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Chinese Military Modernization and Force Development

A Western Perspective

A Report of the CSIS Burke Chair in Strategy
SEPTEMBER 2013

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Introduction

The United States and the People's Republic of China (PRC) face a critical need to improve their understanding of how each is developing its military power and how to avoid forms of military competition that could lead to rising tension or conflict between the two states. This report utilizes the unclassified data available in the West on the trends in Chinese military forces. It relies heavily on the data in the US Department of Defense (DoD) *Report to Congress on Military and Security Developments Involving the People's Republic of China*, particularly the 2013 edition.

It also relies heavily on the annual military balances compiled by the International Institute for Strategic Studies (IISS), though a range of sources are included. It should be noted that this report focuses on Chinese forces, and therefore presents only one side of the US and Chinese balance and the security situation in Asia. It also draws upon a recent Burke Chair report entitled *The Evolving Military Balance in the Korean Peninsula and Northeast Asia*, looking at the bilateral US-Chinese balance in more detail.

The Need for Focused Military Dialogue

The goal behind this report is to create an unclassified dialogue on the military developments in China, including the size and structure of the country's current and planned military forces. Accordingly, it focuses on the actual changes taking place in Chinese forces. It is also meant to provide both US and Chinese analysts with a better basis for understanding Western estimates of the changes in Chinese force strength and force quality.

It provides a detailed analysis of unclassified data on the trends in Chinese military forces since 1985, examining how the often-conflicting trends in such sources interact with reporting on Chinese military spending and strategy. It also shows that important changes are taking place in US strategy and that these changes must be considered when evaluating Chinese actions.

The paper also makes it clear, however, that Western sources and analyses of Chinese military developments are not an adequate basis for US and Chinese dialogue without Chinese review, commentary, or more Chinese transparency in providing data on Chinese strategy, military forces, and military spending. Moreover, this report shows that focusing on strategy and concepts in broad terms is no substitute for a detailed examination of specific changes in force strength, the extent to which concepts and strategy are actually being implemented, and how the shifts in US and Chinese forces actually compare.

The Trends in Chinese Military Modernization

The report examines a range of data regarding Chinese capabilities and force modernization, focusing on the most reliable sources. Using these sources, it analyzes the full range of China's military capabilities as well as trends in their growth and composition. Data alone, however, cannot provide a full narrative: this report places the observable data within the context of contemporary Chinese military thought and doctrine.

The data indicate that the PRC has engaged in a continuing military modernization program that is expanding the capabilities available to the People's Liberation Army (PLA). Although the PLA has consistently reduced its manpower since the 1980s, reductions in obsolete equipment

and the procurement and deployment of modern systems in its land, air, naval, and missile forces have led to increases in the PLA's overall military effectiveness, especially in the context of its "Local War under Conditions of Informatization" military doctrine.

Seen within the context of Chinese military doctrine, the modernization efforts in the PLA Army, Navy, Air Force, and Second Artillery Force have enabled changes in operations and tactics as well as in force structure and weapon systems: these changes, in turn, have expanded PLA military capabilities and placed China on the road to becoming a modern military power.

Setting the Stage: America's Developing Strategy in Asia

As this report makes clear, these changes will ensure that China emerges as a potential peer military power in the Pacific. As a result, the US sees these changes as the emergence of a clear competitor in terms of strategic influence and as a potential future threat.

As this report also makes clear, however, China sees the US as a mirror image in terms of strategic competition and military power. Any analysis of the trends in Chinese military power that focuses on the need for dialogue must be prefaced by the fact that the US is modifying its force posture in Asia as part of major changes in overall strategy. However, it should be stressed that such plans remain highly tentative because of US economic and defense spending uncertainties.

US Forces in the Pacific

The US already has major forces in the Pacific region. US Pacific Command (PACOM) forces included four component commands: US Pacific Fleet, US Pacific Air Forces, US Army Pacific, and US Marine Forces Pacific. These commands are headquartered in Hawai'i and have forces stationed and deployed throughout the region.

As of June 2013, PACOM had some 330,000 military and civilian personnel, or about one-fifth of total US military strength. US Navy and Marine forces were numerically the largest elements in PACOM's area of responsibility (AOR). The US Pacific Fleet included five aircraft carrier strike groups, more than 140,000 personnel, 180 ships, and almost 2,000 aircraft. US Marine Corps Pacific possessed about two-thirds of US Marine Corps combat strength and included approximately 85,000 personnel and two Marine Expeditionary Forces.

US Air Forces Pacific had approximately 43,000 airmen and 435 aircraft; US Army Pacific had more than 60,000 personnel, including five Stryker brigades. PACOM also had over 1,200 Special Operations personnel. In addition, there were about 27,000 Coast Guard personnel available to support US military forces in the region.[1]

Changes in US Strategy and Rebalancing to Asia

It is unclear how these forces will change, in spite of the declared shifts in US strategy and US plans to carry out a limited "rebalancing" of its force structure by shifting forces from Europe and the Atlantic to Asia and the Pacific.

The broad goals in US strategy are clear. The US announced major shifts in its strategy in a document called *Sustaining US Global Leadership: Priorities for 21st Century Defense* that the DoD issued on January 5, 2012.[2] Like all the US official strategy documents that have followed, it never referred to a "pivot" to Asia and gave the Middle East the same strategic priority as Asia. The document did state that,[3]

> U.S. economic and security interests are inextricably linked to developments in the arc extending from the Western Pacific and East Asia into the Indian Ocean region and South Asia, creating a mix of evolving challenges and opportunities. Accordingly, while the U.S. military will continue to contribute to security globally, *we will of necessity rebalance toward the Asia-Pacific region*. Our relationships with Asian allies and key partners are critical to the future stability and growth of the region. We will emphasize our existing alliances, which provide a vital foundation for Asia-Pacific security. We will also expand our networks of cooperation with emerging partners throughout the Asia-Pacific to ensure collective capability and capacity for securing common interests. The United States is also investing in a long-term strategic partnership with India to support its ability to serve as a regional economic anchor and provider of security in the broader Indian Ocean region. Furthermore, we will maintain peace on the Korean Peninsula by effectively working with allies and other regional states to deter and defend against provocation from North Korea, which is actively pursuing a nuclear weapons program.
>
> The maintenance of peace, stability, the free flow of commerce, and of U.S. influence in this dynamic region will depend in part on an underlying balance of military capability and presence. Over the long term, China's emergence as a regional power will have the potential to affect the U.S. economy and our security in a variety of ways. Our two countries have a strong stake in peace and stability in East Asia and an interest in building a cooperative bilateral relationship. However, the growth of China's military power must be accompanied by greater clarity of its strategic intentions in order to avoid causing friction in the region. The United States will continue to make the necessary investments to ensure that we maintain regional access and the ability to operate freely in keeping with our treaty obligations and with international law. Working closely with our network of allies and partners, we will continue to promote a rules-based international order that ensures underlying stability and encourages the peaceful rise of new powers, economic dynamism, and constructive defense cooperation

Former US Secretary of Defense Leon Panetta summarized these shifts in US strategy in more detail in a speech to the Shangri-La Security Dialogue in Singapore on June 2, 2012. It is critical to note, however, that Secretary Panetta did not discuss major increases in US forces, acknowledged the constraints on US military resources, and focused on the need for US and Chinese cooperation and dialogue: [4]

> The purpose of this trip, and of my remarks today, is to explain a new defense strategy that the United States has put in place and why the United States will play a deeper and more enduring partnership role in advancing the security and prosperity of the Asia-Pacific region, and how the United States military supports that goal by rebalancing towards this region.
>
> … America's fate is inexorably linked with this region. This reality has guided more than six decades of U.S. military presence and partnership in this region -- a defense posture that, along with our trading relations, along with our diplomatic ties, along with our foreign assistance, helped usher in an unprecedented era of security and prosperity in the latter half of the 20th century.
>
> In this century, the 21st century, the United States recognizes that our prosperity and our security depend even more on the Asia-Pacific region. After all, this region is home to some of the world's fastest growing economies: China, India, and Indonesia to mention a few. At the same time, Asia-Pacific contains the world's largest populations, and the world's largest militaries. Defense spending in Asia is projected by this institute, the IISS, to surpass that of Europe this year, and there is no doubt that it will continue to increase in the future.
>
> Given these trends, President Obama has stated the United States will play a larger role in this region over the decades to come. This effort will draw on the strengths of the entire United States government. We take on this role not as a distant power, but as part of the Pacific family of nations. Our goal is to work closely with all of the nations of this region to confront common challenges and to promote peace, prosperity, and security for all nations in the Asia-Pacific region.
>
> … We will play an essential role in promoting strong partnerships that strengthen the capabilities of the Pacific nations to defend and secure themselves. All of the U.S. military services are focused on implementing the president's guidance to make the Asia-Pacific a top priority. Before I detail these specific efforts, let me provide some context for our broader defense strategy in the 21st century.

The United States is at a strategic turning point after a decade of war. We have significantly weakened al-Qaida's leadership and ability to attack other nations. We have sent a very clear message that nobody attacks the United States and gets away with it.

Our military mission in Iraq has ended and established—established an Iraq that can secure and govern itself.

In Afghanistan, where a number of Asia-Pacific nations are playing a critical role in the international coalition, we have begun our transition to the Afghan security lead and to an Afghanistan that can secure and govern itself. Recent meeting in Chicago, NATO and its partners—over 50 nations—came together to support General Allen's plan to accomplish this goal. In addition to that, we joined in a successful NATO effort to return Libya to the Libyan people.

But even as we have been able to draw these wars to a hopeful end, we are confronted today by a wide range of complex global challenges. From terrorism—terrorism still remains a threat to the world—from terrorism to the destabilizing behavior of Iran and North Korea, from nuclear proliferation to the new threat of cyberattack, from continuing turmoil in the Middle East to territorial disputes in this region.

At the same time, the United States, like many other nations, is dealing with large debt and large deficits, which has required the Department of Defense to reduce the planning budget by nearly half a trillion dollars or specifically $487 billion that were directed to be reduced by the Congress in the Budget Control Act over the next decade. But this new fiscal reality, challenge that many nations confront these days, has given us an opportunity to design a new defense strategy for the 21st century that both confronts the threats that we face and maintains the strongest military in the world.

This strategy makes clear the United States military, yes, it will be smaller, it will be leaner, but it will be agile and flexible, quickly deployable, and will employ cutting-edge technology in the future. It makes equally clear that while the U.S. military will remain a global force for security and stability, we will of necessity rebalance towards the Asia-Pacific region. We will also maintain our presence throughout the world. We will do it with innovative rotational deployments that emphasize creation of new partnerships and new alliances. We will also invest, invest in cyber, invest in space, invest in unnamed systems, invest in special forces operations. We will invest in the newest technology and we will invest in the ability to mobilize quickly if necessary.

We have made choices and we have set priorities, and we have rightly chosen to make this region a priority.

Our approach to achieving the long-term goal in the Asia-Pacific is to stay firmly committed to a basic set of shared principles -- principles that promote international rules and order to advance peace and security in the region, deepening and broadening our bilateral and multilateral partnerships, enhancing and adapting the U.S. military's enduring presence in this region, and to make new investments in the capabilities needed to project power and operate in Asia-Pacific. Let me discuss each of these shared principles.

The first is the shared principle that we abide by international rules and order. Let me underscore that this is not a new principle, our solid commitment to establish a set of rules that all play by is one that we believe will help support peace and prosperity in this region. What are we talking about? These rules include the principle of open and free commerce, a just international order that emphasizes rights and responsibilities of all nations and a fidelity to the rule of law; open access by all to their shared domains of sea, air, space, and cyberspace; and resolving disputes without coercion or the use of force.

Backing this vision involves resolving disputes as quickly as possible with diplomatic efforts. Backing these principles has been the essential mission of the United States military in the Asia-Pacific for more than 60 years and it will be even a more important mission in the future. My hope is that in line with these rules and international order that is necessary that the United States will join over 160 other nations in ratifying the Law of Seas Convention this year.

The second principle is one of partnerships. Key to this approach is our effort to modernize and strengthen our alliances and partnerships in this region. The United States has key treaty alliances with Japan, South Korea, Australia, Philippines and Thailand. We have key partners in India, Singapore, Indonesia, and other nations. And we are working hard to develop and build stronger relations with China.

As we expand our partnerships, as we strengthen our alliances, the United States-Japan alliance will remain one of the cornerstones for regional security and prosperity in the 21st century. For that reason, our two militaries are enhancing their ability to train and operate together, and cooperating closely in areas such as maritime security and intelligence, surveillance and reconnaissance. We are also jointly developing high-tech capabilities, including the next generation missile defense interceptor, and exploring new areas of cooperation in space and in cyberspace.

In the past several months we have strengthened the alliance and our broader strategic objectives in the region with a revised plan to relocate Marines from Okinawa to Guam. This plan will make the U.S. presence in Okinawa more politically sustainable, and it will help further develop Guam as a strategic hub for the United States military in the Western Pacific, improving our ability to respond to a wide range of contingencies in the Asia-Pacific region.

Another linchpin of our Asia-Pacific security is the U.S. alliance with the Republic of Korea. During a year of transition and provocation on the Korean Peninsula, this alliance has been indispensable, and I have made it a priority to strengthen it for the future. To that end, even as the United States reduces the overall size of its ground forces in the coming years in a transitional way over a five-year period, we will maintain the United States Army's significant presence in Korea. We are also boosting our intelligence and information sharing with the Republic of Korea, standing firm against hostile provocations from North Korea while transforming the alliance with new capabilities to meet global challenges.

The third shared principle is presence. While strengthening our traditional alliances in Northeast Asia and maintaining our presence there, as part of this rebalancing effort we are also enhancing our presence in Southeast Asia and in the Indian Ocean region.

A critical component of that effort is the agreement announced last fall for a rotational Marine Corps presence and aircraft deployments in northern Australia. The first detachment of Marines arrived in April, and this Marine Air-Ground Task Force will be capable of rapidly deploying across the Asia-Pacific region, thereby enabling us to work more effectively with partners in Southeast Asia and the Indian Ocean and tackle common challenges such as natural disasters and maritime security.

These Marines will conduct training and exercises throughout the region and with Australia, strengthening one of our most important alliances and building on a decade of operational experience together in Afghanistan. Speaking of that, I welcome and applaud Australia's announcement that later this year it will assume leadership of Combined Team Uruzgan, and will lead our security efforts there through 2014.

We're also continuing close operational cooperation with our longtime ally, Thailand. The Thais annually host COBRA GOLD, a world-class multilateral military exercise, and this year we will deepen our strategic cooperation to meet shared regional challenges. We are energizing our alliance with the Philippines. Last month in Washington I joined Secretary Clinton in the first-ever "2+2" meeting with our Filipino counterparts. Working together, our forces are successfully countering terrorist groups. We are also pursuing mutually beneficial capability enhancements, and working to improve the Philippine's maritime presence. Chairman Dempsey will be traveling from here to the Philippines to further our military engagement.

Another tangible manifestation of our commitment to rebalancing is our growing defense relationship with Singapore. Our ability to operate with Singaporean forces and others in the region will grow substantially in the coming years when we implement the forward deployment of the Littoral Combat Ships to Singapore.

As we take existing alliances and partnerships in new directions, this rebalancing effort also places a premium on enhancing partnerships with Indonesia, Malaysia, India, and Vietnam, and New Zealand. In the coming days I will travel to Vietnam to advance bilateral defense cooperation, building off of the comprehensive memorandum of understanding that our two nations signed last year. From Vietnam, I will travel to India to affirm our interest in building a strong security relationship with a country I believe will play a decisive role in shaping the security and prosperity of the 21st century.

As the United States strengthens these regional partnerships, we will also seek to strengthen a very important relationship with China. We believe China is a key to being able to develop a peaceful, prosperous, and secure Asia-Pacific in the 21st century. And I am looking forward to traveling there soon at

the invitation of the Chinese government. Both of our nations recognize that the relationship -- this relationship between the United States and China is one of the most important in the world. We in the United States are clear-eyed about the challenges, make no mistake about it, but we also seek to grasp the opportunities that can come from closer cooperation and a closer relationship.

I'm personally committed to building a healthy, stable, reliable, and continuous mil-to-mil relationship with China. I had the opportunity to host Vice President Xi and later Defense Minister General Liang at the Pentagon in the effort to pursue that goal. Our aim is to continue to improve the strategic trust that we must have between our two countries, and to discuss common approaches to dealing with shared security challenges.

We are working with China to execute a robust military-to-military engagement plan for the rest of this year, and we will seek to deepen our partnership in humanitarian assistance, counter-drug, and counter-proliferation efforts. We have also agreed on the need to address responsible behavior in cyberspace and in outer space. We must establish and reinforce agreed principles of responsible behavior in these key domains.

I know that many in the region and across the world are closely watching the United States-China relationship. Some view the increased emphasis by the United States on the Asia-Pacific region as some kind of challenge to China. I reject that view entirely. Our effort to renew and intensify our involvement in Asia is fully compatible -- fully compatible -- with the development and growth of China. Indeed, increased U.S. involvement in this region will benefit China as it advances our shared security and prosperity for the future.

In this context, we strongly support the efforts that both China and Taiwan, both have made in recent years trying to improve cross-strait relations. We have an enduring interest in peace and stability across the Taiwan Strait. The United States remains firm in the adherence to a one-China policy based on the Three Communiqués and the Taiwan Relations Act. China also has a critical role to play in advancing security and prosperity by respecting the rules-based order that has served the region for six decades. The United States welcomes the rise of a strong and prosperous and successful China that plays a greater role in global affairs.

Another positive step towards furthering this rules-based order is Asia's deepening regional security architecture, which the United States strongly supports. Last October, I had the opportunity to be the first U.S. secretary of defense to meet privately with all ASEAN defense ministers in Bali. We applaud the ASEAN Defense Ministers Meeting Plus for producing real action plans for multilateral military cooperation, and I strongly support the ASEAN decision to hold more frequent ADMM-Plus discussions at the ministerial level. We think this is an important step for stability, real coordination, communication, and support between these nations.

