An aging society with rising expectations, burdened with rates of chronic diseases exacerbated by sedentary lifestyles, will probably divert spending from both military development and the economic growth that sustains it. Expanding China's welfare state, in particular, will crowd out other forms of spending, yet the floodgates appear already to be opening.

⁶ China's Percentage of Elderly highest in 2030, *People's Daily*, 12 September 2010, <http://english.peopledaily.com.cn/90001/90776/90882/7137446.html>.

⁷ *Looking to 2060: Long-term Global Growth Prospects*, OECD Economic Policy Paper 3 (November 2012), <http://www.oecd.org/eco/outlook/2060%20policy%20paper%20FINAL.pdf>

One of China's greatest strengths in recent years has been its ability to allocate tremendous resources rapidly to programs for security, infrastructure, and technology development. Many of these programs are seen as extremely inefficient. As competition for resources intensifies, the leadership's ability to allocate increasingly scarce funds effectively will face unprecedented tests.

Domestic challenges may place increasing demands on, and funding claims by, China's internal security forces, whose official budget already exceeds the PLA's⁸ if funding for the paramilitary People's Armed Police is counted as internal (in keeping with China's own budget structure). Potential drivers include unrest in ethno-religiously-restive borderlands such as Xinjiang and Tibet as well as disaster relief, exacerbated by environmental degradation and climate change. Rising living costs and societal expectations may greatly increase the expense of current security approaches, which rely in part on large numbers of relatively low-paid individuals to provide physical security, surveillance, and monitoring of data from security cameras and other sources.

This has a special significance for China's ability to continue developing its external military capabilities. Beijing has judged that it can sustain multiple overlapping advanced programs simultaneously. China's shipbuilding industry—which, aside from its missile and electronics industries, produces China's most advanced indigenous defense products—has already proven able to do this with its simultaneous construction of multiple modern submarine and warship classes. Now China's military aviation industry, which has traditionally lagged, also appears to be making this important strategic breakthrough. In many key areas, China's number of multiple simultaneous programs is rivaled only by the U.S. But how long such dynamic investment can be sustained is unclear.

Within this larger context, manifold factors will likely increase costs and technological requirements and hence reduce the purchasing power of each yuan allocated to defense spending and restrain further budget growth and focus. These include:

- weapons systems and associated infrastructure, which are more expensive to build, operate, and maintain than their less-advanced predecessors
- investments in structural and organizational reform and associated demobilization costs
- rising salaries and benefits to attract, educate, train, and retain technologically-capable professionals
- growing entitlements, particularly as increasing numbers of retirees draw benefits

The closer the PLA approaches leading-edge capabilities, the more expensive and difficult it will be for it to advance further, or even to keep up with the general increase in global capabilities. China's cost advantages decrease as military equipment becomes less labor-intensive and more technology- and materials-intensive. The more sophisticated and technology-intensive PLA systems become, the less relative benefit China can derive from acquiring and indigenizing foreign technologies, and the less cost advantage it will have in producing and maintaining them.

Here China is on a demanding treadmill that has long bedeviled others developing advanced

⁸ Office of the Secretary of Defense (OSD), *Military and Security Developments Involving the People's Republic of China 2013*, Annual Report to Congress, 43, http://www.defense.gov/pubs/2013_china_report_final.pdf.

militaries. Maintaining a leading navy or air force, for instance, is increasingly expensive. Military shipbuilding cost escalation approximates that of other weapons systems, such as military aircraft, making this a revealing example.⁹ Cost control is complicated by relatively small production numbers in the best of cases and rising standards—today’s ships and the conditions under which they are produced and operated are far more sophisticated than their predecessors. In his classic treatise, Philip Pugh marshals considerable historical data to suggest that while countries tend to spend a constant percentage of their economy on defense over time, the cost of ships and weapons increases faster than inflation—typically at 9%. At 2% inflation, this would compound to costs doubling each decade. Pugh finds that even 2% per annum naval budget growth—excessively optimistic for most developed Western nations—would tend to require an annual average 3.5% reduction in fleet numbers. In practice, navies find ways to save costs and innovate (e.g., by shifting given missions to smaller platforms).¹⁰ In an example of its emphasis on civil-military integration, China is accomplishing just such a mission shift by strengthening its coast guard (consolidating its structure and increasing its size) and assigning it missions that PLAN forces had previously. Eventually, however, navies typically find that the cost growth challenge is constant and forces major numbers reductions over time.

A RAND study similarly concludes that the cost growth rate for U.S. Navy vessels over the past half century is 7-11%, with economy-related factors approximating inflation and customer-driven demands accounting for the remaining majority. Of these, ship weight, power density, and sophistication are the largest cost drivers.¹¹ In Pugh’s analysis, such dynamics make it essential to avoid the “Everest syndrome”—constant selection of the most advanced ship possible over a more conservative approach based on competition with actual adversary capabilities.¹² Mass production of the Type 056 *Jiangdao* corvette and Type 022 *Houbei* fast attack craft suggests Chinese avoidance of the “Everest syndrome” in pursuing proximate priorities thus far. A Chinese buildup of aircraft carriers and other large vessels, by contrast, could change that dynamic to Beijing’s detriment.

A combination of rapid GDP growth and shipbuilding prowess puts a country in an enviable sweet spot. Between the world wars, for instance, Japan’s rapid economic growth enabled it to bear ever-increasing ship development costs at a constant defense burden.¹³ World naval powers, including Holland, the UK, and the U.S., have likewise enjoyed such conditions in their years of rapid growth. Today China enjoys a similar combination of factors, but this is unlikely to last.

By developing and deploying advanced technologies, China is raising the bar for regional capabilities competition. An action-reaction cycle forces it to spend ever-more on more-advanced systems to narrow the gap with the U.S. and Japan and stay ahead of other regional rivals. Political scientist Minxin Pei warns that by pursuing gradualist, incomplete reforms,

⁹ Mark V. Arena et al., *Why Has the Cost of Navy Ships Risen? A Macroscopic Examination of the Trends in U.S. Naval Ship Costs over the Past Several Decades* (Santa Monica, CA: RAND, 2006), 20, http://www.rand.org/content/dam/rand/pubs/monographs/2006/RAND_MG484.pdf.

¹⁰ Philip Pugh, *The Cost of Seapower: The Influence of Money on Naval Affairs from 1815 to the Present Day* (London: Conway Maritime Press, 1986), 143-51, 272-77.

¹¹ Arena et al., xiv-xv, 22-49.

¹² Pugh, 316.

¹³ Pugh, 294.

Beijing risks a “trapped transition” instead of transformation into a full market economy. An analogous “trap” may also emerge for the PLA as it strives to transition from a homeland and periphery-focused, people-intensive, mechanized force into a broader-ranging, technology-intensive, information-enabled force. A slowdown in the PLA’s recently-rapid progress looms as fewer easy improvements remain available and the costs of advancement rise even as objectives grow more ambitious than ever.

In particular, by wielding asymmetric weapons, China suggests their efficacy and writes potential adversaries a potent playbook. This portends a new era in A2/AD systems, which Chinese forces themselves may face from other nations. Japan and Vietnam in particular may attempt to deploy missiles, naval mines, and torpedoes to complicate Chinese forces’ ability to prevail in conflict.¹⁴ While China can already exploit its geographical proximity to nearby conflict zones by deploying many overlapping forces to attempt to defeat and overwhelm such approaches, it is far from being able to defend its forces effectively if they face such challenges from a capable power further afield, e.g., India. The likelihood that the PLA will get “trapped” in its region with respect to high-end warfighting capabilities will increase still further if China’s growing military power and assertiveness leads its neighbors to accelerate nascent balancing against it.

To be sure, there are several important caveats to this larger analysis. First, there is a lag effect. Ships purchased on favorable terms today can benefit Beijing for years to come. China currently lacks the unstable business and vendor base of its Western shipbuilding counterparts, factors that increase costs. No other major shipbuilder appears poised to overtake it as the world’s foremost civil shipbuilder by volume, and it is working up the value chain in both military and civil domains. Yet history suggests that China will face difficult choices in the future, particularly as its economic growth slows. Throughout history, lower economic growth rates have tightened shipbuilding budgets, confronting navies with more difficult choices. Straight-line projections only last so long.

Second, slowdown could stimulate innovation. Today’s massive R&D coupled with tomorrow’s slowdown could generate revolutionary Chinese military capabilities that both surprise and challenge the U.S. China is presently investing in military R&D supported by an economy that grows fast enough to support the faster-than-inflation growth of military technology. S-curve factors are likely to render this unsustainable, eventually leaving China with an increased sense of its own capabilities, perhaps some form of overseas commitments (protecting citizens, property, and access to critical resources), and all of the problems maintaining forward military progress that presently plague the European and American militaries. At that point, China, seeking relief from the cost-compounding treadmill, may seek to field a radical, disruptive new capability to achieve its goals more efficiently. Such an approach already emerged at a lower level of Chinese capacity, when the 1999 Belgrade Embassy Bombing persuaded China’s leadership to fund “assassin’s mace” megaprojects to develop weapons of disproportionate effect like the ASBM. In addition to cost-curve dynamics, another similarity to 1930s Japan and today’s China is the extreme opacity of military-technological development. Pugh maintains that Japan’s Long Lance oxygen-driven torpedo was the single example of a major leapfrog

¹⁴ Jack McCaffrie, “Submarines for South-east Asia: A Major Step?” and Nguyen Hung Son, “Vietnam: A Case Study in Naval Modernization,” 29-50 and 121-34 respectively in Till and Chan, eds.

innovation that was kept confidential for a long time, possibly the only such example in all of naval history. But the U.S. government would be unwise to assume that it could never be surprised again.

4. Analytical Approaches to Limited Transparency

China has rightly been criticized for military opacity. Beijing maintains that transparency concerning strategic intentions is more important than transparency concerning specific capabilities at the operational and tactical levels. In that spirit, it does indeed make general statements that largely describe the trajectory and objectives of its military development. China's 2004 Defense White Paper offers an example: "The PLA will promote coordinated development of firepower, mobility and information capability, enhance the development of its operational strength with priority given to the Navy, Air Force and Second Artillery Force, and strengthen its comprehensive deterrence and warfighting capabilities."¹⁵ At the same time, however, Beijing makes categorical statements that may not remain true in the future ("China lacks overseas military bases") or are so vague ("China will never seek hegemony") as to avoid addressing other nations' concrete concerns.

Chinese media reports tend to summarily dismiss reasonable foreign (and some domestic) concerns about Beijing's limited defense spending transparency and rapid military development, failing to recognize both the potential threat that China's increasingly capable military poses to its neighbors and the fact that these neighbors have legitimate rights and interests of their own. Especially in the case of China's official mouthpieces, there is very little room for alternative views or expressions of concern about Beijing's actions and their external consequences; criticisms are routinely rejected as machinations of "anti-China" elements aimed at hyping a "China military threat theory" for craven motives.

As Chinese spokespeople correctly point out, there is no universal standard for military budget categorization or transparency. No nation's official defense budget contains all defense-related spending. Indeed, while China's falls far below typical standards of Western industrial democracies, there are many developing nations with similar lack of disclosure. At the margins, Beijing has increased transparency slightly over time concerning defense budget reporting. As in so many other areas of Chinese development, this progress is from a very low baseline.

However, observers increasingly state that, having the world's second largest defense budget, China is already in a very different category from the vast majority of nations—developing *and* developed—and should therefore be more forthcoming about its capabilities to address others' concerns. A good next step, in keeping with Beijing's emphasis on the UN's paramount importance, would be to move from submitting merely a Simplified Reporting Form to submitting a Standardized Reporting Form, as the U.S. and most other industrialized democracies already do.

Under such conditions, significant limitations remain concerning details about China's military spending and capabilities. It remains difficult to assess:

¹⁵ *China's National Defense in 2004* (Beijing: Information Office of the State Council, 2004), <http://www.china.org.cn/english/2004/Dec/116032.htm>.

- how much exactly China spends on its military, particularly in specific areas
- how far that money goes given China's lower cost structure
- what is the quality and performance of the resulting products

It is nevertheless possible to draw meaningful inferences from macro level data and strategic trends. Multiple factors suggest that China's official figures increasingly reflect its military spending. Numerous reforms in PLA professionalism and accounting have put an increasing portion of revenues and expenditures on the books. Yet the dearth of specific data disclosed by China's government leaves obtaining internal information by other means or inductive estimation as the only alternatives for determining the precise extent and nature of Chinese defense spending. Both these approaches are beyond the capacity of individual civilian researchers.

When China buys export weapons, associated literature usually offers some details, but especially as China invests in its own systems it is often difficult to understand what even China's well-known, obvious platforms are capable of doing at a meaningful level of specificity—a possible source of an American “Everest syndrome” in response. Numerous practical problems with using military equipment in the field are difficult to quantify for the military of any nation, including China's. Measuring the ability of a country to employ sophisticated equipment in a realistic, challenging environment necessitates estimation of effective capability—likewise difficult. Determining net capability by factoring in opposing systems is often impracticable using open sources, even with significant simplifying assumptions.

These limitations in available detail about both capabilities and funding make meaningful comparisons difficult. On the capabilities side, for instance, open sources indicate that the Type 093 nuclear-powered attack submarine (SSN) was launched in 2002, but still do not reveal how quiet it is or how well its sonar works—leaving little basis to compare it against advanced opposing systems.¹⁶

The best evidence of the tremendous challenges in this regard is the paucity of published studies in this field. Truly detailed, reliable inductive estimation has not even been achieved by research organizations capable of devoting multiple specialists to making relevant calculations. Even some of the most comprehensive, sophisticated efforts, by IISS and SIPRI, have yielded only general estimates.

A prime example of the barriers to inductive calculation that even capable organizations face can be found in the challenges of one of its most conceptually straightforward subcomponents: calculating the cost to China of producing a given platform or weapons system. Simply extrapolating from known rough equivalents in one's own country may not yield reliable results given China's very different, poorly understood, and possibly still-unsystematic input pricing. Then there is the question of whether, to what extent, and how to factor in purchasing power parity. As a result, truly intensive, systematic efforts may yield general cost estimates of some

¹⁶ “Shang Class (Type 093/093A),” *Jane's Fighting Ships*, 13 December 2013, www.janes.com.

platforms with commercial analogues (e.g., simpler surface ships), but not those with few commercial connections (e.g., missiles). Moreover, even achievement of a few rough estimates leaves vast areas uncovered, and the task of overall estimation unmanageable.

Specialists who have attempted such investigations suggest that one of the few reliable conclusions of their herculean efforts was that China enjoys great cost advantages in certain defense industrial areas (e.g., electronics, missiles, space, and shipbuilding; perhaps less so with aircraft), especially for capital costs like tooling. It may thus be able to afford tremendous armaments development even at its announced budgetary levels, though productivity and quality remain uncertain in many respects. For instance, AMI International estimates the “total acquisition cost” for a *Yuan*-class (041/039A) conventionally-powered submarine at US\$200 million and a *Jin*-class (094) SSBN at US\$1.3 billion. Yet it acknowledges that “a core assumption behind our estimate” is “that the Chinese are able to build their submarines at lower acquisition cost than comparable products from Europe (much less the United States). ... the Chinese have not stated or published their spending on submarines or any other naval platforms.” Specific factors include “lower cost of labor and materials in China, construction in state-owned shipyards, and use of systems and weapons developed ‘in house’ rather than more expensive sourcing from (foreign) commercial subcontractors....”¹⁷ Similarly uncertain estimates suggest that China’s J-10 fighter may cost roughly \$28 million per aircraft and the J-20 \$100 million per unit. If true, this would make them cheaper than more advanced American counterparts, but approaching similar Russian systems.¹⁸

As for other possible capabilities, China also has the potential to use autonomous underwater vehicles (AUVs) to conduct underwater wartime missions (cutting seabed cables, laying mines, and hunting submarines). Civilian AUVs rely on similar underlying technologies, and China is engaging in considerable research in this area.¹⁹ Even this discrete capability still defies accounting, however, as open sources offer insufficient details to permit an accurate cost assessment.

Yet it will also be important to examine the progression of China’s many simultaneous development programs through the end of their research, development, and acquisition cycles. China has many systems simultaneously in development (including the J-20 and J-31), but—particularly in the case of fighter aircraft—the rapidity with which they can transition to deployment with full operational capabilities remains to be seen.

Given these challenges faced by specialists, it is instructive to consider the foreign organization that combines the greatest capability to estimate the PLA’s budget with some ability to publish its findings: the U.S. Department of Defense. DoD’s estimate of China’s “total actual military-related spending” in relation to Beijing’s official figure fell from ~3.25 fold in 2002 to 1.43-2.14 fold in 2008 to 1.13-1.70 fold in 2011. While this ratio climbed back to 1.27-2.02 for 2012

¹⁷ Bob Nugent, “Naval Acquisition Trends in Asia,” in Till and Chan, eds., 14-28.

¹⁸ Gabe Collins and Andrew Erickson, “China’s Defense Spending Dilemma,” China Real Time Report, *Wall Street Journal*, <http://blogs.wsj.com/chinarealtime/2012/03/05/chinas-defense-spending-dilemma/>.

¹⁹ Lyle Goldstein and Shannon Knight, “Coming without Shadows, Leaving without Footprints,” U.S. Naval Institute *Proceedings* 136.4 (April 2010): 30-35, http://www.usni.org/magazines/proceedings/story.asp?STORY_ID=2311.

(\$135-215 billion vice the official \$106.7 billion), DoD acknowledges that “it is difficult to estimate actual PLA military expenses due to China’s poor accounting transparency and incomplete transition from a command economy.”²⁰

While DoD does not disclose its methodology or any related details, its estimates give strong reason to believe that China’s official budget does increasingly reflect defense-related spending. Together with adjusting for inflation, this suggests that China’s defense spending is:

- among the world’s highest, in both absolute and growth-rate terms
- increasingly “on the books”
- affording the PLA significant capabilities
- sustainable
- capable of being raised substantially in the near future if Beijing saw fit to do so

More specific information and evidence concerning categories of spending included in China’s official military budget would help better determine what proportion of spending it actually reflects. This could help reduce uncertainty about whether Beijing was effectively hiding a significant proportion of military spending. Budget breakdowns by-service and within-service would yield valuable indicators regarding PLA development priorities and capabilities.

Meanwhile, larger data points and dynamics concerning China’s hardware deployments, personnel structure, and national health and wealth offer useful indications concerning medium- and long-term trends. Here are the larger questions that must be answered accordingly:

- How long can China’s rapid growth last?
- During this time, how can the U.S. prevent China from using force, or the threat of force, to harm the regional status quo or the norms that sustain it?
- What capabilities and partnerships does the U.S. need to do so?
- How can Washington implement the most time-sensitive of these measures promptly?
- How can the U.S. demonstrate required presence credibly?
- How can the U.S. sustain necessary investment?

²⁰ OSD (2013), 45.

**OPENING STATEMENT OF JAMES LEWIS
SENIOR FELLOW AND DIRECTOR OF THE STRATEGIC TECHNOLOGIES
PROGRAM
CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES**

DR. LEWIS: Thank you, and I'd like to thank the Commission for this opportunity to testify on this topic, which is one I think we're all interested in.

China's economic model, as you heard, has until recently been the most successful in the world in terms of sustained development. The elements of that model are: heavy government investment in human capital and infrastructure; subsidies and non-tariff barriers to build national champions; weak regulatory barriers for business, in part because of corruption; flexible labor market; and the illicit acquisition of foreign technology.

In the next few years, as a result of this three-decade old program of economic model and economic growth, we will see world-class Chinese commercial products enter global markets. These will be offered at lower prices and sometimes supported by heavy government subsidies and non-tariff barriers to trade.

The Chinese are taking a similar model into the arms market. A decade ago, Chinese weapon systems were not globally competitive. This is changing as a result of sustained investment in R&D, not more than 30 years old, and sustained investment in acquisitions and a healthy dose of espionage. While most Chinese weapons are not yet as good as Western systems, they are good enough for many markets and will be priced significantly lower.

China has used this model--national champions with strong government support offering good-enough products at lower cost--to capture global markets in other industries.

We can assess the change in China's defense industrial base by looking at the areas that are crucial for building modern weapons: a strong R&D base; an ability to turn R&D into innovation and innovation into military products; integration and manufacturing skills; databases on weapons production--the historical experience of building weapons; access to a global supply chain for technology; advanced manufacturing technologies; and access to materials, sensors, software, microprocessors.

These are the things you need to build modern weapons. China has shown improvement in all of these areas, but the most important improvements are its increased ability to manufacture at a high level and its access to international sources of technology through both commercial channels and through espionage.

Except in a few areas, China's indigenous production capabilities are not yet sufficient to build modern weapons, but their manufacturing capabilities are not the obstacle to doing that anymore.

If we look at China's improvements in military aircraft as an

example, the combination of close relationships with commercial aircraft companies from all parts of the world, close commercial relationships with key arm suppliers in Russia, Israel and Europe, extensive industrial espionage, and improved manufacturing capabilities explain the improvement.

By manufacturing, we mean the ability to machine parts to improve the tolerance to make things that fit together. Before when you looked at Chinese aircraft, they had serious quality problems. Now, they don't, and that is a result largely of their work in the commercial avionics space.

Economic espionage in China began with their opening to the West. It moved into cyberspace about 15 years ago. China is the leading practitioner of economic espionage in the world, far and away more than any other country. Its cyber espionage efforts are accompanied by human collection, but over time the priorities have shifted from HUMINT to cyber espionage, and it's been a godsend to their modernization.

A Defense Science Board report identified systems compromised by Chinese espionage, including: Patriot missile; Terminal High Altitude Area Defense; Aegis ballistic missile; F/A-18 fighter; V-22 Osprey; Black Hawk helicopter; the F-35 Joint Strike fighter; and the Littoral Combat Ship.

This is not a complete list. These targets are interesting because if you think about air-sea battle, whether you believe it or not, these would be the systems that would give China an advantage in countering U.S. defenses as well as building their own industrial capabilities.

It's by no means a complete list. We've seen similar activities for air-to-air missiles, helicopters, submarine technologies, space sensors, and nuclear weapons technology.

The sanctions imposed on China after the Tiananmen massacre are less of an obstacle every year largely because they don't stop the sale of advanced commercial technologies, and so, in particular, European producers have classified an item as commercial rather than as ammunition, and that allows them to sell it, and they have made significant contributions, although less than Russia, to Chinese capability.

Many countries try to build arms and have tried to create their own domestic arms industry, and almost all of them have failed. But if a country is willing to spend billions of dollars for decades, and they're ruthless in acquiring technology, they can succeed, and that is the path China is on.

We need to recognize that as China's economy modernizes, as its ability to build world-class products improves, it will have a better defense industrial capability with or without foreign assistance, with or without espionage.

The problems for us are political, as this Commission very well knows. China could be rich and independent and powerful without being antagonistic, but this would require a significant change in the Party's thinking about international affairs. China does face the difficult transition,

but if you look at their history since the takeover of the Party, they have always been willing to create space and devote resources to building a strong defense industry. I don't think that will change no matter what happens.

With that, let me thank you, and I welcome your questions.

**PREPARED STATEMENT OF JAMES LEWIS
SENIOR FELLOW AND DIRECTOR OF THE STRATEGIC TECHNOLOGIES
PROGRAM
CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES**

Factors influencing the advancement of China's military technology

“Testimony before the U.S.-China Economic and Security Review Commission

James A. Lewis

Center for Strategic and International Studies

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In 1983, four Chinese scientists wrote to Deng Xiaoping, saying that China was far behind the West in technology and if it did not take steps to change this, China could find itself relegated permanently to a second class status. Deng's swift response led to the 863 program, the first of many government programs that invested to build Chinese science and technology base for both economic and military goals. Since the end of the Mao era, a central tenet of Chinese national security and economic policy has been to catch up to and perhaps surpass the West.

The components of this effort include sustained investment in research and education and, as part of the economic opening, heavy government investment in strategic industries, and a sustained effort to acquire western technology through means both licit and illicit. China's effort has had uneven success and the rate of return on the massive investment is low. Official statistics are misleading. China remains a net importer of advanced technology. But in the last few years there have been significant improvements and the trend is for these improvements to continue.

China's economic model has, until recently, been the most successful in the world in terms of sustained development. The elements of the Chinese economic model are:

- Heavy government investment in human capital and in infrastructure;
- Subsidies and non-tariff barriers first implemented to attract foreign investment and now used to build national champions
- Weak regulatory barriers to business activity (in part because of rampant corruption) and a flexible labor market;
- Illicit acquisition of foreign technology.

China's leaders want to move away from a dependence on foreign technology. They want China to become a leader in technological innovation. China has made immense investment in programs to build a strong science and technology base for China, but the illicit acquisition of technology remains a central element of China's economic policy, and the motive for long-running state-sponsored espionage programs targeting western firms and research centers.

Chinese companies have traditionally been competitive in producing low-value, labor-intensive goods but recent Five Year Plans have sought to move China “up the value chain” in manufacturing. Between 1995 and 2002, China doubled the percentage of its GDP invested in R&D, from 0.6 to 1.2 percent. China says that it intends to double the proportion of science spending devoted to basic research to about 20 percent of its science budget, in the next 10 years. China is becoming a center for research and development and is home to a skilled technology workforce.

To compare China and the U.S., China has engaged in a sustained investment in technology for thirty years while U.S. investments in science have too often come in fits and starts and been driven by fads. China’s policy to maintain and increase economic growth has many flaws, but at least they have one, and the contrast is beginning to tell. A centrally directed economy subject to heavy political interference can be remarkably inefficient in making investment decisions and in production, but China has compensated for this with heavy and sustained government spending to build capacity and by drawing upon an immense and underutilized talent pool.

China’s justification for evading its WTO agreements and engaging in a massive program to illicitly acquire western technology is that it is still a poor and developing economy, that the West owes it for the “Century of Humiliation,” and, reflecting Mao-era propaganda, that the U.S. is innately hostile, seeking to encircle China and thwart its growth in order to preserve American hegemon. None of these arguments make any sense, but in China’s closed political environment, these assertions will not be subject to scrutiny or debate.

Twenty years ago, China was unable to produce high quality weapons. This has changed, reflecting the larger improvement in Chinese manufacturing capabilities. The next decade will see world class Chinese products enter the global market. These will be high quality products offered at lower prices and sometimes supported by heavy government subsidies and by non-tariff barriers to trade. Unwillingness by Western countries to press China to comply with its WTO commitments creates an opportunity that China has been quick to seize, but even if it complied fully, Chinese firms would still be formidable competitors in a growing range of industries.

Even as late as a decade ago, most Chinese weapons systems were not globally competitive. But sustained investment in R&D and in defense acquisitions (along with a healthy dose of espionage) has changed this. While most Chinese weapons are not yet as good as top of the line western systems, they are good enough for many buyers and priced significantly lower. China has used this model – national champions with strong government support offering good-enough products at much lower cost - to capture global markets in other industries. China used to service the “bottom feeders” in the global arms market – countries that didn’t care about quality and mainly wanted low prices or countries whose ability to buy arms was constrained by international sanctions. This is changing as China’s weapons improve.

We can begin to assess China’s defensive industrial base by examining its performance and improvement in eight areas that are crucial for building modern weapons. These are:

- A strong R&D base, especially for basic research

- An ability to turn R&D into innovations and new products
- An ability to turn commercial innovation into military equipment
- Integration and manufacturing skills
- Databases and experience in weapons production
- Access to a robust national and international supply chain for components and technology
- Access to advanced technology for manufacturing, material, sensors, software, microprocessors and other advanced technologies.
- Doctrine and training to incorporate new technologies into military operations and benefitting from new technology.

China has shown improvement in all of these areas, but the most important factors for explaining China's improved weapons production are its improved manufacturing capability and its access to international sources for components and technology, through commercial channels and through espionage. It is the improvement in China's indigenous production capabilities in combination with access to foreign technology that drive the increased quality of Chinese products. Except in a few areas, such as missiles, Chinese indigenous applied research development capabilities are not yet sufficient to build modern weapons, but their manufacturing capabilities are no longer an obstacle to production. This reflects a larger trend in the Chinese economy, where Chinese companies that seek to compete in the global market have steadily improved and are likely to continue to do so.

Improved manufacturing quality results from a transfer of skills. Foreign Direct Investment (FDI) has been the largest source of technology transfer for China. When western aircraft companies create co-production facilities in China, they teach Chinese workers how to build planes to Western standards. This can include machining tolerances, quality of welds, and the general care taken in producing components and assembling them into an aircraft. Compare the Y-12 of the 1980s to the current Y-12F or to China's new ARJ21, which integrates components from more than a dozen western manufacturers. China does not yet have a fully indigenous capability to build modern aircraft - its struggles to build modern jet engines show this - but Foreign Direct Investment has helped to teach China to build to global standards.

A simplistic critique would attack this investment, but it is hard to see what a realistic alternative would have been for the U.S. and other nations. First, FDI has generated immense revenue for western countries. China's rise makes the world wealthier. Second, even if the U.S. had blocked FDI, other nations with advanced aircraft manufacturers would not. Finally, FDI was predicated on China becoming less hostile and playing by the rules of world trade as it was integrated into the global economy. How China will incorporate itself into international affairs and the role it will play remains an open question. While the trend is now unfavorable, this was not the case for most of the 1980s and 1990s.

Skills gained from manufacturing commercial aircraft can be transferred to building military aircraft. China's improvements in building military aircraft is reinforced by close commercial relationships with key arms suppliers in Russia, Israel and Europe. It is also accelerated by a program of intensive industrial espionage aimed at the U.S, Russia and European manufacturers. Russia sells advanced weaponry including fighter aircraft, and agreed to assembly in China. China has reverse-engineered these weapons. Israel provided advanced avionics and helped in

aircraft design. Transfers from both countries have taken place in fits and starts over the last twenty years, as Russia would contract exports over worries about building Chinese capabilities and as Israel responded to external pressure, but the overall effect has been to make a significant contribution to China's military aircraft production capabilities.