The United States believes it is critical for regional institutions to develop mutually agreed rules of the road that protect the rights of all nations to free and open access to the seas. We support the efforts of the ASEAN countries and China to develop a binding code of conduct that would create a rules-based framework for regulating the conduct of parties in the South China Sea, including the prevention and management of disputes.

On that note, we are obviously paying close attention to the situation in Scarborough Shoal in the South China Sea. The U.S. position is clear and consistent: we call for restraint and for diplomatic resolution; we oppose provocation; we oppose coercion; and we oppose the use of force. We do not take sides when it comes to competing territorial claims, but we do want this dispute resolved peacefully and in a manner consistent with international law.

We have made our views known and very clear to our close treaty ally, the Philippines, and we have made those views clear to China and to other countries in the region. As a Pacific power, the United States has a national interest in freedom of navigation, in unimpeded economic development and commerce, and in a respect for the rule of law. Our alliances, our partnerships, and our enduring presence in this region all serve to support these important goals.

For those who are concerned about the ability of the United States to maintain a strong presence in the Asia-Pacific region in light of the fiscal pressures we face, let me be very clear. The Department of Defense

> has a five-year budget plan and a detailed blueprint for implementing this strategy I just outlined for realizing our long-term goals in this region, and for still meeting our fiscal responsibilities.
>
> The final principle -- shared principle that we all have is force projection. This budget is the first in what will be a sustained series of investments and strategic decisions to strengthen our military capabilities in the Asia-Pacific region. I would encourage you to look at the increasing technological capabilities of our forces as much as their numbers in judging the full measure of our security presence and our security commitment.
>
> For example, over the next five years we will retire older Navy ships, but we will replace them with more than 40 far more capable and technologically advanced ships. Over the next few years we will increase the number and the size of our exercises in the Pacific. We will also increase and more widely distribute our port visits, including in the important Indian Ocean region. And by 2020 the Navy will reposture its forces from today's roughly 50/50 percent split between the Pacific and the Atlantic to about a 60/40 split between those oceans. That will include six aircraft carriers in this region, a majority of our cruisers, destroyers, Littoral Combat Ships, and submarines.
>
> Our forward-deployed forces are the core of our commitment to this region and we will, as I said, sharpen the technological edge of our forces. These forces are also backed up by our ability to rapidly project military power if needed to meet our security commitments. Therefore, we are investing specifically in those kinds of capabilities -- such as an advanced fifth-generation fighter, an enhanced Virginia-class submarine, new electronic warfare and communications capabilities, and improved precision weapons -- that will provide our forces with freedom of maneuver in areas in which our access and freedom of action may be threatened.
>
> We recognize the challenges of operating over the Pacific's vast distances. That is why we are investing in new aerial-refueling tankers, a new bomber, and advanced maritime patrol and anti-submarine warfare aircraft.
>
> In concert with these investments in military capabilities, we are developing new concepts of operation which will enable us to better leverage the unique strengths of these platforms and meet the unique challenges of operating in Asia-Pacific. In January, the department published a Joint Operational Access Concept which, along with these related efforts like Air-Sea Battle, are helping the Department meet the challenges of new and disruptive technologies and weapons that could deny our forces access to key sea routes and key lines of communication.
>
> It will take years for these concepts and many of the investments that I just detailed, but we are making those investments in order that they be fully realized. Make no mistake -- in a steady, deliberate, and sustainable way the United States military is rebalancing and bringing an enhanced capability development to this vital region.

His replacement, Secretary Chuck Hagel, gave a speech at the May 31, 2013 Shangri-La Forum that provided additional data on US policy towards the Asia-Pacific region:[5]

> … [T]he world is undergoing a time of historic transformation, and Asia is at the epicenter of that change. The 21st century will be defined by the rise of new powers; the rapid spread of information, goods, and technologies; innovation and economic integration; new security coalitions that take on shared challenges; issues of trade, energy and the environment; and greater opportunities for people of all nations to have a voice in shaping their future.
>
> With this incredible promise come complications and challenges. In Asia, we see a range of persistent and emerging threats, including:
>
> - North Korea's nuclear weapons and missile programs, and its continued provocations;
> - Ongoing land and maritime disputes and conflicts over natural resources;
> - The continued threat of natural disaster, the curse of poverty and the threat of pandemic disease;
> - Environmental degradation;

- Illicit trafficking in people, weapons, drugs, and other dangerous materials – including the proliferation of weapons of mass destruction;
- And the growing threat of disruptive activities in space and cyberspace.

These are the challenges of the 21st century. This morning I want to describe, from my perspective as the Secretary of Defense of the United States, what we can do together to meet these critical challenges. In particular, America and other nations of the Asia-Pacific must continue to strengthen existing alliances, forge new partnerships, and build coalitions based on common interests to ensure this region's future is peaceful and prosperous.

1. U.S. Investments in Asia-Pacific

In support of this goal, America is implementing a rebalance – which is primarily a diplomatic, economic and cultural strategy. President Obama is increasing funding for diplomacy and development in Asia, including a seven percent increase in foreign assistance in the Asia-Pacific region. The United States is providing new resources for regional efforts such as the Lower Mekong Initiative, which helps improve water management, disaster resilience, and public health. We have built strong momentum toward implementing a next-generation trade and investment agreement through the Trans-Pacific Partnership negotiations. We are fostering regional trade and investment through our work in APEC and our support to ASEAN.

The Department of Defense plays an important role in securing the President's vision of rebalance. Our approach was outlined in the President's 2012 Defense Strategic Guidance, which is still guiding the U.S. military as we reorient its capabilities and capacities to better prepare for future global security challenges.

As we carry out this strategy, it is true that the Department of Defense will have fewer resources than in the recent past. It would be unwise and short-sighted to conclude, however, that our commitment to the rebalance cannot be sustained – particularly given the truth that even under the most extreme budget scenarios, the United States military will continue to represent nearly 40 percent of global defense expenditures. Like the employment of all resources, it is always a matter of the wise, judicious and strategic use of those resources that matters the most and has the most lasting impact.

The fact of the matter is that new fiscal realities present an opportunity to conduct a thorough and much-needed review to ensure we are matching resources to the most important priorities. With that goal in mind, I recently directed a Department-wide Strategic Choices and Management Review. Although the review's outcome is not final, the direction I provided was to follow the President's defense strategic guidance, to focus new energy and thinking on addressing long-standing challenges, and to make our defense enterprise one that better reflects 21st century security realities – including the rise of Asia.

For the region, this means I can assure you that coming out of this review, the United States will continue to implement the rebalance and prioritize our posture, activities and investments in Asia-Pacific. We are already taking many tangible actions in support of that commitment.

For example, the United States is adding to the capacity of our ground forces in the Pacific after Iraq and as we draw down from Afghanistan. The 1st and 3rd Marine Expeditionary Force and the Army's 25th Infantry Division are all returning to their home stations in the Pacific theater. The United States Army is also designating 1st Corps as "regionally aligned" to the Asia-Pacific region.

In addition to our decision to forward base 60 percent of our naval assets in the Pacific by 2020, the U.S. Air Force has allocated 60 percent of its overseas-based forces to the Asia-Pacific – including tactical aircraft and bomber forces from the continental United States. The Air Force is focusing a similar percentage of its space and cyber capabilities on the region. These assets enable us to capitalize on the Air Force's inherent speed, range, and flexibility.

The United States military is not only shifting more of its assets to the Pacific – we are using these assets in new ways to enhance our posture and partnerships. For example, we are pushing forward with plans for innovative rotational deployments in the region. Last year, we noted at this forum that the U.S. Navy had committed to rotating up to four Littoral Combat Ships through Singapore. In recent weeks, the first of those ships, the USS Freedom, arrived to begin a busy schedule of regional maritime engagements. I look forward to visiting the ship tomorrow. Meanwhile, the second company-sized rotation of U.S. Marines

recently arrived in Darwin to deepen cooperation with our treaty ally Australia and other regional partners. Eventually, 2,500 U.S. Marines will be deployed to Australia each year.

America's enduring commitment to peace and security in the Asia-Pacific region depends on sustaining the ability to deter aggression and operate effectively across all domains, including air, sea, land, space, and cyberspace.

Our five year budget plan submitted to Congress this year put a premium on rapidly deployable, self-sustaining forces – such as submarines, long-range bombers, and carrier strike groups – that can project power over great distance and carry out a variety of missions. In the future, this region will see more of these capabilities as we prioritize deployments of our most advanced platforms to the Pacific, including the F-22 Raptor and F-35 Joint Strike Fighter deployments to Japan, and a fourth Virginia-class fast attack submarine forward deployed to Guam.

Even further over the horizon, we are investing in promising technologies and capabilities that will enhance our decisive military edge well into the future. For example, last month, for the first time ever, the U.S. Navy successfully launched an experimental remotely piloted aircraft from an aircraft carrier, ushering in a new era in naval aviation.

Having achieved a series of technological breakthroughs in directed energy, next year for the first time the U.S. Navy will deploy a solid-state laser aboard a ship, the USS Ponce. This capability provides an affordable answer to the costly problem of defending against asymmetric threats like missiles, swarming small boats, and remotely piloted aircraft.

Combined with new concepts, doctrine, and plans that integrate these new technologies and other game changing capabilities, we will ensure freedom of action throughout the region well into the future.

Our investments in Asia are not just about cutting-edge technology and platforms, they are also about cultivating deeper ties between our people and building a network of professional military personnel and security experts across the region.

We have prioritized investments in people, including:

- Expanding the size and scope of our exercises in PACOM, allocating over $100 million in funding for joint exercises in the PACOM region;
- Setting aside new funding for defense education that will allow us to significantly increase the number of students who can attend the Asia-Pacific Center for Security Studies in Hawaii.
- These investments in people, technology, and capabilities are critical to our strategy and to the region's peace and security. Even more important, however, is America's continued investment in our alliances and partnerships, and the region's security architecture.

2. <u>U.S. Bilateral Relationships</u>

Relationships, trust, and confidence are what matter most in the region. America's partners must have confidence in their bilateral ties and alliances with us and our commitments to them and the region, including our treaty alliances. These remain essential to our long-term vision of regional peace and stability.

That is why we have initiated processes with each of our treaty allies to define a new, forward-looking agenda based on enhancing security for our allies and partners, increasing the ability of militaries to work together seamlessly, and building their capacity to contribute to the region's security:

With Japan, we have agreed to review the Defense Guidelines that underpin our Alliance cooperation, and are making substantial progress in realigning our force posture and enhancing Alliance missile defense capabilities;

With the Republic of Korea, we are working to implement the Strategic Alliance 2015 and discussing a shared vision for a more globally-oriented Alliance out to 2030;

With Australia, we are expanding cooperation related to cyber security and space situational awareness. The U.S. and Australian Navies recently reached an agreement to deploy an Australian warship in a U.S.

carrier strike group in the Western Pacific, giving our naval forces new practical experience operating together cooperatively and seamlessly;

With the Philippines we are discussing an increased rotational presence of U.S. forces and helping the Philippine armed forces to modernize and build greater maritime capacity; and

With Thailand, six months ago we announced our Joint Vision Statement, the first such bilateral document in over 50 years.

Our Allies are also working more closely together. In this vein we are encouraged by growing trilateral security cooperation between the U.S., Japan, and the Republic of Korea, as well as the U.S., Japan, and Australia. The United States is also looking at trilateral training opportunities such as jungle training between the U.S. and Thailand that could expand to incorporate the Republic of Korea. Similarly, the United States is working to build trilateral cooperation with Japan and India.

Complex security threats facing the United States and our allies – which go beyond traditional domains and borders – demand these new approaches to Alliance cooperation, and they also demand new and enhanced partnerships as well.

Here in Singapore I look forward to building on our practical collaboration under the U.S.-Singapore Strategic Framework Agreement, which has guided security cooperation not only in this region, but in the Gulf of Aden and Afghanistan as well.

With New Zealand, the signing of the Washington Declaration and associated policy changes have opened up new avenues for defense cooperation in areas such as maritime security cooperation, humanitarian assistance and disaster relief, and peacekeeping support. This week, in Guam, a New Zealand Navy ship is visiting a U.S. Naval facility – the first such visit in nearly 30 years.

With the Vietnamese, we are expanding our cooperation – as set forth in a new memorandum of understanding – in maritime security, training opportunities, search-and-rescue, peacekeeping, military medical exchanges, and humanitarian assistance and disaster relief.

In Malaysia, we are expanding maritime cooperation, including the first-ever visit of a U.S. aircraft carrier to Sabah.

In Burma, we are beginning targeted, carefully calibrated military-to-military engagement aimed at ensuring the military supports ongoing reforms, respects human rights, and a professional force accountable to the country's leadership.

The United States is also working to enhance our partners' capacity to provide for their own security and the security of the region. Ultimately, the United States' goal in the region is to encourage allies to work together to design the next generation of platforms. With our closest and most capable allies and partners, we are already working to jointly develop and deploy cutting-edge technologies to tackle emerging security challenges.

An important example of this cooperation is with India, one of the leaders in this broader Asia region, where we are moving beyond purely defense trade towards technology sharing and co-production.

The world's largest democracy, India's role as a stabilizing power is of growing importance with the increase of trade and transit between the Indian and Pacific Oceans. The United States considers India's efforts to enhance its military capabilities as a welcome contribution to security in the region.

Our vision for the Asia-Pacific region is an open and inclusive one. Along with India, other rising powers also have a special role to play in a future security order as they assume the responsibilities that come with their growing stake in regional stability. To that end, a critical element of our long-term strategy in Asia is to seek to build strong relationships with rising powers – including India, Indonesia and China.

The United States and Indonesia – the world's largest Muslim-majority nation – are building new habits of cooperation that reflect a shared vision for a peaceful and prosperous region. As a large, diverse, and democratic country, Indonesia has a key role in helping lead this region. The United States and Indonesia are working together on humanitarian assistance and disaster response preparedness, maritime security, international peacekeeping, and combating transnational threats.

Building a positive and constructive relationship with China is also an essential part of America's rebalance to Asia. The United States welcomes and supports a prosperous and successful China that contributes to regional and global problem solving. To this end, the United States has consistently supported a role for China in regional and global economic and security institutions, such as the G20. We encourage our allies and partners to do the same.

The United States strongly supports the efforts made by the PRC and Taiwan in recent years to improve cross-Strait relations. We have an enduring interest in peace and stability in the Taiwan Strait. The United States remains firm in its adherence to a one-China policy based on the three joint U.S.-China communiques and the Taiwan Relations Act.

While the U.S. and China will have our differences – on human rights, Syria, and regional security issues in Asia – the key is for these differences to be addressed on the basis of a continuous and respectful dialogue. It also requires building trust and reducing the risk of miscalculation, particularly between our militaries.

President Obama and President Xi, who will soon meet for a summit in California, have both been clear that they seek a stronger military-to-military relationship. I am pleased that the dialogue between our armed forces is steadily improving. Over the course of the past year, positive developments include:

- We hosted then-Vice President Xi Jinping at the Pentagon, and later hosted China's Minister of Defense;
- Secretary Panetta, General Dempsey and Admiral Locklear led delegations to China;
- The first ever Chinese observation of the US-Philippine Balikitan exercise;
- The first-ever joint counter-piracy exercise in the Gulf of Aden;
- The U.S. invitation for China to participate in RIMPAC, the Pacific's largest multilateral Naval exercise;
- An agreement to co-host a Pacific Army Chiefs Conference with China for the first time;
- Later this year, I look forward to welcoming the Minister of Defense to the Pentagon.

While we are pleased to see this progress, it is important for both the United States and China to provide clarity and predictability about each other's current and future strategic intentions.

Accordingly, China, the United States and all nations of the region have a responsibility to work together to ensure a vibrant regional security architecture that solves problems. America's bilateral relationships and Alliances will continue to underpin the region's security and prosperity, but multilateral institutions provide critical platforms and opportunities for countries to work together.

3. Toward a Regional Security Architecture

The United States strongly supports a future security order where regional institutions move beyond aspiration to achieving real results, and evolve from talking about cooperation to achieving real, tangible solutions to shared problems, and a common framework for resolving differences. We are working toward a future where militaries can respond together rapidly and seamlessly to a range of contingencies, such as providing immediate humanitarian assistance and disaster relief.

ASEAN has set the stage for regional cooperation by developing a network of viable institutions. ASEAN nations play a critical role in this region's security architecture, and will continue to do so. In addition to the East Asian Summit and the ASEAN Regional Forum, the relatively new ASEAN Defense Ministers Meeting Plus (ADMM+) provides an important framework for nations in the region to pursue common security objectives.

…. The United States supports Asian nations taking the lead in pushing their region towards greater cooperation… [o]ur relationships with ASEAN nations are critical, and ASEAN leaders extend great hospitality to members of my government every year…. I believe this first-ever U.S.-hosted meeting of ASEAN Defense Ministers will provide another opportunity for us to discuss a shared vision for a dynamic, peaceful, and secure future for the region.

This future can only be realized if we work together to create an environment where all can prosper and succeed, and where coercion and conflict are put aside in favor of open dialogue. This requires a continued commitment to certain foundational principles that have enabled this region's success for generations. These include free and open commerce; a just international order that emphasizes rights and responsibilities of nations and fidelity to the rule of law; open access, by all, to the domains of sea, air, space, and now, cyberspace; and the principle of resolving conflict without the use of force.

Threats to these principles are threats to peace and security in the 21st century. Unfortunately, some nations continue to dismiss these values and pursue a disruptive path – most notably, North Korea.

The United States has been committed to ensuring peace and stability on the Korean Peninsula for sixty years. That means deterring North Korean aggression and protecting our allies, and achieving the complete denuclearization of the Korean Peninsula. The United States will not stand by while North Korea seeks to develop a nuclear-armed missile that can target the United States.

The United States has been clear that we will take all necessary steps to protect our homeland and our allies from dangerous provocations, including significantly bolstering our missile defense throughout the Pacific. No country should conduct "business as usual" with a North Korea that threatens its neighbors. We are working closely with our ROK and Japanese allies to strengthen our posture and ability to respond to threats from North Korea. The prospects for a peaceful resolution also will require close U.S. coordination with China.

Beyond the peninsula, the United States also remains concerned over the potential for dangerous miscalculations or crises posed by numerous competing territorial claims in the region.

The United States has been clear that we do not take a position on the question of sovereignty in these cases. That does not mean, however, that we do not have an interest in how these disputes are addressed and settled. The United States stands firmly against any coercive attempts to alter the status quo. We strongly believe that incidents and disputes should be settled in a manner that maintains peace and security, adheres to international law, and protects unimpeded lawful commerce, as well as freedom of navigation and overflight.

In the South China Sea, the United States continues to call on all claimants to exercise restraint as they publicly pledged in 2002, and to seek peaceful means to resolve these incidents. In that regard, we support the recent agreement between China and ASEAN to establish crisis hotlines to help manage maritime incidents. The U.S. also welcomes efforts to start talks on a Code of Conduct for the South China Sea. We encourage claimants to explore all peaceful means of settling their territorial disputes and the use of the dispute adjudication resolution mechanisms provided by the Law of the Sea Convention. Such efforts should not hinder progress towards developing a binding Code of Conduct.

Even as we seek to uphold principles in well-established areas, we must also recognize the need for common rules of the road in new domains.

The U.S. and all nations in the region have many areas of common interest and concern in cyberspace, where the threats to our economic security, businesses and industrial base are increasing. In response, the United States is increasing investment in cyber security and we are deepening cyber cooperation with Allies in the region and across the globe. Next week I will attend a meeting of NATO Defense Ministers devoted to cyber issues.

We are also clear-eyed about the challenges in cyber. The United States has expressed our concerns about the growing threat of cyber intrusions, some of which appear to be tied to the Chinese government and military. As the world's two largest economies, the U.S. and China have many areas of common interest and concern, and the establishment of a cyber working group is a positive step in fostering U.S.-China dialogue on cyber. We are determined to work more vigorously with China and other partners to establish international norms of responsible behavior in cyberspace.

The United States and its Asian-Pacific allies and partners are far more likely to be able to live peacefully and prosperously in a world where we are bound together by strong economic ties, mutual security interests and respect for rules, norms, and the institutions that underpin them.

Strategy, Rebalancing, and Reality

It should be clear that that any US and Chinese military dialogue must be based on a net assessment of both changes in Chinese strategy and forces described in this report and the changes in US strategy and forces. At the same, such a net assessment needs to be based on more than strategy; clear trends and hard numbers must be taken into account as well.

In the case of US strategy, it is still far from clear what the future US posture in the Asia-Pacific will actually be. The US initially announced that it would shift its naval presence from 50% to 60% of its total fleet by 2020, but later talked about shifting 5% of its fleet and air forces. Since that time, the US has made major further cuts in planned defense spending, made serious cuts in its military readiness and exercise activities, and come to face growing uncertainty over its future defense plans because of Sequestration and a Budget Control Act passed after it announced the changes to its strategy.

It is not clear yet clear what the short term effects of sequestration will be, how much of the FY2014 budget request will be funded, and how large an army, fleet, and air force it will maintain in coming years. Furthermore, the US has long fallen short of its ship-building goals. The US may well have to cut back by a carrier task force equivalent and slow its plans to modernize its submarines and equip them with more conventional long-range missiles.

The Air Force also plans to allocate 60% of its overseas-based forces to the region. While the US talks about focusing on the air-sea battle, it faces similar challenges in modernizing and maintaining its combat air fleet, in procuring the planned number of F-35 fighters, in actually funding and deploying a new bomber, and in modernizing key "enablers" such as its refueling tankers.

The US also faces major challenges in adapting its land forces to its new strategy. A 2012 analysis by the Congressional Research Service notes that similar uncertainties exist in the future posture of the US Army:[6]

> General Odierno reportedly envisions the Army playing an important role in the Asia-Pacific region. Noting that the Asia-Pacific region is home to 7 of the 10 largest armies in the world, General Odierno reportedly stated that the Army would "actively seek new opportunities for expanding current international training opportunities." General Odierno also emphasized how the presence of the U.S. Army in the region—about 25,800 soldiers in South Korea; 23,000 in Hawaii; 2,700 in Japan; and 13,000 in Alaska—serves as a deterrent to potential aggressors and also provides forces that can be deployed elsewhere within the region. In terms of force structure, as previously noted, the Army does not foresee any cuts to Army units in Hawaii, Japan, or South Korea. In addition, three Stryker BCTs are stationed at Joint Base Lewis-McChord in Washington that are assigned to U.S. Pacific Command and under the operational control of U.S. Army Pacific, but it is not known if these units will be reassigned to different missions.
>
> Deterrence and response aside, the Army reportedly plans to step up training exercises in the region in an effort to strengthen its presence and influence. In addition to Pacific-based units, the Army reportedly is considering including the XVIII Airborne Corps at Ft. Bragg, NC; the I Corps at Joint Base Lewis-McChord, WA; and the 101st Airborne Division at Ft. Campbell, KY, in upcoming exercises. The U.S. Army Pacific is reportedly working with the 101st Airborne Division on the possibility of participating in Yudh Abhyas, a bilateral exercise with India. The United States and India would take turns hosting the exercise, with the United States hosting the exercise in 2013. The U.S. Army Pacific is also reportedly working with Australia and New Zealand, perhaps to conduct a battalion-sized event with the New Zealand Army and a brigade-sized exercise with the Australian Army. In addition to working with these armies, the United States also hopes to leverage its relationships with Indonesia, Malaysia, and Thailand in order to increase partnership opportunities with the three nations.

It will probably take several more years to determine what path the US will really pursue in Asia, what its future military spending will be, and what levels of force it will deploy over time. The key point from the perspective of US and Chinese military dialogue is that even if all current plans are implemented, the US would not carry out a major military build-up in Asia, and – as the following analysis of Chinese forces shows – would not posture its forces for a confrontation with China. This highlights the fact – as does the analysis of Chinese forces – that a military dialogue must be founded on hard, detailed analysis of the actual force trends on both sides, not on a worst-case analysis of military rhetoric.

This is the official position of the US, as the May 2013 edition of the DoD *Military and Security Developments Involving the People's Republic of China* report points out:[7]

> During their January 2011 summit, U.S. President Barack Obama and then-PRC President Hu Jintao jointly affirmed that a "healthy, stable, and reliable military-to-military relationship is an essential part of [their] shared vision for a positive, cooperative, and comprehensive U.S.-China relationship." Within that framework, the U.S. Department of Defense seeks to build a military-to-military relationship with China that is sustained and substantive, while encouraging China to cooperate with the United States, our allies and partners, and the greater international community in the delivery of public goods. As the United States builds a stronger foundation for a military-to-military relationship with China, it also will continue to monitor China's evolving military strategy, doctrine, and force development and encourage China to be more transparent about its military modernization program. In concert with its allies and partners, the United States will continue adapting its forces, posture, and operational concepts to maintain a stable and secure Asia-Pacific security environment.

Chapter 1: Assessing China's Armed Forces

For more than two decades the Chinese military has engaged in a military modernization and force development program. There are different explanations for this modernization effort, with analysts from many countries providing explanations based on differing assumptions, theories, and available data.

At the 18th National Congress of the Communist Party of China in November 2012, China's leaders stated that the country was undergoing a period of strategic opportunity through 2020, and they publically focused on domestic development in the context of a relatively peaceful international order. In general, it seemed as if China's new leader, Xi Jinping, was concentrating more on great power diplomacy than his predecessor, Hu Jintao.[8] In practice, however, China has been concentrating on both civil and military development.

Xi Jinping quickly began establishing himself as a strong military leader, going on high-profile visits to Navy, Air Force, Army, and Missile Command facilities during his first 100 days in office. He has also launched a campaign to enhance the armed forces' ability to "fight and win wars," while taking direct control of an interagency body that has overseen the escalation over islands claimed by both Japan and China.[9]

Perhaps the best Chinese summary of Chinese views is presented by its national defense white papers, issued biennially by the Information Office of the State Council of the People's Republic of China.

China's Defense White Papers

The most recent white papers, *China's National Defense in 2008*, and *China's National Defense in 2010,* and *The Diversified Employment of China's Armed Forces* (2013) provide a Chinese analysis of the logic and drivers behind the military modernization program. Importantly, the papers themselves are meant to be viewed as a series, so older versions of the white paper still provide utility for China analysts.[10] In the papers, China offers a summary of its strategic view of the world.

In terms of the official Chinese view of the modern strategic environment, the 2010 white paper notes,[11]

> The international situation is currently undergoing profound and complex changes. The progress toward economic globalization and a multi-polar world is irreversible, as is the advance toward informationization of society. The current trend toward peace, development and cooperation is irresistible. But, international strategic competition and contradictions are intensifying, global challenges are becoming more prominent, and security threats are becoming increasingly integrated, complex and volatile.
>
> On the whole, the world remains peaceful and stable. The international community has reaped the first fruits in joint efforts to respond to the global financial crisis. All countries have stepped up to adjust their strategies and models for economic development, and no effort has been spared in attempting to foster new economic growth points. Scientific and technological innovations are breeding new breakthroughs. And economic globalization has achieved further progress. The international balance of power is changing, most notably through the economic strength and growing international status and influence of emerging powers and developing countries. Prospects for world multi-polarization are becoming clearer. The prevailing trend is towards reform in international systems.

> Steady progress is being made in the establishment of mechanisms for management of the global economy and finance. G20 is playing a more outstanding role. The international spotlight has turned to the reform of the UN and other international political and security systems. Profound realignments have taken place in international relations; economic interdependence among various countries has been enhanced; shared challenges have been increasing; and communication, coordination and cooperation have become mainstream in relationships among the world's major powers. As factors conducive to maintaining peace and containing conflict continue to grow, mankind can look forward to a future that on the whole is bright.
>
> The international security situation has become more complex. International strategic competition centering on international order, comprehensive national strength and geopolitics has intensified. Contradictions continue to surface between developed and developing countries and between traditional and emerging powers, while local conflicts and regional flashpoints are a recurrent theme. In a number of countries, outbreaks of unrest are frequently triggered off by political, economic, ethnic, or religious disputes. In general, world peace remains elusive. Deep-seated contradictions and structural problems behind the international financial crisis have not been resolved. World economic recovery remains fragile and imbalanced. Security threats posed by such global challenges as terrorism, economic insecurity, climate change, nuclear proliferation, insecurity of information, natural disasters, public health concerns, and transnational crime are on the rise. Traditional security concerns blend with non-traditional ones and domestic concerns interact with international security ones, making it hard for traditional security approaches and mechanisms to respond effectively to the various security issues and challenges in the world.
>
> International military competition remains fierce. Major powers are stepping up the realignment of their security and military strategies, accelerating military reform, and vigorously developing new and more sophisticated military technologies. Some powers have worked out strategies for outer space, cyber space and the Polar Regions, developed means for prompt global strikes, accelerated development of missile defense systems, enhanced cyber operations capabilities to occupy new strategic commanding heights. Some developing countries maintain the push towards strengthening their armed forces, and press on with military modernization. Progress has been made in international arms control, but prevention of the proliferation of weapons of mass destruction remains complex, there is still much to do to maintain and strengthen the international non-proliferation mechanism.

China released its newest defense white paper – *The Diversified Employment of China's Armed Forces* – on April 16, 2013. This white paper is different from its predecessors in several key ways. One is that the paper revealed the structure of each military branch – in terms of numbers of troops and officers as well as the organization of each branch. Moreover, the Air Force, Navy, and domestic R&D investment are all emphasized in terms of capabilities and operational reach expansions.

The 2013 paper discussed China's view of itself and its place in the international arena, emphasizing again the PRC's commitment to peaceful development:[12]

> In today's world, peace and development are facing new opportunities and challenges. It is a historic mission entrusted by the era to people of all nations to firmly grasp the opportunities, jointly meet the challenges, cooperatively maintain security and collectively achieve development.
>
> It is China's unshakable national commitment and strategic choice to take the road of peaceful development. China unswervingly pursues an independent foreign policy of peace and a national defense policy that is defensive in nature. China opposes any form of hegemonism or power politics, and does not interfere in the internal affairs of other countries. China will never seek hegemony or behave in a hegemonic manner, nor will it engage in military expansion. China advocates a new security concept featuring mutual trust, mutual benefit, equality and coordination, and pursues comprehensive security, common security and cooperative security.
>
> It is a strategic task of China's modernization drive as well as a strong guarantee for China's peaceful development to build a strong national defense and powerful armed forces which are commensurate with China's international standing and meet the needs of its security and development interests. China's armed forces act to meet the new requirements of China's national development and security strategies, follow the

> theoretical guidance of the Scientific Outlook on Development, speed up the transformation of the generating mode of combat effectiveness, build a system of modern military forces with Chinese characteristics, enhance military strategic guidance and diversify the ways of employing armed forces as the times require. China's armed forces provide a security guarantee and strategic support for national development, and make due contributions to the maintenance of world peace and regional stability.

US Defense White Papers on China's Strategy and Forces

This view of the world bears striking similarities to the way in which China's neighbors, the US, and many Western nations present their views of the security environment. However, outsiders can – and do – speculate on current and future Chinese intentions and capabilities; China's long-running military modernization program has caused some observers to question the reasons for such sustained investments.

The 2013 edition of the DoD's *Military and Security Developments Involving the People's Republic of China* report summarized the recent trends in China's strategy, military efforts, and force posture as follows:[13]

> China's leaders characterize the first two decades of the 21st century as a "strategic window of opportunity." They assess that during this period, both domestic and international conditions will be conducive to expanding China's "comprehensive national power," a term that encapsulates all elements of state power, including economic capacity, military might, and diplomacy. China's leaders anticipate that a successful expansion of comprehensive national power will serve China's strategic objectives, which include: perpetuating Chinese Communist Party (CCP) rule, sustaining economic growth and development, maintaining domestic political stability, defending national sovereignty and territorial integrity, and securing China's status as a great power. (p.15)
>
> China's leaders routinely emphasize the goal of reaching critical economic and military benchmarks by 2020. These benchmarks include successfully restructuring the economy to maintain growth and increase the quality of living of China's citizens to promote stability; making major progress in military modernization; and attaining the capability to fight and win potential regional conflicts, including those related to Taiwan, protection of sea lines of communication (SLOCs), defense of territorial claims in the South China Sea and East China Sea, and the defense of western borders. Statements by Chinese leaders indicate that, in their view, the development of a modern military is necessary for China to achieve greater power status. These statements also indicate that the Chinese leadership views a modern military as a critical deterrent to prevent actions by outside powers that could damage Chinese interests, or to allow China to defend itself against such actions should deterrence fail.
>
> …China regards stable relations with its neighbors and the United States as essential to its stability and development. China continues to see the United States as the dominant regional and global actor with the greatest potential to both support and, potentially, disrupt China's rise. In addition, China remains concerned that should regional states come to view China as a threat, they might balance against China through unilateral military modernization or through coalitions, possibly with the United States. Many Chinese officials and the public see the U.S. rebalance to Asia as a reflection of "Cold War thinking" and as a way to contain China's rise. (p. 15)
>
> Despite its desire to project an image of a developing country engaged in a peaceful development strategy, China's efforts to defend national sovereignty and territorial integrity (underpinned by growing economic and military capabilities) have occasionally manifested in assertive rhetoric and behavior that generate regional concerns about its intentions. Prominent examples of this include China's response to Japan's arrest of a PRC fishing trawler captain following a collision with Japanese coast guard vessels in 2010, its use of punitive trade policies as an instrument of coercion, its actions to shield North Korea from the international response to its sinking of the South Korean naval vessel, *Cheonan*, and its action to pressure Vietnam and the Philippines in the South China Sea and Japan in the East China Sea. Official statements and media during these situations indicate that China sees itself as responding to perceived threats to its national interests or provocations by outside actors. China's lack of transparency surrounding its growing military capabilities and strategic decision-making has also increased concerns in the region about China's

> intentions. Absent a move towards greater transparency, these concerns will likely intensify as the PLA modernization progresses (p. 16)

The DoD went on to cite several specific shifts in Chinese strategy that were having major impacts on US power projection capabilities as well as on regional deterrent and defense capabilities:[14]