Russia's experience with the Sukhoi 27 is illustrative. Russia agreed to China assembling under license 200 SU-27s from kits. The price was reportedly \$2.5 billion. Halfway through project, China revealed a prototype named the J-11, which looks exactly like the Su-27. China claims the aircraft was developed indigenously, but Russia cancelled the assembly license. There are more recent reports that the Su-30 has also been copied. Russia also suspects that China's tank and conventional submarines are based on Russian designs. China is a multi-billion dollar customer for Russian arms, so despite their unhappiness over the Su-27, Russia agreed to resume sales of advanced weapons last year.

These commercial transfers have been reinforced by an energetic espionage program that began with China's economic opening to the West in the early 1980s and moved into cyberspace at least twelve years. There is often a lag between the loss of technology to China through espionage and the appearance of a competing weapon systems, and espionage is only a part of the China's larger effort to acquire technology and build advanced weapons, but an example of a sustained campaign might be China's acquisition of part of an F-117 stealth aircraft shot down by the Serbs in 1999, the hacking and exfiltration of important data from a U.S. military facility engaged in research on stealth aircraft in 2002, and the loss of F-35 technology from a contractor in 2007. These were accompanied by heavy investment in materials research and manufacturing and in aerospace research, but it is likely that it would have taken years longer for China to produce its own stealth fighter without its successful and targeted espionage campaign.

Technological espionage has carried over into cyberspace, as the Chinese discovered that the internet gave them unparalleled access to poorly secured western networks. Cyber-espionage has given China access to defense-industrial databases. These databases provide the historic experience of building weapons. Databases on past programs would show design changes, modifications, how production problems were overcome, and testing results. Since many of these data bases are stored digitally, cyber espionage has given China access to them. The value of access to databases is increased as China acquired the know-how through co-production and education, creating the human capital that can understand and take advantage of data. .

Cyber espionage has been and continues to be a godsend to China's economic and technological modernization. For military equipment, a 2012 Defense Science Board report identified a range of systems as compromised by Chinese espionage. These included the PAC-3 Patriot missile system, Terminal High Altitude Area Defense (THAAD); the Aegis ballistic-missile defense system, the F/A-18 fighter jet, the V-22 Osprey, the Black Hawk helicopter, the F-35 Joint Strike fighter and the Littoral Combat Ship (LCS). These targets not only improved China's own manufacturing capabilities, but provided it insight into air and air defense systems most likely to be used in combat at maritime and air combat and allowed China to try to develop countermeasures to evade or defeat US missile and air defense.

This is by no means complete list. China duplicates this pattern of sustained investment, external sources for technology, and espionage in building other weapons systems. There are reports of successful efforts to acquire technology related to air-to-air missiles, helicopters, submarine technologies, sensors and nuclear weapons. Cyber espionage is accompanied by collection

efforts by human agents, both in China and in other countries, but over time the most rewarding collection programs have shifted from human agents targeting western facilities located in China to cyber espionage. Military, research and economic policy making bodies can task collection. China is reportedly moving to centralize tasking procedures. There appears to be a limited correlation between goals set in the Five year plans and espionage targets.

China is a leading global practitioner (although by no means the only practitioner) of cyber espionage, but its forte is economic espionage. Chinese government agencies, companies, and individuals use cyberspace to illicitly acquire technology or gain business advantage. The head of the British Security Service warned companies that hacking is a routine business practice in China.²¹ China's cyber espionage efforts combine official programs with coordination of efforts of individuals, companies, and civil agencies as collectors. This broad, diffuse, cyber espionage collection program reflects China's approach to intelligence collection – instead of relying on officers operating under official cover, China uses what has been described as “a thousand grains of sand,” where businessmen, researchers or students are asked to collect information when they visit another country.²²

Chinese companies are as much a target for cyber espionage by Chinese hackers as firms in other countries.²³ Economic espionage reflects deep political and perhaps cultural issues as well as entrenched economic interests. Some Chinese hacker groups, including groups affiliated with the PLA, will carry out their official missions during the day and then hack for profit at night. Other official hacking groups will come across commercially valuable information as they carry out their official espionage tasks, take it, and then sell it for a personal profit to Chinese firms. Economic espionage is a money making activity for the PLA and this will only increase the difficulty of bringing it under control.

There is a growing realization in parts of the Chinese government that the lack of strong IP protections does serious damage to China's ability to innovate. Stealing western technology compensates for this inability to create, but it also reinforces the trends that harm China's own efforts to expand innovation. The government recognizes that piracy and weak IP protection undercut indigenous innovation, but is unsure how to proceed. This ambivalence is at the core of one of China's largest policy problems – move closer to global or western standards or impose a national approach that benefits China (and the Party). A decision by China's leaders on cyber espionage is complicated by implications for domestic politics. A misstep could damage support for the regime. The touchstone that guides China's policy decision is whether something produces the continued fast growth that the leadership believes is crucial for domestic stability and their political survival.

²¹ Times of London, “Jonathan Evans alert on China's cyber spying,” December 1, 2007

http://business.timesonline.co.uk/tol/business/industry_sectors/technology/article2980250.ece

²² See, for example: Northrop Grumman Corporation, “Capability of the People's Republic of China to Conduct Cyber Warfare and Computer Network Exploitation,” http://www.uscc.gov/researchpapers/2009/NorthropGrumman_PRC_Cyber_Paper_FINAL_Approved%20Report_16Oct2009.pdf

²³ Office of the National Counterintelligence Executive, “Foreign Spies Stealing US Economic Secrets in Cyberspace,” October 2011, http://www.dni.gov/reports/20111103_report_fecie.pdf

No one can object to a country trying to increase its innovative capabilities or research productivity, but it is the methods China uses that are a problem. In addition to investment in science and engineering, China aggressively pursues illicit technology transfer and intervenes to support Chinese firms against foreign competitors. Illicit acquisition of foreign technology has been promoted by the government policy since China opened its economy, but it also reflects societal attitudes towards intellectual property. One reason China does not have a strong domestic software industry, for example, is that no Chinese company can survive the wholesale pirating of its products.

Cyber espionage is best seen as the leading component of a larger economic espionage effort. China's decision to open its economy in the 1980s included instructions to make technology transfer to Chinese partners a part of every major business negotiation. In a discussion in June of last year in Beijing, a US official said that espionage for national security purposes was a legitimate activity for great powers like the U.S. and China, but that economic espionage was not, and should stop. A PLA officer responded that for China, economic growth and building China's technological base were national security issues, and therefore justified.

Other Asian countries have used similar policies to quickly upgrade their industries, but usually brought their policies into line with global IP protection norms within two or three decades. China does not seem to be making this transition, for reasons of both domestic political and international strategy. Technology transfer to China that expanded China's productive capabilities would be in the West's interest if China protected intellectual property protections and if important segment of China's decision making elite, including in particular the PLA, were not so antagonistic.

Espionage reinforces and accelerates the improvement of China's manufacturing capabilities. But even without espionage, China would develop advanced manufacturing capabilities. Espionage may even retard the development of indigenous capabilities to a degree, by discouraging IP creation. If China had not illicitly acquired technology, its national income would have probably recovered as quickly in the Post-Mao recovery, but it would not have made the strides towards technological parity with the west its leaders wanted for reasons of prestige and defense. The effect of illicit acquisitions has been to accelerate technological improvement and increase China's international competitiveness. The argument that the U.S. engages in similar activities in the 19th century is simply a distortion of history.

For defense industries, the combination of sustained investment and foreign technology inputs has significantly improved China's arms production capabilities, moving it from building museum pieces to modern weaponry that in some categories is as good or almost as good as western arms. The sanctions on arms exports imposed after the Tiananmen massacre pose less of an obstacle to China's defense industrial improvements very year. China continues to object to them and would be willing to buy Europeans weapons ((opening up the possibility of reverse engineering. European manufacturers know that China has become one of the largest arms importers in the world. But the most important reason that Tiananmen sanctions have less effect is that they do not stop the sale of advanced commercial technologies than can contribute to military production.

Many countries have tried to build advanced arms and failed. It is not an easy task. But if a country is willing to spend billions of dollars for decades and is ruthless in acquiring technology, it can succeed. Of all the developing countries, China is the only one to show signs of succeeding. This is perhaps a legacy of the Party's Leninist inheritance and the priority Lenin gave to defense production. But we need to recognize that as China's economy modernizes, so will its defense industrial capabilities, with or without foreign assistance or Chinese espionage.

China will not change its behavior until there are threats and penalties. Congress can create these. There are few rewards left to give, perhaps the only one is formal recognition of market economy status, which should not be granted until there has been significant progress in reducing economic espionage. Congressional action to compensate for China's growing defense production capabilities could occur in four areas.

- Congress could look for ways to make the U.S. a more business friendly environment. rationalizing the tax code, controlling non-discretionary spending, and streamlining regulatory burdens.
- Congress could create incentives and penalties to encourage American companies to increase their network defenses. DOD has begun to do this using its contracting authorities.
- Congress could provide sustained funding for the hard sciences, and for science and engineering education at the undergraduate and graduate level. It sometimes appears that Americans have forgotten the central role defense R&D played in American economic growth from 1950 to 1990.
- Congress and the Administration need to take steps to reduce economic espionage. The argument that the Snowden leaks create parity between the US and China is ridiculous, like saying that U.S. spying on political and military targets in China justifies the PLA pillaging our industries. China will use Snowden leaks for political advantage, but since they already assumed we were spying on them the leaks had little effect on their actual policies or negotiating positions. The best strategy would be multilateral, with many countries giving Beijing the same message: this not responsible state behavior.

U.S. policy is to encourage competition in global markets, and China as an economic competitor is a welcome addition to the global economy. Where our policies erred was in assuming that China would follow international practice in trade and that it would become a partner rather than a potential military opponent. Chinese leaders are ambivalent about their relation with the U.S. If we just had to deal with Chinese industry and economic policy-makers, the only real issue would be winning greater compliance with WTO commitments and ensuring fair conditions for competition, but they are not the drivers of Chinese policy and the PLA remains insular and deeply hostile. China can be independent, rich and powerful without being antagonistic, but this would require significant change in the Party's thinking about international affairs. A renewed U.S. partnership with China remains possible, but will require energetic and assertive diplomacy.

Yuan Shikia, the Qing General who overthrew the last Chinese emperor in 1912, said that the way to restore China's prestige and power was to build "a wealthy nation and a strong army." This is something that China's current

leaders could easily agree with. China has been able to close the technology gap much more rapidly than expected. Where does this leave us? In the near term, illicit acquisition of technology China is better able to make use of the technology it acquires through purchase of illicitly. China's own R&D capacity is improving as a result of sustained investment. Cyber espionage against technology and commercial targets is unabated. And in the long term, China's commercial growth will continue to drive improvement in manufacturing capabilities that will improve the defense industrial base.

PANEL II QUESTION AND ANSWER

HEARING CO-CHAIR TOBIN: Thank you both. Let's first hear Commissioner Dr. Wortzel.

COMMISSIONER WORTZEL: Okay. Good seeing both of you here. Thanks for the testimony.

Andrew, on page one of your testimony, you talk about the "New Historic Missions." What potential changes do you detect to Hu Jintao's historic missions or the military strategic guidelines in Xi Jinping's speeches to date, and particularly the one to the last Plenary session?

And Jim, you have kind of an interesting set of phrases about indigenous innovation. So what would you describe as examples of Chinese indigenous innovation in the commercial and the military field as opposed to new systems acquired by theft or reverse engineering?

DR. ERICKSON: Commissioner Wortzel, thank you for that very important question. This is something we need to keep our eyes on.

I think it's still early to deliver a decisive answer on that. I don't think Xi Jinping has conclusively articulated a decisively new vision for the PLA. If I had to interpret at this point where things might head, I detect in some of his language a greater focus on specific military capabilities, specific war fighting capabilities.

I think right now the PLA is funded to be able to continue to pursue the "New Historic Missions" together with a laser-like focus on high-end capabilities for the core interests that matter most to China from its perspective and hence what it most wants to have: deterrence and peacetime influence and, in a worst case scenario, wartime capabilities.

I think we need to watch for signs of some of the new historic-type missions, such as humanitarian assistance and disaster relief, being deprioritized. I don't see evidence of that yet, but that would be an interesting indicator.

I don't think we can see that from the example of the Philippines aid situation, where it was delayed. I suspect that was specific to relations with the Philippines wherein it was awkward to criticize the Philippines strongly for territorial dispute reasons in China's official media, and then it would be too difficult to have an about-face rapidly and say, "oh, but the Philippines deserve the greatest sympathy, and here's an immediate large amount of aid" even while parts of China remain poor.

I think one factor to look at would be anti-piracy and so-called

"far seas," distant water operations, particularly if and at what time the Gulf of Aden operations wind down. This past December 26 marked the fifth year official Chinese sources have stated that China is committed to supporting, among other things, through the U.N., anti-piracy operations in the Gulf of Aden through this November, I believe, but there have been widespread statements not only among Chinese military analysts but also even such officials as General Chen Bingde about the ongoing costs of these missions.

So I think we don't have enough data points to answer that important question fully yet, but some interesting data points may come on line in the coming months.

DR. LEWIS: Thank you.

So the indigenous innovation effort, I think we could largely classify as a failure, a nice try, but it didn't work. That said, there are places where two years ago I would have said the Chinese hadn't shown any ability to innovate; I would not say that anymore.

If you look at some of their IT companies, in particular in the IT sector, you could see innovation. Companies that previously relied on commercial espionage now are capable of making their own products that are relatively good.

On the military side, I'd still look at medium-range ballistic missiles as a place where they've put tremendous effort over the years and now have good products of indigenous design.

About six months ago, I went to an Internet conference in China. It was different because it wasn't government sponsored. All the people in the room could have been picked up and dropped into Silicon Valley without any problem. They were all in t-shirts and jeans and running shoes and they had backpacks. They looked like Californians; right. And you have this thriving community that has been able to create some products that actually outpace American products.

They have a social network product that's probably better than some of ours so that community is a source of innovation. The problem, of course, for the Chinese is the political obstacles that still hamper their ability to achieve their goal of creating high-tech innovation, innovative economy.

They know this. It's taboo to talk about it, but if you have a very constraining political environment, doesn't that have an effect on your ability to create new products? The answer is yes. They don't know how to fix that.

Weak IP protections hamper innovation. They know that. Very difficult for the government to change the culture that does not respect IP. So even if they wanted to, and sometimes I think they do, they would face immense problems.

The positive sign in this is, as we all know, the place that builds the stuff is more likely to come up with the innovations. So, increasingly, as China improves its manufacturing capability and builds higher-end products, they will see the kind of near-range innovations that people who aren't

building the product will not capture.

So this year, I think largely because of this community outside of the official structure, you're seeing strong innovative capabilities, and the difficulty for China will be, as I think Dr. Erickson said, being able to capture the benefits of an increasingly robust commercial sector without making tracking political changes.

COMMISSIONER WORTZEL: Thank you.

HEARING CO-CHAIR TOBIN: Commissioner Wessel.

COMMISSIONER WESSEL: Thank you, gentlemen, for being here.

I'd like to pursue a line of questioning around the question of cyber incursions, espionage, et cetera. Dr. Erickson, you gave estimates about the defense budget, and I would like to know if you have any estimate of what costs they have been able to save in terms of development by being able to target weapons systems, technologies, et cetera, denial, all of that? Number one.

Number two, and for both the witnesses, I followed the cyber debate quite closely. Since the Snowden affair, we have had a change in the debate that I think is fairly dramatic. So I'd like your assessment of what impact that has had on our ability to raise the cyber espionage issues? And some think, or state, that the U.S. doesn't have clean hands. I think we do things differently. That's a separate debate.

And in light of the fact that the U.S. is now seeking to accelerate Chinese investment in the United States, what kind of exposure might we have? What are the cyber espionage capabilities and opportunities for China going forward?

DR. ERICKSON: Let me make some brief general comments, and then cede the balance of my time to Dr. Lewis, who is a cyber expert.

I think when we are trying to calculate or at least get a rough sense of how much China can take advantage of a certain area of capabilities, perhaps even in a cost-saving or cost-efficient manner, it helps to break that down and divide it into different sub-areas.

So potentially China can save the most and get the most advantage when it's using its own labor, when it's not necessary to import--at least commercially--a large number of foreign technologies, and potentially a lot of the work in the cyber dimension, I think, falls toward the end of the spectrum of offering great opportunities in those areas.

So there would be no surprise to me if China were pursuing this quite aggressively, and it appears to be the case from everything that I am able to read.

One other note on reciprocity, and I know the Commission continues to look very closely at Chinese investments in the United States, and I think it's very correct for that to be under very close examination. I think the theme of reciprocity has not come up sufficiently. Certainly for specialists and experts in this room, it comes up, but I still don't think it comes up in the overall discussion and policy debate sufficiently.

Looking back, for example, to the Unocal situation, I don't think there was enough discussion of the fact that no equivalent purchase would be possible from an American firm or an American interest going into China. So particularly as China becomes more involved, Chinese entities become more vigorous in their efforts to invest in the U.S.--and indeed when safe and appropriate, that can be beneficial for the U.S. economy--I think not only does this merit continued close scrutiny, but also the constant theme of reciprocity. It needs to be a two-way street, and China needs to make its offerings and openings in correspondence with those of the U.S.

COMMISSIONER WESSEL: Just as a note on that, before you go, Dr. Lewis, I'm sure you're aware that we're now negotiating a bilateral investment treaty with China so the issues you're raising I think are going to be front and center. It hasn't received much attention lately, but both for the economic and security-related issues of investment, that's I think on this year's plate that we need to spend a good bit of time on.

Dr. Lewis.

DR. LEWIS: One of the problems we've had over the years is that we tend to negotiate trade agreements that are very beneficial to companies and countries and forget about some of the security issues, and the classic example, of course, is Russia where we ultimately acceded to their accession to the WTO without ever mentioning the fact that they're the world's leaders in cyber crime.

That was a huge error. Hopefully, we won't repeat it in this one. I wouldn't take any bets on that though.

I'm going to give you a number. I'm making it up as we go along. We did a study last year that estimated the losses to the U.S. of about \$100 billion through cyber crime and espionage. Perhaps 60 billion of that is the theft of intellectual property. China is probably responsible for 40 percent of the economic espionage in cyberspace so that would give you somewhere in the range of 20 to \$25 billion in both commercial and military gain for them.

I say that with all the caveats, is that I did it right here on the paper, and so it doesn't--it will need additional scrutiny.

One thing to bear in mind is as China's manufacturing abilities improve, they will be able to get greater advantage from the technology they take. So right now if you steal a billion dollars' worth of IP, you might only be able to monetize 100 million of it; right. And as your ability to manufacture improves, that will change. That is the trajectory we're on.

The effects of the Snowden thing are largely miscast in the press. I often wonder how is it that people come to these conclusions without actually talking to foreigners. Some of us would say that would be a drawback, but apparently it's not. So I do talk to foreigners. For example, I talked to the European Commission Office here in Washington today on exactly this subject. I've also talked to Chinese officials, German officials.

Where are we? So with China, it really hasn't changed the landscape that much. They always assumed we were doing this. You know,

it's like "so what?" And that's what I've asked them flat out, and they said we always knew you were doing this; right. So has it changed their interests? Has it changed the obstacles to reaching agreement with them? Not really.

They will look to see if they can exploit the Snowden revelations for political advantage. Where they want agreement is they want to reduce military risk in cyberspace. They are not interested in reducing economic espionage absent significant U.S. pressure. The issue here might be, does the administration feel hampered in any way?

In Europe, mixed reactions. The public is more upset by Snowden than officials. The key here is Germany, and again Snowden really hasn't changed that much. Before Snowden, the Germans opposed taking strong measures against Chinese economic espionage; right. They did that because in the middle of a European crisis when China was their biggest market, they could not afford to damage that relationship when they were holding up the entire rest of the continent. Perfectly reasonable position. It hasn't really changed.

You could look at places like Brazil, and say, okay, the Brazilians are energized and activated as a result of Snowden. I'm willing to accept that risk. I expect the government is as well.

So you'd really want to look at very limited set of changes as a result of Snowden. What I hope is that we don't talk ourselves into surrendering; right. And so you have a lot of commentary that says the U.S. is at a disadvantage. There is no evidence of that other than one or two countries. But if we come to believe it--

COMMISSIONER WESSEL: Well, in a follow-up line of questioning, I think we have a self-imposed disadvantage, not from our trading partners. But we'll do that later.

HEARING CO-CHAIR TOBIN: Commissioner Slane.

COMMISSIONER SLANE: Thank you both for coming. It's been very, very helpful.

Dr. Lewis, in your written statement to us, you talk about the ability to turn commercial innovation into military equipment. And I'm just wondering with the issue of forced technology transfer and all of the technology that Boeing, General Electric and others have turned over to the Chinese, how you're feeling on how that has helped them on the military side?

DR. LEWIS: There is no doubt that the decision to force technology transfer from Western companies is one of the core elements of China's success. And the Chinese will, at least in private, admit that.

I think that it's not just U.S. companies that I would focus on, and in some ways, it's Russian, European and Israeli companies that have done far more.

If you took U.S. companies entirely out of the equation, it wouldn't affect their military programs that much. The submarines use European technology; the aircraft use Russian technology. So the larger

sense of extracting technology from companies has contributed significantly. I'm not sure it's the U.S. side as well. It's more the other countries that have really improved their military capabilities.

COMMISSIONER SLANE: Dr. Erickson, anything to add?

DR. ERICKSON: I would add, Commissioner, that I think we really need to see in more depth how this plays out through China's research, development and acquisition process.

As I mentioned in my written remarks, there are a number of programs now, particularly in the military aviation industry, where there's a lot going on, but the final output is very unclear, and I think we'll have some indications over the next few years how effective they are in transforming these technologies that they're acquiring and developing on their own and integrating into actually a fully-fielded, full operational capability product. So a lot of strengths there, but for final outputs still some complexities, I think.

COMMISSIONER SLANE: You know it's interesting because the pressure that's put on these companies because the market is so enormous. It just seems to me that it's a very short step from commercial improvements to fighter planes and other military improvements.

And it sounds like, Dr. Lewis, you're more worried about the Russians and the Israelis and Europeans than our companies.

DR. LEWIS: [Nods affirmatively.]

COMMISSIONER SLANE: Thank you very much.

HEARING CO-CHAIR TOBIN: Vice Chairman Reinsch.

VICE CHAIRMAN REINSCH: Thank you.

Jim, when you began, you mentioned the likely imminent arrival of Chinese commercial products that are world-class. Can you mention what some of those might be?

DR. LEWIS: Telecom, white goods, automobiles, Internet services. Give me a minute. I think that's a good start. How about there?

VICE CHAIRMAN REINSCH: What about commercial aircraft?

DR. LEWIS: That's where this is exactly the trend you're talking about, and I would look at the work. So the Chinese would say, you know, you want me to buy your airplane; you have to build part of it here; right. That's a technology transfer because you're showing Chinese workers how to build to Western standards.

And in my written testimony, I talked about their old airplane, the Y-12, which was always a perilous adventure because of the uneven manufacturing quality. Still dilemmas there for the Chinese, but they've learned how to build stuff to Western standards more than technology, and that's where I would look.

Their regional jet, again, it's the combination of things: partnership with a Western company or with two Western companies; improved manufacturing capabilities; and then I would look for some kind of both subsidies for foreign sales and some sort of restrictions on Western competitors to selling to the China market. So that's probably the path we're

on. Same path for other technologies.

VICE CHAIRMAN REINSCH: This is a bit of a digression, but I want to pursue one more thing. The path you are charting is very, very similar to what the Japanese tried to do in the '70s, '80s and '90s, which hasn't panned out. But I take it you believe that the Chinese will be more successful.

DR. LEWIS: My colleague will probably want to chime in on that as well. The key difference is the Japanese were not antagonistic, and the Chinese are; right. So seeing Japan's economy develop and modernize is different than seeing Chinese--

VICE CHAIRMAN REINSCH: Yes, but why would being antagonistic make them more successful?

DR. LEWIS: A little more commitment. I don't think they've had to worry about some of the issues that the Japanese have to worry about in terms of domestic politics. They will plateau, and so I think we probably both agree on that. They're approaching the moment of plateau, but it will be a much higher level than it was ten years ago.

VICE CHAIRMAN REINSCH: Andrew, do you want to make a brief comment because I've got one more for Jim as well?

DR. ERICKSON: I would just add to that I think we really need to look sector by sector, and then within the sector, system by system and sometimes components. I think on the military side as well as on the commercial side, there's a hierarchy. Some sectors are much more advanced than others, whether it's--at the top-end--missiles, some aspects of defense electronics, some parts of shipbuilding.

But then when we look at aviation, including on the commercial side, there are still tremendous problems with the jet engines. So getting to aviation a little bit more specifically, I would have no hesitation about flying on a Chinese commercial aircraft in the near future; however, as an airline, I might be very skeptical of the long-term costs of operating it. I don't think China has proven itself there yet.

VICE CHAIRMAN REINSCH: Thank you on that.

Jim, a few years ago, we commissioned a study and then had testimony from Danny Breznitz, I believe, about innovation in China, and one of the things I recall him doing was drawing a distinction essentially between incremental design improvements, sort of internal changes to make the thing work better, faster, whatever it needed to do, versus the creation de novo of new products, new technologies, and arguing that the Chinese were very, very good at the former, not so good at the latter.

And I guess the question for you, Jim, is (a) do you think that's correct still, because this was awhile back; (b) is that weakness, if it is a weakness, something that can be overcome by theft, or is it a larger problem?

DR. LEWIS: That's the intent of the theft is to overcome weaknesses in these areas. I still think it's a correct way to describe the situation. What concerns me is not that the Chinese aren't particularly good at the new innovations. What concerns me is that we're slowing down. So

it's not that China is speeding up as much as it is that we're slowing down, and that's why they're getting closer.

But the whole idea behind the economic espionage is to compensate for weaknesses in their own technological and research base.

VICE CHAIRMAN REINSCH: Okay. I've got some more, but my time is up. Thanks.

HEARING CO-CHAIR TOBIN: We'll probably have a second round.

VICE CHAIRMAN REINSCH: Put me down then.

HEARING CO-CHAIR TOBIN: So hold that question.

Senator Talent.

HEARING CO-CHAIR TALENT: Thank you. Dr. Lewis, I really appreciated your language about cyber espionage, well, appreciated the elegance of the language, "cyber espionage has been and continues to be a godsend."

So I'm just--for the record then--I mean we have the previous panel testified, as you gentlemen know, that the Chinese have been engaged in a systematic military build-up, and it has narrowed the gap between their capabilities and ours and empowered them. So you're saying that they could not have achieved that without stealing American technology, at least not in the time frame in which they've done it?

DR. LEWIS: No. Unfortunately, I think they could have achieved it, but it would have taken longer.

HEARING CO-CHAIR TALENT: A lot longer.

DR. LEWIS: Yes.

HEARING CO-CHAIR TALENT: So within this time frame, they had to do that--

DR. LEWIS: Yes.

HEARING CO-CHAIR TALENT: --to get the technology.

DR. LEWIS: And when they run into problems, they look at a global market and take from whoever has the solution, but they would have been able to make significant progress in naval and air forces, at least, without any contribution from the U.S.

HEARING CO-CHAIR TALENT: Right.

Now, I want to go in one other area. In the course of acquiring this technology, and we're aware of what they've done with regard to our defense contractors, can you talk a little bit about the battlefield advantage that that might give them in terms of having already, if you will, reconnoitered our systems and so therefore being aware of vulnerabilities, weaknesses, strengths, et cetera? This is for either or both.

DR. ERICKSON: Senator, I think that's an excellent point. The acute familiarity with at least many of the technical aspects of foreign systems, to include U.S. systems, is a huge advantage.

I think an advantage, but with some complexity, is this rapid assimilation of foreign technology, or at least attempted assimilation. In some cases, I think it has led to a hodgepodge of different systems that

they're trying to integrate together. I think they have become better at that, particularly as more of their indigenous inputs come on line and come into the mix.

But again I think that's why it's also essential to look across the research, development and acquisition process.

The harvesting is clearly immense. The appetite is huge. There is a lot of eating here. The digestion is more complex. Now, make no mistake, the overall defense industrial base is so large and capable in aggregate that there's a lot going on, and it is increasing the PLA's capabilities significantly.

But to understand the nuances of how that actually plays out in practice, I still think we need to look at some of the details, and some of the details are not always an unalloyed good for them.

DR. LEWIS: You know having the technology is one, and I think as we both said, you need doctrine and training to go behind it. So on that aspect, their doctrine and training still lags behind, and they know that. They're taking steps, but it will be awhile.

The second and more specific point is that software probably makes up 30 to 40 percent of the cost of any new weapon system. Most modern weapons wouldn't work without software. If you could get in and monkey with that software, that could give you a real advantage, and so, of course, everybody is trying to do that.

The list of systems I named, if you could degrade the ability of say the Patriot to defend against incoming missiles, that would give you an advantage. So I think there are two tracks here: there's the long-term effort to build a robust conventional capability; and there's an immediate effort to gain asymmetric advantage by interfering with command and control weapons operation.

HEARING CO-CHAIR TOBIN: On that last point, I'll come back with a question later, but let's first hear from Senator Goodwin, please.

COMMISSIONER GOODWIN: Thank you, Madam Chair.

I would speculate that voluntary transfers of technology have also played a large role in China's efforts to modernize. So I'd like to talk a little bit and get your thoughts about the embargoes that were put in place following Tiananmen in 1989 and explore specifically what did those embargoes, both by the United States and the European Union, explicitly prohibit and restrict and how perhaps our interpretation or our allies-in-Europe's interpretation of those restrictions have evolved and expanded over time?

DR. ERICKSON: Well, thank you, Commissioner, for those points. I think those are very important areas to look into. I'll let Dr. Lewis speak to some of the specifics because I think he knows more about the exact policies in those areas and how they play out.

What I will say, as someone who spends a lot of time reading Chinese language military-related documents and to include journals, magazines sponsored by China's state shipbuilding industry and other

entities, as well as sometimes seeing some of the international trade shows where things are marketed, it's quite clear that considerable European technology is already going to China, to include for military uses. China's submarines, and I believe surface vessels as well, for some time have used German diesel engines.

If you go to some of the trade shows, you can find a German pavilion supported by the local consulate where these technologies are being marketed.

In some of these Chinese defense industry type publications, I've even occasionally seen advertisements by European firms, typically not for specific weapon systems. We're talking very basic types of components. But there's obviously quite a bit of activity going on there, and I think Dr. Lewis might have more specifics.

DR. LEWIS: You know the trick in managing these lists is what is actually--managing these sanctions is what actually falls subject to them. And so if you wanted to get around them, what you would do is say I will not sell any munition to China so you reclassify the item as a commercial good, and then it can go, and that would be the story behind submarine engines, for example, which a lot of us might say there's no such thing as a commercial submarine engine, but the government in question apparently came to that conclusion.

You can see this in cruise missiles, small jet engines from a European source. You can see it in aircraft, of course, and helicopters, as we've discussed. So I think the intent there is to sell to China; right. China is the second-largest consumer. I mean if you're looking at the global arms market, you've got the U.S., tough competition, you've got the Persian Gulf, also tough competition, and you have China, which has been ceded to those countries that do not have Tiananmen sanctions. It's an irritant.

Europeans are kind of stuck. I mean they're in NATO, an alliance for collective defense. At the same time, their companies would like to sell to China, and so the long-term solution is they wish the sanctions would go away. The near-term solution is to transfer technology from being considered military to commercial, and I think this remains a major difference between the two, the European countries and the U.S.

COMMISSIONER GOODWIN: Thank you.

HEARING CO-CHAIR TOBIN: Chairman Shea.

CHAIRMAN SHEA: Thank you very much. You're both great experts so we very much appreciate your being here.

I'm going to try to ask a series of quick questions. If you could just say yes or no. I'm not trying to play "gotcha," but I'm just trying to create an argument. So see if you'll go along with me.

China's military modernization is made capable by its economic growth; is that fair to say? Yes?

DR. ERICKSON: Yes.

DR. LEWIS: Yes.

CHAIRMAN SHEA: Yes. China's economic growth is in large

part of the result of its integration into the global economy, foreign direct investment, cyber espionage, theft of intellectual property, which has been greatly enabled by the U.S. as an active participant in bringing China into the world global market and through FDI, but also as an unwilling victim of cyber espionage and theft. Is that fair to say, that China's economic growth, that the U.S. enabled, has greatly enabled China's economic growth? Is that fair to say?

DR. ERICKSON: I don't think any other country has made a greater contribution.

CHAIRMAN SHEA: Okay. I'll take that as a yes. Thank you.

So China's military modernization is in part aimed at countering the United States and defeating us in a potential conflict; is that fair to say? Its military modernization, their planning, is aimed at countering the United States, in part, and defeating us in a potential conflict; is that correct?

DR. ERICKSON: Yes, if it ever came to that.

CHAIRMAN SHEA: So in the annals of world history, is there a similar, is there an analogy or similar situation where one power has greatly assisted the economic rise of another power, and that second power has become a military competitor and potential threat to the first power? Is there any other situation in world history like this?

DR. LEWIS: I'd say yes with some caveats. You know the issues for China are they had a huge quantity of low-priced labor; right. That's the part you left out, is the labor in China, both brains and brawn, drew foreign investment there.

The inflow of capital and the government's willingness to direct the capital. That helps. So just removing the Maoist constraints would have led to a burst in growth, and they cleverly exploited foreign investment to accelerate that growth.

But the obvious example is the U.S. in the 19th century where we had huge population inflows, and we had huge land assets, and we had influxes of capital from Europe, and particularly from the UK, so foreign investment.

It's not true to make the comparison that the U.S. stole technology in the 19th century, and China's just doing the same thing. That's the silliest argument I've ever heard, well, one of the silliest.

But in that sense, and if you'd asked the British in the 19th century, or if you'd asked the Americans, the forts along the Potomac were designed to keep out the British fleet, and the last one we built was in 1905. So similar. The difference is, of course, two democracies, strong cultural ties, commitment to rule of law, and we don't have that with China.

CHAIRMAN SHEA: Dr. Erickson.

DR. ERICKSON: If I could add, part of the reason we're in this complex relationship is that we do have substantial shared interests, particularly in the economic sphere. That's part of what makes this so difficult, and often there are not simple solutions for ending these problems, but I think the issues that you bring up make it all the more important that

we can have no illusions about this. We have to keep our eyes wide open and continue to scrutinize everything.

And as a bottom line, make sure that things are always a two-way street, whether it's economic, market access, reciprocity, or more generally not allowing China to say, "well, we'll make our military preparations but only for a worst case scenario and peacetime deterrence, while all of yours are inherently illegitimate," that sort of thing.

CHAIRMAN SHEA: Thank you both. Thank you.

Just to follow up, Dr. Lewis, in your testimony, you say foreign direct investment has been the largest source of technology transfer for China, and you suggest that it's helped their military capability, and you say that a simple critique would attack this investment, but it's hard to see what a realistic alternative would have been for the U.S. and other nations. And I agree with that, "would have been."

And then later you say, U.S. policy is to encourage competition in global markets, and China as an economic competitor is a welcome addition to the global economy. Where our policies erred was in assuming that China would follow international practice in trade and that it would become a partner rather than potential military opponent.

So you're saying this was then, that was then. We made some errors in judgment and couldn't foresee the future, but this is now, and I'm wondering if you have any suggestions for changing policy and whether there is anyone in Washington who actually integrates both the military silo and the economic silo and thinks about a response to China in a more integrated way?

DR. LEWIS: No, I think, you know, so sometimes I kid Chinese that I talk to and say that ultimately we'll be able to work out a partnership because we both have a common religion: we both worship money. And they understand that.

But to do that will require, I think, being assertive with China and focusing on the reciprocal elements. They have lots of reasons why reciprocity is inappropriate, and so they will tell you, you know, a century of humiliation, and you're a global hegemon, and we're still a developing country and very poor, and the answer to that is, yes, that was true in 1980 and 1990. It's not true when you're the second-largest economy in the world.

And so they have not been willing to cede that the old arguments they had for not playing by the rules don't make sense anymore.

DR. ERICKSON: I think there is a certain reality at this point to the size of China as measured across economic and military capabilities, but I think we should never sell ourselves short in terms of our overall capabilities.

I think the U.S. has a very bright future, and some people aren't appreciating that sufficiently. We need to proceed with confidence in that regard. I think we're in a particularly difficult period, perhaps roughly going out over the next decade, in which we're still working to put things together at home to some extent, while China's at the tail end of a golden era

of growth where it hasn't faced as many tough decisions about spending and military and economic priorities.

And I think part of the key will be to prevail during this period, not let China undermine the peace and stability of its immediate region, and ultimately there will be slowing factors that will put China in a more complex position that other more developed nations like the U.S. face.

At that point, I think there's reason to at least hope that a recalibration of priorities will make them more open to the types of true reciprocity, true two-way street approaches. That would be essential to any sort of more effective understanding.

Right now, they don't seem inclined to, or able to make, certain binding agreements in that regard, and so I think we really need to pay attention during this period. If I could add one more thing: In terms of things we can do at home, when I go to trade shows and I see what other foreign companies are doing, including American companies, they're very reliant on the Chinese market because they're very worried about, for example, certain strategic budget funding issues in the U.S.

Sometimes it's a very specialized company making a specialized product that may be essential to the development of important systems, and if we let some of that get lost in the shuffle and some of these companies and people feeling that they need to find employment elsewhere or transfer technology elsewhere, I think that would be very unfortunate. So that's something positive we can do at home here.

Thank you.

CHAIRMAN SHEA: Thank you very much.

DR. LEWIS: Just a quick note. If you want to know the cheap metric to gauge the positions of both countries, look at the number of members of the National People's Congress in China who own residences in Canada or the U.S. and have residency permits versus the number of members of U.S. Congress who have residences or residency permits in China. Something is going on there that's indicative of the confidence that each side has in its own system.

HEARING CO-CHAIR TOBIN: Thank you.

Commissioner Brookes.

COMMISSIONER BROOKES: Thank you.

A lot of my questions have been asked, but two questions here. Is it worthwhile for the Commission to look into the status of the U.S.-EU arms embargo? And the second question is, considering the slowing growth in China, what effect do you expect that will have on defense spending and, importantly, on research and development?

Thank you.

DR. LEWIS: You probably want to put the arms embargo on your to-do list. It will come up for reconsideration. I can't remember when exactly, and that might be a good time, the preceding year.

The immediate problem of the transfers of commercial technology would be worth looking at now.

Slowing growth is something that suggests there will be political pressures in China, where if you have to pay a certain amount to keep the PLA happy, and if they lose that ability? But in the past they've been willing to maintain high levels of spending in key programs no matter what the economy was doing.

The larger issue might be political stability, as if the regime had domestic problems. It might complicate their acquisitions.

DR. ERICKSON: Let me add a bit more on China's potential economic slowdown and the military implications that you raised, Commissioner.

I think it's hard to predict exactly the numbers on this, but I think we've shifted from seeing great prospects for continued rapid growth to a number of downside risks to that growth. It's hard to see how that won't tend to slow over time.

Now, China is already big enough and powerful enough, economically, technologically, and militarily, that barring some true hard landing or terrible set of events for China, I think China will continue to loom large in its immediate region militarily, strategically, economically, and otherwise.

However, I do think things will get much more complex for China's planners in terms of resource allocation for programs. Right now there seems to be a lot of Chinese writing suggesting that China has a lot of advantages in the resources it can allocate, but the actual efficiency of a lot of that allocation remains relatively low in a variety of areas.

Meanwhile, as I alluded to in my written remarks, there are any number of factors that tend to increase costs over time that we struggle with, other advanced militaries struggle with, and China will increasingly struggle with.

So I see this all as making it likely that they will neither be intent on or able to achieve the same intensity of military development very far away from China that they've already achieved closer to China.

However, let me also mention three caveats that I brought up in my testimony because the fact is that it's difficult to predict the future, and particularly militaries which are duty-bound to plan for worst-case scenarios always have to keep this in mind, however unlikely this might be.

First of all, even with an economic slowdown, there will be a lag effect in the limitations that puts on some hardware deployment. Large platforms such as ships -- especially ships, I would argue, that were purchased during this relatively flush period -- will be useful in many ways for years to come. So a lot of that won't have to be purchased again in a time of perhaps greater spending competition for China.

Then there's the issue of what a slowdown itself stimulates. Certainly, if the Chinese government is not able to deliver a politically desirable rate of economic growth, it may lean harder on nationalist credentials to supply that credibility. I think the term "diversionary war" is bandied about too easily, but I think already we may even be seeing some

diversionary tension efforts, very calibrated and modest, but still there -- particularly in the East China Sea but perhaps also in the South China Sea as well.

So that's an area of concern. You can have a similar type of military, but what is that stick being wielded to try to pressure neighbors? That could still be very unpleasant and lead to some tensions that involve key U.S. interests and alliances.

Then there is the potential for innovation, and I'm not even talking about so much the specific component level innovation. But rather in 1999, Chinese writing suggests after the Belgrade Embassy bombing, Jiang Zemin was finally able to take his military vision that he'd been developing for some years under Deng Xiaoping's shadow and really bring it out into the open, get top level support for so-called "assassin's mace" -- or sort of silver bullet -- mega-projects. Because the thought was that China is vulnerable to this pressure from other big countries, yet it remains technologically limited, how to make the most of that; and as a result of that focused spending, we're seeing programs coming on line in recent years such as the anti-ship ballistic missile.

In the future, China facing a new strategic challenge and taking advantage of these years of high level defense industrial investment in R&D might be able to seek a new round of breakthroughs in that regard, and we certainly can't rule out that possibility.

COMMISSIONER BROOKES: Thank you.

HEARING CO-CHAIR TOBIN: Dr. Erickson, you just said potential for innovation, and I'd like to have you both talk a little bit about that, but I want to go first to your paper, Dr. Erickson.

You mentioned the PRC has autonomous underwater vehicles (AUVs), and that that's a potential capability that they have. It seems to me that, leaving aside the American R&D capabilities, Japan and South Korea have tremendous robotic capacity, and they're close in the neighborhood.

Wouldn't it be a real naval game-changer if some of these UAVs were used by Japan or Vietnam, and has China thought about that? You don't have to be out in the deep waters to have some counterforce and new technology standing up to the PRC. So robotics and innovation and how strong are those players in fielding something to counter the PRC?

DR. ERICKSON: Thank you, Commissioner, for this excellent line of inquiry on these points.

I think the undersea realm is one of the most critical areas for us to pay attention to. It's a continued area of U.S. strength, but certainly China is working hard in this area as well, and it's long been something of a question to me, and I think many others: why has China appeared to be so weak in anti-submarine warfare for so long?

Part of the answer is perhaps because they didn't have many alternatives, but another question that comes up is: do they feel that they have other types of capabilities that can at least partially compensate for that?

And when, with several of my colleagues, I did a detailed study on Chinese sea mine development, we found that some of the fairly serious Chinese writings on the subject were talking about using sea mines as a sort of poor man's anti-submarine warfare, if you will.

I wonder if AUVs and other types of systems might not also be envisioned in this regard? We can certainly see great Chinese attention to acoustic technologies and other efforts. Now, I don't have the technical experience to state what, specifically, is the future for these types of underwater robotic systems. I think there could be some serious limitations based on power supply and speed and range that might make that a complex picture.

But here's what I see as the bottom line. I think we're looking at probably roughly a decade-long period where, even as we strive to work with China productively as possible, we really have to deter negative behavior; particularly by China against its neighbors. And the undersea realm is a real area of strength that we need to preserve. One of the best ways to do this, in my personal view, is to make sure that we continue a build rate of Virginia class nuclear-powered submarines of two a year.

I think that's one of the strongest systems that we have. It's available here, right now. There will not be a lag time in developing it. I can go into more detail, but that's one I would mention.

Then, in addition, getting back to some earlier comments, I think we need to make sure that we're not falling victim to unforced errors or unforced underperformance on our part. By that I mean specifically we need to respond to China's challenges in a productive way, but we also need to ask ourselves within a level of budget calibration that's efficient for our economic growth: which is essential? Are we doing what we can to maximize our military capabilities productively?

And I would ask, among other things, are we doing things as much with missiles such as the long-range anti-ship missile that we could? You see, China's approach is very asymmetric weapon-centric, very missile-centric. Now not all of that may be appropriate for us, especially under the INF Treaty with the longer-range, but for shorter-range anti-ship cruise missiles I know of no treaty or arms control limitations that we face in that regard. Isn't there something more that we could do in that regard at an efficient economic approach?

Thank you.

HEARING CO-CHAIR TOBIN: Thank you.

And Dr. Lewis, could you address the innovation question and comment on use of robotics? It wouldn't have to be underwater either, you know, something minuscule could be deployed.

DR. LEWIS: You know, a couple trends that are reshaping how people, how a nation will wage war. There's a few we might think about.

One is a shift away from heavy ground forces towards a combination of air sensors, precision and special operations forces. You don't always want to prepare for the last war, and that was the winning

strategy in Afghanistan. But it appears to be a direction people are moving in.

Another one is what I'd call the shift from platform into target, and particularly for the U.S., when we are committed to large expensive platforms, and platforms are increasingly just becoming targets. You want to think about this like building battleships before World War II; very nice on parade, but not that effective in actual fighting.

And the third one, of course, is the UAV, the unmanned option, probably a little overstated. I wouldn't look for any Japanese or Korean capabilities. That could change. To turn these things into military systems, you need not only the robotic skills, but you need certain military skills.

I think the Chinese are putting a fair amount of effort into that. It turns out a UAV is really easy to build. If you have 15,000 bucks, and you want to buy one of those print manufacturing devices, you can build a pretty good UAV. But using that for military advantage, putting the weapons systems on it, is harder.

So everyone is tracking the UAV revolution. What I think we'll see in the future is a move away from large expensive manned-platforms to maybe a single large, expensive manned-platform controlling a number of smaller unmanned platforms. And that will reduce risk and probably increase capability.

Which country is better at figuring out how to do this will be the one that gains advantage. Right now we have a lead. We'll see if we can keep it up.

HEARING CO-CHAIR TOBIN: Thank you.

We have a second round that I'm about to begin. So if Commissioners can signal me. But the first person on the second round is Commissioner Slane.

COMMISSIONER SLANE: As you both know, we have our export control laws trying to protect our sensitive security technology, and I just wanted to get your thoughts on these mega R&D centers that are being opened up in China on a joint venture basis in the U.S. optoelectronics industry, aviation industry, and semiconductor industry. What are your feelings on whether these devices, these joint venture research centers--many of them are huge multimillion dollar centers--do they undermine our export control laws? Is that a way for the Chinese to circumvent them?

DR. LEWIS: I think companies are betting on a good outcome in the bilateral relationship, and so when you talk to them, what they say is that there's a global race for brain power. Brain power is more or less evenly distributed, and they would rather capture those Chinese brains for their business than have someone else capture them.

That's a reasonable business strategy. Working with Western companies does improve Chinese capabilities. So we do have a tension here. They will get better at doing these things. We will also improve. And if you think that the outcome is going to be an unhappy one, then it's a mistake. If you think we can manage it so it's a good one, then it's probably something

to do.

I don't worry too much about technology transfer because right now it's so easy for the Chinese to hack in and get whatever they want. Why would they bother doing anything else? They're not the only ones who do this so we don't want to pick on them.

Recent revelations in the press show that other nations are quite active when it comes to cyber espionage, not for commercial purposes I'd say, but I don't worry about it too much because there are so many avenues to acquiring technology. The balance is, do the economic gains we get in keeping our companies strong outweigh the risks of Chinese indigenous improvements?

And that's a hard one. That's something where I know the Commission has done some good work.

DR. ERICKSON: If I could just add, I think these concerns are very real. But I think there are some complexities there, to include the fact that some of the things that China needs the most for its building an innovation system are not specific hardware aspects, which are relatively easy for them to achieve in many cases; but processes and larger, more nebulous things that often are not technically restricted; and the people exchange and the people flow. The best practices exchange really helps tremendously with that.

So what are some of the solutions given that we're grappling with these realities? I think one of the keys is to make sure that we keep moving ahead as rapidly as possible, and that's what a lot of these commercial companies are betting on. They're often more concerned about the details than they'll let on in public for fear of bad publicity, for fear of offending their Chinese counterparts. But this is the general strategy that I think in this competitive technological world is really incumbent on all of us.

And I think here again is where the Commission's scrutiny can play a very positive role. I don't have a lot of details or specific knowledge, but I suspect given the way bureaucracies work, in this budget environment with a lot of challenges of meeting budget requirements, there are a lot of long-term, medium and long-term militarily relevant, strategically important R&D processes that risk being underfunded and running into important and limiting discontinuities.

A lot of these details are only known to very specific specialists. They're not known to even segments of within the Beltway who are debating these issues on a regular basis, let alone the American taxpayer. I think the Commission could really make a contribution by shining more of a light on that. Are we maintaining our necessary strategic spending and programs to keep advancing our capabilities and also to ensure that our strategically relevant corporations can continue to turn to us for their sustenance and not have things dispersed out to whoever has more money out in the world?

COMMISSIONER SLANE: Thank you.

HEARING CO-CHAIR TOBIN: Mr. Chairman.

CHAIRMAN SHEA: This is for Dr. Lewis, and thank you for all

your work on the cyber issue.

In your testimony, you said that the best strategy in response to Chinese cyber espionage would be multilateral with many countries giving Beijing the same message: this is not responsible state behavior.

I agree, multilateral is the ideal approach. I don't know whether just giving them a verbal message, that they should stop and we don't like this, is going to lead to any kind of result. But I was wondering if you have given thought to what types of multilateral actions could raise the costs for this cyber espionage so that the costs begin to exceed the benefits?

DR. LEWIS: You would have to raise both political costs and trade costs, and we have been slow to do both. So more comprehensive strategy, which I believe the administration is at least thinking about, where you would think about not only carrots--there are things we could do that China would like--but also some sticks, and you need to use them judiciously. Sometimes just a threat of using a penalty is enough.

I know from previous experience it's helpful. When the Americans show up and say it, the Chinese may discount it a little bit, but if you have the European Union and Australia and Japan and any number of other countries all coming in and giving the same message, that will get their attention. They don't want to be seen as outliers. That's decreased from say ten years ago, but they still would--that's the political cost.

The trade cost we'd have to think about where are there places we could either take, hold hostage something that China wanted or put restrictions on privileges they have now.

CHAIRMAN SHEA: Thank you.

HEARING CO-CHAIR TOBIN: Vice Chairman Reinsch.

VICE CHAIRMAN REINSCH: Thank you.

I want to pick up on something you alluded to when we had our last exchange and something you said a few minutes ago, Jim, about the United States slowing down in terms of innovation rather than the Chinese moving faster.

This is more a commercial question than a military one, but what's your remedy for that? What policy should we be pursuing? This is the giant softball.

DR. LEWIS: It's not, unfortunately, because one of the problems we've had; a group of us about eight or nine years ago started this big innovation debate and I kind of regret it now because innovation has become just a word you throw out. We used to talk about competitiveness, and now we talk about innovation. You have to put it in a larger economic context. Some of it is the investment in R&D that began in the Eisenhower administration and ended at the end of the Cold War and has never been replenished adequately. So how would you put more into R&D?

Some of it is improvements in access to education. That would be largely at the college and graduate level. So an easy one would be--every once in awhile, I teach a class at some of the local universities, and if you ask the students if I offered to pay your freight for a degree in

engineering and science, how many of you would go into engineering or science? And the answer is about two-thirds of them.

So if you thought about ways you could subsidize college and graduate education, not anything else, that would be good. You need to look at some of the ways that we allocate resources as a government in terms of investment.

What are the things that discourage investment in new technologies? I won't go into that, but we have an industrial policy. It's just not aimed at the right industries for military strength.

And finally, you would want to think about how to make the U.S. a better business environment. The reason I thought that was I was at a World Bank presentation about a month ago. They do an annual survey of how good each country is as a business environment. U.S. is still the best. All right. That's great.

What they said is that we haven't had any change in the last decade. We— have not improved at all in the last decade. Other countries are improving. So we are the best, but these are the trend lines, and that's what we want to think about; how do we make this a better business environment?

You have to put innovation in this larger economic context, and then I think you can begin to talk policies. But I would agree that sustained funding for the sciences that have military application is a crucial part.

VICE CHAIRMAN REINSCH: Thank you.

Andrew, do you want to say something? I've got one more question, but changing the subject; either of you, can you contrast the role when it comes to tech transfer writ large, not espionage but voluntary, involuntary, whatever, can you say a little bit more about the role of Russia and China as opposed to other countries?

DR. ERICKSON: Let me start, and I suspect Dr. Lewis will have more to say. I tend to look at this specifically through the Sino-Russian arms exchange, purchases from Russia by China. What seems to be happening over time is there is less and less that China really wants to or needs to purchase from Russia. But there are still a few key areas. Jet engines are one of them. I think metallurgy, drawing in part on a very robust set of investments in the Soviet era, is an area where the Russians may still be ahead of the Chinese in some respects.

So that's the general perspective I would have on that, but I think Dr. Lewis has more specifics along the lines of what you asked.

DR. LEWIS: I still love the Sukhoi-27 story, which is the Russians agreed to transfer the Sukhoi and do production in China. It's a technology transfer. And about halfway through the contract, the Chinese announced, oh, by the way, we have something called the J-11. It just happens to look like the Sukhoi-27. Don't leap to conclusions.

So the Russians were peeved, but recently got over their peevishness to resume arms sales to China. I think the Russian military technology has been really the key to Chinese modernization, and that is a

dependence that probably is ending as Chinese capabilities improve and as the Russians reach the end of their ability to live off the Soviet investment in arms design.

The systems they're operating are still largely the things that were done at the end of the Soviet Union. They have not been able to deploy new systems although they've talked about them. So, again, this is historical. If you could have taken Russia out of the equation, China's defense industry would be much weaker than it is now, but that was not something anyone was able to do.

We had discussions with the Russians in the 1990s about this, and we had two concerns, we the U.S. government. At that point I was in the government. We didn't like the Russians selling to Iran. We were able to make good traction there. We didn't like the Russians selling to China. It was just too big a market, and they wouldn't go along.

VICE CHAIRMAN REINSCH: Thank you.

HEARING CO-CHAIR TOBIN: Commissioner Wessel.

COMMISSIONER WESSEL: Thank you. Commissioner Reinsch's comments could open up a vein of questioning for many hours relating to innovation.

VICE CHAIRMAN REINSCH: That's the idea.

COMMISSIONER WESSEL: Thank you, Bill.

I've been involved in the President's Advanced Manufacturing Partnership, and I would argue in part that it's not necessarily innovation that is our problem. It's commercialization, that it's taking an idea and being able to get off the lab bench and onto the shop floor, and all too often the incentives are to take it into the shop floor in China or elsewhere and then, as you know, the cycle of R&D is once the production moves, R&D tends to move as well because scientists, engineers want to be close to where it's being applied.

So I think we're a great innovator. I'm not saying either of you said that we're not. Some of what we're doing seems to be a function of a different mind-set. When we talk about policy here in government, the first question often is, is it WTO legal? I think the question in China is probably how long can we get away with it?

And, we hope they want to play by the rules, but they haven't been, and there's been no cost to it. So what should we be doing differently? Should we just hope for the best and hope that at some point, they will see that IP protection is important to them, and they have to apply it to everyone else, or should we have a more hard-nosed approach to the balance of the benefits in the relationship, reciprocity and ensuring that this works for both of us better than it has?

Dr. Lewis. Dr. Erickson.

DR. LEWIS: Well, there's an impression that the Chinese developmental burst is running out of steam, and it's slowing down and will eventually follow a pattern we've seen in other Asian countries. And so the question is how do we feel about hanging out until they slow down and their

velocity reaches zero; right?

And that's probably some number of years away. I'm not comfortable with that, but it is the default position.

COMMISSIONER WESSEL: But as a non-market economy, when they slow down, why do we think they're going to be operating under Western standards?

DR. LEWIS: Oh, I don't think they will, but I think they're going to reach a level that will become flat and then will have maximized the risks to the WTO commitments and to our technology base. Are we willing to accept that?

COMMISSIONER WESSEL: So we will have lost as much--the pace of us losing--

DR. LEWIS: Yeah.

COMMISSIONER WESSEL: --will slow down?

DR. LEWIS: That's right. That's the default position. Do nothing and, just wait for the rain to stop.

The alternative would have to be being a bit more assertive, and when you talk to the Chinese--we mentioned earlier some of their excuses: we're still poor, we're a developing country, so you can't hold us to the same standards--and it's probably time to start holding them to the same standards.

That's really an issue you could have a discussion with trade experts; about why they would tell you this is a bad idea. From a strategic point of view, they're completely wrong, but that is probably why I'm saying we just sit tight, the pain will end in a few years, and then the--I'm just kidding.

COMMISSIONER WESSEL: The pain will end, and we won't feel as bad as quickly as we were.

Dr. Erickson, any comments?

DR. ERICKSON: It's hard to say what, how exactly we might assert ourselves better. I'm sure you have more specific ideas of how to do that, but I think the key is to bring reciprocity as much as possible into as many things as possible, and, again, not being directly involved in trade research and debate or bilaterals, I nevertheless feel that, for example, when Unocal came before Congress -- for whatever reason -- reciprocity was not adequately injected into that debate even in this town here.

And I think we need to make it more of a theme, raise the awareness, inject it as much as possible into the bilateral relationship.

COMMISSIONER WESSEL: I would argue that part of that is our own fault or a lot of that is our own fault. You know the failure to have rules that give Americans the ability to have majority control of certain businesses is something we negotiated away in the WTO.

We negotiated away the right to have our movies go into China up to a certain level. So many of the restrictions are self-imposed.

Thank you.

HEARING CO-CHAIR TOBIN: We have one last question, and then others of us who have questions, we will be in touch with you in other

ways, but Dr. Wortzel.

COMMISSIONER WORTZEL: All this technology transfer from the Europeans got me to thinking, and I'm looking at an article--

VICE CHAIRMAN REINSCH: Wow.

COMMISSIONER WORTZEL: You're in trouble. So I want to try and educate myself or see if you can help educate me. If you talk about all these German and French provided submarine engines, tank engines, diesel engines, I mean I'm assuming that in today's world, like my car, they're very software dependent. In other words, you don't operate it by turning dials and things; it's controlled by software.

And, of course, GM can stop my car any time it wants. So instead of trying to counter the sale, wouldn't it be easier to corrupt the software when you needed to?

DR. LEWIS: I think all countries are exploring that possibility. All major military powers are exploring that possibility.

DR. ERICKSON: I would say it's factors like these that makes China the further it advances in military sophistication get on a demanding treadmill where it costs more and more. It's more and more complex. The more of the gaps that they close vis-à-vis the top world standard, the more complex and difficult it becomes to prevail still further.

And I think they can still get a lot of mileage out of that at this point. But I think over time that will be more and more of a burden for them to pay for all that, to maintain all that, to stay ahead of where they want to stay ahead of, just as the U.S. military and some other advanced militaries have encountered.

So I think there's a lot that they can do in this regard, but the more you do things like this, the more vulnerabilities you take on together with opportunities.