> **Anti-Access/Area Denial (A2/AD).** As part of its planning for military contingencies, China continues to develop measures to deter or counter third-party intervention, particularly by the United States. China's approach to dealing with this challenge is manifested in a sustained effort to develop the capability to attack, at long ranges, military forces that might deploy or operate within the western Pacific, which the DoD characterizes as "anti-access" and "area denial" (A2/AD) capabilities. China is pursuing a variety of air, sea, undersea, space and counter-space, and information warfare systems and operational concepts to achieve this capability, moving toward an array of overlapping, multilayered offensive capabilities extending from China's coast into the western Pacific. China's 2008 Defense White Paper asserts, for example, that one of the priorities for the development of China's armed forces is to "increase the country's capabilities to maintain maritime, space, and electromagnetic space security."
>
> An essential element, if not a fundamental prerequisite, of China's emerging A2/AD regime is the ability to control and dominate the information spectrum in all dimensions of the modern battlespace. PLA authors often cite the need in modern warfare to control information, sometimes termed "information blockade" or "information dominance," and to seize the initiative and gain an information advantage in the early phases of a campaign to achieve air and sea superiority.
>
> China is improving information and operational security to protect its own information structures, and is also developing electronic and information warfare capabilities, including denial and deception, to defeat those of its adversaries. China's "information blockade" likely envisions employment of military and non-military instruments of state power across the battlespace, including in cyberspace and outer space. China's investments in advanced electronic warfare systems, counter-space weapons, and computer network operations (CNO) — combined with more traditional forms of control historically associated with the PLA and CCP systems, such as propaganda and denial through opacity, reflect the emphasis and priority China's leaders place on building capability for information advantage. (p. 33)
>
> In more traditional domains, China's A2/AD focus appears oriented toward restricting or controlling access to China's periphery, including the western Pacific. China's current and projected force structure improvements, for example, will provide the PLA with systems that can engage adversary surface ships up to 1,000 nm from China's coast. (p. 33)
>
> China is also developing weapons for its entire military to project force further from its coast. Current and projected missile systems will allow the PLA to strike regional air bases, logistical facilities, and other ground-based infrastructure. Chinese military analysts have concluded that logistics and power projection are potential vulnerabilities in modern warfare, given the requirements for precision in coordinating transportation, communications, and logistics networks. China is fielding an array of conventionally armed ballistic missiles, ground- and air-launched land-attack cruise missiles, special operations forces, and cyber-warfare capabilities to hold targets at risk throughout the region. (p. 33)
>
> **Territorial Disputes.** Senior Chinese officials have identified protecting China's sovereignty and territorial integrity as a "core interest" and all officials repeatedly state China's opposition to and willingness to respond to actions it perceives as challenging this core interest. In 2012, this was demonstrated by Chinese actions at Scarborough Reef in the South China Sea and the Senkaku Islands in the East China Sea. (p. 2-3)
>
> The Chinese government maintains that its maritime rights extend to virtually the entire South China Sea and often illustrates this claim using a "nine-dash line" that encompasses much of the South China Sea area. At the same time, Beijing is ambiguous about the precise meaning of the nine-dash line; to date, China has not clarified the meaning of the nine-dash line or its legal basis. In April 2012, Chinese maritime law enforcement vessels and Philippine coast guard vessels engaged in a protracted standoff at Scarborough Reef, after the Philippine Navy attempted to conduct a fishing enforcement action against Chinese fishermen. (p. 2-3)
>
> Although overt tensions between China and the Philippines subsided by year's end, both sides continue to

claim jurisdiction over the reef. Chinese law enforcement vessels have maintained an almost continuous presence ever since. (p. 2-3)

In November 2012, China also added a map which contained the nine-dash line to all of its new passports. This action elicited negative responses from other nations in the Asia-Pacific region. China's increased reference in official government materials to the nine-dash line is a source of concern to its neighbors and other nations because, at a minimum, it creates an impression that China is not merely claiming all the land features within the nine-dash line, but it may also be claiming a special sovereign status of all the water and the sea-bed contained therein. (p. 2-3)

China claims sovereignty over the Senkaku Islands (what the Chinese refer to as the Diaoyu Islands) in the East China Sea, territory also claimed by Taiwan and Japan. In April 2012, the Governor of Tokyo announced plans to purchase three of the five islets from private Japanese owners. In response, in September 2012, the Government of Japan purchased the three islands. China protested the move and since that time has regularly sent maritime law enforcement ships (and, less often, aircraft) to patrol near the Senkakus to protect its claims; this has included regular Chinese maritime operations within 12nm of the islands. On September 25, China published a white paper entitled, "Diaoyu Dao, an 'Inherent Territory' of China." In addition, in September 2012, China began using improperly drawn straight baseline claims around the Senkaku Islands, adding to its network of maritime claims inconsistent with international law. In December 2012, China submitted information to the U.N. Commission on the Limits of the Continental Shelf regarding China's extended continental shelf in the East China Sea that includes the disputed islands. (p. 2-3)

…China's use of force in territorial disputes has varied throughout its history. Some disputes led to war, such as China's border conflicts with India in 1962 and Vietnam in 1979. A contested border with the former Soviet Union during the 1960s raised the possibility of nuclear war. In more recent cases, China has been willing to compromise with and even offer concessions to its neighbors. Since 1998, China has settled eleven land-based territorial disputes with six of its neighbors. Several disputes continue over exclusive economic zones (EEZ) and ownership of potentially rich, off-shore oil and gas deposits. (p. 21)

The East China Sea contains approximately seven trillion cubic feet of natural gas and up to 100 billion barrels of oil. Japan maintains that an equidistant line from each country involved should separate the EEZs, while China claims an extended continental shelf beyond the equidistant line to the Okinawa Trench (which almost reaches Japan's shore). In early 2009, Japan accused China of violating a June 2008 agreement providing for joint exploration of oil and natural gas fields, and claimed that China unilaterally drilled beneath the demarcation line, extracting reserves from the Japanese side. China, Japan, and Taiwan continue to dispute possession of the nearby Senkaku Islands. (p. 22)

The South China Sea plays an important role in Northeast and Southeast Asian security considerations. Northeast Asia relies heavily on the flow of oil and commerce through South China Sea shipping lanes, including over 80 percent of the crude oil to Japan, South Korea, and Taiwan. China claims sovereignty over the Spratly and Paracel island groups and other land formations within its "nine-dash line" claim - claims disputed in whole or part by Brunei, the Philippines, Malaysia, Indonesia, and Vietnam. Taiwan, which occupies Itu Aba in the Spratly Islands, makes the same claims as the PRC. In 2009, China protested extended continental shelf claims in the South China Sea made by Malaysia and Vietnam; in its protest to the U.N. Commission, China included the ambiguous nine-dash line and reiterated that it has "indisputable sovereignty over the islands in the South China Sea and the adjacent waters and enjoys sovereign rights and jurisdiction over the relevant waters as well as the seabed and subsoil thereof." (p. 22)

Despite increased political and economic relations over the years between China and India, tensions remain along their shared 4,057 km border, most notably over Arunachal Pradesh (which China asserts is part of Tibet, and therefore of China), and over the Aksai Chin region at the western end of the Tibetan Plateau. Both countries in 2009 stepped up efforts to assert their claims. China tried to block a $2.9 billion loan to India from the Asian Development Bank, claiming part of the loan would have been used for water projects in Arunachal Pradesh. This represented the first time China sought to influence this dispute through a multilateral institution. The then-governor of Arunachal Pradesh announced that India would deploy more troops and fighter jets to the area. An Indian newspaper reported that the number of Chinese border violations had risen from 180 in 2011 to more than 400 by September 2012. (p. 22)

Counter-Space. PLA strategists regard the ability to utilize space and deny adversaries access to space as central to enabling modern, informatized warfare. Although PLA doctrine does not appear to address space operations as a unique operational "campaign," space operations form an integral component of other PLA campaigns and would serve a key role in enabling A2/AD operations. Publicly, China attempts to dispel any skepticism over its military intentions for space. In 2009, PLA Air Force Commander General Xu Qiliang publically retracted his earlier assertion that the militarization of space was a "historic inevitability" after President Hu Jintao swiftly contradicted him. General Xu Qiliang is now a Vice Chairman of the Central Military Commission and the second highest-ranking officer in the PLA. (p. 34)

The PLA is acquiring a range of technologies to improve China's space and counter-space capabilities. China demonstrated a direct-ascent kinetic kill anti-satellite capability to low Earth orbit when it destroyed the defunct Chinese FY-1C weather satellite during a test in January 2007. Although Chinese defense academics often publish on counterspace threat technologies, no additional anti-satellite programs have been publicly acknowledged. A PLA analysis of U.S. and coalition military operations reinforced the importance of operations in space to enable "informatized" warfare, claiming that "space is the commanding point for the information battlefield." PLA writings emphasize the necessity of "destroying, damaging, and interfering with the enemy's reconnaissance...and communications satellites," suggesting that such systems, as well as navigation and early warning satellites, could be among the targets of attacks designed to "blind and deafen the enemy." The same PLA analysis of U.S. and coalition military operations also states that "destroying or capturing satellites and other sensors…will deprive an opponent of initiative on the battlefield and [make it difficult] for them to bring their precision guided weapons into full play." (p. 34)

Military Information Operations. Chinese writings have outlined the five key features at an operational level of a maturing Chinese information operations (IO) strategy. First, Chinese authors emphasize defense as the top priority and indicate that Computer Network Defense (CND) must be the highest priority in peacetime; Chinese doctrine suggests that "tactical counteroffensives" would only be considered if an adversary's operations could not be countered. Second, IO is viewed as an unconventional warfare weapon, which must be established in the opening phase of the conflict and continue during all phases of war. Third, IO is characterized as a preemption weapon to be used under the rubric of achieving information dominance and controlling the electromagnetic spectrum. Fourth, IO is seen as a tool to permit China to fight and win an information campaign, precluding the need for conventional military action. Fifth, potential Chinese adversaries, in particular the United States, are seen as "information dependent." (p. 9)

An IO campaign includes actions taken to seize and maintain campaign information superiority, unify command campaign information operational forces, carry out information warfare-related reconnaissance, and offensive and defensive information warfare methods. According to a PLA military manual, there are many types of supporting IO to campaigns including an island-landing campaign IO, blockade campaign IO, fire power attack campaign IO, border counterattack campaign IO, counter-landing campaign IO, and counter-airstrike campaign IO. These IO campaigns can be sub-divided into joint campaign IO and combined arms campaign IO. Depending on the military services involved in the campaign, IO can be further divided into army campaign, navy, air force, and strategic missile force campaign IO. Their primary tasks are to protect the PLA's campaign information systems, collect intelligence from enemy information systems, destroy enemy information systems, and weaken the enemy's ability to acquire, transmit, process, and use information during war. (p. 10)

The PLA continues to conduct frequent military exercises demonstrating advances in information technology and information integration of its military forces. China has performed integrated joint combat operations exercises showcasing intelligence acquisition, joint command, joint strike, and support operations, increasingly incorporated information technology and information integration into its annual training requirement. A number of annual exercise series, including the *Vanguard*, *Lianhe*, and *Joint Education* series have increased required integration and full reliance on information technology for command of complex operations. In 2012, according to PLA newspapers, many military exercises banned paper maps and orders altogether. Also in 2012, there was an increasing emphasis on PLA command academies participating in joint exercises using command information technologies, which indicates proficiency on such platforms is now a requirement for graduation to higher command positions. (p. 11)

Overall, these developments are reshaping the structure and character of virtually every aspect of China's forces, making it a far more effective military power in terms of both conventional and asymmetric warfare capabilities and altering the balance of nuclear deterrence affecting the Pacific region.

The Strategic Forces Driving Chinese Military Modernization

China has many reasons to modernize its security forces and expand their war-fighting capabilities. From a Chinese perspective, the other nations of the world create as many strategic uncertainties for China as China does for them. China shares borders with 15 other countries in Asia (counting Japan), several of which pose serious security issues in Chinese eyes. Taiwan, North Korea, Pakistan, and India all present challenges to regional stability. The US presence in the region is also seen as posing a further challenge in terms of strategic planning.

China has good reason to see the US as both a major trading partner and as a potential strategic rival. China is reasserting its role as a major regional power after more than a century of outside interference and exploitation as well as internal conflict. As a world economic power, China's sphere of interests spans the globe. Becoming a major world power creates strategic and military imperatives that generate a momentum of their own. In the last decade, the development of China's domestic and foreign policies has increased the country's involvement in international affairs. The rapid expansion of international trade, along with China's increased reliance on imported commodities and participation in multilateral policymaking institutions, has exposed China to risks that may increasingly jeopardize its interests abroad and at home. In addition, domestic problems in China may pose issues for internal stability.

China makes several of these points in its defense white papers. It states that China's military faces a world in which "China is … confronted by more diverse and complex security challenges" that threaten its "vast territories and territorial seas." Consequently, China "faces heavy demands in safeguarding national security" from external threats. Moreover, China's internal concerns, "the 'Taiwan independence' separatist force," and "separatist forces working for 'East Turkistan independence' and 'Tibet independence'" continue to pose domestic challenges.[15]

In addition, the US creates a unique issue for China, as "the United States is reinforcing its regional military alliances, and increasing its involvement in regional security affairs."[16] The US also continues to sell weapons to Taiwan. The 2013 white paper implicitly criticized the increasing US presence in the Asia-Pacific as well as highlighted the increasing complication of international relations:[17]

> There are signs of increasing hegemonism, power politics and neo-interventionism. Local turmoils occur frequently. Hot-spot issues keep cropping up. Traditional and non-traditional security challenges interweave and interact. Competition is intensifying in the international military field. International security issues are growing noticeably more abrupt, interrelated and comprehensive. The Asia-Pacific region has become an increasingly significant stage for world economic development and strategic interaction between major powers. The US is adjusting its Asia-Pacific security strategy, and the regional landscape is undergoing profound changes.
>
> …. China still faces multiple and complicated security threats and challenges. The issues of subsistence and development security and the traditional and non-traditional threats to security are interwoven. Therefore, China has an arduous task to safeguard its national unification, territorial integrity and development interests. Some country has strengthened its Asia-Pacific military alliances, expanded its military presence in the region, and frequently makes the situation there tenser. On the issues concerning China's territorial

> sovereignty and maritime rights and interests, some neighboring countries are taking actions that complicate or exacerbate the situation…. Major powers are vigorously developing new and more sophisticated military technologies so as to ensure that they can maintain strategic superiorities in international competition in such areas as outer space and cyber space.

Exacerbating these challenges is the Revolution in Military Affairs (RMA) that is forcing China to face strategic challenges while adapting to a rapidly changing military environment. In addition to "fierce" military competition and vigorous development of foreign military technology, China must contend with an expansion in the number of militarized domains. The specific references to outer space, cyber space, and the polar regions in the 2010 white paper express concerns found in the 2008 version over "strategic nuclear forces, military astronautics, missile defense systems, and global and battlefield reconnaissance and surveillance."[18]

Despite these challenging world trends, China describes its own defense policy as one that does not present a threat to any other state and which upholds world peace and stability:[19]

> China pursues a national defense policy that is defensive in nature. In accordance with the Constitution of the People's Republic of China and other relevant laws, the armed forces of China undertake the… duty of resisting foreign aggression, defending the motherland, and safeguarding overall social stability and the peaceful labor of its people. To build a fortified national defense and strong armed forces compatible with national security and development interests is a strategic task of China's modernization, and a common cause of the people of all ethnic groups.
>
> The pursuit of a national defense policy that is defensive in nature is determined by China's development path, its fundamental aims, its foreign policy, and its historical and cultural traditions. China unswervingly takes the road of peaceful development, strives to build a harmonious socialist society internally, and promotes the building of a harmonious world enjoying lasting peace and common prosperity externally. China unswervingly advances its reform and opening up as well as socialist modernization, making use of the peaceful international environment for its own development which in return will contribute to world peace. China unswervingly pursues an independent foreign policy of peace and promotes friendly cooperation with all countries on the basis of the Five Principles of Peaceful Coexistence. China unswervingly maintains its fine cultural traditions and its belief in valuing peace above all else, advocating the settlement of disputes through peaceful means, prudence on the issue of war, and the strategy of "attacking only after being attacked." China will never seek hegemony, nor will it adopt the approach of military expansion now or in the future, no matter how its economy develops.

China's Declared Strategic Goals

In order to achieve the aims of the PRC's defense policy, the PLA intends to both secure China as a sovereign state and also to further the cause of world peace. The PLA plans to "broaden their visions of national security strategy and military strategy, aim at winning local wars under the conditions of informationization, make active planning for the use of armed forces in peacetime, deal effectively with various security threats and accomplish diversified military tasks."[20] In particular, the PLA will adhere to the following fundamental principles and policies:[21]

- Safeguarding national sovereignty, security and territorial integrity, and supporting the country's peaceful development.
- Aiming to win local wars under the conditions of informationization and expanding and intensifying military preparedness.
- Formulating the concept of comprehensive security and effectively conducting military operations other than war (MOOTW).
- Deepening security cooperation and fulfilling international obligations.

- Acting in accordance with laws, policies and disciplines.

China underscored its public emphasis on peaceful intentions and defensive military modernization in its 2010 white paper, describing its actions and policies as follows: [22]

> With the development of national economy and society, the increase of China's defense expenditure has been kept at a reasonable and appropriate level.… In recent years, the share of China's annual defense expenditure in its GDP has remained relatively steady, while that in overall state financial expenditure has been moderately decreased.
>
> …. China has always stood for the complete prohibition and thorough destruction of nuclear weapons.… As a permanent member of the UN Security Council and a nuclear-weapon state signatory of the NPT, China has never evaded its obligations in nuclear disarmament and pursues an open, transparent and responsible nuclear policy. It has adhered to the policy of no-first-use of nuclear weapons at any time and in any circumstances, and made the unequivocal commitment that under no circumstances will it use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones. China has never deployed nuclear weapons in foreign territory and has always exercised the utmost restraint in the development of nuclear weapons, and has never participated in any form of nuclear arms race, nor will it ever do so. It will limit its nuclear capabilities to the minimum level required for national security.
>
> … China consistently supports the efforts of non-nuclear-weapon states in establishing nuclear-weapon-free zones, has already signed and ratified all the relevant protocols which have been opened for signature of any nuclear-weapon-free zone treaties, and has reached agreement with the ASEAN countries on relevant issues under the Protocol of the Treaty on the Southeast Asia Nuclear-Weapon-Free Zone. China supports the Treaty on a Nuclear-Weapon-Free Zone in Central Asia and its protocols signed by Central Asian countries, and supports the establishment of a nuclear-weapon-free zone in the Middle East.

"Defensive" Force Modernization and Transformation versus "Offensive" Force Modernization and Transformation

There is little practical difference, however, between *defensive* force modernization and transformation and *offensive* force modernization and transformation. Like other modern military powers, China must now make procurement and force transformation decisions that will shape its forces for years to come. At the same time, a host of internal and external events could suddenly change the nature of these efforts or their strategic focus. Even if China has no goals or ambitions beyond those stated in its defense white papers, events and crises can put national leaders into unenviable situations and force hard decisions upon them.

This is why it is so critical to look beyond what states say and what critics suspect. There are measures of China's capabilities and actions that are based largely on hard data rather than opinion. Much is known about the current state of China's armed forces and its future plans and arms purchases. China's holdings and deployment of major weapon systems, order of battle, arms trade, and internal security matters can be measured, and those measurements can disclose many aspects of what China is doing.

While many uncertainties do exist in the data available, many official sources such as government reports, yearbooks, white papers, and other official reports address Chinese security policy modernization. The International Institute for Strategic Studies (IISS) also provides extensive unclassified data on China's force structure, and other sources also provide recent numbers on defense spending and weapons system procurement. China's policy of information on military matters does make such assessments difficult in some areas and leaves considerable uncertainty in others, but a wide range of data that few experts question does exist.

This report deliberately focuses only on such data and does little more than touch on China's possible strategies and on the less tangible measures of its intentions and capabilities. It does not make assumptions about whether China's military buildup constitutes a threat to the US or other Asian nations.

These limits mean that the following descriptions and trend analyses must be kept in perspective. A quantitative description of military capabilities cannot be the sole foundation for strategic decisions. Force numbers and orders of battle cannot portray the ingenuity (or lack thereof) and morale of the people in command.

Successful tactics, the ability to make the best use of resources, combat experience, and a functioning support base are some of the factors that may alter the meaning that comparisons of numbers may suggest. Security forces are a means of political decision-making. Their success will ultimately depend on the extent to which political leaderships use them.

At the same time, data in this analysis often portray the qualitative trends in Chinese forces and provide a better basis for understanding possible strategies and intentions. Modernization data, in particular, provide such insights where quantitative force data may not. These data are provided throughout the text of this report.

In addition, it is possible to portray key aspects of the military balance without making value judgments or guessing which given scenarios might develop. They are presented deliberately as bare data in order to avoid guesses about possible intentions and war-fighting options.

Chinese View of the US 'Rebalance' and the Growing Chinese-Russian Strategic Partnership

Chinese experts often view the rebalancing of US forces from Europe to Asia as an offensively-based policy meant to contain the rise of China as a world power. The 2013 Chinese defense white paper specifically referred to the US in this regard, implicitly criticizing the US's increasing presence in the Asia-Pacific as well as highlighting the increasing complication of international relations:[23]

> There are signs of increasing hegemonism, power politics and neo-interventionism. Local turmoils occur frequently. Hot-spot issues keep cropping up. Traditional and non-traditional security challenges interweave and interact. Competition is intensifying in the international military field. International security issues are growing noticeably more abrupt, interrelated and comprehensive. The Asia-Pacific region has become an increasingly significant stage for world economic development and strategic interaction between major powers. The US is adjusting its Asia-Pacific security strategy, and the regional landscape is undergoing profound changes.
>
> …. Some country has strengthened its Asia-Pacific military alliances, expanded its military presence in the region, and frequently makes the situation there tenser. On the issues concerning China's territorial sovereignty and maritime rights and interests, some neighboring countries are taking actions that complicate or exacerbate the situation…. Major powers are vigorously developing new and more sophisticated military technologies so as to ensure that they can maintain strategic superiorities in international competition in such areas as outer space and cyber space.

Chinese newspapers and citizens have also been upset over the US 'rebalance' to Asia. China does not issue official critiques of US military strategy and plans like those the US DoD issues on Chinese strategy and forces. At the same time, it does tightly control what its press is allowed to print, and the following quotes – representative of many similar examples – show that Chinese

strategic patience with the US has limits that are important in considering how China may view US policy towards Asia:[24]

- *Liaowang*, August 23, 2012: The strategic objective of the United States "is to ensure its leading status in the entire Asia pacific region, build a trans-Pacific order centered on the United States, and continue its Pacific dominance. And the key link in achieving this objective is to dismantle the East Asian regional corporation framework which has already taken shape….The key link here is to sow discord in the good neighborly, friendly, and cooperative relations between China and countries on its periphery."[25]
- *Renmin Ribao,* January 30, 2013: The United States "is boosting old military alliances, damaging the political foundation of East Asian peace, sharpening the territorial sovereignty contradictions between China and the countries around it, building a united front aimed at China, forcibly pushing the Trans-Pacific Strategic Economic Partnership, and disrupting the self-determined cooperation and regional integration process between the East Asian countries…in order for China to achieve strategic balance in the Asia Pacific region, it must greatly increase its military presence…. [China] should give full play to the strategic role of Russia and DPRK."[26]
- *Renmin Ribao*, February 28, 2013: "America's overall goal is to secure the total control of the Eurasian Continent, and the purpose of clearing the perimeter is to pave the way for ultimately subduing China and Russia...this no longer is simply containment aimed at impeding expansion; rather, it is a way of choking aimed at controlling or even suffocating the other side…judging by the historical experience of the Cold War between the United States and the Soviet Union, containment will surely be accompanied by murder."[27]
- *Jiefangjun Bao* (a military journal), January 22, 2013: After a long critique of the United States, the article ended as follows: "We [China] should cast away that pacifism and romanticism, which will easily evolve into capitulationism under pressure and threat. We should make full struggle preparation and war preparation. Only by doing so can China maintain a longer period of peace and development."[28]
- *People's Daily Online*, April 10, 2013: Ever since U.S. President Barack Obama proposed the high-keyed "return to the Asia-Pacific" at the end of 2011, the U.S. has begun to frequently organize joint military exercises in the Asia-Pacific region. For those exercises conducted in 2012 by the U.S. in the Western Pacific region alone, there were as many as 17 code names. Why is the U.S. so interested in Asia-Pacific region? Why does it frequently conduct such "exercises"? In a geostrategic sense, containing China in the Asia-Pacific region is the basic content of the U.S. policy toward China. There are three major means for the U.S. to conduct deep involvement in the Asia-Pacific region: first, wide alliance to win over various countries in the Asia-Pacific region; second, military forward deployment to realize strategic "re-balancing"; and third, occupy a "leading" position in the region to play "pro-active role".[29]

According to a July 2013 Pew Global Attitudes poll, 37% of Americans view China favorably and 40% of Chinese view Americans favorably.[30]

The US rebalance to Asia may also have helped lead to an improved relationship between China and Russia. Chinese President Xi Jinping's first official state visit was to Moscow for a summit with Russian President Vladimir Putin on March 22-24, 2013 – just as Putin's first foreign trip after assuming the Russian presidency in 2012 was to China. The two leaders discussed forming a comprehensive strategic partnership to advance both countries' interests, affirming support for each other's strategic and territorial interests. Xi was the first foreign leader to be allowed to visit Russia's strategic defense command headquarters and war room, and the two leaders noted the US' intercontinental ballistic missile defense system as a concern to both countries in that it could perhaps undermine the deterrence-based strategic military balance.[31]

Simultaneously, officials signed 30 agreements on cooperation in military exchanges, technology, energy, and trade, while the two countries also ratified the 2013-2016 implementation guidelines of the China-Russia Treaty of Good-Neighborliness and Friendly Cooperation. A $270 billion deal with Rosneft to double oil supplies to China was announced in June 2013. Putin and Xi

announced that bilateral trade was expected to reach $100 billion by 2015 and $200 billion before 2020.[32] Year-on-year, China-Russia trade increased by 11.2% in 2012, reaching $88.2 billion, compared with the 6.2% growth in trade for China overall. China is Russia's largest trade partner, while Russia is China's ninth largest. The number of Chinese tourists visiting Russia jumped 47% over 2011 levels to 343,000 in 2012.[33]

In early July, China joined Russia for its largest-ever naval drills with a foreign partner, the "Joint Sea-2013" exercises, further emphasizing the deepening relationship between the two countries. The Chinese Defense Ministry reportedly sent four destroyers, two guided missile frigates, and a support ship to the exercises. The two countries also conduct anti-terrorism joint drills, the most recent of which was planned for July 27 – August 15 in the Russian Ural Mountains. Though US-Chinese maritime cooperation has been more limited, China will take part in the 2014 US-organized multinational Rim of the Pacific naval exercises, the world's largest.[34]

China has also been increasing military, economic, and diplomatic ties with US neighbors and arming states in the Western hemisphere. Prior to the Obama-Xi summit in June 2013, Xi visited Trinidad, Costa Rica, and Mexico, where he announced hundreds of millions of dollars of loans.[35]

Regional Views of the US 'Rebalance'

The regional reaction to the changes in US strategy has been different than the Chinese reaction discussed above, and reflects a growing concern with China's recent geopolitical assertiveness – especially in the Southeast Asian region – regarding China's avowed 'peaceful development.' In this context, the US rebalance to Asia has been seen in a more positive light than it likely would otherwise have been. According to the July 2013 Pew Global Attitudes poll, of the Asia-Pacific nations surveyed (Japan, Philippines, South Korea, Australia, China, Indonesia, Malaysia, and Pakistan), 64% view the US favorably and 58% view China favorably. Japan is the outlier. While 69% of Japanese citizens see the US favorably, only 5% see China favorably.[36]

At the same time, the reaction of Southeast Asian states has not been uniform, and even formal treaty allies of the US such as the Philippines and Thailand have had mixed reactions. There is significant domestic political opposition in the Philippines to expanded basing rights for the US. It was reported in mid-July 2013 that the US and the Philippines were in the midst of negotiations for increased positioning of US military equipment and personnel rotation into the country, though the issue of re-establishing US bases was being side-stepped.[37] Thailand has recently increased relations with China – including in defense-related areas. Singapore has increased its quasi-basing facilities available to the US Navy but refuses to give up its neutrality and be drawn into any sort of alliance. [38]

Other Southeast Asian states have been even more cautious; Vietnam, despite territorial disputes with China, has continued strict rationing of US Navy port calls in order to not undermine its relations with China. Indonesia and Malaysia must both be careful not to alienate domestic constituencies by increasing relations with the US, while Malaysia has kept a positive attitude towards China – its most important trading partner – and has recently increased defense and security ties. As a 2012 IISS report noted,[39]

> Policymakers throughout Southeast Asia and the wider Asia-Pacific are acutely conscious of and concerned about the implications for their countries' foreign and security policy orientations of the changing regional distribution of power, particularly in terms of China's growing power and assertiveness. At the same time,

> though, remaining on good terms with Beijing is important for their economic health, and most Southeast Asian states (the Philippines being the exception) have been unwilling to jeopardise their trade and investment links with China.
>
> But Southeast Asian governments also harbour substantial doubts over the durability of America's role, and have not been easily convinced by the rhetoric of the US rebalance. They understand well that there is a significant public-relations element in pronouncements about the long-term viability of the US security role. Southeast Asians have seen a series of outside powers come and go. They recognise that, as the US reduces its forces in Europe and withdraws from Afghanistan, the Asia-Pacific will naturally be the main defence focus for America. But they also know that Washington's longer-term regional commitment could become hostage to fiscal realities and to changes of administration. In these circumstances, most Southeast Asian states are keeping their strategic options open.

Meanwhile, India appears to welcome America's strengthened regional presence as a counterbalance to China and as a chance for India to assert its strategic role in the region. Japan, especially in the context of territorial disputes over islands, has also welcomed increased US presence.

Chapter 2: Underlying Resources for China's Security Capabilities

It is China's economic growth that underpins the changes in its strategy and force structure as well as its rapid rate of military modernization. At the same time, China's high rate of economic growth, the size of its gross domestic product (GDP), and its large population are making it a major force in the global economy.

These factors have already given China the resources to become a major military power with increasingly advanced equipment and technology. If they continue, China's strong economic base, steadily more advanced mix of civil and military technology, and increasingly well-trained and educated workforce will bolster China's prestige in the international system and lay the foundation for steady increases in Chinese military power.

This makes China's economy a critical underlying factor in assessing its military power, but it is important to note that China's role as a global power may be defined more by its economy than by its military forces. Moreover, China's role as a major trading partner and exporter may ultimately give it more influence and leverage relative to both the US and the world than the modernization of its military forces and its steady increase in power projection capability.

Is Becoming an Economic Superpower a Prelude to Becoming a Military Superpower?

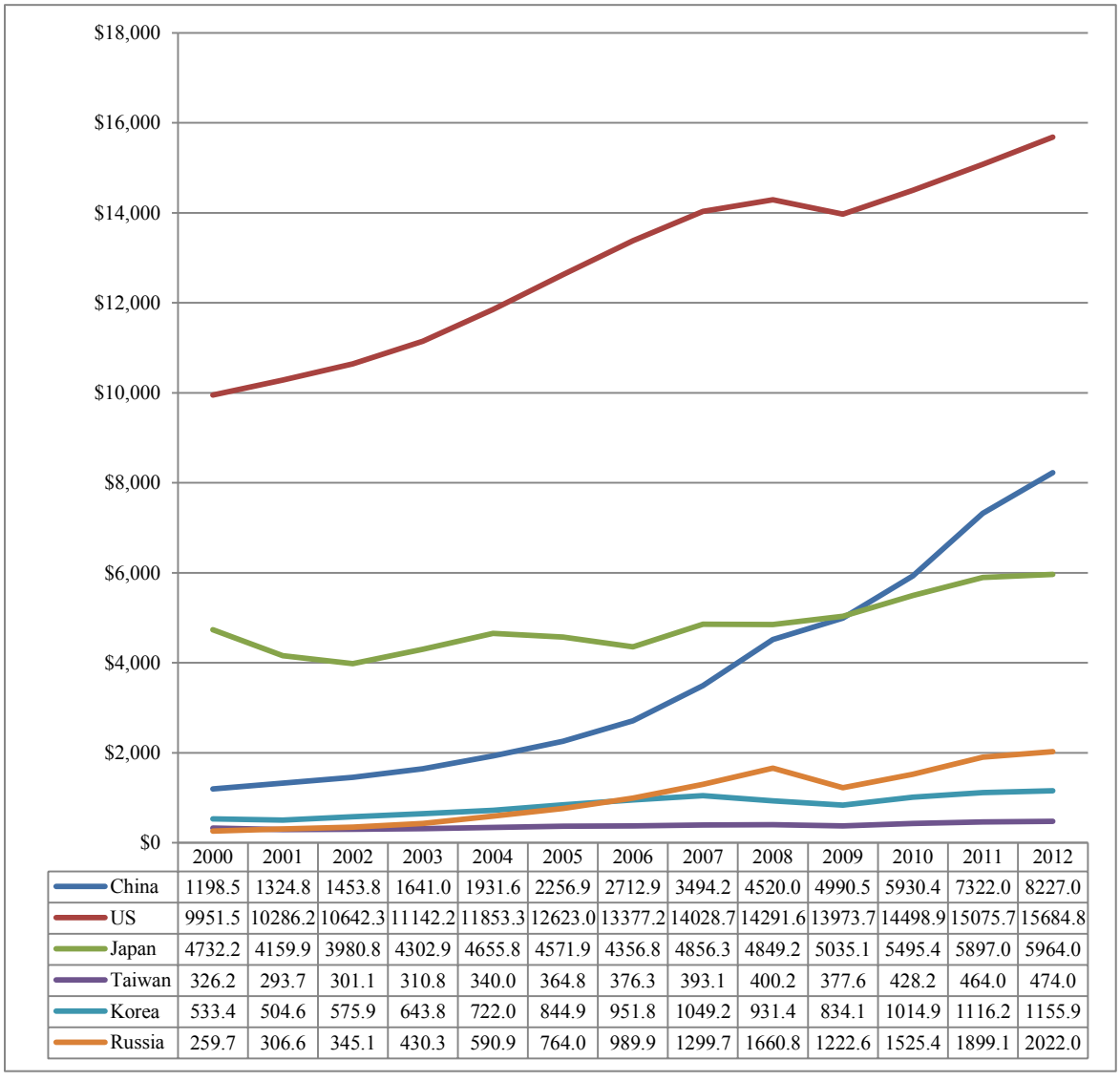
Figures 2.1 to 2.3 show the comparative rise in China's GDP relative to that of the US and other key regional powers. The figures show that China is already on track to having the world's largest GDP in PPP terms, although its GDP in market terms lags behind its PPP GDP, and its per capita income remains limited. It has outpaced almost all other states in terms of sustained growth, including major potential rivals in the developing world like India.

As past cases like Japan have shown, however, trees do not easily grow to the point where they reach the sky. China faces serious potential challenges in sustaining its current economic growth. These include an aging population; making a massive nation-wide shift from a rural agricultural economy to an urban industrialized economy; dependence on the overall health of the global economy; competition with cheaper developing states and labor; saturation of export markets; dealing with corruption, influence peddling, and nepotism and the public reaction; reforming state industries and eliminating barriers to effective internal economic investment and competition; and creating a more equitable distribution of income and stable consumer demand.

Even if China can largely sustain its current growth, it will face most of the same limits on its power that the US has faced as an economic superpower. There is a natural synergy between economic and military power, but it is also a synergy that has its limits. China's military success depends on its ability to use military power to achieve its political and strategic goals while avoiding or seriously limiting any actual use of force or conflict. It is hard to conceive of any scenario for a major conflict between China and the US – or between China and any other military power – the real world end state of which would not do China far more harm than the benefits could be worth.

At the same time, China's emerging economic power depends on stable trade relationships that by their very nature require benefits for China's trading partners as well as China. It also depends on creating a stable domestic economy that provides steadily expanding benefits for China's people and balancing the limits to China's experts with steadily expanding domestic demand. China may compete with other states for natural resources and trade but – like the use of force – such competition has serious real world limits. Competitors and the world will react and do so at China's expense.