COMMISSIONER WORTZEL: Well, it also strikes me that I mean if you look at the self-strengthening movement in China, 1850s, 1860s, they bought the best naval gunnery, naval engines, steam propulsion in the world, but they never developed the ability to manufacture it themselves.

So the first time they had to use it, it got busted or shot, they were stuck. And we really haven't thought a lot about the parallels with what the Chinese are doing to themselves today. So I mean that caused me to say two things, that (a) maybe this technology transfer is more of a blessing than a curse. The curse would be if they could do it indigenously. And (b) it does open opportunities to do what GM can do to my car.

HEARING CO-CHAIR TALENT: Okay. We are past time. So thank you, Dr. Erickson, Dr. Lewis, for your really enlightening testimony, and we're going to start the afternoon panel, the third and last panel, pretty promptly at 1:10. So we're going to break until lunch or break for lunch until then.

Thank you.

HEARING CO-CHAIR TOBIN: Please join us if you can this afternoon.

PANEL III INTRODUCTION BY COMMISSONER JAMES TALENT

HEARING CO-CHAIR TALENT: Okay. Commissioners are trickling in so we'll start with our panel, our third panel--yes, trickling. Yes, it may become a flood at any minute.

Our final panel today discusses the strategic impact of China's military modernization and potential U.S. responses to these developments. I do want to remind our witnesses to please hold their remarks to seven minutes if possible so that there is time for questions and answers.

Mr. Mark Stokes is the Executive Director of Project 2049 Institute, 2049 Institute, a 20-year U.S. Air Force veteran, and he has also served as Team Chief and Senior Country Director for the People's Republic of China, Taiwan and Mongolia in the Office of the Assistant Secretary of Defense for International Security Affairs.

Dr. Roger Cliff is a Senior Fellow at the Atlantic Council where he researches East Asian security issues. Previously, he has worked for the Center for Strategic and Budgetary Assessments, the Project 2049 Institute, the RAND Corporation, the Office of the Secretary of Defense, and VERAC, Inc.

The Honorable David Gompert is currently a Senior Fellow at the RAND Corporation. He was Principal Deputy Director of National Intelligence from 2009 to 2010. During 2010, he served as Acting Director of National Intelligence, in which capacity he provided strategic oversight of the U.S. intelligence community and acted as the President's Chief Intelligence Advisor.

Finally, Tom Donnelly, is a Resident Fellow and Co-Director of the Marilyn Ware Center for Security Studies at the American Enterprise Institute. From 1995 to 1999, he was Policy Group Director and Professional Staff Member here on the House Armed Services Committee.

Finally, all four of these witnesses are old friends and have testified before the Commission in earlier times, and Mr. Donnelly is a former member of the Commission. So welcome to you all, and Mr. Stokes, you can begin.

**OPENING STATEMENT OF MARK STOKES
EXECUTIVE DIRECTOR
PROJECT 2049 INSTITUTE**

MR. STOKES: Thank you, Mr. Chairman, and members of the Commission. It's a great opportunity to come here and participate in this important event and to talk about an important issue, important to U.S. interests and national security and stability in the Asia-Pacific region.

My presentation today will address sort of the all-others aspect of PLA military modernization, which includes command, control, communications, computers, intelligence, surveillance, and reconnaissance, or C4ISR for short. I'll address cyber, cyber warfare or sort of the other term of art, computer network operations; then I'll also address counterspace issues.

As a preface, what I'd like to be able to do is sort of put things a little bit in a political context, not in detail, but at least to emphasize that military modernization, hardware aspects of the PLA force modernization, is roughly one-half of actually what's going on because the relationship between political warfare and military modernization, or hardware, is symbiotic in nature.

And they feed off of each other. Military capabilities, whether real, latent, or perceived, even if they're ten years down the road, may still have near-term political effect, and that's something that separates the PLA to some extent from the way that we view modernization issues.

In this sense, there's some parallels that could be drawn between the PLA and the Chinese Communist Party and the former Soviet Union in the sense of how they leveraged, again, real or perceived or latent military capabilities for political effect in the near term, and the PLA does have a large organization that's dedicated to political warfare under the General Political Department.

So with that as a preface, the PLA has an ambitious military modernization program. That is intended at least in part not only to serve near-term political objectives but also to be able to project conventional political power to support, to be able to complicate the United States' ability to intervene in territorial or sovereign disputes around the territory of the People's Republic of China, more specifically, be able to complicate, for example, U.S. support for treaty obligations as well as support under the Taiwan Relations Act.

These three areas that I'm addressing could be viewed as critical enablers of use of force. First starting with C4ISR-- I have submitted a statement, a little bit late, but a lot of details are in the statement submitted -- but the C4ISR is best looked at in three areas.

One is command and control, the other one is communications, and the other aspect is ISR. It's important to focus mostly on the command and control aspect. Command and control system of the People's Liberation Army today has a peacetime and then a wartime footing. In peacetime, the

command and control system is managed by the General Staff Department largely, as well as the component commands, the services, the PLA Air Force, PLA Navy, as well as the Second Artillery Force. Then you also have the seven military regions as well.

On a wartime footing, in a time of crisis, the Central Military Commission--the system is flexible in nature, and it's scenario dependent--but the Central Military Commission would direct the formation of a Joint Theater Command, and within a Joint Theater Command, the most likely scenario would be to have members, perhaps the Vice Chairman or member of the Central Military Commission that would actually serve as the Joint Force Command.

You'd also have a political structure, a political commissar that possibly could come from the General Political Department at the deputy director level, as well as representatives that can come from Artillery, Second Artillery, Air Force and Navy.

This command and control system Joint Theater Command will be divided up into, for example, different centers. For example, the Fire Power Control Center, Intelligence Information Center, as well as other supporting aspects, and then component commands.

It's important to emphasize this because it sort of gives an idea about how centralized the PLA operational structure could be, and it also offers opportunities for vulnerabilities that could exist that could be leveraged in a conflict.

Communications; there's significant investment into more sophisticated communications to be able to support operations at the operations levels with the tactical level. Investment in, for example, fiber optics, satellite communications that can support operations at extended ranges.

On the communication side, also, for example, tactical data links that could support a networked force more or less with questions being even if they have the technology, whether or not they would use that depending upon the level of political control that they want to exercise, as well as the amount of trust they would put in individual soldiers, sailors, and airmen.

On the ISR side, there is a lot of literature about what they're doing on the ISR side--space-based, developing increasingly sophisticated remote-sensing satellites, synthetic aperture radar, among other things.

On the cyber front, in terms of other areas, on the cyber front, there is a very large infrastructure to conduct computer network operations, inclusive of computer network exploitation or cyber reconnaissance, computer network defense, and then perhaps most importantly, computer network attack.

There's many questions about who would have the portfolio for this and who would have the mission, and in assessing the capabilities, I think it's important to be able to try to nail down exactly which organization has this and how would it fit within the command and control structure.

Generally, the consensus or sort of conventional wisdom is the

GSD Fourth Department. Whether or not this is actually the case I think is yet to be determined.

And then lastly, looking at aspects of counterspace; counterspace could be viewed as having three components; one being kinetic kill vehicles. That actually had been demonstrated, but it's unclear whether or not there's an operational capability in the active force today. It could be latent or it could be real. It's not clear yet.

Another aspect is on jamming, for example, using more passive, not really passive means, but jamming that would go against or interrupt or complicate U.S. communication satellites; jamming synthetic aperture radar satellites by use of high-powered lasers, for example, that dazzle electro-optical sensors.

So this is sort of a fire hose approach at looking at these particular areas, but in terms of a scenario that would drive this force modernization, it's my view that the primary scenario driving force modernization remains Taiwan. It's not the only scenario. They're diversifying the scenarios. But it is only Taiwan and its democratic system of government that poses an existential threat to the monopoly power that the CCP enjoys today, and so with that, I will turn it over to our next speaker and, again, appreciate the opportunity to come here and talk.

**PREPARED STATEMENT OF MARK STOKES
EXECUTIVE DIRECTOR
PROJECT 2049 INSTITUTE**

**Prepared Statement of
Mark A. Stokes
Executive Director
Project 2049 Institute
Before**

The U.S.-China Economic and Security Review Commission

Hearing on China's Military Modernization and its Implications for the United States

Thursday, January 30, 2014

Room 2118, Rayburn House Office Building

Mr. Chairman and members of the commission, thank you for the opportunity to participate in today's hearing on a topic that is important to U.S. interests in peace and stability in the Asia-Pacific region. It is an honor to testify here today.

The Chinese Communist Party (CCP) and the People's Liberation Army (PLA) are steadily advancing their capacity to exercise coercive military power in order to advance national security interests. Increasingly less constrained by technological barriers that have hampered it in the past, the PLA has been investing in capabilities that may offset shortcomings in the face of a more technologically advanced adversary.

My presentation today focuses on three aspects of the PLA's broad force modernization program -- command, control, communications, computer, intelligence, surveillance, and reconnaissance (C⁴ISR); computer network operations (CNO), and counterspace. Looking horizontally beyond its immediate periphery and vertically into space, Chinese analysts view disruption of the U.S. ability to project conventional power to support alliance obligations and legal requirements under the Taiwan Relations Act (TRA) as a legitimate force modernization goal. These three areas function as critical enablers for military use of force.

As a preface, PLA military modernization should be viewed within a political context. Military modernization and political warfare have a symbiotic relationship. Political warfare adopts active measures to promote the rise of CCP legitimacy within a new international order and defend against perceived threats to state security. Political warfare employs strategic psychological operations and propaganda as means of influencing international discourse and policies of friends and potential foes alike. Political warfare, carried out both during peacetime and in armed conflict, amplifies or attenuates the political effects of military instrument of national power. For example, coercive persuasion, which integrates demonstrated or latent military capabilities with political warfare, is intended create the conditions for resolution of cross-Straits differences on Beijing's terms.

The objects of political warfare and military coercion have extended beyond Taiwan. To support broader political goals, the PLA is gradually transforming into a modern military force capable of responding to an increasingly diverse set of contingencies further from its shores. National pride resulting from successes in the information, cyber, and space domains shores up domestic CCP legitimacy. Advances in military capabilities also encourage greater risk in enforcing territorial claims in the East and South China Seas. However, the priority remains a credible capacity to exercise decisive use of force to coerce the Republic of China (Taiwan) into a negotiated solution on Beijing's terms and discourage foreign intervention. As time goes on, the same political-military capabilities that could be exercised against Taiwan could be applied toward other disputes around the PRC's periphery.

C⁴ISR

With the foregoing in mind, development of a survivable and responsive C⁴ISR system is a central PLA force modernization priority. C⁴ISR systems reduce surprise, increase warning time, facilitate the sharing of information within an often stovepiped PLA bureaucracy, ensure continuity of operations, and allow senior decision makers to make better-informed decisions. Although hardware is important in times of emergency, weapon systems are of limited utility without an advanced C⁴ISR system.

Information technology is at the heart of C⁴ISR, an area in which the PLA has traditionally been at a relative disadvantage. Today's global information revolution is a phenomenon that is transforming the world's industrial-based societies and economies. In our everyday lives, we look to information and communications technology to work, function, cooperate, and compete more effectively. The trend towards increased computing power to process, collate, and analyze a vast quantity of sensor data in order to mitigate and respond to a range of security challenges has turned the information revolution into a C⁴ISR revolution. Success or failure in PLA use of

force is likely contingent upon the quality of information available to commanders and the manner in which it is used.

Command and Control

The PLA is enhancing its ability to command and control forces that could be brought to bear in a future contingency. The CMC's peacetime conventional command and control system is centered today upon the General Staff Department (GSD), three other first level general departments -- General Political Department (GPD), General Logistics Department (GLD), and General Armaments Department (GAD -- seven military regions, PLA Navy, PLA Air Force (PLAAF), and Second Artillery Force.

In a crisis situation, the CMC's peacetime command and control of conventional forces likely would transition to a joint task force structure, referred to as a Joint Theater Command (JTC). The form and substance of a contingency JTC appears to be flexible and scenario dependent.

In a notional scenario, a CMC vice chairman, CMC member, and/or senior GSD and GPD authorities (eg, Deputy Chief of the General Staff and GPD deputy director) could serve as JTC commander and political commissar. Under CMC guidance, GSD likely would be the principle organization responsible for overseeing the transition from peace to wartime command and control. A JTC staff could be centered upon the most relevant military region(s), with additional elements drawn from GSD, the other three general departments, and representatives from the Air Force, Navy, and Second Artillery. The primary mission of the JTC would be to plan and prepare for joint operations and exercise authority over national level PLA assets and corps-level components assigned to the JTC. The CMC, GPD, and joint theater political authorities would also oversee the transition of political warfare assets from peacetime to a wartime status.

The CMC likely would likely augment forces within a military region through apportionment of selected assets from throughout the PLA to the JTF and corps-level Navy, Air Force, and conventional Second Artillery component commands. Direct CMC oversight of and integration with the JTC ensures an orchestrated political-military strategy with access to party and state resources. The GSD Operations Department (also known as the GSD First Department), one of 12 subordinate second-level GSD departments, manages the National Joint Operational Command Center and oversees a specialized contingency office to coordinate with civilian authorities during emergencies.

JTC employment of national assets likely would be carried out via a primary JTC command center. The primary command center would be supported by reserve and rear command posts, and if necessary, a forward command post. The forward command post and the rear command post, which is responsible for logistics support, reports to the primary command center. The reserve post would assume duties as the primary command center if the latter is neutralized.

PLA writings indicate that the JTC's primary command and control center would be comprised of a subordinate communications center, firepower coordination center, intelligence information center, an information operations (IO) or electronic countermeasures (ECM) command center, and an operations support center responsible for meteorological and other functions.

Representatives from the Navy, Air Force, and conventional Second Artillery component command likely would maintain coordination cells within the JTC command center.

Second Artillery, Air Force, and Navy component commands under the JTC would coordinate long range precision strike operations through the firepower coordination center. PLA analysts view an air campaign as an integral component of “joint firepower warfare” operations involving the coordinated use of PLAAF strike aviation assets and Second Artillery conventional theater missiles. An intelligence information center theoretically would integrate and distribute sensor data, navigation, survey, mapping, and weather information. The command and control system reportedly allows for skip echelon communication from the battalion/regimental level and up. Joint IO/ECM center responsibilities may include oversight of collection and analysis of electronic reconnaissance, development of an ECM concept of operations and electronic attack plan; assignment of responsibilities and targets, transmission of orders to ECM units; and coordination with the JTF leadership and other centers.

Nuclear and conventional command and control systems appear to be managed separately in both peacetime and wartime. The CMC likely would retain strict control over nuclear weapons in a crisis situation, rather than apportioning to JTC authority. This issue warrants further study.

Communications and Computers

In a crisis situation, the PLA’s peacetime and national civilian telecommunications infrastructure would transition to meet JTF requirements. To support operations at increasing distances from Chinese shores, the PLA is investing heavily into advanced information and communications technology. JTF communications authorities, most likely overseen by the GSD Informatization Department, would leverage military and national civilian telecommunications infrastructure as needed to establish a joint operational command communications network to support the command structure. JTF communications centers likely would include representatives from the general departments, Navy, Air Force, and Second Artillery and as well as provincial telecommunications offices.

The GSD Informatization Department is responsible for developing, constructing, operating, and maintaining a PLA-wide interoperable joint command and control communications system. Priorities include development and fielding of a capability - an Integrated Command Platform -- that correlates sensor data produced by GSD assets and distributes to joint and corps-level component commanders. Sensor data produced by corps-level component units likely would contribute to a common operational picture. In addition, Navy, Air Force, and conventional Second Artillery units maintain independent communication systems in peacetime that likely would be interoperable with a JTF in a crisis situation. The CMC likely maintains a separate communications network reserved for nuclear command and control.

At the tactical level, the PLA appears to be applying principles of network centric warfare to communicate and correlate data from increasingly sophisticated sensor architecture. Network-centric warfare equips soldiers, airmen, and sailors with a common operational and tactical picture that could significantly increase situational awareness. As a result, individuals and units equipped to participate in the network could synchronize actions without necessarily having to

wait for orders, which in turn reduces their reaction time. In addition, a tactical network may allow for dispersed and flexible operations at lower cost. Therefore, the introduction of a networked common tactical picture, based on an advanced tactical data link program, could be a paradigm shift that could gradually break down the PLA's traditionally stovepiped approach to defense. The effectiveness of such a system may depend upon the level of political control imposed on tactical commanders and trust in individual operators.

In addition to static infrastructure of fiber optic cables, line of sight microwave and tactical radios, the PLA has been investing in the development and production of dedicated military communications satellites. Broadband satellite communications enable transmission of high volumes of data from sensors to a wide variety of users at increasingly extended ranges from China's periphery.

Intelligence, Surveillance, and Reconnaissance

The PLA's C⁴ISR systems also includes ISR assets that would support operations against targets operating in the land, maritime, and space domains. The PLA's ability to strike mobile targets is likely bounded by the range of its persistent surveillance. To expand its battlespace awareness, the PLA is investing in space-based, airborne, and surface-based sensors that could enable monitoring of military activities in the Western Pacific, South China Sea, and Indian Ocean.

The PLA manages increasingly sophisticated space-based electro-optical (EO), synthetic aperture radar (SAR), and electronic reconnaissance (ELINT) satellites. Space-based systems expand the PLA's battlespace awareness and support strike operations further from Chinese shores. The GSD Intelligence Department most likely drives requirements and leverages the data produced by space-based sensors. Space assets enable the monitoring of naval activities in surrounding waters and the tracking of air force deployments into the region. A constellation of small electronic reconnaissance satellites, operating in tandem with SAR satellites, could provide commanders with precise and timely geolocation data on mobile targets. Space-based sensors also provide images necessary for mission planning functions, such as navigation and terminal guidance for land attack cruise missiles, including automated target recognition technology that correlates pre-loaded optical, radar, or infrared images on a missile system's computer with real time images acquired in flight.

Satellite communications also offer a survivable means of linking sensors to strike systems, and will become particularly relevant as PLA interests expand further from Chinese shores. Existing and future data relay satellites and other beyond line of sight communications systems could relay targeting data to and from the JTC and corps-level component command centers. Authors publishing in authoritative journals have advocated accelerating and expanding China's space-based surveillance system to cover targets operating out to a range of 3000 kilometers from the shoreline. Increasingly greater spatial resolution and an ability to monitor U.S. activity in the Asia-Pacific region (including the locations of US aircraft carrier battle groups) in all weather conditions are likely to enhance China's ability to conduct military operations farther from shore.

In a crisis situation, China may have the option of augmenting existing space-based assets with microsatellites launched on solid-fueled launch vehicles. Weighing between 10 and 100 kg,

microsatellite programs to date appear experimental in nature, but competency and experience could translate into a lower cost, operationally responsive space capability.

Airborne ISR assets include increasingly advanced and diverse range of unmanned aerial vehicles (UAVs) operated by GSD, Navy, Air Force, and Second Artillery. The Air Force and Navy also operate manned peacetime aerial reconnaissance aircraft. Beyond satellites and airborne ISR platforms, the PLA appears to be assessing the feasibility of “near space” flight vehicles equipped with EO, SAR, and ELINT sensors. Near space flight vehicles, operating at the upper extremes of the atmosphere, may emerge as a dominant platform for a persistent regional wide surveillance capability over the next decade. Coverage from platforms similar to satellites in low earth orbit could offer significant improvements in resolution. Duration of flight for near space vehicles far exceeds that of UAVs and their small radar and thermal cross-sections make them difficult to track and target.

In addition to space-based, near space, and airborne sensors, PLAAF radar brigades comprise a large air surveillance network, including at least one over the horizon (OTH) “skywave” radar system that monitors air and maritime activity out to 3000 kilometers.

In a contingency situation, sensor data from a range of platforms likely would be correlated or fused within a JTC intelligence information center, which would be staffed in part by apportioned assets from GSD Intelligence (Second) and perhaps Technical Reconnaissance (Third) Departments. Theoretically, the center could task satellites and airborne platforms and other collection assets, analyze information, and ensure a JTC leadership maintains situational awareness.

Computer Network Operations

The PLA oversees a large CNO infrastructure that functions as an integral component of its C⁴ISR system. Computer networks are the main arteries of cyber operations. Information and communications technology enable and enhance the capabilities of actors to engage in the cyber realm. Modern societies and governments increasingly rely on cyber-based information systems in order to process, coordinate, and manage critical processes necessary to function. Yet due to the highly automated and interconnected nature of economic transactions and the protection of critical infrastructure, the cyber domain is emerging as a new dimension in conflicts of the future. The PLA’s investment into CNO capabilities represents a significant evolution in the PRC’s quest for total information awareness.

CNO can be viewed in the context of *informatization*, which is a means to ensure sustained economic growth, compete globally in the information technology realm, and ensure national security. Informatization relies on information security systems that can support economic restructuring and national security. In the information age, information security within the broadest context as ensuring CCP legitimacy, enhancing the party-state’s ability to consolidate power, defending national networks against internal and external threats, and supporting economic development. Security of the party and state requires mastery of the global cyber sphere.

In the military context, CNO often is referred to as “network attack and defense,” based on the premise that “without understanding how to attack, one will not know how to defend.” In the U.S. lexicon, CNO includes computer network attack (CNA), computer network exploitation (CNE), and computer network defense (CND). Cyberspace is an important domain for national security, and CNO is viewed as a critical enabler for ensuring future operational effectiveness.

CNO capabilities could be brought to bear in peacetime and in a crisis situation. The GSD Technical Department (also known as the GSD Third Department) has cognizance over a vast signals intelligence and CNO infrastructure. These functions are encompassed within the euphemism of “technical reconnaissance,” which is a foundation of “informatized” warfare. GSD Third Department command authorities manage a complex CNE, or cyber reconnaissance, infrastructure that exploits vulnerable computer networks around the world, while also ensuring the integrity of classified networks within China. The Third Department Second Bureau, headquartered in Shanghai, is an illustrative example of a front end collection and analysis entity. Cyber reconnaissance builds upon a traditional core competency in SIGINT, advanced high performance computing and encryption/decryption technical capabilities, and a status as China’s largest employer of well-trained linguists. Faced with its own challenges to communication systems and computer networks, the Third Department has responsibility for assuring the security of PLA computer systems in order to prevent foreign adversaries from gaining access to sensitive national security information.

Operational Third Department entities operate alongside technical reconnaissance bureaus under military regions. While unclear, entities engaged in CNO likely are fragmented and stovepiped. Information security engineering bases in Shanghai, Beijing, and Tianjin serve as windows to the broader academic and commercial cybersecurity community.

Which organization within the PLA has responsibility for CNA remains an open question. Most assessments point toward the GSD Fourth Department, which traditionally has been the principle staff organization responsible for radar-related planning and electronic countermeasure (ECM) operations. A preliminary survey reveals few clues about a Fourth Department strategic cyber attack mission. GSD Third Department itself and PLA Second Artillery Force, China’s answer to U.S. Strategic Command, are alternate candidates. In general, the organizational structure for strategic cyber attack requires greater attention.

Cyber espionage and potential disruption of critical U.S. computer networks have emerged as a significant national security challenge. In his May 2011 *International Strategy for Cyberspace*, President Obama declared that the United States will work with partners to “encourage responsible behavior and oppose those who would seek to disrupt networks and systems, dissuading and deterring malicious actors, and reserving the right to defend these vital national assets as necessary and appropriate.” In response, the U.S. national security community is adopting a multifaceted approach to address the cybersecurity challenge, including through strengthened awareness, deterrence, greater investment into counterintelligence, and international partnerships with defense establishments familiar with PLA cyber operations, such as Taiwan. Counterintelligence tools include both disruption and deception, which offset the inherent asymmetric advantages that the attacking side enjoys.

The PLA's ambitious cyber operations also warrant consideration of appropriate responses to hostile cyber network attacks intended to neutralize U.S. command and control and critical infrastructure. Most important would be the determination of what types of computer network attacks would constitute an act of war, and what types of responses would be most appropriate.

Counterspace

In addition to C⁴ISR and cyber warfare, counterspace operations is another priority area for PLA force modernization. Freedom of action in space, and an ability to deny an adversary access to its space assets, offer military advantages in land, air, maritime, and information domains. The United States and other powers are dependent on space assets for military operations and to ensure an advantage over potential adversaries. The U.S. relies on space-based assets for communications, navigation, missile warning, environmental monitoring, and reconnaissance. Given vulnerabilities in space infrastructure, a potential adversary could target U.S. space assets and seek to deny advantages gained through the leveraging of space capabilities. Space superiority is characterized by the freedom to operate in space while denying the same to an adversary.

Policymakers in Beijing view space power as one aspect of a broad international competition in comprehensive national strength and science and technology (S&T). The PLA has been investing in a range of passive and active counterspace technologies, and has demonstrated a rudimentary capability to track and intercept satellites orbiting around the earth's poles. The ability to engage targets in space is viewed as part of a broader effort to field a "national aerospace security system." Chinese writings tend to link counterspace with an ability to track and engage all flight vehicles transiting space, including ballistic missiles. China's space and missile industry conducted successful tests of a kinetic kill vehicle in January 2007 and January 2010, thus demonstrating a basic ability to intercept polar orbiting satellites and medium range ballistic missiles during the mid-course of flight.

Chinese pundits highlight trends toward militarization of space and outline requirements for counterspace operations in future conflicts. However, non-destructive means of denying an enemy use of satellites and mitigating threats from space debris may be a more urgent priority than fielding kinetic kill vehicles. As noted by one former U.S. national intelligence authority, "counter-command, control, and sensor systems, to include communications satellite jammers, are among Beijing's highest military priorities."

Elements of a viable counterspace program include an architecture that fuses multiple sources of data in order to detect, identify, and track satellites and other space objects; development and production of technologies that neutralize threats; and a clearly defined and well trained organization able to coordinate and execute counterspace operations. Counterspace operations depend upon a survivable space surveillance network, and China is gradually developing a supporting infrastructure. China's ability to track and mitigate space debris could serve as a metric for the amount of progress that is being made.

The lead organization within the PLA for counterspace operations remains an open question, as does the relationship between national space and counterspace policies and programs. GAD-

affiliated organizations have produced assessments of space strategy, characterizing space power and advocating prioritization of space technology in order to further PLA warfighting under conditions of “informatization,” including counterspace operations and “space superiority.” Analysts differentiate between “hard” and “soft” counterspace measures, and relevance of an independent “space force” that would centralize space operations under a unified command.

Discussion of an independent space force has been underway since the 1990s, and resolution of the issue has yet to clear. While GAD manages a space launch, tracking, and control network, both the PLAAF and Second Artillery have indicated intent to establish space operations as a core competency. The PLAAF argues that battlespace for air defense operations should be extended beyond the atmosphere and into space and over sea, yet integrated under a single air defense command organization. Under an ambitious and long term force development concept of “integrated air and space (aerospace) operations,” one PLAAF analyst has argued that “space control is a reasonable extension of air control.”

At the same time, the Second Artillery has argued that it should be responsible for military space operations. For example, an internal Second Artillery text references a “Second Artillery space operations unit” as an operational support function. However, no clear operational infrastructure for a space mission is evident in Second Artillery order of battle. Theoretically, existing medium, intermediate, and intercontinental ballistic missiles could be adapted for a space intercept role by reprogramming missile guidance and fusing.

One analysis explains that the space domain would be divided along the Karman Line: the PLAAF would assume the air defense mission for threats below 100 km, while the Second Artillery would be responsible for threats above 100 km. A senior PLAAF Equipment Department authority noted the service’s investment into missile defense development. Regardless, uncertainty surrounds the role of the GAD, PLAAF, Second Artillery, or other entities in managing space operations, including planning, programming, and budgeting functions; satellite launch, tracking, and control; ground processing; and counter-space operations.

Beyond the issue of space control, the PLA has been investing in a wide range of passive and active means to deny a potential adversary’s ability to leverage space-based assets. R&D investments include foreign satellite communications monitoring systems, electronic countermeasure systems to disrupt an opponent’s use of space-based systems, as well as developing the capability for physical destruction of satellites in orbit. The PLA and civilian counterparts also have been enhancing national satellite laser range finding capabilities, and investing in radar systems for satellite surveillance and tracking. China also is investing into the means to deny an adversary effective use of space-based ISR assets through concealment, camouflage, and deception.

Conclusion

Senior authorities in Beijing seek to reshape the global order in a manner consistent with the interests of the Chinese Communist Party. Economic, cultural, political and military power, guided by political-military concepts such as the “Three Warfares,” are critical for expanding

and strengthening Beijing's global influence and mitigating domestic challenges to the party's monopoly on power.

Despite heightened tensions in the East and South China Seas, the subordination of ROC to CCP authority remains the principle driver for PLA force modernization. Diminished *military* tensions across the Taiwan Strait today should not mask the fundamental instabilities simmering beneath the surface. Political warfare operations, backed by a large conventional missile infrastructure in southeast China, are growing in intensity and scope. The subordination of Taiwan, and its democratic system of government, to PRC authority under a "One Country, Two Systems" formula remains the CCP's most urgent core interest. The objective reality is that Taiwan, under its current ROC constitutional framework, exists as an independent, sovereign state. The two equally legitimate governments – the PRC and ROC – are currently committed to One China principles, under which they exercise exclusive administrative jurisdiction over the territory under their respective control, with neither side subordinate to the other. In the context of the U.S. "One China" policy, a "One China, Two Governments" framework may serve as the most accurate representation of the status quo in the Taiwan Strait.

However, from Beijing's perspective, Taiwan's democratic government – an alternative to mainland China's authoritarian model – presents an existential challenge to the CCP's monopoly on domestic political power. With political legitimacy in the Taiwan Strait viewed as a zero sum game, authorities in Beijing have long sought the political subordination of Taiwan under a "One Country, Two Systems" principle. The resolution of cross-Strait differences is constrained without broad acknowledgement if not recognition of the ROC's political legitimacy within the international community.