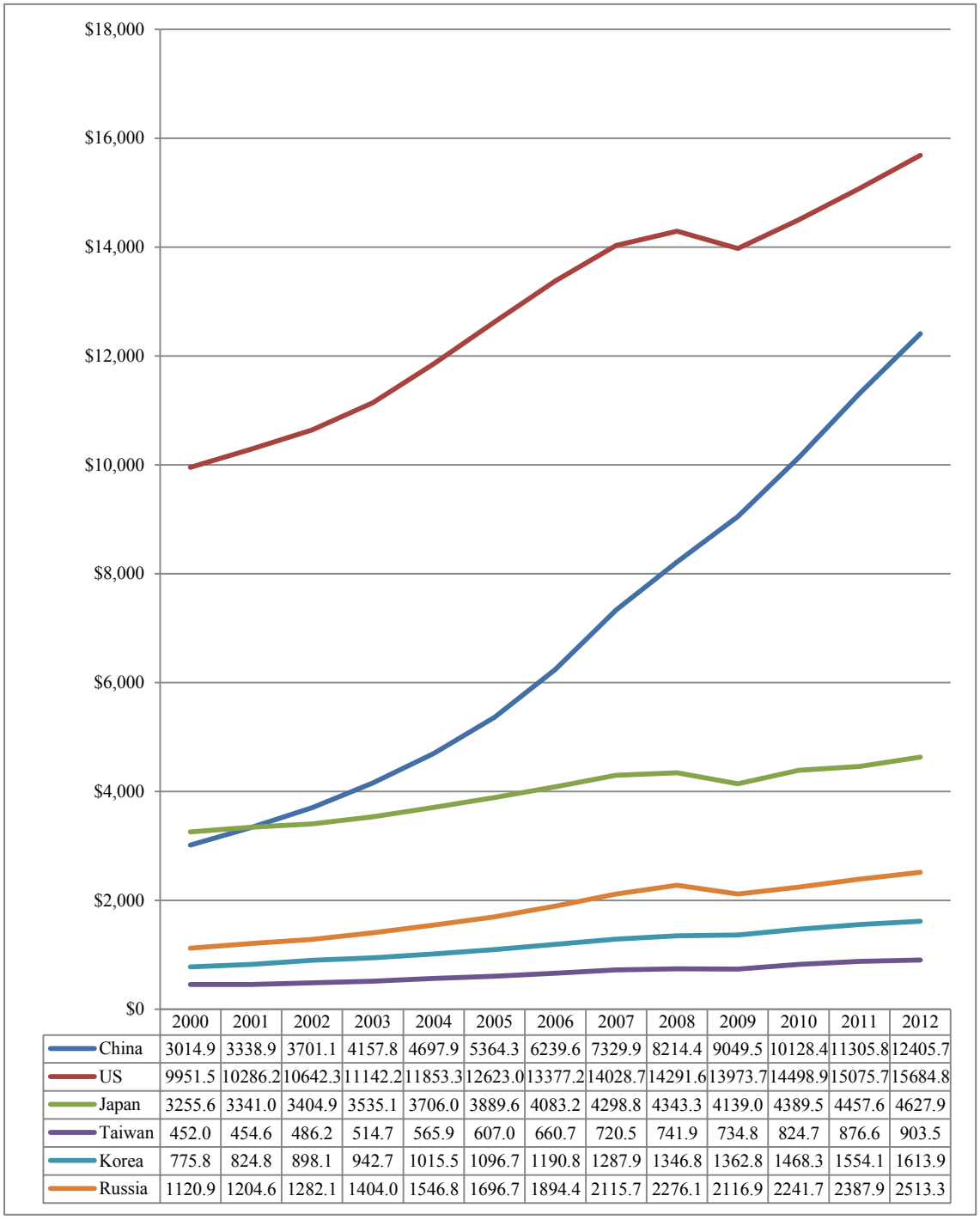
Figure 2.1: China's Comparative GDP Rise – Current Prices (US$ Billions)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
China	1198.5	1324.8	1453.8	1641.0	1931.6	2256.9	2712.9	3494.2	4520.0	4990.5	5930.4	7322.0	8227.0
US	9951.5	10286.2	10642.3	11142.2	11853.3	12623.0	13377.2	14028.7	14291.6	13973.7	14498.9	15075.7	15684.8
Japan	4732.2	4159.9	3980.8	4302.9	4655.8	4571.9	4356.8	4856.3	4849.2	5035.1	5495.4	5897.0	5964.0
Taiwan	326.2	293.7	301.1	310.8	340.0	364.8	376.3	393.1	400.2	377.6	428.2	464.0	474.0
Korea	533.4	504.6	575.9	643.8	722.0	844.9	951.8	1049.2	931.4	834.1	1014.9	1116.2	1155.9
Russia	259.7	306.6	345.1	430.3	590.9	764.0	989.9	1299.7	1660.8	1222.6	1525.4	1899.1	2022.0

IMF, *World Economic Outlook Database*, April 2013 Edition, accessed July 3, 2013. http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx.

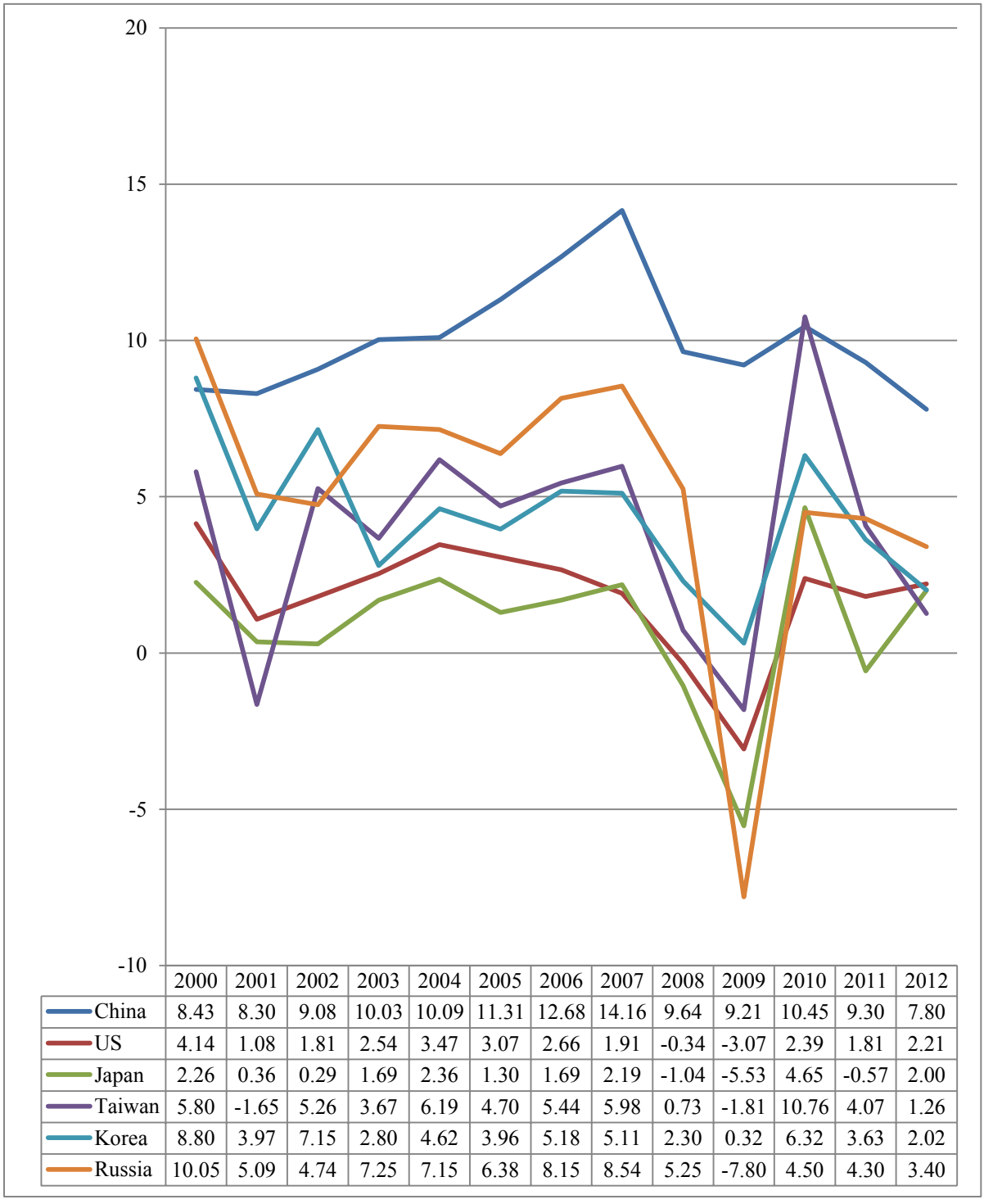
Figure 2.2: China's Comparative GDP Rise – PPP Valuation (Billions of Current International$)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
China	3014.9	3338.9	3701.1	4157.8	4697.9	5364.3	6239.6	7329.9	8214.4	9049.5	10128.4	11305.8	12405.7
US	9951.5	10286.2	10642.3	11142.2	11853.3	12623.0	13377.2	14028.7	14291.6	13973.7	14498.9	15075.7	15684.8
Japan	3255.6	3341.0	3404.9	3535.1	3706.0	3889.6	4083.2	4298.8	4343.3	4139.0	4389.5	4457.6	4627.9
Taiwan	452.0	454.6	486.2	514.7	565.9	607.0	660.7	720.5	741.9	734.8	824.7	876.6	903.5
Korea	775.8	824.8	898.1	942.7	1015.5	1096.7	1190.8	1287.9	1346.8	1362.8	1468.3	1554.1	1613.9
Russia	1120.9	1204.6	1282.1	1404.0	1546.8	1696.7	1894.4	2115.7	2276.1	2116.9	2241.7	2387.9	2513.3

IMF, *World Economic Outlook Database*, April 2013 Edition, accessed July 3, 2013. http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx.

Figure 2.3: China's Comparative GDP Growth, Constant Prices (Percent Change)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
China	8.43	8.30	9.08	10.03	10.09	11.31	12.68	14.16	9.64	9.21	10.45	9.30	7.80
US	4.14	1.08	1.81	2.54	3.47	3.07	2.66	1.91	-0.34	-3.07	2.39	1.81	2.21
Japan	2.26	0.36	0.29	1.69	2.36	1.30	1.69	2.19	-1.04	-5.53	4.65	-0.57	2.00
Taiwan	5.80	-1.65	5.26	3.67	6.19	4.70	5.44	5.98	0.73	-1.81	10.76	4.07	1.26
Korea	8.80	3.97	7.15	2.80	4.62	3.96	5.18	5.11	2.30	0.32	6.32	3.63	2.02
Russia	10.05	5.09	4.74	7.25	7.15	6.38	8.15	8.54	5.25	-7.80	4.50	4.30	3.40

IMF, *World Economic Outlook Database*, April 2013 Edition, accessed July 3, 2013. http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx.

Economic Trends Shaping Military Spending

China's levels of military expenditure have tended to rise in ways that are relatively constant when compared to national income. Many governments increase military spending in rough proportionality to economic growth; while they may find strategic rationales for doing so, wealth seems to generate force development, particularly in developing nations and emerging powers.

So far, China has not faced any serious economic challenges in shaping its strategy and military modernization. China has recorded comparatively high GDP growth rates during the past two decades and although there are some indications that economic growth is slowing, China should be able to finance its current high level of modernization indefinitely into the future. In 2012, China's GDP stood at $8.26 trillion (based on the official exchange rate), while its purchasing power parity (PPP) GDP stood at an impressive $12.38 trillion.[40]

Positive Trends

In spite of a slight drop-off in its growth rate, China's economy is predicted to continue a robust expansion into the middle of the decade. While the Chinese government has announced it was targeting growth of 7.5% for the year, the Chinese economy grew 7.7% in the first quarter of 2013, though this dropped to 7.5% in the second quarter.[39] In mid-July, the Chinese finance minister stated that he expected growth to average approximately 7% for 2013, hinting that economic growth may drop below 7% in the second half of the year; however, *Xinhua* later retracted this statement, saying that the minister had stated that economic growth for 2013 was expected to average 7.5%. Some Western analysts believe that 2013 annual economic growth could be even lower unless government stimulus and reforms are enacted.[41]

On May 28, 2013, the International Monetary Fund (IMF) predicted that China would grow at around 7.75% for 2013. Inflation was forecast to be 3% and the current account surplus to remain at 2.5% of GDP. The statement released by the IMF in May 2013 noted,[42]

> Notwithstanding this relatively favorable near-term outlook, China's economy faces important challenges. In particular, the rapid growth in total social financing—a broad measure of credit—raises concerns about the quality of investment and its impact on repayment capacity, especially since a fast-growing share of credit is flowing through less-well supervised parts of the financial system. While good progress has been made with external rebalancing, growth has become too dependent on the continued expansion of investment, much of it by the property sector and local governments whose financial position is being affected as a result. High income inequality and environmental problems are further signs that the current growth model needs to change.
>
> The Chinese authorities recognize these challenges, and the new government that took office in March has announced a set of reforms for 2013 to start addressing them. In our discussions with the authorities, they emphasized their intention to embark on a comprehensive reform agenda that will ensure more balanced, inclusive and environmentally friendly growth going forward. While China still has significant policy space and financial capacity to maintain stability even in the face of adverse shocks, the margins of safety are narrowing and a decisive impetus to reforms is needed to contain vulnerabilities and move the economy to a more sustainable growth path.
>
> Our dialogue with the authorities has highlighted three broad challenges for the reform agenda: (1) embedding strong governance in lower-level state or state-related economic institutions, especially the banks, state-owned enterprises, and local governments; (2) continued liberalization and reduced government involvement, allowing a greater role of market forces; and (3) a decisive push for rebalancing toward higher household incomes and consumption. Overall success will depend on effective implementation of all three of these goals; for example, further liberalization of financial markets will not

> achieve the desired efficiency gains—and may even be counterproductive—in the absence of strengthened financial discipline and accountability.
>
> In terms of the main policy areas of the agenda, the mission was reassured by the authorities' focus on the financial sector, fiscal reforms, and other measures to strengthen price signals and the framework for well-functioning markets. Reining in total social financing growth is a priority and will require further tightening of prudential oversight as well as, critically, improved investor accountability for their investment decisions (rather than the widespread perception of guaranteed returns on interest-bearing assets). These policies may slow activity in the short-term, but would do so in a way that supports the transition to a more sustainable growth path. If growth were to slow sharply below this year's target, then on-budget fiscal stimulus should be used, focusing on measures that support household incomes and consumption, such as reductions in social contributions, subsidies to consumption, or targeted social safety net spending.
>
> Continued progress with interest rate liberalization and greater exchange rate flexibility will support rebalancing, and can be accompanied by a gradual and careful further opening of China's capital account. The staff's assessment of China's external position is broadly unchanged from last year's, with the renminbi considered to be moderately undervalued relative to a basket of currencies.
>
> Fiscal reforms are an integral part of the agenda to support rebalancing, improve governance, and raise the efficiency of investment. Including local government financing vehicles, an estimate of 'augmented' general government debt has risen to nearly 50 percent of GDP, with the corresponding estimate of an 'augmented' fiscal deficit on the order of 10 percent of GDP in 2012. While part of this deficit is financed through land sales, and augmented debt is still at a well-manageable level, it is important to gradually reduce the deficit over the medium term to ensure a robust and sustainable debt profile. Continuing tax reform and a comprehensive re-ordering of local government finances, realigning resources with spending needs and revamping the framework for local government investment and borrowing, will be key elements of this effort. Shifting part of the very high social security contributions to other taxation would also contribute to rebalancing and reduce the burden on low-wage earners.
>
> A broad range of other structural reforms will support the transition to more balanced and inclusive growth. Many of these, such as improved pricing of energy, land and water, are already proposed by the authorities. Allowing more competition in sectors currently considered strategic will boost growth and household income, and higher dividends from state-owned enterprises will improve financial discipline and provide additional fiscal revenue.
>
> Taken together, these measures represent a challenging reform agenda that will require strong determination and administrative capacity to implement. The authorities repeatedly emphasized that they are fully aware of those challenges, as they are of the need for a decisive new round of reforms to shift the economy onto a more balanced and sustainable growth path. Their success will benefit both China and the rest of the world, reflecting the growing importance of China and its integration with the global economy.

The Economist Intelligence Unit, taking a longer view, predicted that "the economy will expand by 7.8% in 2013, but this will mark a peak, with the rate of growth gradually decelerating to 6.3% in 2017," while "[r]eal GDP growth will average 7.3% a year in 2013-17."[43] Consequently, in the near term, China's economic growth will continue and China's potential to support large and advanced military forces will at least be sustained, if not increased.

Economic Uncertainties

As noted earlier, there are important short term and structural uncertainties as to China's economic future and ability to keep funding a massive military program in the longer term. As the IMF noted above, three key challenges for reform are increasing strong governance in state-related economic institutions and the lower levels of the state, continuing to liberalize and decrease government involvement in the economy, and rebalancing the economy towards higher household incomes and consumption.[44] As China shifts from an export-dependent growth model to growth increasingly reliant on domestic consumption, economic imbalances can impede

growth – in particular, intensifying gaps in the social safety net and the need for financial reform.[45]

Overall, the Chinese export-led economy depends heavily on the health of the global economy to maintain growth and stability. Some export markets are also reaching saturation points, such as the market for solar panels – in 2012 the world demand was approximately 30 gigawatts, while the supply of solar panels was 60 gigawatts. The slow recovery from the global recession and the Eurozone's sovereign debt crisis has impacted the East Asian region as a whole. While probable economic forecasts place the region in a positive light, a 2012 World Bank report highlighted the potential economic risks facing East Asia: [46]

> For the majority of countries in the region, the health of the global economy and high-income Europe, in particular, represents the strongest risk at this time.
>
> **Trade.** If the situation in Europe deteriorates sharply, global trade could fall by 5 or more percent with serious implications for the very open East Asia region.
>
> **Finance.** The potential freezing up of international capital flows under emerging global conditions has increased, exposing East Asian countries, notably, China, Indonesia, Malaysia and Thailand to the possibility of market disruptions, exchange rate volatility and external financing pressures. Vulnerabilities are more acute for countries with large shares of short term and maturing debt or current account deficits.
>
> **Commodity Prices.** A large number of commodity exporting countries in the region could experience revenue losses (notably oil exporters and especially raw materials producers) under a slower global growth environment.
>
> **Remittances.** Migrant remittance receipts are potent drivers for growth in countries, such as the Philippines and small island economies – these flows, as well as tourist arrivals could be stymied by sluggish labor market developments in the OECD and could fall sharply in the event of a global crisis.
>
> **Real Estate in China** is arguably over inflated. Should the market deflate, ensuing wealth losses and loan defaults could further weaken the outlook for China.