Actual, presumed, or latent capabilities, amplified by an equally capable political warfare infrastructure, increases the PLA's capacity for coercive persuasion in resolving sovereignty and territorial disputes in the CCP's favor. Growing military capabilities – real or perceived – are intended to achieve near term political effects, including effecting change in U.S. policy toward Taiwan and the region as a whole. As its persistent sensor and command and control architecture increases in sophistication and range, the PLA's ability to hold at risk an expanding number of targets throughout the western Pacific Ocean, South China Sea, and elsewhere around its periphery is expected to grow. A survivable space-based sensor architecture, able to transmit reconnaissance data to ground sites in China in near-real time, facilitates the PLA's ability to project firepower at greater distances and with growing lethality and speed.

The PLA's development of counterspace, cyber, and C4ISR capabilities could affect the relative balance of power in Asia. U.S. satellites and computer networks may be vulnerable to disruption during a crisis. However, the degree of vulnerability depends upon the types of investments that DoD makes to defend assets in space and computer networks over the next 5-10 years. The relative balance of power also depends on vulnerabilities in the PLA's command, control, and communications system, and the willingness of the United States and its security partners to exploit those vulnerabilities in a crisis situation. The balance of power also depends on a balance of political will and adherence to enduring principles that have guided American foreign policy for decades.

Finally, concepts associated with Air Sea Battle and Offshore Control both have merits. Deterring PRC resort to use of force to resolve sovereignty and territorial disputes requires a demonstrated capacity to deny the PLA its military objectives. The ability to exploit vulnerabilities in the PLA's command and control system, even one that could be held in reserve, should be a top priority. In a crisis, the national command authority should have a range of options from which to choose, bearing in mind escalatory risks associated with each option. A unilateral declaratory policy that limits U.S. military action to offshore control, with no parallel reduction in the most destabilizing aspects of PLA force modernization (eg., conventional ground-based ballistic and land attack cruise missiles), may only encourage greater risk in Beijing's approach to resolving disputes in the region.

**OPENING STATEMENT OF DR. ROGER CLIFF
SENIOR FELLOW
ATLANTIC COUNCIL**

DR. CLIFF: I'm impressed by his ability to time his talk to within ten seconds. I will strive to attain the same standards.

I am honored to have another chance to speak before this Commission. This is, I think, the fifth or sixth time I've actually spoken with this Commission, and it is always a great opportunity for me and I hope useful for you all.

I was asked to talk about how China might employ its military capabilities in a conflict with the United States, what the effects might be, and how the United States should respond.

So let me start with the first part of that, which is how China would employ its capabilities, and, of course, that would depend on the type of conflict, but the most plausible conflicts seem to be, first of all, the one that Mark mentioned, the war over Taiwan, and I would add to that conflicts in the East China Sea and the South China Sea, and in all cases, these would primarily be air and naval conflicts. So they share many characteristics with each other.

The types of capabilities that I believe China would employ in these conflicts would include cyber attacks on U.S. and allied information systems; the use of jammers and lasers to disrupt or blind U.S. and allied radars, surveillance satellites and other sensors; the use of kinetic kill anti-satellite missiles, as well as co-orbital anti-satellite systems against U.S. military and intelligence satellites; the launching of conventionally-armed ballistic missiles against U.S. and allied air defense systems and air bases; attacks on key facilities by covert operatives who have been infiltrated in advance into Taiwan, Japan and Guam potentially; the use of cruise missiles and aircraft with precision-guided munitions to attack key U.S. and allied bases and facilities in the Western Pacific region; and attacks on U.S. aircraft carriers and other warships with a variety of systems, including the famous anti-ship ballistic missiles, but perhaps even more importantly submarines and land-based aircraft as well as potentially surface ships.

The net effect of these attacks would probably be quite

significant. A large proportion of U.S. combat aircraft based in Okinawa and the main islands of Japan could be destroyed on the ground by them.

And U.S. aircraft carriers operating within about a thousand miles of China would also be at risk for being damaged or disabled.

Now one response to these threats would be to pull our assets farther back, to have the land-based aircraft operate and the aircraft carriers operate from locations farther away from China, but this type of response would also have drawbacks. First, the amount of combat power that could be projected over Taiwan, the East China Sea, or the South China Sea from these more distant locations would be much less than could be projected from closer-in bases or closer-in operating locations for aircraft carriers.

Second, it would entail a huge and potentially vulnerable logistics tail to keep all these aircraft fueled. Short-range fighter aircraft would require multiple refuelings en route both on their way in and on their way out. And this would require a huge number of tanker aircraft to keep them fueled and the constant bringing in of aviation fuel to keep them in the air.

So the net effect of the types of capabilities that I've just described could make it much easier for China to achieve air superiority over locations such as Taiwan and the East China Sea or the South China Sea, and if China can achieve air superiority over those locations, then it would be much easier for it to achieve sea superiority as well, particularly with regard to the surface of the ocean, not so much undersea.

And then if China is able to do that, then it's going to be much more difficult for the United States to defeat a Chinese use of force in one of those scenarios. And recognition of this danger could cause countries in the region to question whether or not the United States is really willing and able to uphold its security commitments in Asia.

So what should the United States do to respond? I'm going to skip over a couple of points in the interest of time, and I'd like to make five observations. And I'm not going to talk here about specific systems or strategies although I've done that elsewhere on other occasions, but to try to make some overarching observations that I think should inform whatever choices we make.

The first is that the huge technological edge the U.S. military has enjoyed over the Chinese military is eroding. I think everyone is aware of that.

Second, in the current fiscal climate, it's not realistic to think that we can overcome this challenge by huge increases in the U.S. defense budget.

Third, in potential conflicts with China, quality of weaponry is more important than overall quantity in the U.S. force structure.

Fourth, quality weaponry is useless without the infrastructure to support it.

And fifth, the U.S. advantage, the main U.S. advantage, comes not from our high-tech weaponry but from the organization, people, training,

doctrine and culture of our military. However, our advantage in those areas is eroding as well.

So how can we therefore maintain our qualitative edge over China and strengthen our infrastructure in the region in an era of constrained defense spending? I know Dr. Gompert has some very interesting ideas, but I personally don't see much of an alternative to cutting the size of our forces to free up the funds we need to ensure our continuing qualitative advantage over China.

Doing so would be unfortunate. It would impact our ability to keep units present in hot spots around the world. But I think it's simple reality. Now, we're about to get the results of the latest Quadrennial Defense Review, and we will see if they've made the kinds of tough choices that I think need to be made, but given institutional inertia and the interests that are invested in the current U.S. force structure, I'll be surprised if they are all made.

My recommendation for Congress, and I was asked to provide some recommendations for Congress, is whatever cuts the U.S. Defense Department is asking for, the default position at least should be to support those cuts and to push them to make more.

I believe that China's growing military capabilities are presenting the U.S. with a security challenge of a magnitude we haven't seen since 9/11. Responding to this challenge is going to require foresight and courage, foresight to take action now before a crisis has occurred, and courage to make fundamental changes in the way we do business in the absence of an immediate and imminent danger. Thank you.

**PREPARED STATEMENT OF DR. ROGER CLIFF
SENIOR FELLOW
ATLANTIC COUNCIL**

**Testimony before the U.S.-China Economic and Security Review Commission
Hearing on China's Military Modernization and its Implications for the United States
Roger Cliff
Senior Fellow, Atlantic Council
January 30, 2014**

One way to analyze the implications of China's military modernization for the United States is to consider how China would use its military capabilities in a conflict with the United States. This, in turn, would depend on the nature of the conflict. A conflict over minor interests would likely entail limited commitments of force and lower levels of escalation, while a conflict over issues that threatened China's national survival could potentially entail the commitment all of China's military forces and unlimited levels of escalation.

How China's Military Capabilities Might Be Employed in a Conflict with the United States

A conflict over Taiwan is one of the more likely scenarios for armed conflict between the United States and China and, given the stakes involved for the Chinese leadership, would probably entail large-scale force commitments and high, but not unlimited, levels of escalation. Examining a hypothetical conflict over Taiwan, therefore, can provide insights into how China's military capabilities could impact the United States.

Although a variety of conflicts over Taiwan are imaginable, a Chinese attempt to invade the island would involve the fullest range of forces and operations. A 2006 textbook on military campaigns, *Campaign Studies* 《战役学》,²⁴ published by China's National Defense University, describes a generic approach for conducting amphibious invasions. Although an invasion of Taiwan would undoubtedly differ in some of the details from what is described in *Campaign Studies*, the main elements described in *Campaign Studies* are probably broadly accurate.

According to *Campaign Studies*, an amphibious landing campaign would consist of three main phases: initial operations in preparation for the landing, embarking the invasion forces and transporting them across the water, and landing them on the beach and establishing a beachhead. The preparatory operations would include seizing information superiority, air superiority, and sea control; neutralizing enemy defenses in the area where the landing would be conducted; and clearing mines and obstacles in the landing zone. Once the preparatory operations were complete, the invasion force would move to its embarkation ports, be loaded onto amphibious transports, and sail to the landing beaches. During this time the Chinese military would need to continue to maintain information superiority, air superiority, and sea control. When the invasion force arrived at the landing beaches, it would disembark, neutralize any enemy ground forces in the landing area, defeat any counterattacks on the beachhead, and expand the beachhead as rapidly as possible. As additional forces were added to the beachhead, eventually the invasion force would break out of the beachhead and seek to conquer the entire island.²⁵

Seizing information superiority, air superiority, and sea control is said to entail neutralizing a variety of targets including enemy command and control centers, communications hubs, information processing facilities, information warfare centers, radar emplacements, surface-to-air missile and anti-aircraft artillery batteries, air bases, navy bases and commercial ports, surface-to-surface missile emplacements, coastal defense missile emplacements, warships in port, munitions depots, aircraft, surface ships, and submarines. It would also entail defending against such attacks by the adversary. Means by which such targets can be neutralized or defended are said to include ballistic missiles, cruise missiles, aircraft, surface ships, submarines, and surface-to-air missiles, as well as electronic warfare and computer network operations.²⁶

In the case of an invasion of Taiwan, the question is who "the enemy" would include. That is, would China attack the types of targets listed above only if they belonged to Taiwan, or would it also attack such targets that belonged to the United States? My view is that, if the Chinese leadership believed that they could win a war for Taiwan without physically attacking U.S. bases

²⁴ Zhang Yuliang (张玉良), Yu Shusheng (郁树胜), Zhou Xiaopeng (周晓鹏), ed., 《战役学》, (Beijing: National Defense University Press, 2006).

²⁵ Zhang, Yu, and Zhou, 2006, pp. 316-330.

²⁶ Ibid.

and facilities in the region, they might attempt to do so and thus limit their attacks to U.S. aircraft in the air and ships at sea that were intervening in the defense of Taiwan. If, however, Chinese leadership came to believe they could not win without physically attacking U.S. bases and facilities in the region (or if the U.S. began attacking targets in mainland China), then they would expand the scope of their attacks to include any bases and facilities in the region out of which U.S. combat forces were operating. In what follows, therefore, I assume that the Chinese leadership has determined that it cannot successfully conquer Taiwan without attacking U.S. bases and facilities in Japan, Guam, and any other territories in the region, as well as U.S. assets in space.

Campaign Studies and other authoritative Chinese publications on military operations that have been analyzed are not specific about the order in which targets would be attacked or with what types of assets.²⁷ However, the logic of these publications and circumstantial evidence suggest that efforts to electronically infiltrate U.S. and Taiwanese military and civilian information systems would be underway well before the commencement of combat operations. Combat operations would then begin with the triggering of malware designed to disable, disrupt, or corrupt U.S. and Taiwanese information systems, along with the use of jammers and lasers to disrupt or blind U.S. and Taiwanese radars, surveillance satellites, and other sensors; the launching of direct-ascent antisatellite missiles against U.S. surveillance satellites; the launching of a barrage of ballistic missiles at U.S. and Taiwanese missile and air defense systems, air bases, and any warships within range of China's antiship ballistic missiles; and attacks on key targets – such as early warning radars, air traffic control facilities, underground cables and pipelines or above-ground switching facilities and fuel manifolds – by covert operatives infiltrated in advance (potentially months or even years in advance) into Taiwan, Japan, and Guam.

Cruise missiles and aircraft with precision-guided munitions such as laser- and satellite-guided bombs and air-to-surface missiles would then be used to attack “point targets” that the ballistic missiles lacked the ability to destroy with a high probability. Such targets would include hardened aircraft shelters, radar installations, command posts, communications hubs, aviation fuel storage and distribution facilities, aircraft repair and maintenance facilities, and munitions depots.

The Chinese military would also look for opportunities to attack U.S. aircraft carriers – a key element of the U.S. ability to contest air and sea superiority around Taiwan – with antiship ballistic missiles, submarine-launched torpedoes and cruise missiles, land-based aircraft,²⁸ and surface ships with anti-ship cruise missiles.

²⁷ *Campaign Studies* describes the targets that would be attacked, but not the order in which they would be attacked or with what assets. A recent RAND study on Chinese air force operations (Roger Cliff, John Fei, Jeff Hagen, Elizabeth Hague, Eric Heginbotham, and John Stillion, *Shaking the Heavens and Splitting the Earth: Chinese Air Force Employment Concepts in the 21st Century*, Santa Monica, Calif.: RAND Corporation, 2011) describes the likely sequence of operations and targets for the Chinese air force in an air superiority campaign, but has no information on how these would be coordinated with the actions of assets controlled by other services, such as the ballistic and cruise missiles operated by the Second Artillery Force.

²⁸ Given the threat posed by U.S. nuclear attack submarines and other dangers, this scenario assumes that the Chinese navy would, at least initially, keep its own carriers close to China's coast and on the periphery of the conflict where they would force the U.S. to devote assets to tracking their location and hedging against an incursion by them but limiting their vulnerability to U.S. attack.

The net effect of these attacks on the U.S. ability to defend Taiwan would likely be substantial. By 2020 China will have significant numbers of medium-range ballistic missiles and land-attack cruise missiles capable of reaching any of the U.S. facilities in Japan, which are the closest to Taiwan. The ballistic missiles could be used first to overwhelm and destroy the majority of land-based air and missile defenses in Japan, to destroy aircraft parked in the open or in unhardened hangars at air bases, and to damage runways to prevent aircraft from taking off or landing. Cruise missiles and long-range land-based aircraft with precision-guided munitions could then be used to destroy aircraft parked inside of hardened shelters and other key facilities. The net result would likely be the destruction on the ground of a large proportion of U.S. combat aircraft based in Okinawa and the main islands of Japan and significant damage to other key U.S. facilities in Japan.

U.S. aircraft carriers operating in the Western Pacific would be at risk as well. Much attention has been given to China's development of an antiship ballistic missile, but U.S. carriers would face other hazards that could be even more severe. Carriers operating within about a thousand miles of China's coast, for example, would also be subject to attack by land-based Chinese Su-30 and J-11B fighters, JH-7 supersonic fighter bombers, and H-6 bombers, all of which can be armed with antiship cruise missiles. Although U.S. carrier strike groups are specifically designed around defending the carrier against this kind of attack, the sheer numbers of these aircraft China will likely have by 2020 – probably several hundred J-11s and JH-7s – mean that at least some attacks would be likely to succeed. And even if they did not succeed, the carriers might be so consumed with defending themselves that they would not be able to use significant numbers of their aircraft for defending Taiwan.

Another hazard for U.S. aircraft carriers operating close to China would be China's submarines. Although the majority of China's submarines will continue to be slow, diesel-powered boats for the foreseeable future, by 2020 most or all of these will be armed with antiship cruise missiles, including eight "Kilo" class submarines equipped with the long-range, supersonic, sea-skimming Klub system. The slow speed of China's diesel submarines would mean that a U.S. carrier would essentially have to run one over for the submarine to get a torpedo shot off, but a carrier strike group coming within missile range of one or more submarines would be a much more likely event.

Most of China's air-launched and submarine-launched antiship cruise missiles will be subsonic in 2020, and thus relatively easy for the strike group's air defenses to intercept, but if even one missile from a salvo penetrated the strike group's defenses, it would make for a very bad day for whatever ship it hit. Even a Nimitz-class carrier, although unlikely to be sunk by just one or two such missiles, could nonetheless be put out of action if the missile struck at the waterline and caused the carrier to be unable to steam at the speeds required for aircraft launch and recovery. One response to this combination of threats would be to operate U.S. land-based and carrier aircraft from locations farther away from China. For land-based aircraft, the only significant U.S. base outside of the range of China's medium-range missiles but still relatively close to Taiwan is Andersen Air Force Base at Guam. For aircraft carriers it would mean staying at least a thousand miles away from China's coast.

There are two main disadvantages to this approach. First, the amount of airpower that could be projected over Taiwan and China from such locations would be significantly less than from other locations. If operating out of Okinawa, for example, which is about an hour's flight time away from Taiwan, each fighter aircraft could probably fly about two four-hour combat air patrols a day. That would make each mission six hours long, including flight time to and from station, and leave six hours between each mission to refuel and rearm the aircraft and perform required maintenance. From Guam, by contrast, transit time would be about four hours each way. If the fighter still spent four hours on station, each flight would require a total of twelve hours. Required maintenance time between flights tends to go up in proportion to the length of the flight, so each fighter would only be able to fly about one sortie per day. As a result, the number of fighters that could be kept in the air over Taiwan would be roughly halved when flying from Guam as compared to Kadena. Carrier aircraft would be similarly affected if forced to fly from carriers more than a thousand miles from China, as opposed to steaming in waters closer to Taiwan.

The second disadvantage to long-range fighter operations is that fighters cannot carry enough fuel to fly all the way to Taiwan from Guam or a carrier more than a thousand miles off of China's coast, so they have to be refueled en route by tanker aircraft. It turns out that it would take nearly one tanker aircraft in Guam to support each fighter aircraft based there. Although Andersen is a very large base, there is a limit to how many total aircraft it could handle at one time and thus to how many fighters could viably operate from it. In the case of carrier-based aircraft, the situation could be even more difficult, depending on where the carriers were operating. Overall, a huge and potentially vulnerable logistical effort would be required to provide the aviation fuel needed to sustain long-range fighter operations.

Over the longer run an additional challenge is likely to arise: China is believed to be developing intermediate-range conventional ballistic missiles and bomber aircraft capable of reaching Guam. When that happens, Guam will no longer be invulnerable to attacks from mainland China.

Even if Guam remains safe for the time being, if China can succeed in halving the number of aircraft the U.S. can keep in the Taiwan area at any given time, then China's ability to achieve air superiority in the area will have essentially doubled. Once air superiority is achieved, moreover, achieving sea control around Taiwan becomes easier, as U.S. and Taiwanese surface ships will be vulnerable to attack from the air. And if air superiority and sea control can be achieved, then China will be in position to launch an amphibious invasion of Taiwan.

Amphibious invasions are always highly risky operations and this one would be no exception. First, although China might be able to maintain air superiority over Taiwan most of the time, the United States could nonetheless put a large number of aircraft into the air for a short period of time to launch attacks on China's invasion fleet as it made the more-than-ten-hour journey to Taiwan from ports on China's coast. Second, although China might control the surface of the sea around Taiwan, its ability to find and sink U.S. submarines will be extremely limited for the foreseeable future. Those submarines would likely be able to intercept and sink Chinese amphibious transports as they transited toward Taiwan. Each submarine would only be able to get off a few torpedo shots, however, before it would need to withdraw for self-preservation, as the launching of the torpedoes would disclose its presence. Whether these attacks would be

sufficient to thwart the invasion, therefore, is unclear.

Many of the Chinese capabilities and operations described above could be employed in other conflicts involving the United States, such as an attempt to seize control of the islands called the Senkaku by Japan and Diaoyu by China or to seize control of Philippine-held islands in the South China Sea, so the Taiwan scenario is by no means a special case. Although I have little doubt that the United States would come to the defense of Taiwan or its treaty allies in conflicts like the ones described here, the capabilities that China is acquiring and the geography of the region mean that there is a legitimate possibility that the United States could be defeated in a conventional war, something that has not been true for over a quarter century. Recognition of this reality could cause countries in the region to question whether the United States is willing and able to uphold its security commitments in Asia.

How the United States Should Respond

How should the United States respond to this growing challenge? There are those who say that China's leadership would never resort to the use of force, as it would disrupt the economic growth on which their legitimacy is based, and therefore that there is no need to respond to China's growing military capabilities. My concern is that there could come a day when that was no longer true. That is, a leadership group whose legitimacy rested on achieving nationalistic goals more than economic growth could someday come to power in China. Even China's current leadership, if economic growth stalled, could find its hold on power under threat and feel compelled to respond forcefully to perceived provocations from outside of China.

There are also those, including a surprising number in the U.S. Defense Department and military services, who say that Taiwan, much less the Senkaku or Spratly Islands, is simply not worth a confrontation with China over. They point out that China has nuclear missiles capable of reaching the United States and that in any case China is more important to the U.S. economy and security than are Taiwan, Japan, or the Philippines, and therefore there is no need to respond to China's growing military capabilities. I disagree. The United States has both a moral and a material interest in a world in which democratic nations can survive and thrive. Backing away from our commitments to protect Taiwan, Japan, or the Philippines would be tantamount to ceding East Asia to China's domination. The act itself would signal to all in the region that the United States had ceded it to China. In the process we would weaken or discredit our alliance with Japan, one of our most important economic and security partners not just in Asia but throughout the world. Such a choice would make U.S. interests less secure, not more so.

I believe, therefore, that the proper response to China's growing military capabilities is to take steps to ensure that the United States maintains the capability to prevail in the event of a conflict with China in the western Pacific region. I will not speak here of specific systems or strategies that should be developed, although I have done so elsewhere,²⁹ but instead give my views about the overarching principles that should inform the U.S. response.

²⁹ E.g., see Roger Cliff, Mark Burles, Michael S. Chase, Derek Eaton, Kevin L. Pollpeter, *Entering the Dragon's Lair: Chinese Antiaccess Strategies and Their Implications for the United States* (Santa Monica, Calif.: RAND Corporation, 2007).

Let me begin with several observations. First, the huge technological edge the U.S. military has enjoyed over China is eroding. This is the result of China's rapid economic growth and integration into the world economy, ever-increasing defense spending in China, and the "follower's advantage" that results from the fact that it is easier to imitate the technological successes of others than to develop fundamentally new technologies. By my estimates, in 2020 the weaponry of China's military forces will be roughly comparable to that of the U.S. military in 2000. One way to look at that is to say that even in 2020 China's military will still be 20 years behind the U.S. military. Another way to look at it, however, is to ask how much more advanced the U.S. military will be in 2020 as compared to 2000.

A second observation is that, after a decade in which U.S. defense spending more than doubled, it is not realistic to think that we can overcome the challenge of China's growing military capabilities by throwing additional money at it. U.S. federal budget deficits, grassroots opposition to government spending, and the winding down of the wars in Iraq and Afghanistan – and hopefully the winding up of no new wars – mean that U.S. defense spending is not likely to significantly increase for the remainder of the decade. Responding to the challenge presented by China's growing military capabilities will require new ways of making use of current funding levels, not solutions that depend on increased defense spending.

A third observation is that, in potential conflicts with China, quality of weaponry is more important than overall quantity. In the case of aircraft, given the limited amount of basing capacity available to the United States in the western Pacific region and the finite capacity of aircraft carriers, it is better to have one high performance fighter than two medium-performance ones. In the case of ships, it is better to have one highly-capable ship based in the Pacific than two less-capable ships split between the Pacific and Atlantic. This means that it is essential to provide our forces with new and more advanced weapon systems as they come available, and to continue to upgrade the systems we already have, even if that means we can afford fewer of them.

A fourth observation is that quality weaponry is useless without the infrastructure to support it. This means air bases that are able to handle large numbers of aircraft, have hardened shelters to protect the aircraft operating there, and rapid repair capabilities to restore flight operations after an attack; it means aerial refueling aircraft and underway replenishment ships; it means maintenance and repair facilities and storage depots; and it means the communications and transportation networks to connect all of them together.

A fifth observation is that software is more important than hardware. The true U.S. advantage comes not from our high-tech weaponry but from the organization, people, training, and culture of our military. Here too, however, our advantage is eroding. The training of the Chinese military improves year by year and, according to my analysis, by 2020 the average Chinese soldier will be better educated than his or her American counterpart. To maintain our qualitative edge over China we not only need more advanced weaponry and better infrastructure, we also need to ensure that our military organizations are flexible and responsive, that the services are recruiting and retaining the best people and giving them the best training and education, and that they are fostering a culture based on performance and initiative, not one of caution and conformity.

How can we maintain our qualitative edge over China and strengthen our military infrastructure in an era of constrained defense spending? I see no alternative to cutting the size of our forces.

Current U.S. force structure is still largely based on a two-regional-wars standard developed during the 1990s. This standard posited that the United States should maintain the capability to conduct two nearly-simultaneous wars on the scale of 1991's Operation Desert Storm against Iraq. The logic behind this standard was not that two such wars were likely to occur simultaneously by chance, but that, if one such war occurred, the United States would want to have the capability to deter potential aggressors not involved in the first war from taking advantage of the fact that U.S. forces were tied down in the first war by launching or threatening aggression elsewhere. The justification for the U.S. force structure has evolved since the 1990s, but the force structure itself has remained largely the same.

Unfortunately, while the two-war requirement was reasonable and feasible when the wars in question would have been with regional powers such as Iraq or North Korea, it is not feasible when one of the wars would be with a global power such as China is becoming. Maintaining the capability to prevail over China at current budget levels will require the reduction of U.S. force structure to a level such that we could not simultaneously both fight China and conduct another Desert Storm-type operation.

Reducing the size of U.S. force structure will also limit U.S. capacity to deploy forces abroad in response to contingencies that require lower levels of force than Desert Storm but which require that the forces be deployed for longer periods of time. Current U.S. operations in Afghanistan would be one example but, even if the U.S. deployment to Afghanistan is significantly reduced or ended in the near future, there will still be a recurring need to deploy U.S. forces overseas. Before the terrorist attacks of 9/11, substantial U.S. forces were deployed for long periods of time to hot spots around the world such as the Balkans, the Middle East, and the Korean peninsula.

Note that the needed funds cannot be freed up through "efficiencies" like cutting headquarters staffs. The funding levels needed go far beyond what can be achieved through the pursuit of increased efficiency. There is also no way to obviate the need to free up additional modernization and infrastructure funds by developing innovative strategies or operational concepts. One of the things I was asked to do in my testimony was to give my assessment of Air-Sea Battle. This is a difficult question to answer because so little information about Air-Sea Battle is publicly available. As someone who has spent a considerable portion of his career analyzing this challenge, however, I can say that it is one that cannot be solved through simple, inexpensive fixes, and Air-Sea Battle does not appear to be making such claims either. Countering China's military capabilities and geographic advantages will require the development not only of new concepts of operations but also, in order to implement those concepts, of capabilities and facilities that are different from the ones we have been investing in for the past two decades.

I have not done the analysis to say exactly how much should be cut or from where, but I am certain that cuts will need to be made. Some funds can perhaps be freed up by not acquiring systems that are less essential to the missions the U.S. military will need to be able to conduct in

coming years, but these will not be enough. Roughly two-thirds of the base defense budget (not including overseas contingency operations) goes to pay for the personnel and operation and maintenance costs of our standing forces, with virtually all of the remainder going to pay for their ongoing modernization. If we want to maintain our technological advantage over China we will need to spend more on modernization, not less. The only way to do so, without increasing the overall defense budget, will be to reduce the amount we spend in those other two budget categories. If we simply pay our troops less, however, we will get less-talented people. If we spend less time operating and maintaining the forces, they will be less-well trained and equipped. The only other way to reduce personnel and operation and maintenance costs is to reduce the overall size of our forces.

Having to reduce the size of our forces is unfortunate and will impact the ability of the United States to keep military units present in various potential hotspots around the world, but it is simple reality. The good news is that the forces that remain will be more than sufficient in number for any plausible conflict with China. Even at this reduced size, moreover, if the United States were to become involved in a war in one part of the world (e.g., with China), the forces that were not committed to that conflict, though not as large as those that so easily defeated Iraq in 1991, would nonetheless be substantial and capable enough to cause any leader to think twice about trying to take advantage of U.S. commitment in one part of the world by threatening or launching a war somewhere else. Nonetheless, reducing the size of our military is always a difficult and painful thing to do.

We will soon learn if the latest Quadrennial Defense Review has made the tough choices that proper response to China's growing military capabilities requires. Given institutional inertia and the interests that are invested in the current U.S. force structure, however, I will be surprised if all of the needed choices are made. The likelihood that the Defense Department will take some but not all of the steps needed to respond to China's growing military capabilities raises the last issue I was asked to address, which is what policy recommendations I would present to Congress regarding China's military modernization and its implications for the United States.

My first recommendation, therefore, is, whatever cuts to force structure or acquisition programs the Department of Defense asks for, push them to make more. Ask them how each major force structure element and acquisition program they are intending to preserve contributes to our capability to respond to potential contingencies involving China. If the element or program does not contribute to our capability to respond to potential contingencies involving China, ask them to explain what other essential mission it does contribute to. If they cannot give a good answer to that question, then ask them, if that program were eliminated, how the funds used to support it could be used to increase our capability to respond to potential contingencies involving China.

My second recommendation is, where the Department *does* ask to make cuts to force structure or acquisition programs, the default position of Congress should be to support those cuts. That does not mean that the DoD will always make the right choices or that Congress should not scrutinize those choices, but, unless the force structure element or acquisition program being cut is clearly one that contributes to our ability to respond to potential contingencies involving China, Congress should give the DoD the benefit of the doubt. Virtually all DoD programs have value. The challenge is to ensure that the critical ones take precedence over the merely valuable.

Cutting forces and acquisition programs is not without cost. Some military personnel will have to leave the service and many communities and businesses are dependent on funds that come from military units and acquisition programs. As someone who lives in North Carolina, I come from a state that could be significantly impacted by a major reprioritization of defense spending. But the primary purpose of national defense is to protect the interests of the nation as a whole, not to support particular communities and businesses. If Congress and the Administration do not make the vital but difficult choices required to ensure the Department of Defense's ability to protect those interests, then they will have let those communities and businesses down as much as the rest of the nation.

China's growing military capabilities are presenting the United States with a security challenge of a magnitude that it has not faced since 9/11. Like 9/11, moreover, this challenge is one that has been building for years and will likely to continue to grow in the future, but is not apparent to most Americans. Responding to this challenge, therefore, will take foresight and courage. Foresight to recognize that action is needed now, before a crisis has occurred, and courage to make fundamental changes in the absence of immediate and imminent danger.

**OPENING STATEMENT OF DAVID GOMPERT
SENIOR FELLOW
RAND CORPORATION**

MR. GOMPERT: Thank you, Mr. Chairman, Commissioners. Thank you, Mr. Chairman, for pointing out that I have a connection with RAND, and most of the work I've done on China recently has been in connection with that association.

I agree with the analysis you've just heard and feel no need therefore to repeat it. I'm going to devote most of my seven minutes to--
HEARING CO-CHAIR TALENT: I have to say I read the bio that they gave me. I would have been even nicer if I were making up my own comments about you.

[Laughter.]

MR. GOMPERT: I haven't been able to keep a job for more than a couple of years for a long time.

I'm going to focus more on U.S. responses, but let me start this way. If one were to apportion U.S. defense spending over the last ten years according to which COCOM it supports, PACOM would get about 20 percent, CENTCOM would get about 45 percent, and then the rest spread out.

That's about what the Chinese have been spending on average over the last years on their military capabilities in the same part of the world. So on an economic basis, resource basis, we've been applying pretty much the same input. I would argue that the Chinese are getting a lot better output. The highest Chinese priority has been, as the previous speakers have

indicated, their anti-access/area denial capabilities. That is the capability to render vulnerable American forces in the region or coming to the region by virtue of Chinese ability to target those forces and strike those forces, which has consequences not only for any military operations but, as Roger Cliff has just said, for the politics of the region as well.

The Chinese have been doing very well in this regard as the previous witnesses have indicated. They've made significant progress, not only in absolute terms but relative to the survivability of our forces. They've got geographic advantages. They have economic advantages. That is for every dollar put into targeting capabilities, you get more operational payoff than every dollar we put into these big legacy platforms that we maintain.

They have technological advantages because of the global availability of the technologies associated with targeting the C4ISR.

The idea of trying to defend our forces, protect our forces, is not a particularly promising one against the likes of China for at least a couple reasons. Quiet submarines are hard to find. I know as an old anti-submarine warfare officer. And ballistic missiles are hard to shoot down when they come in very, very large numbers, and the Chinese have quiet submarines and they have large numbers of missiles.

So force protection could be the black hole of resources without a huge payoff. I think the U.S. military understands this, and after considering it for really a number of years, the Navy and the Air Force, in particular, have articulated a strategy of air-sea battle, and I do want to point out that in response to the situation I describe, this is a very rational strategy. Okay? It's a very natural strategy. And from a warfighting point of view, it's an elegant strategy.

The strategy, and at the risk of being a little bit unfair to the Air Force and the Navy, is essentially to disable the kill chain that would target and strike our forces before our forces could be used. But to do that involves substantial risks. One is the fact that most of the Chinese kill chain is on Chinese territory so let's not kid ourselves. We're talking about attacks on the Chinese mainland, but we're also talking about early strikes because if you're going to kill the kill chain, the best time to do it is before it can be used.

So as appealing as this might be from the warfighting point of view, it does pose problems of potential crisis instability and also escalation. Now, we didn't start this. The Chinese have already been developing a strategy that puts an emphasis on early strikes. In fact, Chinese doctrine has essentially been maybe the only way to prevail in a conflict with the United States would be to strike early, strike U.S. forces early with cyber and physical weapons.

But now you have a situation looming in which both sides have military strategies and are emphasizing military capabilities that put a premium on early use and conversely where the penalty for waiting gets very, very high. This is what we old Cold warriors used to call crisis

instability.

The reason I'm rather exercised about this is that while I hardly think that war out of the blue between the United States and China is very plausible, I think we're going to have friction and crises, and if we're going to have crises, and those crises could become unstable because of the respective military strategies, I think it's something that policymakers and not just military planners ought to be aware of.

So then how do we respond to the problem that we've outlined here? First, I should say there is no silver bullet, and the response is going to take a long time. Ten years let's say. The analysis that I have seen indicates that in the course of that ten-year period, the Chinese anti-access/area denial capability relative to our forces and their survivability is going to get very, very serious, something that our old friend Andy Marshall used to refer to as a "keep out" zone in the Western Pacific, which is among the world's most vital areas. Ten years from now.

I'm sorry to say I have no solution that is going to remedy these trends within that period. My solutions are of a much longer-term nature. The first is to think through and design different types of platforms, much more survivable platforms instead of large concentrations of strike power, particularly surface strike power. I would look much more at submarines, submarine-based strike power, and I would also look at much more numerous cheaper platforms for launching drones, for example. You don't need a \$12 billion aircraft carrier to launch drones.

So there are ways, but it will take a long time to create a more survivable platform for U.S. strike power in the Western Pacific. All the more reason to get started now.

The second thought I have, which I admit is even more creative, is for the United States to propose and pursue some form of multilateral regional maritime security regime. We have plenty of friends in the region that would sign up, and I think the Chinese should be invited. I think the Chinese would find themselves in a very difficult position if we were creating a regional maritime security regime, and they were left with the choice of whether to isolate themselves or to join in.

But because I think this would be a good idea for regional security and for American interests in the region. In any case, I would recommend serious consideration by policymakers of such an initiative, again, with the idea of inviting the Chinese to participate.

I welcome your questions after the next witness.

**PREPARED STATEMENT OF DAVID GOMPERT
SENIOR FELLOW
RAND CORPORATION**

Responding to China's Anti-Access Strategy

David C. Gompert
January 24, 2014

Thank you for the opportunity to share with the Commission my thinking about Chinese and U.S. military capabilities and strategies in the Western Pacific. These are complex, fluid, and potentially dangerous developments that demand attention beyond defense experts.

The following submission draws on work I have done on several issues I am told would be of interest to the Commission. None of these ideas represent the views of any of the institutions with which I am connected.

The Vulnerability Problem and Limits on Defense

Although the United States and China have compatible global interests, they are at loggerheads in East Asia. China's growing military power and its claims over much of the resource-rich South China and East China Seas are causing neighboring states, including U.S. allies, to seek U.S. military backing. Yet, as those states and the Chinese all know, U.S. forces in the region are becoming increasingly vulnerable to China's anti-access capabilities. This creates the prospect of regional instability, loss of U.S. influence, and heightened threat of conflict.

For their part, the Chinese regard U.S. forces in the region as menacing to China and its "core interests." They are, as a consequence, determined to neutralize the threat those forces pose, and they have considerable economic and technological wherewithal to do so. Taking into account demands on U.S. defense resources outside of East Asia (e.g., CENTCOM), China is already spending as much as the United States on military capabilities for East Asia. Moreover, China's investments in technology-based anti-access capabilities offer higher returns, in operational impact, than do corresponding U.S. investments in platform-heavy forces.

Just as geography and economics favor China in this competition, so does technology. China is achieving world-class sophistication in developing and applying the dual-use technologies on which advanced targeting – the key to anti-access capabilities -- depends. In particular, the Chinese are exploiting information and satellite technologies for sensing, networking, and precision-guidance to improve and extend the range of their targeting of U.S. strike platforms with missiles, submarines, and cyber weapons. Because of their strike capabilities and importance in projecting U.S. power in East Asia, U.S. aircraft carriers are in the bulls-eye of Chinese targeting.

Defending carriers, as well as surface combatants, troop carriers and other surface ships, against large numbers of anti-ship missiles and quiet submarines is difficult and expensive. Both

submarine warfare and missile warfare – two of China’s highest priorities -- are “offense-dominant” in that returns on additional investment in offensive capabilities exceed returns on equivalent investment in defenses against those capabilities. For all the effort the United States has put into ballistic missile defense (BMD) in the last three decades, it remains inadequate or prohibitively costly against complex saturation attacks by large, sophisticated states like China.³⁰ Current hit-to-kill BMD may work and be worth the cost against the likes of Iran or North Korea; but China can multiply and improve its missiles (or decoys) more readily than the United States can expand its intercept capacity. Precisely because they know BMD can be overwhelmed by large missile attacks, the Chinese have been building large missile arsenals.

Likewise, anti-submarine warfare (ASW) has made relatively little progress despite huge investment for a simple reason: submarines are hard to find. Just as deep waters with thermal variations frustrate active sonar, passive sonar can be frustrated by quieting submarine machinery. Consequently, non-acoustic technologies continue to receive attention; but results have disappointed. Moreover, sinking or disabling submarines with non-nuclear weapons is problematic. The lesson China has learned from the discouraging story of ASW is that, even against U.S. ASW, the world’s best, it makes sense to invest in large numbers of submarines.³¹

Just as U.S. aircraft carriers are becoming vulnerable, so are the land bases in the region that U.S. air forces use. As ranges, numbers and accuracy of Chinese missiles increase, so will the difficulty of defending these bases against them. Moreover, both carrier-based and land-based U.S. aircraft will have to contend with increasingly integrated and extended-range Chinese air defense networks.

U.S. strike platforms, e.g. aircraft carriers, can be placed beyond the reach of enemy sensors, provided their own weapons can still reach their targets. But the reach of Chinese sensors and weapons will continue to increase. It is a matter of time, technology and money – the Chinese have all three -- before China is able to deploy constellations of space-based sensors that can scan beyond the Western Pacific, track targets and guide weapons. China is a growing space power, with plans to launch 10 satellites on average per year, compared to 17 for the United States. As for missiles, the Chinese are already able to achieve intercontinental range, and they can achieve accuracy with geo-positioning technology.

In sum, the survivability of U.S. forces in the Western Pacific is already a problem. Moreover, given existing technologies, it is not feasible and affordable for the United States to reverse the trend of growing vulnerability by defending them better.

Air-Sea Battle³²

The U.S. Navy and Air Force know this. So they are responding with preparations to

³⁰ See Gompert and Saunders, *Paradox of Power*. NDU 2011.

³¹ Presumably, the U.S. Navy and U.S. Strategic Command also know that submarines are not about to become detectable and vulnerable, or they would not place the heavy reliance they do on the SSBN leg of the strategic nuclear triad.

³² See Gompert, David C., and Terrence Kelly, *Foreign Policy*

counter China's anti-access capabilities under the heading "Air-Sea Battle."³³ The concept seeks to "attack-in-depth to disrupt, destroy, and defeat adversary forces" across air, land, sea, space, and cyber domains by "first, disrupting [adversary] C4ISR systems; second, destroying adversary weapons launchers (including aircraft, ships, and missile sites); and finally, defeating the weapons an adversary launches."³⁴ This is to be accomplished by both physical and cyber attacks on China's anti-access "kill chain." Of course, if such attacks are tardy, China will be able to target and strike U.S. forces. Conversely, the earlier the kill chain is attacked, the more U.S. strike power survives – a feature the Chinese understand. Indeed, maximizing Air-Sea Battle's effectiveness requires attacking China's anti-access forces *before* they can attack U.S. forces.

Also significant is that most of China's kill chain – air and naval bases, missile launchers, air-defense systems, C4ISR centers – is located *in China*. This implies that U.S. forces, per Air-Sea Battle, would not only strike first but would strike targets in the Chinese homeland at the outset of hostilities. As the Chinese would see it, Air-Sea Battle is aimed at rendering China defenseless against follow-on U.S. attacks.³⁵ Furthermore, the Chinese are likely to regard attacks on their territory as crossing a strategic threshold.³⁶ While they would almost surely not respond with nuclear weapons, they could respond with other strategic options, such as cyber and anti-satellite (ASAT) attacks. It is this combination of the incentive to strike first and the need to strike China itself that lends profound strategic implications to Air-Sea Battle.³⁷

There is no reason to think that the Chinese will be resigned to the disadvantageous position into which Air-Sea Battle would put them – for again, they interpret it as a U.S. move to disable their defenses against U.S. strikes.³⁸ Chinese commentators are already calling for China to intensify its efforts to develop cyber-warfare and ASAT capabilities in order to counter Air-Sea Battle, which depends critically on the computer networks and satellites that connect U.S. C4ISR, platforms, and weapons.³⁹

In sum, Air-Sea Battle implies a U.S. threat of early strikes on Chinese territory; would be perceived as – indeed, would be – escalatory; could cause the Chinese to increase investment in and reliance on cyber-warfare and ASAT; and could divert the United States from addressing

³³ Schwartz, Norton A. (Gen., USAF), and Jonathan W. Greenert (Adm., USN), "Air-Sea Battle: Promoting Stability in an Era of Uncertainty," *The American Interest*, February 20, 2012.

³⁴ Greenert and Welsh, "Breaking the Kill Chain" (May 16, 2013)

³⁵ See, for example, Zhao Jinjun, "Objectively Viewing 'Air-Sea Battle,'" *Beijing Zhanyou Bao*, June 30, 2012, p.3.

³⁶ Such attacks would try to disrupt, destroy and defeat (D3) enemy A2AD capabilities by networked, integrated attacks in depth (NIA). See <http://navylive.dodlive.mil/2013/06/03/overview-of-the-air-sea-battle-concept/> for details.

³⁷ This is also how the Chinese understand it. See, for example, Global Times (on line), "'Not to be Misunderstood – Air-Sea Battle is Officially Directed at China!,'" January 12, 2012 (<http://mil.huanqiu.com/Observation/2012-01/2349817.html>)

³⁸ See, for example, Zhao Jinjun, "Objectively Viewing 'Air-Sea Battle,'" as one of several other publicly available documents that indicate such concerns.

³⁹ Derived from the previously noted Chinese public writings and statements in which they recognize both the dependence of Air-Sea Battle on cyber and space and their need to prepare for it.

the fundamental problem of the vulnerability of its forces in the Western Pacific. Air-Sea Battle is an advantageous war-fighting strategy, and provides capabilities that the United States ought to have. However, for it to be the only option the U.S. military would offer the President in the event of confrontation with China would be risky.

Crisis Instability

Stepping back, the growing emphasis in *both* Chinese and U.S. military strategies on early attacks could create conditions in which war becomes more likely. Having been impotent against two U.S. aircraft carriers during the Taiwan crisis of 1996, the PLA has embraced the idea that the best, if not only, way to avoid another humiliation is to be able to strike U.S. forces before they could strike China and its forces. While not seeking war, the Chinese especially dread a prolonged one, in which the full weight of American military strength would surely prevail. So they are crafting plans and fielding capabilities to take out U.S. carriers, air bases, command-and-control networks, and satellites early and swiftly. This is the Chinese military-operational strategy to which Air-Sea Battle responds.

The problem is that the combination of Chinese and U.S. military-operational plans and capabilities portends a textbook case of “crisis instability” in which the price for failing to attack before the opponent does is defeat. The danger lies in the fact that each knows the other is thinking the same way and so has all the more incentive to preempt if war looks imminent -- or probable, or maybe just plausible. China would want to attack U.S. strike forces before losing the kill chain that enables it to do so, and the United States would want to attack the kill chain before it enables China to attack its forces. Given the penalty for attacking second and the incentive to preempt, such logic can turn crisis into war.

Still, it would take some spark to ignite actual hostilities. Moreover, generals and admirals do not make the decision to go to war: presidents do. While there is some comfort in expecting that political leaders on both sides would tamp down tensions and not order preemptive attack, it does not take much imagination to see how circuit-breakers could fail in the heat of a crisis. There are several sources of friction in East Asia that could cause a Sino-American showdown: Chinese enforcement of its air-identification zone or harassment of Japanese vessels in the disputed East China Sea could dictate a U.S. show-of-force; U.S. naval forces could oppose a Chinese attempt to restrict freedom of the seas in the South China Sea; instability in North Korea could bring both China and the United States to consider intervening to get Pyongyang’s nuclear weapons under control; China might contest the presence of U.S. ships or aircraft suspected of snooping off its coast; Taiwan could declare independence.

In any such situations, an incident or mistake could transform the logic of avoiding conflict into the logic of avoiding defeat. Even if politicians are cautious, their military advisors and commanders would open their play-books and prepare their forces accordingly, as good officers do. Although U.S. political and military leaders are steeped in the principle and procedures of firm civilian control, not so their Chinese counterparts. The PLA, once under tight Party control, now has a corner on Chinese military expertise, a voice in war-and-peace decisions, and a propensity to take chances to show that China can no longer be pushed around. If in a crisis the PLA advised China’s political leaders that U.S. forces were getting ready for war

and China's only chance to avoid defeat was to strike early, per the plan, would Beijing say no?

If at the same moment U.S. military commanders advised the President that the PLA was gearing up and could preempt unless U.S. forces acted, would Washington risk the loss of U.S. carriers, air bases, personnel, and credibility by waiting? Thus, current efforts by both sides to enhance their ability to eliminate threats early and quickly would increase the consequences of allowing the other side to strike first and put a premium on early action. This, in turn, makes it less likely that political leaders could defuse a Sino-U.S. confrontation before it turned violent.

The advent of cyber-warfare could add to the potential instabilities of Chinese and U.S. military-operational planning. Having identified U.S. C4ISR as the pivotal vulnerability of U.S. capabilities and strategy, there is every reason to expect the Chinese to initiate cyber-warfare at the outset of an armed conflict, or even as a precursor. But by the same token, Chinese vulnerability to cyber-warfare is growing as it increases its reliance on networks for targeting and extends the reach of its sensors, weapons, and communications far beyond China. Consequently, the U.S. military may be increasingly inclined to resort to cyber-warfare against the Chinese kill chain; indeed, explanations of Air-Sea Battle make no bones about this.

Although C4ISR networks are presently well protected, it is unclear how long this will remain the case. Firewalls, patching and other network-security measures can provide some protection against lesser state and non-state cyber threats. But against projected offensive cyber-war capabilities and complex attacks of the sort China and the United States may be capable defense could prove inadequate.⁴⁰ Moreover, because much IT infrastructure is dual-use, attacks against military networks involve a danger of escalation to general cyber-war, including against dual-purpose networks, critical cyber infrastructure, commercial and civilian systems. Given their network vulnerabilities, the difficulty of defense, and the other side's offensive strength, both the United States and China will have strong aversions to such escalation. This presents a major dilemma for *both*: how to use cyber-warfare against enemy C4ISR in the event of a conflict versus how to minimize the risk of open-ended, even uncontrollable cyber-war. This dilemma demands the exercise of tight political control by both states to avert escalation.⁴¹

Again, prevailing Chinese military strategy gives the U.S. military a strong incentive to initiate cyber-warfare, and Air-Sea Battle would give the Chinese an equally strong incentive. Indeed, the availability to both sides of cyber-warfare options could aggravate the underlying problem of crisis instability. If each is already poised to strike early if not preemptively for fear that waiting will endanger its forces, there could be a temptation to initiate cyber-warfare. Because it is non-lethal, may be difficult to attribute, and may not be regarded as justification for response with kinetic weapons, cyber-warfare could be viewed as a comparatively low-risk way to degrade the enemy's C4ISR and thus its ability to fight – especially if there is reason to anticipate that the enemy will also resort to cyber-warfare early. The threshold for cyber-warfare could be low; the temptation high. On the assumption that the initiation of cyber-warfare could lead to regular hostilities, it could further increase the danger that crisis could lead to war.

⁴⁰ See Gompert and Saunders, *Paradox of Power*

⁴¹ Ibid

The combination of military strategies that favor early strikes and the low threshold of cyber-warfare has the potential to increase the risk of war that neither the United States nor China would rationally want. If crises are potentially unstable, the probability of war becomes a function of the probability of crises, which we know are not improbable. This makes it critical for political leaders to be (a) thoroughly familiar with military plans and their implications, including those for cyber-warfare and (b) have in place effective crisis-management communications channels.

Toward a Less Vulnerable U.S. Force

If there is a solution to the vulnerability problem that would improve stability, strengthen deterrence, and serve U.S. interests, it lies in outsmarting China's anti-access strategy and targeting capabilities. Taking full advantage of information networking, the United States could shift toward more distributed, numerous, diverse, elusive, small, long-range, and hard-to-find naval strike forces, while also exploiting two promising capabilities: drones and cyber-warfare (though taking into account the dilemmas concerning cyber-warfare just explained).⁴² The particular elements of a less vulnerable U.S. posture could include:

- Submarines
- Long-range strike
- Unmanned systems (air, surface, sub-surface)
- Larger numbers of diverse and smaller missile and aircraft platforms
- Continuously improving, distributed C4ISR networks

If Chinese submarines are a growing challenge to U.S. ASW, Chinese ASW has little hope of finding U.S. submarines. The U.S. Navy is already increasing the role of submarines for extended-range precision strike with conventional ballistic and cruise missiles. How many and what kind of submarines should be made available for this purpose remain important open questions. The way the United States designs and builds them, submarines are very expensive – even more expensive than aircraft carriers per unit of strike payload. The U.S. commitment to nuclear-powered submarines reflects the need for distant and lengthy patrolling. Yet, large numbers of much cheaper non-nuclear-powered submarines – even with shorter “legs” – could be a U.S. conventional-strike option as China improves and extends its anti-surface capabilities.

Hand in hand with hiding U.S. targets is befuddling Chinese targeting with increased complexity. For the U.S. Navy, more numerous, diverse, small, fast, and stealthy strike platforms (and decoys) would be a major challenge for a Chinese targeting system that is designed against a few, big, slow, and unmistakable high-value ones. Unmanned vehicles, vessels, and ship-launched aircraft are less costly and more expendable than manned platforms. In larger numbers, and in combination with various strike platforms, they can complicate Chinese targeting and C4ISR. Because a diverse alternative force could be widely distributed, China's surveillance, tracking, and targeting problem would be much more difficult.

A more survivable U.S. posture along these lines would be neither destabilizing nor

⁴² A detailed description of what this would mean for the transformation of U.S. Naval forces can be found in *Sea Power and American Interests in the Western Pacific*, David Gompert, RAND, 2013.

escalatory. Rather, by facing China with a more complex targeting challenge, it would discourage Chinese preemptive attack, obviate the need for U.S. preemptive attack, and allow time to defuse a crisis. Because forces that could do this could pose a significant threat without placing a premium on early strikes, and because striking them comprehensively would be very difficult and risky for China, they would strengthen deterrence without detracting from stability. Although such forces will take years to field, that is all the more reason to start now.

This is not to say that legacy platforms, including large aircraft carriers, have no future in the Western Pacific. The traditional blue-water fleet will remain potent, relevant, and survivable in most regions, and so will be available for East Asia. Moreover, surface combatants will remain important in expressing U.S. commitment and advancing U.S. interests – roles for which the more elusive capabilities just prescribed are not ideal. But by networking them with less vulnerable platforms, their effectiveness and even their survivability can be enhanced. At issue is the balance between concentrated sea power and distributed sea power. The view here is that the balance should tilt increasingly and as quickly as prudently possible toward the latter.

Maritime Security Cooperation

Given how long it would take the United States to deploy substantially less vulnerable forces to the Western Pacific, and the fact that it cannot meanwhile retreat from this vital region's waters, the United States should also pursue a political alternative—one that engages its regional partners and, ideally, China itself. While it may be a long-shot, the United States should explore the idea of cooperative maritime security in the region, leaving to China whether to participate or not. The current flare-up of tensions in the East and South China Seas may seem to make this idea seem a bit romantic. However, it could also be such tensions could make avenues for cooperation more interesting to all parties.

With the rapid expansion of sea-borne commerce and sea-bed resource extraction that has accompanied globalization, the idea of collective maritime security, first championed by Admiral Mike Mullen, when Chief of Naval Operations, has gained momentum in a number of regions (other than East Asia).⁴³ Even as the dominant sea power, the United States cannot assure access in every ocean, littoral, and choke-point where it is needed in today's world. Just as the United States is capitalizing on its sea power to mobilize and lead others toward cooperative maritime security elsewhere, it should try to do so in the Western Pacific, where the stakes are highest.

Because East Asia is a virtual archipelago of interdependent economies spanning some of the world's most important seas, it could be argued that no region has a greater need for a collective, inclusive approach to maritime security. Moreover, because the region's sea-faring nations are prosperous and have competent navies, it is reasonable that they should do their fair share in securing waters that are at least as important to them as to the United States.

Accordingly, the United States should propose and pursue an East Asian maritime partnership, inviting to join all states that share its interest in assured access and passage. Such

⁴³ The seminal statement of the idea of cooperative, U.S.-led maritime security came in Mullen's speech "A Global Network of Nations for a Free and Secure Maritime Commons," at Naval War College, Newport, R.I., September 2005.

cooperation could be predicated on the norms that disputes should be settled nonviolently and that civilian shipping engaged in peaceful, peacetime trade should not be threatened. These norms could be buttressed by enhanced maritime information-sharing, crisis consultations, joint exercises and operations (e.g., against non-state threats), and measures to avoid incidents. Realistically, resolving the region's complex maritime legal disputes should not be a precondition for creating or joining the partnership; but a pledge to refrain from force in the meantime should be. While such undertakings would not preclude military competition or conflict outright, they could reduce mistrust, mistakes, and mismanaged crises of the sort that are more likely than rational forethought to trigger Sino-U.S. hostilities.

Assuming that China would be asked to be part of it, the question then arises as to what threat would motivate the formation of the grouping. Apart from such external threats, an East Asian Maritime Partnership would, if including China, constitute a classic *collective security* arrangement. Theoretically, collective security is undergirded by an understanding that all participating states will refrain from force and other aggressive conduct. Further, it is enforced by a corresponding understanding that the participants will organize and act against any state that violates the collective security – even if that state had acceded to the grouping. In effect, a collective security arrangement can be transformed into an alliance against any wayward state.

Along this line, China could be invited and urged to join provided certain criteria are met. The matter of criteria thus becomes dispositive. While the United States and its partners would want to attract China's involvement, they would also want to ensure that the goals of regional maritime security are served. To this end, the principal criteria for China (and all others) to enter an East Asian Maritime Partnership might include:

- agreement that outstanding maritime-territorial and resource disputes be settled peacefully, consensually, and through international legal norms or processes;
- rejection of the use of force against commercial and civilian shipping and activities (even in the event of claimed encroachment);
- acceptance that the United States has as much right of access to East Asian waters as any country of the region – for that matter, any country of any region -- does;
- agreement to transparency, crisis consultations, confidence-building, joint exercises, and joint operations; and
- naval cooperation against any state that rejects or violates these norms.

Again, settling maritime disputes should not be a precondition of an East Asian Maritime Security Partnership. Rather, it is intended to prevent these disputes from leading to armed conflict and to afford security for economic activities. Precisely because the scramble for islands, waters, and resources in East Asia is already harmful to both economic development and security, a general pledge to act peacefully and cooperatively ought to be a criterion of a regional collective maritime security regime.

An invitation to join on such terms would leave China with the choice of whether to proceed multilaterally or unilaterally. There are at least three possible results: China could decline and reject the grouping and its criteria as anti-Chinese; it could join but then fail to adhere to the criteria; it could meet the criteria, join, and become a valued partner. The United States should aim for the third possibility. Of course, gaining Chinese acceptance would be a tall

order -- the key being to make it plain that the multilateral maritime cooperation in the region will go forward with or without China. A number of China's neighbors -- Japan, Australia, Singapore et al -- are developing advanced and capable naval and anti-naval forces. While the United States should not seek to align them against China, the Chinese should think twice before rejecting a cooperative maritime arrangement.

It might be that Chinese nationalism, weak civilian control of the military, and distrust of American motives would make China's accession to regional maritime cooperation unlikely, at least for now. Chinese ambivalence toward U.S. military-to-military contacts over the years suggests a need for American patience and persistence. The United States has tried repeatedly and earnestly to create channels of communications on security matters in hopes of reducing mistrust and preventing mistakes (e.g., incidents at sea).⁴⁴ It has recently upped the ante by proposing to include China in exercises at sea. So far, the only serious maritime cooperation with China has been in countering Somali pirates far from the Western Pacific.

The PLA Navy (PLAN) has been the least interested in the on-again/off-again contacts that do occur. When China has made provocative moves in the East China Sea and South China Sea, or has reacted strongly to what it perceives as provocations by others, the navy is the agent, if not master-mind. Because the PLAN's ambitions depend on treating the United States as an enemy of and threat to China -- as German admirals argued Great Britain should be treated in the late 19th Century -- its interest is not in engaging in maritime cooperation but in foiling it.

What, then, would make one think that collaboration in maritime security has *any* chance of success? Clearly, it will not happen under current conditions. But the United States could change conditions by proposing and proceeding to create an East Asian Maritime Partnership with or without China. This would provide the United States with leverage it now lacks. If the Chinese elected to remain apart, despite a sincere invitation to participate, this would provide the United States and its other partners all the more reason to view China as a threat to regional maritime security. Most likely, the Chinese would be divided over the propositions advanced here. They might lobby their neighbors to rebuff the American plan; but in view of regional attitudes about Chinese maritime ambitions, they would not succeed.

It appears a debate has begun in China about whether the last ten years of increased power and forcefulness have produced desirable results. Some astute Chinese believe that China's behavior has caused the region's other states to seek the shelter of U.S. security links. U.S. relations have strengthened with South Korea, Japan, Vietnam, Singapore, Indonesia, Australia, New Zealand, The Philippines, even Burma, while China's only ally, North Korea, is a growing liability. If Chinese fear of isolation were to prevail over faith in intimidation, Chinese civilian leaders might consider regional maritime security cooperation an opportunity.