An IMF assessment in July 2013 was generally favorable, but it did note that China needed reform in other areas:[47]

> **…** China's economic performance over the past three decades has been remarkable, a testament to its ability to implement necessary but difficult reforms. Continued success now requires another round of decisive measures—in line with the new leadership's expressed intention to re-energize the reform effort.
>
> **…**Staff expect the economy to grow by 73/4 percent this year, although with downside risks from both external and domestic uncertainties. Since the global crisis, a mix of investment, credit, and fiscal stimulus has underpinned activity. This pattern of growth is not sustainable and is raising vulnerabilities.
>
> While China still has significant buffers to weather shocks, the margins of safety are diminishing…To secure more balanced and sustainable growth, a package of reforms is needed to contain the growing risks while transitioning the economy to a more consumer-based, inclusive, and environmentally-friendly growth path.
>
> In the near term, a priority is to rein in broader credit growth and prevent a further build up of risks in the financial sector. Only if growth were to slow too sharply below the authorities' target, on-budget fiscal stimulus should be used in a manner that supports rebalancing and helps protect vulnerable groups.
>
> Accelerated financial sector reforms are needed to secure a safe transition to a market-based financial system. This will combine allowing greater room for market forces (such as liberalizing interest rates in the 'traditional' banking industry) with strengthened oversight, governance, and investor accountability. While this will lead to higher borrowing costs for many firms, it is critical to reduce the large-scale regulatory arbitrage and moral hazard evident in the current system, and to improve the allocation of credit essential to future growth and sound finance.

> The post-2008 expansion in quasi-fiscal activity needs to be gradually unwound. Key reforms to this end should include a comprehensive revamp of local government finances, increasing SOE dividend payments to the budget, and continuing tax reforms allowing, inter alia, a shift in the tax burden away from regressive social contributions.
>
> A more market-based exchange rate, with reduced intervention, will facilitate further adjustment in the renminbi which staff assess as moderately undervalued against a broad-basket of currencies.

A range of other structural reforms will support rebalancing and help unleash new sources of growth, such as opening markets to more competition, reforming resource prices, and gradually liberalizing the capital account. Graphics representing the IMF assessments can be seen in **Figure 2.4**. The IMF also warned that, [48]

> Directors noted that the growth outlook is clouded by mounting domestic vulnerabilities in the financial, fiscal, and real estate sectors. At the same time, potential spillovers from developments in the euro area and major advanced economies continue to pose external risks. Directors agreed that China has the capacity to withstand shocks, but considered that a further strengthening of policy buffers over time would be desirable. Accordingly, Directors underscored the importance of transitioning to a new growth path that is more consumption-based, inclusive, and environmentally friendly. They welcomed the authorities' reform strategy in this direction, which charts a path toward mitigating risks, rebalancing growth, and addressing income disparities, thus safeguarding China's important contribution to global growth.
>
> Executive Directors agreed that the near-term challenge is to contain risks to financial stability, by reining in credit growth and nontraditional forms of lending. Going forward, Directors stressed that a more market-based financial system would help improve the allocation of capital, boost household income, and prevent a further buildup of risks. Emphasizing that financial sector liberalization should progress at the appropriate pace and sequencing, they considered as pressing priorities further deregulation of interest rates, greater use of market-based instruments in monetary management, and enhanced prudential oversight, including over the activities of non-banks.
>
> In this connection, Directors agreed that a more robust and transparent framework for resolution of bad debts and troubled financial institutions would facilitate an orderly exit of weak institutions. They also welcomed the authorities' plan to introduce deposit insurance, and encouraged them to take steps to remove the perception of implicit government guarantees on some financial products, which would ensure a more effective pricing of risk and limit moral hazard.
>
> Directors recognized the contribution of off-budget, quasifiscal activity in supporting demand since the global financial crisis. Nonetheless, they encouraged the authorities to unwind it gradually to limit fiscal risks and, if economic growth slows down too sharply, they recommended using on-budget fiscal stimulus, focused on consumption.
>
> Directors also encouraged continued efforts to strengthen the governance and transparency of local government finances while protecting priority spending. In addition,
>
> shifting the tax burden from social contributions toward more progressive and efficient forms of taxation, including a value added tax, would boost the role of private consumption as a growth-driver and reduce income inequality. Directors welcomed the authorities' indication to consider this as part of a comprehensive reform of the social security system.
>
> Taking note of the staff's assessment that the renminbi remains moderately undervalued, Directors considered that a more market-based exchange rate system would facilitate further internal and external rebalancing. They supported the authorities' policy of restraining foreign exchange intervention, thereby allowing market forces to play a greater role in exchange rate determination. Directors stressed the importance of advancing structural reform under the Twelfth Five-Year Plan. They encouraged continued liberalization of the capital account, carefully sequenced with financial and exchange rate reforms. Further progress on demand rebalancing is particularly crucial, including by opening markets to domestic and foreign competition, especially in the services and upstream industries, raising resource prices and taxes, and increasing dividend payments by state-owned enterprises to the budget.

> Recognizing China's rapid economic and financial development and its increasing global importance, Directors supported plans to continue to upgrade the statistical base, which they hoped will eventually lead to China's subscription of the Fund's Special Data Dissemination Standard. In particular, they welcomed the authorities' ongoing efforts to improve data on local government finances.

Other Asian countries have questioned China's future economic progress. The 2013 Japanese defense white paper noted that China was experiencing increasing domestic challenges:[49]

> China has various domestic problems. Corruption within central and local communist party leaderships is becoming a great political problem. As a result of its rapid economic growth, there are emerging problems such as regional disparities between urban-rural and coastal-inland regions, wealth gaps among urban residents, inflation, environmental pollution, and lack of agricultural/industrial water. Moreover, issues associated with the rapid aging of the population are forecasted to arise in the future. Because these factors, that could destabilize the government administration, are growing larger and diversifying, it is expected that China will continue to tighten its control on the society. However, it has been pointed out that there are unstable aspects in controlling public activities, partly due to the spread of the Internet. Moreover, China also has domestic ethnic minority issues, such as protest activities by ethnic minorities in areas such as the Tibet Autonomous Region and the Xinjiang Uyghur Autonomous Region.
>
> It has been reported that some ethnic minorities are undertaking campaigns seeking separation and independence. Against this background, Xi Jinping assumed the post of General Secretary of the CCP and Chairman of the CCP Central Military Commission at the first plenary session of the 18th Central Committee of the CCP in November 2012, and then assumed the post of President at the first session of the 12th National People's Congress in March 2013, thus seizing control of the three powers of party, military and government. At the session, President Xi Jinping called for "arduous efforts for the continued realization of the great renaissance of the Chinese nation and the Chinese dream." However, the environment surrounding the Xi government would not be rosy. How the administration will handle various challenges attracts attention.

At the same time, China faces longer-term problems in successfully dealing with the massive shift from a rural agricultural economy to an urban industrialized economy. China plans to move 250 million rural residents into newly-built cities and towns over the next 12 years, primarily as a way to find a new source of growth for the slowing economy.[50]

Corruption, influence peddling, and nepotism are also rampant in the Communist party; Xi Jinping has recently led an anti-corruption movement that Chinese newspapers have reported as likely to be a key priority for his government in the coming years. This appears to be, at least in part, a reaction to the increasing public discontent regarding daily incidents of minor corruption, high-level leadership scandals, and negligence and inefficiency of local Party members. However, many in China believe that the corruption-related problems in China cannot be solved without fundamental political reforms, such as developing an independent media and judiciary.[51]

China also must address the effects of rising labor costs and the resultant movement of businesses to countries with cheaper labor, such as Cambodia and Vietnam, the latter of which has wages half those in China.[52] Low costs of operations and a large human resource pool made China especially attractive for foreign manufacturers and investors; over the past several years, wages have steadily risen, concurrently increasing the cost of manufacturing and operations in China. Rising labor costs, declining earnings, and uncertainty over the pace of economic reforms are reducing foreign investors' confidence in the economy.[53]

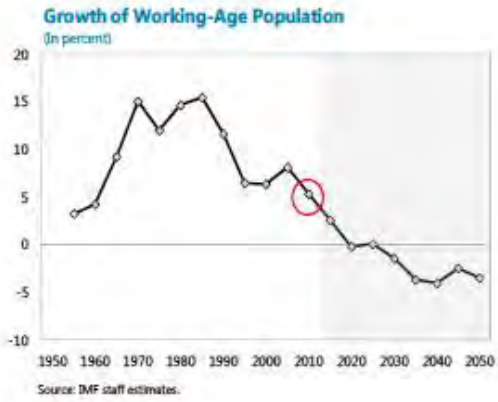
Furthermore, the country must deal with an aging population, an issue that is especially serious in the overall context of the demographic impact of its one child policy in reducing its labor force and concurrently reducing the number of workers available to care for the large number of the elderly. According to the 2010 census, people between the ages of 15 and 59 began to

decrease in 2010 and will likely fall by 29.3 million by 2020. Total urban employment is still increasing as Chinese workers move to the cities, but the workforce has started to shrink in absolute terms; China will now need to boost economic output through increased economic efficiency via reallocating resources.[54]

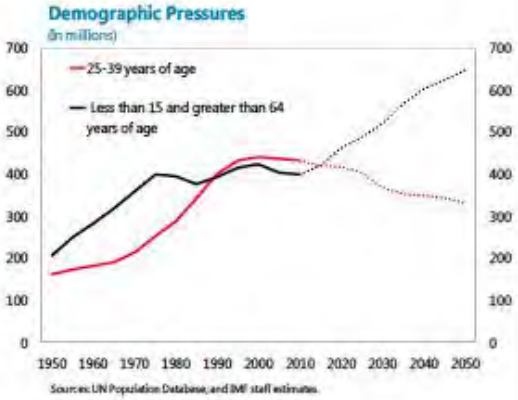
Figure 2.4: July 2013 IMF Assessment of China's Economy – Part One

Box 4. China's Looming Demographic Changes

China is at the dawn of a demographic shift as the economy will soon start to be weighed down by a shrinking workforce and aging population. The working-age (15–64) population will start to fall in less than a decade due to declining fertility, reflecting the one-child policy. The cohort of 25–39 year olds—the core industrial workers—will shrink even faster, with implications for the pattern of growth reliant on building new factories and finding a ready supply of workers. The dependency ratio (population younger than 15 and older than 64 as a share of the working-age population), which declined for decades, is projected to increase from 13½ percent in 2010 to around 30 percent by 2030.



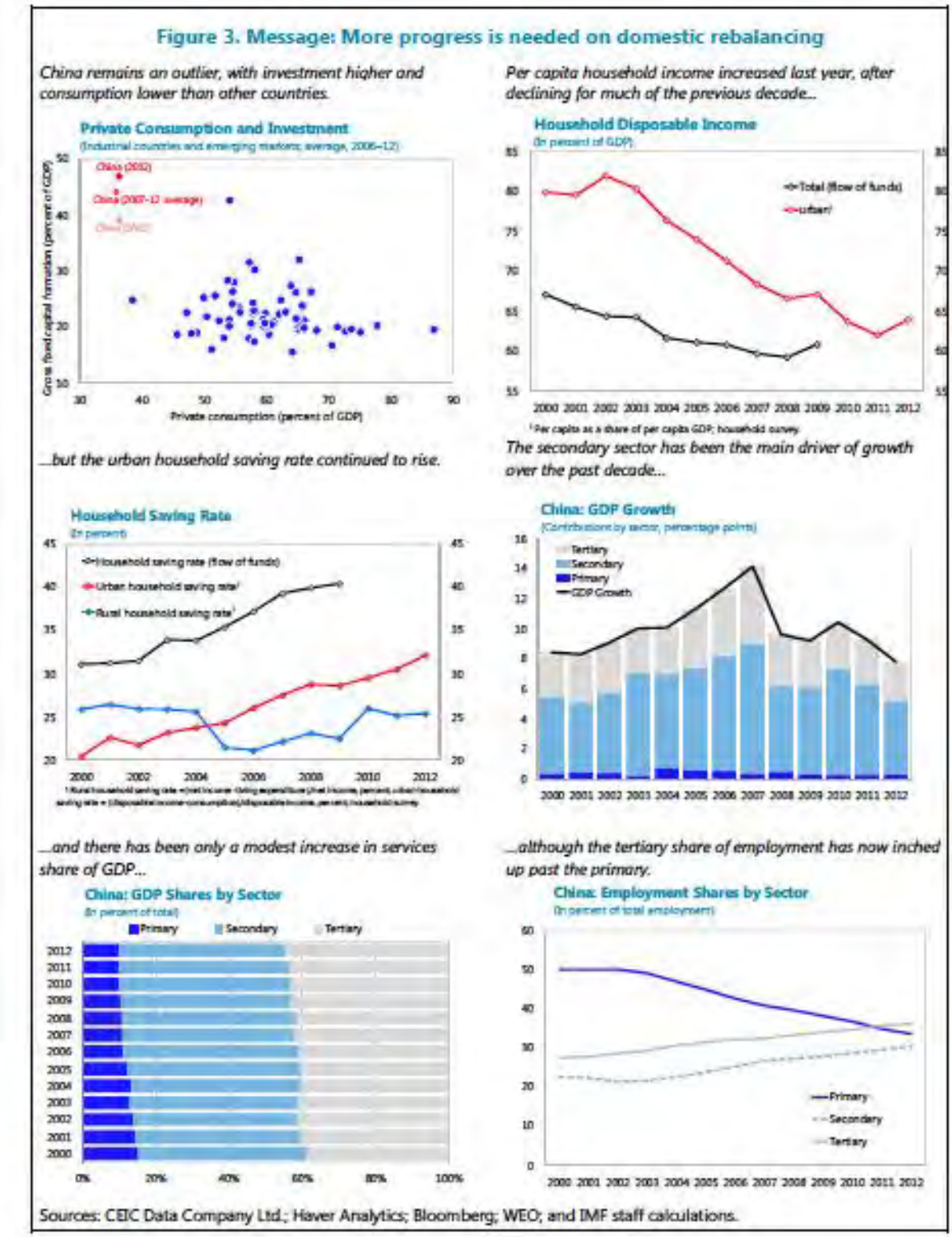
These demographic changes imply that China will meet the Lewis Turning Point—when the supply of plentiful low-cost labor is exhausted—toward the end of the decade.[1] As the surplus labor dwindles, labor cost will rise, which would affect prices, incomes, and corporate profits in China and would have implications for trade, employment, and price developments in key trading partners. For China, this transformation makes it even more important to switch from an extensive to an intensive growth model.



[1] See Das and N'Diaye (2013), "Chronicles of a Decline Foretold: Has China Reached the Lewis Turning Point," IMF Working Paper 13/26.

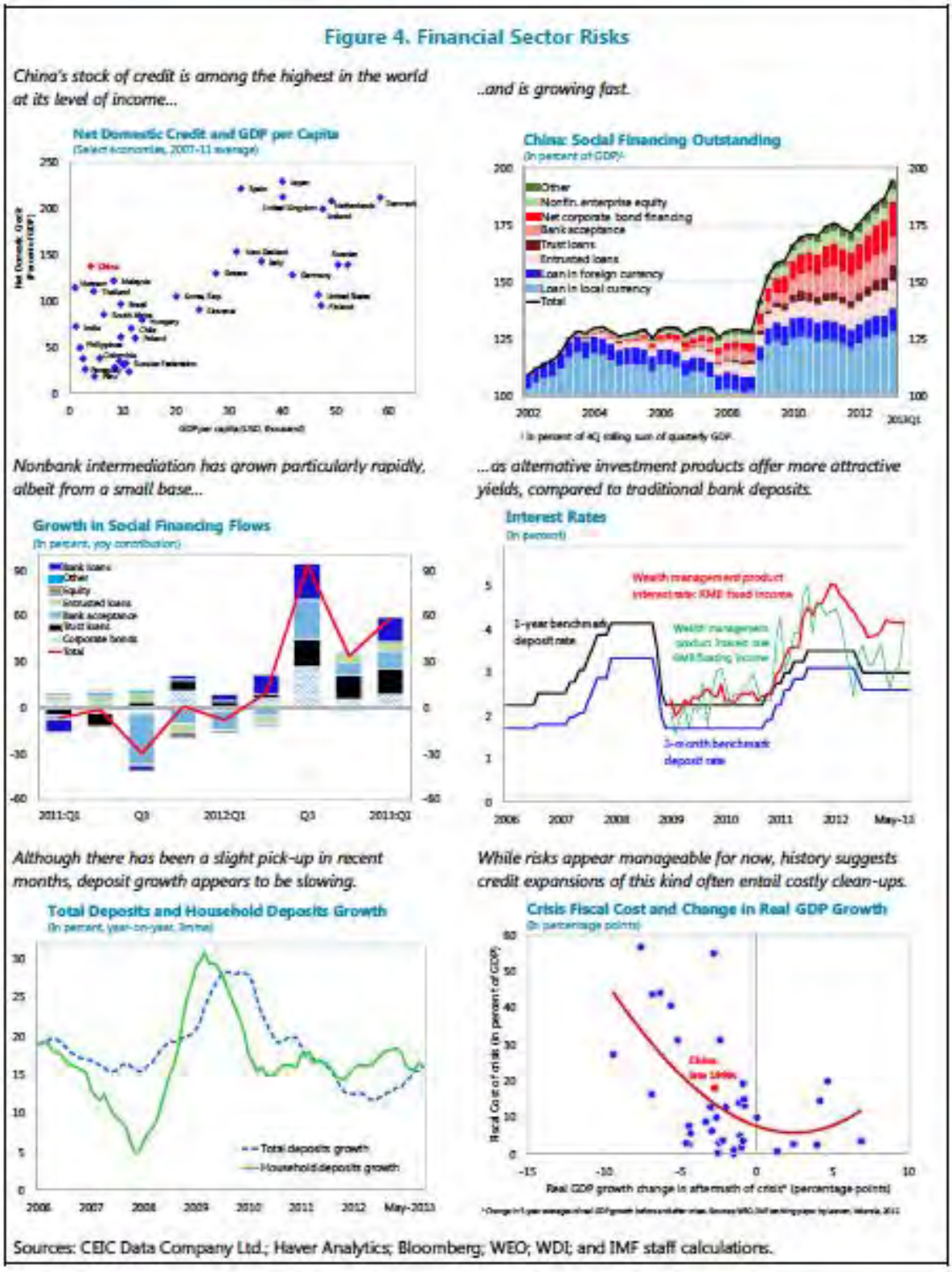
Source: IMF, *People's Republic of China 2013 Article IV Consultation [Country Report 13/211]*, July 2013, p. 20.