⁴⁴ Historically, the Chinese attitude toward security cooperation has been hesitant, ambivalent, and conditional. After agreeing to contacts, the Chinese then suspend them when in their view China has been dissed, e.g., by U.S. arms sales to Taiwan and support for Chinese dissidents or alleged separatists (e.g., the Dalai Lama). American officials and observers now wonder whether the main effect of U.S. efforts to engage Chinese counterparts has been to hand the Chinese leverage on other issues in the relationship. On the whole, senior U.S. officers have reason to feel that they have gone the extra mile to engage China, only to be frustrated.

Whether China participated or not in a cooperative approach, the United States would retain and modernize its naval capabilities for war-fighting, along the lines recommended earlier. In no case should the United States mortgage its ability to defend its interests, its allies, its forces, freedom of the seas, and commercial shipping throughout the region. Conversely, multilateral cooperation with the region's capable sea-faring states would be advantageous for the United States in any case.

Conclusions and Recommendations for Congress

The emerging Sino-U.S. relationship is at once complex, ambiguous and delicate. It combines the promise of cooperation on global security with the prospect of competition and possibility of crisis in the Western Pacific, where China's growing might, dynamism, and ambition are in tension with America's determination to preserve equilibrium. Even in the region, war would be irrational. If it occurred, it would most likely be because of crisis-mismanagement. My concern is that both powers are moving toward military postures and embracing war-fighting concepts, if not plans, that could produce a spiral of incentives to act before the other does. This has been evident for some years in Chinese military writings, and now it could be inferred from American military writings.

The United States should counter Chinese anti-access capabilities in a way that strengthens, not weakens, stability. The key to that is to develop and field the most survivable forces technology permits – less concentrated and less conspicuous than today's easy targets for the Chinese kill chain. Movement in that direction is not likely to come from the U.S. armed services without a strong nudge from their civilian leaders, and at best will take years. Similarly, U.S. policy-makers – and, for that matter, Chinese policy-makers – should insist on reviewing operational plans, including those for cyber-warfare, to ensure that war-winning notions do not make war more likely.

While the odds of inducing China to join in a regional maritime-security partnership may seem long, the United States should consider proposing such cooperation open to but not dependent on Chinese participation. Such cooperation would be beneficial whether or not China agrees to participate; moreover, the Chinese might opt to join if the alternative is isolation.

In sum, the United States has both technological and political options that could strengthen crisis stability, lessen the intensity of military rivalry, reduce the danger of conflict, and yet retain a U.S. advantage in the event of conflict.

With the foregoing in mind, Congress could play a helpful role in improving the ability of the United States to safeguard its interests, reassure its friends, and sustain its stabilizing role in the Western Pacific, while also reducing the risks of conflict and increasing the scope of cooperation with China. The following ideas deserve consideration:

- *In authorizing and appropriating funds for the Department of Defense, scrutinize the survivability of existing and new weapons platforms be explained and favor research and development of inherently less vulnerable ones.* The transition process will be lengthy, given long life-cycles and program inertia; so Congress

should be patient but persistent. Congressionally-mandated analysis of the cost-effectiveness of force protection relative to that of inherently less vulnerable forces would be a logical place to start.

- *In questioning senior military officers about strategies and plans, raise the matter of crisis stability – that is of incentives to act first.* In this same spirit, question Administration witnesses as to whether the strategic implications of military-operational plans have been spelled out and are understood. What may be a good war-fighting approach (e.g., Air-Sea Battle) could also heighten Chinese fears that the United States would initiate conflict by striking China itself. Given the growing possibility of crises in the Western Pacific, this deserves early attention. Congress could find it important to request an Administration and/or independent study of the implication of emerging Chinese and U.S. military strategies.
- *Seek to clarify the reasoning and implications of U.S. military plans for cyber-warfare in the context of Sino-U.S. hostilities.* Although the United States must be prepared for cyber-warfare in virtually any 21st-Century conflict, when, how, and to what end it would engage in it are consequential questions. Because this is a formative matter being debated both inside and outside of government, it is important for Congress to become knowledgeable and constructively skeptical.
- *Support the idea of multilateral maritime-security cooperation in the Western Pacific.* To be clear, the U.S. has not resisted Sino-American military cooperation; rather, the problem has been on the Chinese side. The analysis here is that (a) multilateral maritime-security cooperation would be advantageous whether or not China accepts an invitation to participate; (b) the Chinese are more likely to participate if the alternative is to be isolated. Therefore, doubts about a positive Chinese reaction should not discourage a multilateral approach.

Security issues stemming from Sino-U.S. military competition are as complex as they are critical. U.S. policy-makers and military leaders are grappling with them thoughtfully and prudently. I respectfully suggest that these are not matters for dividing branches or parties, but instead for open, frank and patient conversation, informed by rigorous analysis.

**OPENING STATEMENT OF THOMAS DONNELLY
RESIDENT FELLOW AND CO-DIRECTOR OF THE MARILYN WARE CENTER
FOR STUDIES
AMERICAN ENTERPRISE INSTITUTE**

MR. DONNELLY: Thank you. It's a pleasure to see old colleagues, particularly Bill. I look forward to what you have to say. It's good to be here.

I'm conscious of the fact that I'm the last witness at the end of a long day. So I brought cartoons which also allowed me to defer the completion of my written testimony until I could finish it.

So I'm going to quickly--I hope everybody has got the slides--I'm going to zip through them. This really reflects just simply the part of my testimony I wanted to concentrate on, but the theme of the testimony is, and I think it's complementary to the previous witnesses, is to try to begin to get

our arms around what would be a generally strategic response to the problems posed by China's military modernization.

Particularly at the end of his testimony, David Gompert got to what is I think at the threshold of the point that we need to pursue further. So far our response has been primarily technological, tactical and to some degree operational. As David suggested, I would say there are a lot of problems with things like air-sea battle, one of the big ones, of course, being striking a nuclear power on its own homeland, with weapons that really aren't that big.

But on the other hand, I would also like to dial back a little bit to remind everybody that our interests in the region-- the Pacific pivot-- really is not anything new. It's a little unhappy to refer to Dean Acheson's famous "leave Korea out of the perimeter" speech, but if we can overlook that for the moment, the underlying logic I think is worth reevaluating. We have a defensive perimeter that runs all the way forward from an American perspective in the Western Pacific.

It has been that way since the end of World War II fundamentally. If you flip to the graphics--and the second slide is also kind of a trip down a nostalgic lane--these are graphics from the Christian Scientist Monitor and the New York Times of the early 1950s, particularly the map on the left is from the Times. You can see the little perimeter line that skirts the Chinese coast. Ah, for the days when that's the way that the New York Times thought. They don't think that way this day, but what I'm trying to suggest is this is pretty fundamental military geography.

The second graphic I think is worthy of note because we concentrate so much on the First Island Chain and the defense of the perimeter but forget that this is really a very deep-lying position for us. That's a strategic and military advantage that we need to exploit, but it's also, as previous witnesses have suggested, a bit of a weakness. Reinforcing from these positions, particularly if the lines of communication are at risk, is going to be extremely difficult.

I would also say, as the last prefatory remark, I want to concentrate primarily on deterring a war, on things short of warfighting. One of the things that we did when I served on the Commission was oversee the QDR legislation, and if we've made any mistake over the last 20 years, it's to sweep unhappy contingencies or scenarios into the lesser-included-cases file.

If patrolling and presence in the Pacific is a lesser-included-case, our deterrence challenge will be raised exponentially. So I want to talk about preventing war, raising the bar to China, using the capabilities that have been developed and primarily in a political way.

Last map is on the next slide, and it's really just to reorient people to what I would regard as our current position. The dotted line is the First Island Chain. That's our perimeter. The area defined by the yellow, the Philippine Sea, is really our rear tactical area of maneuver, and Guam obviously in the Marianas is the primary position we now have spent a lot of

money reinforcing that. It's increasingly going to be vulnerable, but if we're not up, able to use the Philippine Sea, in particular, with ease and safety, we're going to be in a world of hurt when it comes to responding to crises along that perimeter.

Two graphics to suggest how the temperature is going up on the front line; my colleague at AEI, Phill Lohaus, did these. The first graphic shows the location, the intensity and the frequency of the incidents that happened in the South China Sea, and particularly the East China Sea, and just for recent news value, we've overlaid the Air Defense Zone that the Chinese declared a month or so ago over top of it.

So they are pushing out, bumping shoulders up against particularly our treaty allies and our strategic partners in the region, and that's a graphical representation.

And the chart that follows that shows how the pattern is changing over time. As you can see, since 2010, the frequency of incidents is rising really dramatically, and I don't see any reason to believe that this trend won't continue as the Chinese develop more capabilities and as they succeed from their point of view in what they're trying to accomplish. They want the fruits of war without actually having to fight the war.

The next three maps I won't go through in detail, but they're more detailed snapshots of the three elements of the perimeter that I think are most crucial. The thing about the South China Sea that we should always, or that is really striking now, is that since we left the Philippines 25 years ago--for very good reasons--there's a giant salient in what used to be the perimeter; there's a hole in the line. Something should be done about that. We should be thinking about that.

And I'd like to flip just because I'm almost out of time to the two slides that have the overly cute headline "Exit PLAN." As David Gompert suggested, quiet submarines, nuclear-powered submarines with long patrol capabilities, that are quiet enough to skirt the shallow waters of the South China Sea and then to make a break for the Philippine Sea to the deepwater trenches -- in particular, that are just beyond the First Island Chain-- is like a "Hunt for Red October" nightmare.

To overdraw an analogy, this is like the old GIUK gap. We're not really listening to that water. There are capabilities that could do so, and our anti-submarine capabilities have been focused on trying to flood a zone intensely over a short period of time for the last 20 years.

So that constant ability to patrol, and as the Chinese get an increasing number of these 095-type submarines, assuming that they are what we think they are, this is a very critical military vulnerability. When they get out into the Philippine Sea, our ability to reassure our allies, to reinforce in time of war, is going to be seriously jeopardized.

So with that I've concluded the testimony. I appreciate your tolerance and indulgence.

PANEL III QUESTION AND ANSWER

HEARING CO-CHAIR TALENT: Thank you, Tom, and thank you for the really cool graphics, too. It's really nice.

MR. DONNELLY: I spent a lot of money to make them up. I thought I'd get extra use out of them.

HEARING CO-CHAIR TALENT: Okay. Dr. Wortzel is recognized first.

COMMISSIONER WORTZEL: I want to talk about your slides for a second because I think they're a nice job on illustrating.

First of all, your frequency chart spans two Communist Party General Secretaries, which suggests a broader consensus in the Central Military Commission and the Politburo, or Politburo Standing Committee, on this more aggressive approach. So we've got ten more years of this to look forward to.

MR. DONNELLY: It also suggests the younger leadership is more aggressive.

COMMISSIONER WORTZEL: Right. Now, the other slides, I would invite you to comment on. You have this one where you're showing the 095, the nuclear sub, the Osumi, Miyako and Taiwan Straits, and Taiwan Trench on one slide, the Luzon Strait on another. You kind of leave out the Sunda and the Lembeh, but you talk about them.

In any case, what struck me as I looked at that is a real opportunity for longer-range diplomacy, capacity building in friends and allies, where you could see the Japanese quite capable of handling Osumi and Miyako. Taiwan, don't focus on the Taiwan Strait; block at the Taiwan Trench. The U.S. handles Luzon and probably the Australians Sunda and Lembeh.

That really complicates things diplomatically and from a political and military standpoint for the Chinese, but that requires a diplomatic approach and a military diplomatic approach in capacity building now. So I would invite you and anybody else to comment on that.

MR. DONNELLY: I would thoroughly agree, Larry. I think actually the level of investment and the willingness of the potential partners to take a share of the cost and to develop operational procedures that will make those investments militarily effective is very high. I think there is Cold War precedent for this. Nobody really wants to have Chinese attack boats running around without us around or without the world, I mean it's a shared goal, an achievable one, but one that does require some investment, both diplomatically and at the coalition level.

Again, as I understand it, the technologies that would allow us to constantly listen and monitor those straits but also the deepwater, there are ways to turn the trenches into good places to listen.

So it is a great opportunity, but it's really at the other end of the spectrum from prompt global strike or, the things that have really been front and center in figuring out how to respond technologically and tactically to

the Chinese challenge.

COMMISSIONER WORTZEL: On the other hand, prompt global strike might be attractive to some, but it scares the hell out of our allies and is highly escalatory vertically and horizontally, and these things, they're pretty defensive and require less capacity building.

MR. DONNELLY: I completely agree.

MR. GOMPERT: With some colleagues at RAND, we're looking at another idea which actually dovetails with this notion of capacity building with allies and friends in the region. I mean it begs the question, well, what capacity are you trying to develop?

What if we were to turn this logic of force projection and anti-access on its head? We're the ones who are clinging to the idea of the ability to project force right into the teeth of this improved anti-access capability, which I indicated earlier has technology, geography and economics going forth.

But if we were to focus more on frustrating, defeating, preventing, and deterring projection of force by China, in thinking about how we can do that without putting ourselves in the position where the only option the President would have is to attack China itself early, we should look harder at the technologies associated with anti-access/area denial. And guess what? We are very strong in those technologies. This is all about sensors. It's all about targeting.

And if we were to change the frame of reference, what we would discover is that with our allies and friends in the region, we could make consequences for the Chinese projecting power, particularly over distance--you know, the closer it is to China, the harder it is to stop it--over distance, we could establish prohibitive costs for that where we're the ones who are able to exploit the technological and economic advantages of these particular capabilities. But it does require a very different way of thinking about what our defensive purposes are in the Western Pacific.

COMMISSIONER WORTZEL: Thank you.

HEARING CO-CHAIR TALENT: Okay. Next up is Commissioner Wessel.

COMMISSIONER WESSEL: Thank you, gentlemen. Tom, good to have you here. We always tolerated you when you were on the Commission so I'm glad that continues.

I want to try and understand the last, Tom and Dr. Gompert, your interchange, and welcome everyone else, because it seems to me there is some inherent or internal conflict. On the one hand, Dr. Gompert, you were talking about the need to have, if possible, some kind of multilateral or regional maritime security regime. Separately, you're both arguing for enhanced capabilities for sensors, et cetera, which, in some ways is, I understand, an early warning system; it can also be viewed as a containment strategy, if you will, by some.

How do those two work together? Can we accomplish both? I mean how would China view the enhanced sensors with your call to include

them as well in some maritime security arrangement?

MR. DONNELLY: That's an excellent question. I'm very pleased to try to answer that question. I think it's important to remember the difference between a policy of containment. On the other hand, I wouldn't necessarily--we should also remember what it actually was historically speaking. But set that aside from a military strategy of deterrence. We still want to trade with China. We still want to have cultural interactions. We want to do all the other stuff.

We just want to prevent them from changing the geopolitical system by the use of force either through intimidation or actual employment. So I think that's a little bit overly simplistic, but I think it is a useful way to remember what we're about. We certainly want to deter China from using its military power to intimidate our friends, to deny us access, et cetera, et cetera.

That's not the same thing as a policy of deterrence. There's no reason why we couldn't continue to engage or, whatever the opposite of containment is. So at the policy level or the political level, both these things are not contradictory. They actually I think are mutually supportive.

COMMISSIONER WESSEL: Would you liken it then to the '80s strategy around arms control of "trust but verify"?

MR. DONNELLY: Again, I'm happy to just take it on the face value of what it is. I think also politically we want to complicate China's go-to-war decision. We don't want them to be able to use force discretely against just us or just the Japanese. We want to have a coherent coalition so that go-to-war decision for China or use-of-force decision is a very unpalatable one.

You know, attacking Japan for China is not an easy decision to have to make. So the ability to tie in the Japanese, to have sort of reinforcement along the frontline as well as from our support areas in the rear is critically important. Again, just making that go-to-war decision for the Chinese as unattractive as we possibly can.

COMMISSIONER WESSEL: So would you see the multilateral security arrangement as being something that is possible, desirable?

MR. DONNELLY: You know, from my trips to Southeast Asia, this kind of maritime surveillance which would be a much lower--they don't have to worry about the submarines so much, but the partners in the region, that's the kind of military presence they would like. It would help the Indonesians and the Filipinos control their own national waterways to be able to see what's going on. You know, what's wrong with that?

So I think this is a much easier lift than some of the other parts of the military response to China that would be necessary but much harder to do.

COMMISSIONER WESSEL: Dr. Gompert.

MR. GOMPERT: First, it's worth pointing out that the U.S. military has been quite forthcoming about engaging the Chinese in military-to-military contacts, exchanges, and cooperation, including maritime

cooperation, so there's been no hesitation on the U.S. side. Prudence, but nevertheless a willingness to pursue more than we currently do.

The resistance has been very much on the Chinese side, especially the PLA, and within the PLA, especially the Navy, which, of course, defines itself as being the corresponding force to American presence in the region, which the Chinese find menacing.

So this has been a problem, and I quite admit that it is maybe not a pipe dream to think that the Chinese would play, but I think to offer the Chinese participation would be very important.

I think from a deterrence point of view and a regional reassurance and cohesion point of view, some kind of a multilateral, at least maritime, partnership would be very advantageous.

I think the more interesting question is what does it mean to involve the Chinese in something like this? If you go all the way back to the genesis of the idea of maritime security cooperation, Mike Mullen, who spoke of what was then called the "thousand ship navy," he made it quite clear that this was not going to derogate from American superiority at sea or from the importance of maintaining that superiority and the willingness and the readiness to use it, but he just felt that it was a very good way to complement preparations for warfighting and pure deterrence.

And I don't think I can articulate any better than Mike did at the time, but it requires a degree of nimbleness on the part of the United States, agility to manage this sort of two-part strategy that is going to be a challenge.

We're a big lumbering superpower, not always the most nimble, but clearly the idea would be, to the extent that a more cooperative approach seems to be working where the Chinese are involved, where the Chinese are participating in joint patrols and so on, where perhaps the degree of tension over the maritime disputes is receding, that suggests that maybe we're moving in a promising direction, and that while you don't lower your guard or your capabilities to deter, it at least invites you to pursue harder the cooperative approach.

But by the same token, if they absolutely refuse to participate, or agree to participate and then try to torpedo the endeavor, that also tells you something in which case you sort of shift to your other foot.

But it seems to me worth a try, and if we had the agility, worth it to have both in play.

COMMISSIONER WESSEL: Thank you.

HEARING CO-CHAIR TALENT: Go right ahead.

MR. STOKES: If I may, I'd like to pull on that thread a little bit, this issue of regional security cooperation arrangements or regional security arrangements. In the late 1970s, early 1980s, the former Soviet Union, began to deploy what at the time were significant capabilities that at the time were viewed as quite destabilizing.

Those military capabilities included increasingly accurate and lethal ballistic missiles, conventionally capable ballistic missiles SS-21 and

SS-23. At the time, they were viewed as quite destabilizing because of what was required to be able to defend against them, which meant going after, because they're difficult to intercept in flight, required going after the targets at their source, being able to interdict the command and control and the actual operational infrastructure on the ground.

The perceived instability of land-based ballistic and land-attack cruise missiles was sufficient enough to warrant negotiations that concluded with the Intermediate Nuclear Force Treaty in December of 1987.

The perceived instability of ballistic missiles was viewed as sufficiently dangerous that there was international agreement to form the Missile Technology Control Regime because of the inherent instabilities associated with land-based ballistic missiles, because of difficulty in intercepting in flight. There is a Hague Agreement also.

Is it coincidental that the PLA began to invest heavily in conventional ballistic missiles a mere six months after conclusion of the INF Treaty in December 1987? Is it mere coincidence that the PLA formed the first Operational Test and Evaluation Unit to be able to deploy the DF-15 or the CSS-6 in Jiangxi Province about the same time, after the last terms of disarming all ballistic missiles, both Soviet Union and the United States disarming, basically disarming the entire arsenal of ground-based ballistic land-attack cruise missiles with ranges between 500 and 5,500 kilometers. The most successful arms control treaty in history.

But one has to question why since that period with the MTCR and with the United States and former Soviet Union locked into the most successful arms control agreement, there has been utter and deafening silence about the PLA's emphasis in centrality of long-range precision strike assets, land-based ballistic and land-attack cruise missiles. Utter silence.

This has become an issue though. In early 2007, the Russian foreign minister at the time, I believe Medvedev, as well as Putin, basically threatened to withdraw from the INF Treaty unless that treaty was made multilateral, stating that it's unfair that they're restricted in their military modernization by an agreement that does not extend to other countries around the world.

they used the word "neighbors." They didn't say who. It was sufficient enough that President Bush and President Putin both for the 63rd U.N. General Assembly actually did call for multilateralization of the INF Treaty. But since that point, there's been very, very little discussion about the fundamental instability about this one capability.

So if there was an initiative, for example, to call for some sort of a limitation or multilateralization, whether it's a missile test ban, global, with the U.N., or other forum, missile test ban or some sort of multilateral INF treaty, would there be support of Russia? I bet there probably would be. How about Japan? I bet Japan--I wouldn't be surprised if Japan even in the next six months or so began their own initiative for the U.N. to actually call for some sort of a missile control regime, regional if not global in nature.

And the last point on this, there has been a debate recently

between air-sea battle and offshore control, for example. The notion that air-sea battle is a point of departure I think is somewhat misguided. From a pure military perspective, it's hard to fathom that military planners, deliberate planners, would not include in their plans interdiction operations all the way back to 1954 with the US-ROC Defense Treaty, all the way up until the present day.

So the notion that air-sea battle is by itself provocative I think is somewhat misplaced. The issue is the only way to really defend against the type of long-range precision strike infrastructure that the PLA is developing generally is to go after the command and control system that I addressed in my presentation.

Yes, it's very escalatory, but at least having that ability and presenting the president with a range of options, with the understanding that each option has escalatory consequences, but at least having the ability. I'm not sure any way around it.

The problem with offshore control is, in effect, it is a unilateral declaratory policy without getting anything in return. In other words, to just say we will as a declaratory policy not conduct deep interdiction operations, but there's nothing in return really. I mean if you put that on the table as a possible topic for discussion, for example, some sort of multilateral INF treaty, then it becomes somewhat more attractive, but the idea of integrating, for example, as Dr. Gompert has, about trying to think through some other approaches to be able to increase stability and crisis stability I think is quite worthwhile.

HEARING CO-CHAIR TALENT: All right. I think Dr. Wortzel had a brief follow-up to this line of questions. So I'm going to bring him in.

COMMISSIONER WORTZEL: Professor Gompert, I've always felt that a thousand ship navy was a great concept if you're talking about anti-piracy and search and rescue at sea. But that it was the most foolhardy thing I'd ever heard suggested.

So my question is how do you incorporate your most aggressive potential competitor into a coalition ultimately designed to deter?

MR. GOMPERT: Well, let's just make a leap of faith and imagine that the Chinese notwithstanding the opposition of the PLA Navy would actually agree to participate. What good would it do? It certainly wouldn't solve the vulnerability problem that I indicated. It would not, necessarily reassure our allies, which of course is a critical issue.

So what good would it do to involve the Chinese? First of all, I would say, I can think of a couple very practical ways that it could be beneficial.

First, these waters, particularly the East China Sea and the South China Sea, are vital waters and they're also contested waters. I don't believe that the underlying disputes are going to be settled for decades, truly resolved, barring a conflict to resolve them, because they are too complex and the positions too deeply held.

So we're going to live with that. If we're going to live with that

anyway, I would hope that whatever pledges the parties might make about the use of force, that we might put in place some practical activities, if you will, sort of confidence building, so that military forces, naval forces, operating around these, in these critical waters because it's not just the islands, it's the waters, that these be under some kind of a multilateral scheme.

We certainly don't want to go down the unilateral route, which is what the Chinese are already trying to do. So there would be an understanding about cooperative patrols, about letting each other know, each other being those who participate in the cooperative regime, we're going to be doing operations. We're going to be doing cooperative operations. I think that might improve confidence or reduce the likelihood of an incident because I think a war between the United States and China is most likely to happen by mistake.

And the question is how do you avoid mistakes? This might be one way to avoid mistakes. I also think that the United States should keep pushing patiently and persistently to try to engage the Chinese military in more cooperation. The Chinese military is not under tight civilian control as it once was under the Communists, and therefore we can't count on the civilians in Beijing to exercise the kind of control that would make us comfortable.

And therefore this idea of engagement with the Chinese I think continues to be attractive from our point of view. Whether they participate or not would be up to them, and I'd just finish with one remark. There's a debate in China today. I'm not a Sinologist, but I think my colleagues would bear me out. There's actually a debate behind the scenes about what China has gained over the last ten years.

And the conventional wisdom is that China has gained enormous amount by virtue of its military build-up and its ability to intimidate and back up its claims by the threat of force. And that's a respectable argument. But there is another argument that's being heard now from some Chinese that for all of this military build-up, China is more isolated than it has been in a long time.

And the United States is closer not only to its traditional allies but to others in the region, not as a consequence of anything United States has done, because we've been sort of engaged elsewhere during this period, but mainly by virtue of not only the growth of Chinese power but also the pattern of the use of the power.

So the Chinese are not monolithic. There could well be a debate in China that would lend itself to at least the argument that we don't want to isolate ourselves. If the Americans are organizing the region, let's avoid having it organized against us if we can.

HEARING CO-CHAIR TALENT: Thank you.

Go ahead.

MR. DONNELLY: I'll be really brief. Larry, if there were a way to negotiate away the red pimples off this map, that would be great. Okay.

The frequency chart suggests that the bad guys in Beijing are winning the argument, and since 2010, they've been winning it by a lot. Okay. I like George's "trust but verify" approach.

HEARING CO-CHAIR TALENT: Commissioner Tobin.

HEARING CO-CHAIR TOBIN: Great. Thank you all for in many cases what you've called, Dr. Gompert, creative ways of thinking around this tension, this build-up that we've seen. I want to turn to Dr. Cliff. You make an argument in your written testimony that I'd like to have you discuss further with us.

You state that we are losing our edge over China, and then you raise a question how much more advanced does the U.S. military have to be in 2020 as compared to now? And then you go on with a couple observations that say there's no way we can get to where we want to be unless we do major cuts.

Now, in your oral testimony, we didn't get a chance to yet see what you're thinking of, why we would do those cuts, and I think in an era of financial restraint, it would be good for all of us here today to hear what you have in mind. We're cutting in order to do what? And maybe that can help us deter. It was a great argument.

DR. CLIFF: I'm glad you think so. I'm sure not everyone will. But here's my logic.

The U.S. military today has, for example, over 2,000 land-based fighter aircraft. There is no scenario involving China where I can find a use or a place to put even half of those fighter aircraft. Okay. But that has two implications. One is if I'm going to have fighter aircraft, I want them to be the best fighter aircraft I can get.

I don't want an F-16, great aircraft of its time. It's going to be outclassed by what the Chinese are throwing up at us. I want, I wish I could have the F-22, but that's a done deal now. I want the F-35 where there is some-- I don't want to name particular programs. Boeing has a very interesting concept for upgrading the F-15 that could provide you with many of the same capabilities as the F-35, but whatever they are, I want the best ones.

And that's going to be expensive. All right. We're already talking about slowing down procurement of F-35s. That's not the way to go. If we want to save money, the only real way to save money is by cutting the size of our forces, and as I said, that's unfortunate. Our forces exist for more than just wars with China, but I don't see any other way to free up the funding we have.

Two-thirds of the defense budget goes to basically pay for personnel and operations costs for our existing forces. The other third goes to the modernization of those forces. If we want to expand that one-third that's going to modernization, we have to cut those other two-thirds, and the only sensible way to do that is to cut the size of the forces.

So that in a nutshell is the basis of my argument.

HEARING CO-CHAIR TOBIN: Great. I wanted to hear that

because it's really a cost-benefit analysis, and I think politically could be used to help to make that shift in investment.

Thank you.

HEARING CO-CHAIR TALENT: I had a question along those lines so I'll just jump in with it now. I really was, I was perplexed because, Dr. Cliff, you rehearsed I thought very well the arguments why the Chinese are growing in technological ability, and that their military build-up is empowering their strategy, and then you conclude that given the advantages they have geographically and logistically, there's a legitimate possibility that we could actually lose a conventional war--something that hasn't been the case for 225 years, and then you recommended cutting force structure.

How would you respond to this concern that I have? I mean our force structure has already been cut a lot, precisely to save money, because the Chiefs all understand how expensive people, and right now we got a smaller force structure than we had 20 years ago, and yet since then, look at the missions we've picked up, not only in China, but I mean a little thing called Global War on the Terror, and North Korea and nuclear capacity, Iranian potentially nuclear capacity, and the force is smaller than it was.

I mean how about this idea? How about somebody just propose actually spending more money on the military instead of cutting the crud out of it? I mean what do you think about that?

DR. CLIFF: Well, I think spending more, spending more money on the military with, as I imply, would be great--that way we could have it both ways. We could continue to maintain the capabilities we need for a China scenario while having the force structure, and here with regard to our other events around the world, and some of them are winding down, but who knows what's going to wind up in the future, just in terms of being able to sustain those deployment cycles for our men and women who are in Afghanistan and other lovely scenic spots around the world, for them to not have to spend a year over there, come back for six months, spend another year over there.

The war in Afghanistan is winding down, but even before--you know, when I was in the Defense Department, it was before all this, or up until my time was just ending when the building kind of rattled a bit, and--but up until then, the concern was even at the deployment cycles we had at the time in the late 1990s and early 2000, that this was overstressing the force. So you do need a force structure --forget the War on Terrorism--just for the routine types of things that go on.

If we don't have the extra money though, then we have to make a choice, and the choice is are we going to be prepared for this scenario or are we going to have to accept the fact that Bosnia or the equivalent of Bosnia falls apart again? We're not going to have a brigade to deploy to Bosnia like we had in the 1990s.

So that's why I say it's unfortunate to have to make those choices, but if we don't have more money, then we are going to have to make that choice.

HEARING CO-CHAIR TALENT: No, I got it. So you're saying in the skimmer rationale that you would sacrifice, I guess, capacity rather than capability if you were down to it. But the better thing would be not to sacrifice anything, that we actually instead come up with a baseline that will give us some hope of defending the vital interests of the United States everywhere.

DR. CLIFF: Yes.

HEARING CO-CHAIR TALENT: So I think I get you now. And, you know, fair enough.

Tom, do you have a point you want to make?

MR. DONNELLY: Very quickly. Look, I mean I think we have a strategic choice to make prior to making a program and budget choice. The fundamental competition is between ourselves and our allies. We're a global superpower in an international system that China wishes to change. So it's a rising power, a continental East Asian power that's now burgeoning to project power abroad and afield.

Before, changing the situation in the Middle East will affect the balance of power in East Asia, both for our allies and our partners but also for the Chinese. That doesn't mean the Chinese are going to drive up the Persian Gulf and take over the watch from us or something like that, but we ought to evaluate before we, in figuring out how to deter China. We need to take everything into account.

I think that our global military posture, our ability to apply indirect pressure in a variety of ways to deter Chinese mischief making, not simply along that perimeter, but in many ways, is one of our biggest strategic advantages. If we too tailor the force to the operational, immediate operational challenges, I think we'll be tossing aside one of our biggest strategic advantages.

HEARING CO-CHAIR TALENT: If by spending four percent of the GDP on the armed services instead of three percent, we actually can defend the interests of the United States everywhere, it's an option we ought to at least consider, and I don't think anybody here is arguing with that. You're just saying if we're not given that option, then we have to make certain choices.

David, go ahead.

MR. GOMPERT: Well, having already offended the Air Force and the Navy, I might as well going ahead and offend the Marines and the Army. I don't know how the QDR will turn out, but I would imagine, I would hope, that there is a debate about the requirement for ground force structure and end-strength. It would be odd if it wasn't. After all, we've just come through a decade in which there is a growth, necessarily, in ground forces and not to mention enormously costly extended occupations.

So then the question is, just to go back to first principles, just why do we need ground forces in the future? Well, of course, we need ground forces in the future, but maybe different kinds of ground forces, and maybe not the same level of ground forces, and maybe ground forces that

operate much more quickly but in smaller packages.

I don't think--I mean one never says "never." And I get all that. We have to be prepared for everything, but preparing for continued and very large-scale ten-year occupations strikes me at this particular moment as not a high priority, nor would ground forces be the highest priority in the cases of the two most challenging wars that we can imagine today, clearly with China, which would be extraordinarily challenging, albeit unlikely, and the other one is with Iran, more likely and less challenging.

Both of those conflicts, in all likelihood, at least if American preferences for how they would be conducted would prevail, would be heavily maritime, naval, aerospace, cyber.

So what I would like to see, whatever the level is, is not only maybe a shift from quantity to quality, but also a shift toward the kinds of forces that have not been neglected over the last ten or 12 years, but they certainly haven't been the highest priority, and that is to resume the investment in the science and technology and the development of the forces that, let's face it, are predominantly aerospace and naval forces.

HEARING CO-CHAIR TALENT: David, they're talking about taking the Army down to 420,000 people. It was 475, 480 before 9/11. Okay. And as Dr. Cliff said, barely adequate. That force was stressed in the late '90s. So this isn't a question, I mean it's going down, but the question is, is it going to go down to below where it was before 9/11?

I'll give you the last word, and then we'll go on. I've taken up too much time. So go ahead if you want it. Then I'm going to go to the next. Okay.

Commissioner Slane.

COMMISSIONER SLANE: Thank you all. It's been really, really informative.

At the end of the day, we have to make a recommendation to Congress, and I'm trying to get my arms around all of this. What is it that we tell them? They're asking us where is China going? What is the end game? Where do you see this thing in ten or 15 years?

And some people are reminding us of the old imperial Japan scenario in the '20s and '30s when they saw the United States declining. They were building up their military, and they saw the opportunity to strike, and they did. And when you couple that with the CIA telling us that as hundreds and millions of more Chinese enter the middle class in the next ten or 15 years, there aren't going to be enough resources on the planet to satisfy the consumer demand of a billion Chinese, forgetting the Indians, who are right behind them, and there's going to be shortages and conflict and crises over natural resources.

So I think what I'm hearing all of you saying here is that given our economic problems, what we really need to do is to rethink this whole defense strategy and try to break away from the special interests, the defense special interest groups and other entities that are thwarting moving on to a more effective defense policy. I mean am I on the right track here?

MR. DONNELLY: My role in life is to be the Troglodyte at the party. You know I've seen efforts to achieve defense efficiencies, to be more selective in terms of our strategic appetites and desires, all those things. The efficiencies have failed to materialize, and because we are a global power, and again I think that is our greatest strategic advantage in this competition, is to make China's push against the international system, if they're determined to change it--there are many ways short of direct confrontation. We obviously have to deter them, particularly in these flashpoints and points of crises, and maintain a qualitative military advantage.

But, as you say, the Chinese are going to need a world of support in terms of natural resources and markets. The Asian middle class could--the non-Chinese Asian middle class already is much larger than the Chinese middle class, will remain so, and is likely to grow. That advantage is likely to increase.

So we have a lot going for us if we will defend the system as a whole, and I think for China to try to use these very modest investments is a brittle and fragile way for them to achieve their goals, but, again, it's our job to keep the system going and to pay the costs and to rally the coalition that would be necessary to achieve that.

So I think the costs of doing so are relatively modest. They're in many ways more intellectual and political than they are directly military, but we must maintain a sufficient military, not simply to deter attack on Taiwan or to assure that the Chinese and the Japanese don't get into something that they can start but can't find a way out of, but also to assure that the international system is one the Chinese can't exploit for their political advantage.

And their biggest weakness, the farther you get from China, the weaker they are and the stronger we are.

MR. GOMPERT: There will be stresses and strains on the Chinese economy, Chinese society, demographic and resource related. I don't know whether that means that the Chinese will be more preoccupied with those problems, more inward and perhaps less able to commit the kinds of resources they have been committing to defense, or whether, instead, it's going to make them more determined to have greater control, greater access, and assured access to the rest of the world, notwithstanding American power in their part of the world.

So I don't know how these scenarios about what's going to become of China will affect the issues we've been discussing here, but I'm not sure it really matters that much.

Our problem with China I don't think is at the global level. I mean the Chinese have been huge beneficiaries of this system, of globalization and the institutions and everything. And we have striking commonality or at least compatibility of interests with the Chinese sort of at the global level. Differences to be sure.

Our problems are in that region, and they are because of the

growth of China, Chinese power, and the increase in Chinese assertiveness in that region, which just happens to be a vital region for the world economy and for us, and we do not have the option of abandoning that region and allowing it to become an exclusive sphere of influence for China.

So I'm afraid this means that we don't have a choice but to figure out some way of maintaining our position, our credibility with our allies and with the Chinese in that region.

Now, at the same time, you asked where we're going to be in ten years? I think where we're going to be in ten years is in worse shape than we are now, and I'm not sure, as I said in my remarks--

COMMISSIONER SLANE: Worse shape economically?

MR. GOMPERT: No, no. In worse shape specifically with regard to the vulnerability of American forces in that part of the world or being sent to that part of the world. I see nothing in the next ten years that's going to change that contest.

And I believe that the Chinese are absolutely committed to this anti-access strategy and these capabilities, not only because they find it helpful in order to extend their reach and to provide a cover, if you will, for their ability to threaten force, to have their way over these disputed islands and so on. Clearly that's at work. But also because for them it's a matter of homeland defense.

I mean they don't always look at it the way we suspect them of looking at it. They look out and they see immense American strike power, land-based and carrier-based, and other, in that particular part of the world, all of which can target and probably is targeted on targets in China.

So both for reasons of homeland defense and for regional strategy, the Chinese will persist, and this will remain a very high priority for them.

Again, I think that since we have no choice but to prevent that part of the world from becoming a sphere of influence, we have to find some strategy that involves improving the capacity of local partners, which has already been mentioned. Absolutely important. Continue to tempt, to try to engage the Chinese, and perhaps exert some influence over the PLA.

And third, as I said earlier--I now am repeating myself--to recognize that reliance on these huge air bases that are within range and these afloat-air bases that are within range is really not where we can afford to be ten years from now. We have to think about different forces.

DR. CLIFF: I agree with everything my two colleagues have already said on this point. I just want to address the issue of the end game. To my mind, in the long-run, the end game for us is a democratic China. That's what we're trying to get to, and when I say "we are trying to get to," there's really not much we can do to influence that outcome, but when that day comes--the Soviet Union fell apart eventually--China will eventually become democratic. It's taken a lot longer than people were predicting 20 or 25 years ago, but I have no doubt that it will eventually come.

What we're trying to do, in my opinion, is manage the time

between now and then to try to avoid having a conflict with China while not sacrificing our interests and the interests of the entire democratic world. I mean look at the countries that ring China--Japan, Taiwan. These are all--the Philippines--these are all democracies. These countries that have conflicts and territorial disputes with China.

So they are really part of us, and we can't, I know there are people who think we should just try to avoid any conflict with China, that conflict with a nuclear superpower simply isn't worth fighting over Taiwan about and so on, but I disagree with that. I think these are vital national interests of the U.S.

The good news is we, as Dr. Gompert has said, these countries are here. They're our allies whether formally or informally. Japan has huge economic, technological, military capabilities. We can't do this alone, but the good news is we have some great allies in the region--Japan, Taiwan, Australia, South Korea, and so on.

And so to my mind, the strategy is to manage this problem, avoid a conflict with China without sacrificing all of our interests until that day. China is getting too big for its britches and it's getting beyond the capability of any one country to handle. But I don't think the problem goes on forever, that eventually we will be faced with a democratic China, and at that point, there will still be frictions and disputes, but I don't think they'll represent a security threat to the United States or the other countries of East Asia.

MR. STOKES: Briefly, I agree that there is a tendency to be hyperfocused on military solutions to resolve what are essentially political problems.

Starting with the premise that there's two ways that Chinese senior leadership behavior, what drives their strategy, if a strategy actually exists, two ways of looking at it in terms of American observers or even international observers.

One is to look at things through sort of a geostrategic context, to interpret CCP, Chinese Communist Party, behavior as being geostrategically driven. Terms that are usually associated with this is, for example, First Island Chain, Second Island Chain, breaking out, ensuring stable supply of oil and issues like this; China maintain dominance out to the First, Second Island Chain.

The other way to look at things in terms of a driver for PRC foreign policy behavior is political in nature, and that is that what really drives the Chinese Communist Party is sustaining the monopoly that they have on power and suppressing any sort of a dissent or challenge to that power.

Senior authorities in Beijing, sure enough, in my view, seek to reshape the global order in a manner consistent with the interests of the Chinese Communist Party, and everything stems from there. This is the reason why in the presentation or the pitch that I gave that I emphasized Taiwan so much because, in essence, what you have in terms of what really--from my readings what really when they talk about core interests, there's a

prime core interest, and that core interest is and remains Taiwan.

And what's strange is that over the last four years, what you've seen is sort of a lot of you could view provocative PLA behavior in the East China Sea or South China Sea or just generally more assertive behavior, whether or not that's intended or not, but the effect in Washington has been an amazing lack of--basically diminished support for Taiwan and democratic systems around the world.

Very rarely these days do you hear much about human rights in China in terms as a--not like in the 1990s when you actually had human rights that were linked to things like trade and issues like this. You don't hear that much anymore.

Is this purposeful? Because one of the key goals of the Chinese Communist Party is actually to remove Taiwan from the table but at the same time--this is why I emphasize political warfare so much--because when you look at what they're doing on Taiwan in terms of--and I'm not afraid to say this--subversive behavior on Taiwan itself, to be able to use coercive persuasion on both sides of the political spectrum, to be able to draw Taiwan in--the Republic of China into an agreement on a course of behavior.

The objective reality is that you have two legitimate governments on both sides of the Taiwan Strait--the People's Republic of China and the Republic of China. Just because we don't have diplomatic relations with Taiwan doesn't detract from this objective reality. It exists as an independent sovereign state--the ROC does--with competing sovereignty claims.

So with this in mind, Beijing's goal-- because of its existence, it poses by its simple existence, this democracy, a challenge to the legitimacy of the Chinese Communist Party, even within a one-China context.

And so in terms of looking at the challenges in terms of how the United States deals on the future, to me is to just be reminded that U.S. foreign policy has long acted in accordance with fundamental principles. There's a dichotomy between interests and principles, but principles are very, very important, and so I would just leave it there, that there is an element of political that really should be considered much more.

HEARING CO-CHAIR TALENT: Okay. Our Chairman and then Vice Chairman and then, if we have time, a second round or some questions in a second round. Dennis.

CHAIRMAN SHEA: Thank you. This has been a great hearing, and thank you for your informative testimony. I have to say it's been a bit depressing, as well. We can't avoid that.

Are you familiar with the book, more of an essay, by a gentleman by the name of Hugh White from Australia, and he wrote a monograph called "The China Choice," and I'm going to do a disservice to his argument by trying to summarize it, but he says, look, China is going to rise, its economy is going to be larger than the United States, maybe ten to 15 years from now. They're going to continue to push this anti-access strategy. The United States is just not necessarily going to decline, but it's just not going to have

the resources to do what it's been doing, and China is just going to get stronger and stronger. So we need to rethink what we're doing in the Western Pacific.

So he says there are really three choices. The United States can resist China's challenge and try to preserve the status quo, and that's air-sea battle and maybe distributed weapon systems that are lower cost and more technologically advanced.

The second choice is it can step back from its dominant role in Asia and just let China run the Western Pacific.

Or there's the third choice, which he suggests, and he admits it's a tough one, or we can remain in Asia on a new basis, allowing China a larger role but also maintaining a presence. So basically a concert/an agreement where you have a sphere of influence and we have our sphere of influence, try to assuage the Japanese and the other countries in the region, but allow China to have a bigger say in the region.

Is that a bad idea? Or go forth. Troglodytes go first.

MR. DONNELLY: All right. Well, I would just also observe that even by Australian standards, Huge White is regarded as a crackpot--

CHAIRMAN SHEA: Okay. Well, thank you for informing me.

MR. DONNELLY: --by many in Australia. However, I think his analysis is fundamentally flawed in two ways. First of all, I think he just understands where the trend lines are and where the balance would be. If you aggregate America, its allies and its partners, its democracies in the region, measured by military power, economic power, pace of growth, anything, if China remains, as Mark described, dedicated to arranging the world to the satisfaction of the Communist Party, its challenge will get worse, not better.

It will be a destabilizing power, but its ability to achieve that goal will recede. I don't see a way in which China can achieve its goal without internal political change, as Roger suggests. This is a losing bet over the long haul.

It may be ugly before it happens. All of us may be dead. Who knows. But I think Hugh's analysis where history is going is fundamentally flawed. Plus I mean that would be, you know, for us, we have to look at it as Americans, as Mark said.

CHAIRMAN SHEA: He's looking at it as an Australian, a crackpot Australian.

MR. DONNELLY: Well, that's why I think he's out of step with his comrades. Australian democracy is pretty deeply held and passionately held, and they've paid a big price to remain so. So, again, that's why I would just say Hugh White is out of step with the mainstream, at least, even of Australian thought.

But for Americans who, you know, again, believe that there is justice in the world, and there is a proper relation between individuals and the state and all that, the political principles that we hold to be universally true, and which actually our allies and an increasing number of people in

East Asia share with us, I think it would be not just strategically unwise but a bit of a moral failure to secure what we can secure.

I mean the competition--we have all the advantages in the competition. Everybody has emphasized the acute nature of the narrowly-focused military balance, but the global strategic competition, the long-term strategic competition, is one in which we have, I believe, all the great advantages, every prospect of success, and it would be actually relatively easy to maintain enough of a military posture, both unilaterally and in coalition with our partners, that the calculus for China will be a very ugly one. Again, it doesn't mean that they won't cross the threshold, particularly if their economy slows and Han nationalism is the only glue that holds them together domestically that the Party exploits.

There were reasons to worry about the inner-German border and what the Soviets would do or the Warsaw Pact would do, but in the long run, our ability to prevail when we least expected it reflected the underlying power situation and, I would argue, certainly what we would like to have the course of history be.

CHAIRMAN SHEA: Okay. Thank you.

Mr. Gompert.

MR. GOMPERT: Well, first of all, put me down as not believing that our problem with China is that there is a bunch of Communists in Beijing who want to revise the world system.

CHAIRMAN SHEA: So you differ with Dr. Cliff?

MR. GOMPERT: In that regard. As I said earlier, I think the problem we have with China is very much a geopolitical problem in a particular part of the world that is obviously vital to the Chinese and also vital to us and to the world.

At the global level, I see a lot of, as I said, convergence of interests, not to mention the fact that the Chinese would be the first to say they have benefited enormously from the system as it works. Sure, they try to game the system, but the real problem, I think, the strategic collision is occurring in that particular part of the world.

Which is all the Australian was really talking about, I think. I think his prescription is wrong both normatively and analytically, normatively because I think for the United States to think that somehow it's going to be able to negotiate some sort of spheres of influence and rules governing that particular part of the world sort of contradicts everything we know about that part of the world, including other very important actors there like the Japanese and the Koreans.

But I also believe it's bad analysis because there is no indication that this is what, in fact, is happening. Now, I don't take too much comfort over the behavior of the East Asians, of the Chinese neighbors, over the last ten years because you don't know whether it's going to continue. But the pattern that we have seen is that they have moved closer and closer toward the United States.

Our security relationships, both the traditional ones and new

ones, have gotten better, not because of any grand American strategy, but basically because the Chinese have been involved in self-encirclement. They've produced these improved relations. So we see none of this sort of pattern of we've got to make peace with the Chinese, and we've got to accommodate the Chinese. We're seeing quite the contrary.

And the Chinese are now left with one friend in the region: North Korea. It's a friend that the Chinese would be the first to say they'd just as soon not have.

But having said this, here's the danger, and I want to come back to Taiwan because I think the situation with regard to Taiwan could become critical. Fortunately, cross-Strait relations have been pretty good, and there's been openness and dialogue and improvements and a variety of-- however, the military situation surrounding Taiwan in the event of a crisis or a conflict is already I would say dire.

And I think this could already affect the behavior of both Taiwan and China. Right now they both seem to be moving in a more collaborative fashion, but if it turned sour, I think the Chinese would be in a much stronger position and Taiwan would be in a much less confident position about our ability to come to the defense of Taiwan in the event of a crisis or conflict because of exactly the military trends we've talked about.

So what I worry is not only about Taiwan if things were to take a bad turn between Taiwan and the mainland, but also that pattern that can creep outwards. Right now we have a dominant military position still in the South China Sea and, I would argue, in most of the East China Sea. But over time, that will erode.

CHAIRMAN SHEA: Thank you.

HEARING CO-CHAIR TALENT: Bill. Commissioner Reinsch is next, our Vice Chairman.

VICE CHAIRMAN REINSCH: I think Dr. Cliff wanted to say something.

HEARING CO-CHAIR TALENT: Oh, I'm sorry. Please.

DR. CLIFF: I did if you don't mind. Going back to Hugh White's essay, first of all, he employs a typical rhetorical device, which is, okay, there's three views. There is this extreme view, there is that extreme view, and there is my view. So I disagree with his analysis, as well, but I do think--

CHAIRMAN SHEA: I suspected that.

DR. CLIFF: --there is a grain of truth here, though, which is I mean there's no question that China is becoming more powerful, and it's going to have more influence in the region. As David has pointed out, that is also pushing countries closer to the U.S., but there are going to be certain things where China is going to be able to put its foot down, and we're going to have to decide whether or not we're willing to go to the mat with them on it.

Taiwan is one where I think we should go to the mat, but I'm a little disturbed sometimes. In particular, in an exercise I just participated in

where there were personnel from the U.S. military who were assuming that the U.S. military in the year 2023 or 2024 could still do whatever it wanted to with China, with impunity. We're going to need to accept the reality that that's not the case, and there are going to be issues where the stakes are really important for China, and they're not nearly as important for us, and we may have to give way a little bit and accommodate their interests, I think.

I would certainly draw that line west of Taiwan. Whether or not it goes west of the Senkaku Islands, however, is another question.

CHAIRMAN SHEA: Thank you.

VICE CHAIRMAN REINSCH: Thank you.

I just had one question. I want to go back to something that came up in the first panel, and I think, Dr. Cliff was here, but I'm not sure about the rest of you. And it was a question that actually the panelists came up with and then didn't answer, so I'm going to ask you to comment on it, which is in trying to create a strategy with China, how do you distinguish between deterrence and provocation?

I think the first panel felt that was hard, and then that was when they stopped. So I'd like to ask you all or as many of you that want to say something about it, how do we do that? I think the Chinese are very prone to see virtually anything we do as a provocation--erroneously most of the time. But they see it that way, and that then leads to a pattern.

How do we distinguish between a strategy of deterrence and their perception of it as provocation?

HEARING CO-CHAIR TALENT: This grows out of a comment I made that I was concerned that we were doing enough to provoke the Chinese but not enough to deter them. And the first panel had some--

VICE CHAIRMAN REINSCH: Better way of putting it. Don't all talk at once.

DR. CLIFF: I will leap into that breach. So, first of all, everything we do, the Chinese manage to somehow construe as being directly against them. I was talking to an American University professor in Shanghai in 2006. She was teaching at a top university in Shanghai at that time, and she had this discussion with her students about, you know, the U.S. invasion of Iraq, and there wasn't a single student in her class who didn't think that our invasion of Iraq was part of an encirclement strategy against China.

So, you know, at one level there is really not much you can do to reassure China, to not provoke China. That said, there are things that are relatively more provocative and things that are relatively less provocative.

I would put the air-sea battle idea or the types of actions that are implicit at least, in the not completely nonprovocative category if you're implying that we're going to have to go to attacks on the mainland early on.

You know, there are things that we can do that, you know, this is part of why I think, there are other things that we can do that can maintain our ability, at least in the short-to-medium term, to sustain our ability to hold air and sea superiority in the Western Pacific region without having to strike mainland China and force them at least to make that first move and say

we're going to attack your bases in Okinawa, Guam and elsewhere, at which point I think they would be certainly expecting us to retaliate in kind by attacking their air bases.

So there are capabilities that are more provocative. If you're talking about long-range global strike, if you're talking about ways of defeating the Chinese anti-access strategies that are predicated on attacks on the mainland, that's more provocative.

If you have a back-up plan that says, yes, we'll do that if we need to, but here's some other things we can do that don't require strikes on the mainland, that's less provocative.

MR. GOMPERT: I think that's right. I would frame it a little bit differently. As I said earlier, there are really two things going on with the Chinese. One, they view our strike power in the Western Pacific as very threatening. Let's admit that. And when we say that our strategy depends upon early strikes on the Chinese homeland, it definitely tends to aggravate that sense of threat from us.

The other thing that's going on, and I think the developments in the East China Sea really underscore this, is that the Chinese see those same anti-access capabilities that they're developing as giving them a cover so that they can then project force out in the immediate region for now but perhaps deeper.

I think that's a very important distinction because to the extent that we can find ways to strengthen deterrence without relying on threats to the Chinese mainland but instead developing the kinds of forces, both survivable and oriented toward preventing Chinese force projection, they would have less reason to view that deterrence. It would still deter what really troubles us, which is their force projection after all, but I think it would perhaps better reconcile the two objectives of not appearing to be provocative and yet deterring.

MR. DONNELLY: I'll be really quick. We are provocative to them, and the pattern of their behavior over the last couple of years is indicative that we have provoked them, I think, through weakness and indecision rather than because we're in their face, and having whined about air-sea battle and strike on the mainland up to this point, I wouldn't deny that it's a necessary arrow that we have to have in our quiver.

We wouldn't eliminate our nuclear deterrent vis-a-vis China. Possibly our nuclear deterrent isn't what it needs to be, either qualitatively or quantitatively, to deter China.

So the ability to attack China has got to be part of our military capability. My point was that it can't be the only one. We don't want that to be the only tool that we have and the first tool that we reach for.

So, you know, the question is how we're going to be provocative? You know, since we're going to do the time, we might as well do the crime. And we ought to do it in a way that's sensible, that is, in fact, stabilizing in reality and mitigates the advantages that the Chinese think they're accumulating and deters them or discourages them from themselves being

provocative to us and particularly to our allies.

It's our allies and the rest of the perceptions in East Asia that I think are, probably should be more driving our policy than what Chinese perceptions are or at least what the Chinese government tells us Chinese perceptions are.

MR. STOKES: If I may, starting off, the issues of deterrence and provocation, they're related but very, very different in some ways. Provocation is in the eye of the beholder. For example, there may be an action that the PLA takes that we find provocative, and the PLA would find actions that we take would be provocative.

In general, if there is some action that we take, the PLA--again, political warfare--they will call it provocative, and they do it consistently time and time again. They have an entire propaganda apparatus that's geared toward things being a provocation. I don't mean this in the sense of the Cold War. There actually is a very, very extensive propaganda system. As a matter of fact, it's a major leading system in the Chinese Communist Party--the Propaganda and Ideology Small Leading Group and the office that stems from that.

So provocation, it's the same issue as offense versus defense. Whether or not a system and a capability is offensive or defensive is in the eye of the beholder. Depends on what side of the gun that you're looking at.

So having said that, on deterrence, again going back to the issue of hyperfocus on military aspects of deterrence, deterrence is simply manipulating the cost and benefit to decision-makers on the opposing side. In this case, it is manipulating the cost/benefit, manipulating the values and being able to affect the values, those things that the political bureau, that the Politburo Standing Committee, the key leadership, the things that they value, being able to manipulate the cost/benefit calculus.

It's not just military. If it was purely military in terms of deterrence, deterrence by denial is relatively straightforward, denying them the military objectives. But deterrence in a much broader sense, there's a whole range of other elements on deterrence, and I'm not sure if there's been a lot of really detailed examination of what values the Chinese Communist Party leadership, the Standing Committee of the Politburo, holds must dear and how those could be manipulated.

Is it affecting their bank accounts? Is that really the key issue in terms of risking money that they may have overseas? Is it undermining certain aspects or doing what they actually accuse us of doing, which is actually subversion. For example, the National Defense University video that was just released this past October that claims us to be sort of engaged in subversive activities.

They view our existence simply--because one of the key elements in terms of their policy is actually what they call anti-Westernization. They view us as being subversive quite often. So our existence as a democracy to them is provocative. So I'll hold it at that.

HEARING CO-CHAIR TALENT: Okay. Thank you, Bill.

We're going to give the last question to Commissioner Tobin. We're coming up against the three o'clock time limit.

HEARING CO-CHAIR TOBIN: So we've come to the end of this day and discussed China's modernization of its military, and I just want to make certain, because we haven't heard that much, has the PLA modernized its ground forces? To what extent?

I know, Dr. Gompert, you started to talk to that, and Mr. Donnelly, too. There's what? 14 countries that surround it. We've spent a lot of time on the navy and the air force. Is there anything we need to know on that front, on its modernization?

MR. DONNELLY: I think I want Mark to weigh in, but particularly with airborne forces and marine forces, they've certainly done a lot of thinking and some investing to be able to--they've learned from our experience in post-invasion of Iraq and Afghanistan. So they understand that after the invasion, that doesn't necessarily end the story. Again, but I think Mark probably knows the details. And that's one way in which the Taiwan scenario is still driving them in a measurable way.

MR. GOMPERT: Yes, very quickly. I'm really not an expert on this. But what's basically happened over the last 20 years is the Chinese strategy has shifted from concern about its land neighbors and disputes and land warfare and thus ground capabilities to a concern about us and the seas.

HEARING CO-CHAIR TOBIN: Yes.

MR. GOMPERT: And therefore naval and anti-naval and air capabilities.

But it's very important to watch exactly the point that you mentioned, and that Mr. Donnelly has referred to, which is so far force projection has not been a high priority. A high priority has been anti-access, but as soon as we see priority on air-mobile ground forces, for example, high-speed amphibious forces, anything that would suggest quick force projection, not necessarily huge armies to cross borders, that would be of great concern because that combination of anti-access and the creation of a keep-out zone--

HEARING CO-CHAIR TOBIN: Yes.

MR. GOMPERT: --and then development of the capability to project force, including ground force, would be very troubling.

HEARING CO-CHAIR TALENT: Anything else? Mark?

HEARING CO-CHAIR TOBIN: Briefly.

MR. STOKES: I'll focus on one small slice of the ground force issue, and I actually would defer to Colonel Wortzel because I'm not sure anybody can be as well-informed about the ground forces as Commissioner Wortzel.

The slice that I would address would be the army aviation as sort of a representative example of the amount of investment they're putting on ground forces. My impression that there is significant investment being put into at least the army aviation side, and presumably that would include all the way up to the ground forces.

In terms of investment into research and development and also manufacturing of new helicopters, attack helicopters, utility helicopters, things like this, upgrading, and, if I'm not mistaken, upgrading and expanding the number of army aviation regiments, and I believe upgrading those to brigades in certain areas, within certain group armies, as well as direct organic assets under military regions. That is something that I've seen some indication of.

So I'll leave it at that, and hopefully--

HEARING CO-CHAIR TOBIN: We'll keep our eye on that.

HEARING CO-CHAIR TALENT: Katherine, do you have any closing comments?

HEARING CO-CHAIR TOBIN: Well no, other than thank you very much, gentlemen. We appreciate your testimony, the testimony of the other panelists, and special thanks to Matthew Southerland, who is one of the Commission's policy analysts, right here. He's worked really hard with you and with Senator Talent and myself to make today possible.

Before we adjourn, I would like to express the Commission's gratitude for the continued interest and support for our mission shown by Congressman Frank Wolf of Virginia. I know he's announced his retirement from Congress, and his expertise and his enthusiasm will be sorely missed.

We stand adjourned.