Figure 2.4: July 2013 IMF Assessment of China's Economy – Part Two



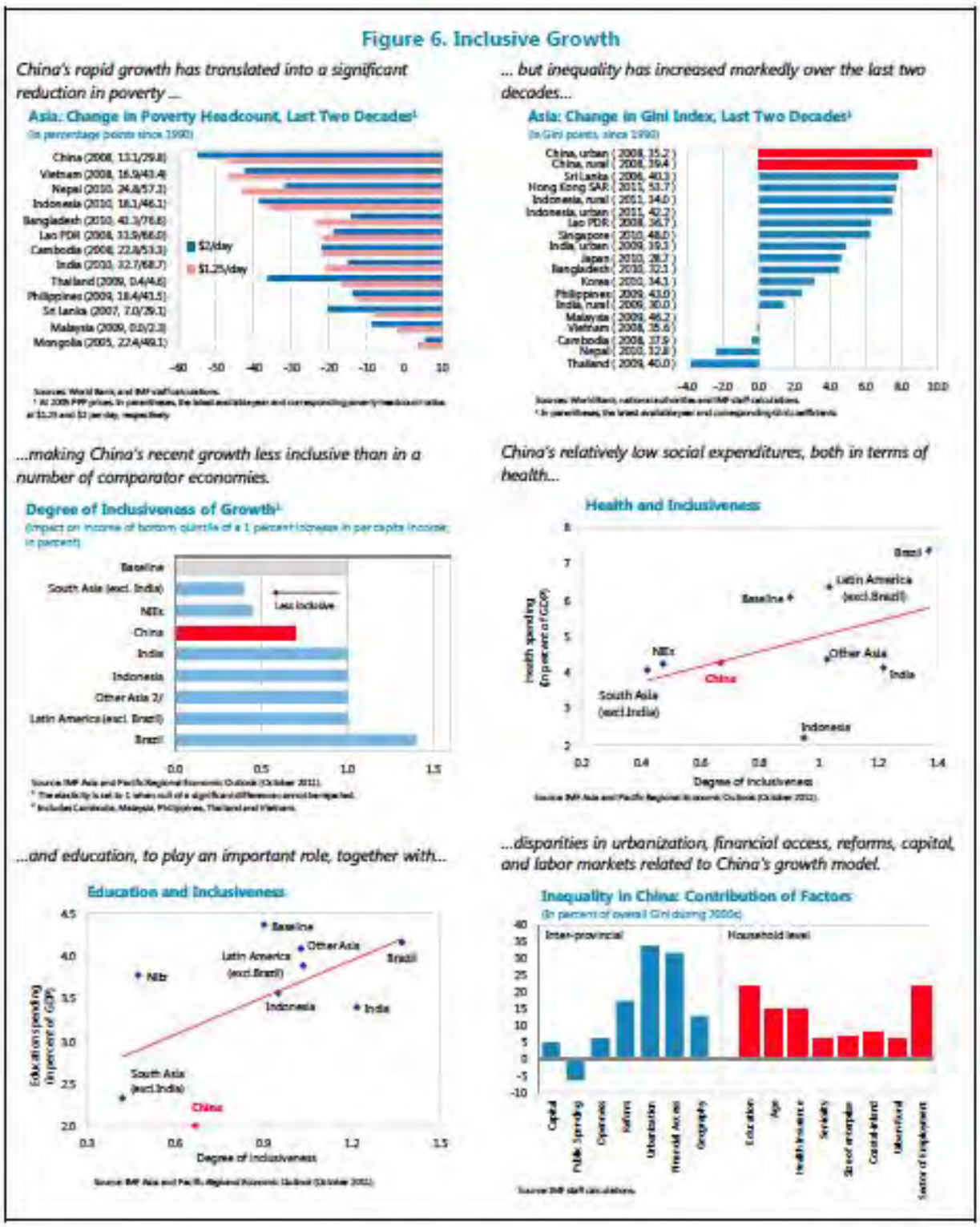
Source: IMF, *People's Republic of China 2013 Article IV Consultation [Country Report 13/211]*, July 2013, p. 8.

Figure 2.4: July 2013 IMF Assessment of China's Economy – Part Three



Source: IMF, *People's Republic of China 2013 Article IV Consultation [Country Report 13/211]*, July 2013, p. 11.

Figure 2.4: July 2013 IMF Assessment of China's Economy – Part Four



Source: IMF, *People's Republic of China 2013 Article IV Consultation [Country Report 13/211]*, July 2013, p. 18.

Chinese Economic Growth Relative to Increases in Military Spending

"Trees do not grow to the sky." Nevertheless, most experts feel that China will continue to enjoy substantial economic growth and that this will continue to drive a steady expansion in the capability of its military forces. **Figures 2.5 and 2.6** below demonstrate differing – although increasingly uncertain – estimates of China's economic performance. They show that multiple organizations' estimates that China will continue to experience robust economic growth even if not at the double-digit rate of the mid-2000s.

- **Figure 2.5** illustrates Chinese percentage growth rates from 2000 to a 2018 projection.
- **Figure 2.6** shows Chinese GDP based on purchasing power parity, from 2011-2018.

At the same time, **Figure 2.7** shows a strong correlation between the rate of increase in GDP and a rise in official military expenditures as acceleration in GDP growth is matched by a constant defense expenditure-to-GDP ratio.

These figures need to be kept in mind when interpreting the level of Chinese military spending. The US DoD annual report on Chinese military power, issued in May 2013, stated that:[55]

> On March 5, 2013, Beijing announced a 10.7 percent increase in its annual military budget to $114 billion, continuing more than two decades of sustained annual defense spending increases. Analysis of data from 2003 through 2012 indicates China's officially disclosed military budget grew at an average of 9.7 percent per year in inflation-adjusted terms over the period. China has the fiscal strength and political will to support defense spending growth at comparable levels, despite lowering its economic growth forecast in 2012 to 7.5 percent from 8 percent in 2011. Continued increases will support PLA modernization efforts and facilitate China's move toward a more professional force.
>
> Using 2012 prices and exchange rates, the DoD estimates that China's total actual military-related expenditure for 2012 falls between $135 billion and $215 billion.
>
> However, it is difficult to estimate actual PLA military expenses due to China's poor accounting transparency and incomplete transition from a command economy. China's published military budget omits several major categories of expenditure, such as procurement of foreign weapons and equipment.

The Japanese defense white paper for 2013 put the issues differently, and in a broader context:[56]

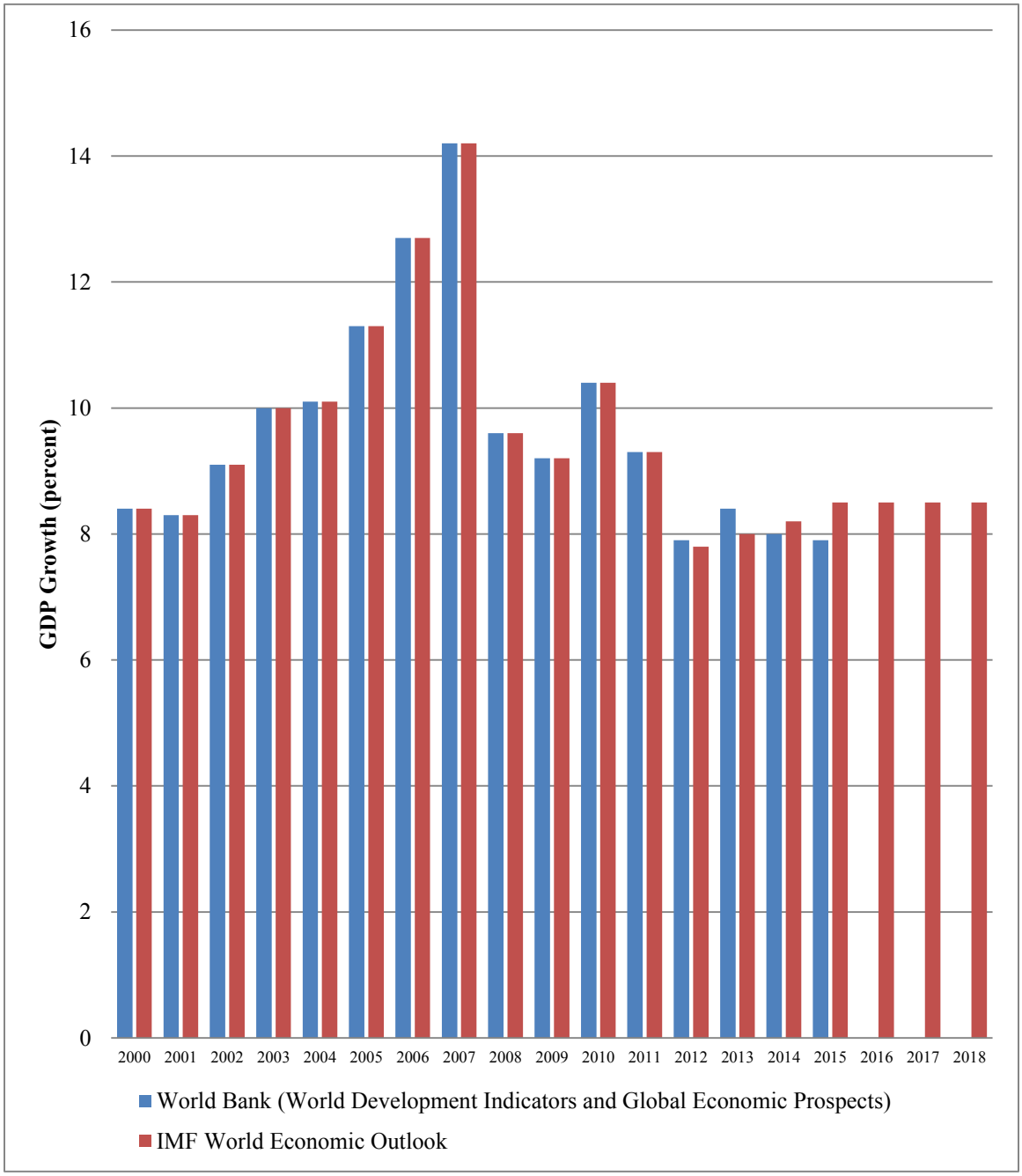
> China has been increasing its defense spending, broadly and rapidly modernizing its military forces, mainly its nuclear and missile force as well as its Navy and Air Force, and strengthening its capability for extended-range power projection. In addition, China is working to improve joint operational capabilities among services and branches, to conduct practical exercises, to cultivate and acquire highly-capable human resources for administering operations of informatized forces, and to improve the foundation of its domestic defense industry. Furthermore, China has been rapidly expanding and intensifying its activities in its surrounding waters and airspace. These moves, together with the lack of transparency in its military affairs and security issues, are a matter of concern for the region and the international community,
>
> … China has not yet achieved the levels of transparency expected of a responsible major power in the international society. For example, as for a detailed breakdown of national defense spending, China basically announced only the total amount and general purposes for the following three categories: personnel, training and maintenance, and equipment. Slight progress was seen in China's National Defense in 2008 in terms of information disclosure, but it does not provide a basic breakdown of procurement costs for major weapons. Moreover, in China's defense white paper titled, "The Diversified Employment of China's Armed Forces," released in April 2013, its contents were limited to selective topics.
>
> While it gave a detailed description of a limited number of topics, there was no reference to national defense spending, which had been described in previous defense white papers issued until this one, illustrating decreased transparency in terms of disclosure of information. Thus, China has not made the information available in a transparent fashion, which is a desirable conduct to be practiced by a major country having a sense of responsibility to the international community. The report for the United Nations

> Instrument for Reporting Military Expenditures submitted by China in 2009 was not filled out in accordance with the standard format used by many other nations, including Japan, which requires a detailed breakdown of military expenditure. The information disclosed in the report submitted by China was almost as simple as that provided in China's defense white papers.
>
> …China announced a national defense budget for FY2013 of approximately 720.2 billion yuan. The initial budget amount announced represented a growth of approximately 10.7% (approximately 69.8 billion yuan) compared to the initial budget amount for the previous fiscal year. This shows that the Chinese national defense budget continues to increase at a rapid pace. The nominal size of China's announced national defense budget has approximately quadrupled in size over the past ten years, and has grown more than 33-fold over the past 25 years. As regards the relationship between defense and economy, China positions the buildup of defense capabilities as important a task as economic development, explaining that it "adheres to the principle of coordinated development of national defense and economy" in China's National Defense in 2010. Accordingly, it is believed that China will continue to invest resources in improvement of its defense capabilities to a degree that does not hamper its economic development.
>
> In addition, it must be noted that the amount of the defense budget announced by China is considered to be only a part of its actual military expenditures. For example, it is believed that the announced defense budget does not include all the equipment procurement costs and research and development expenses.

At the same time, it is equally important to note that some of the US reaction to the following analysis of Chinese military strategy and modernization tends to ignore the fact that nations generally increase military power as their economic strength increases, become more sensitive to strategic concerns beyond their border, and become more competitive with other states. The US sometimes ignores its own history in doing so, in particular what British and other European perceptions were of the growth of US power.

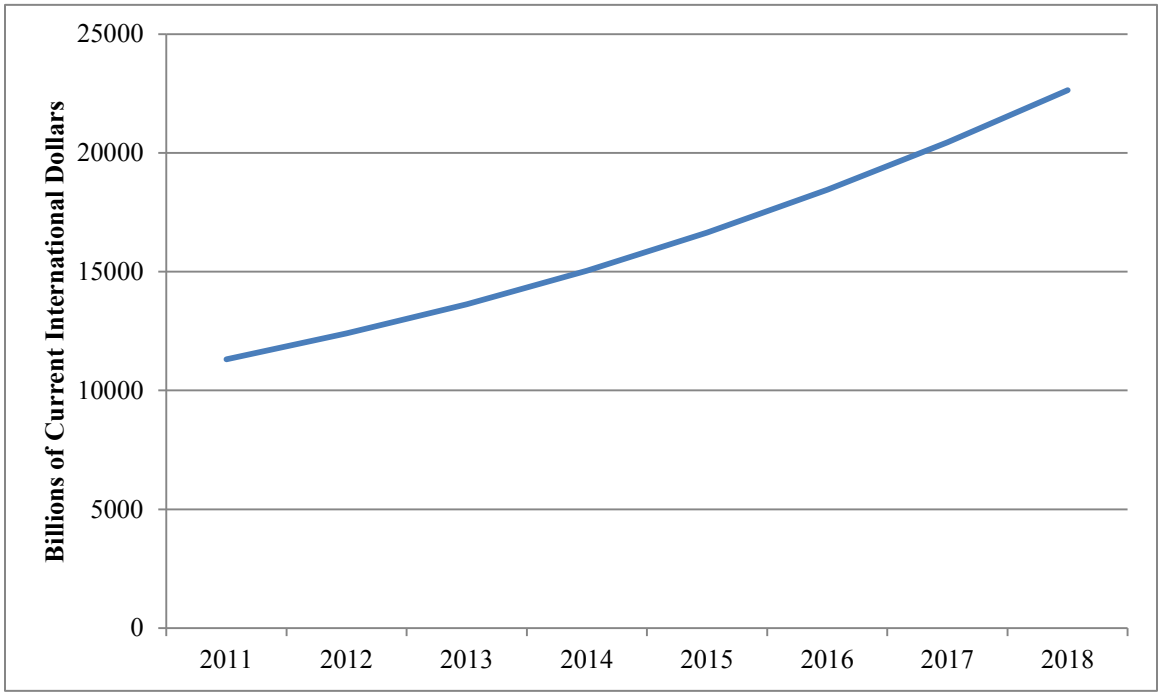
Moreover, few countries have suffered as much in the recent past from outside exploitation and invasion. China's attitudes toward military and strategic competition are only partially driven by the fact China has a communist government – one where "communism" bears a striking resemblance to late 19th century state-driven European crony capitalism. Chinese nationalism is shaped by anger at a history than dates back to the Opium Wars of 1839-1860, European and Japanese zones of exploitation, wars with Japan, and an American role that sometimes aided China but also joined outside states in exploiting and invading China during the siege of Beijing in 1900. [57]

Figure 2.5: Different Estimates of Chinese GDP Growth Rates (Market Prices): 2000-2018



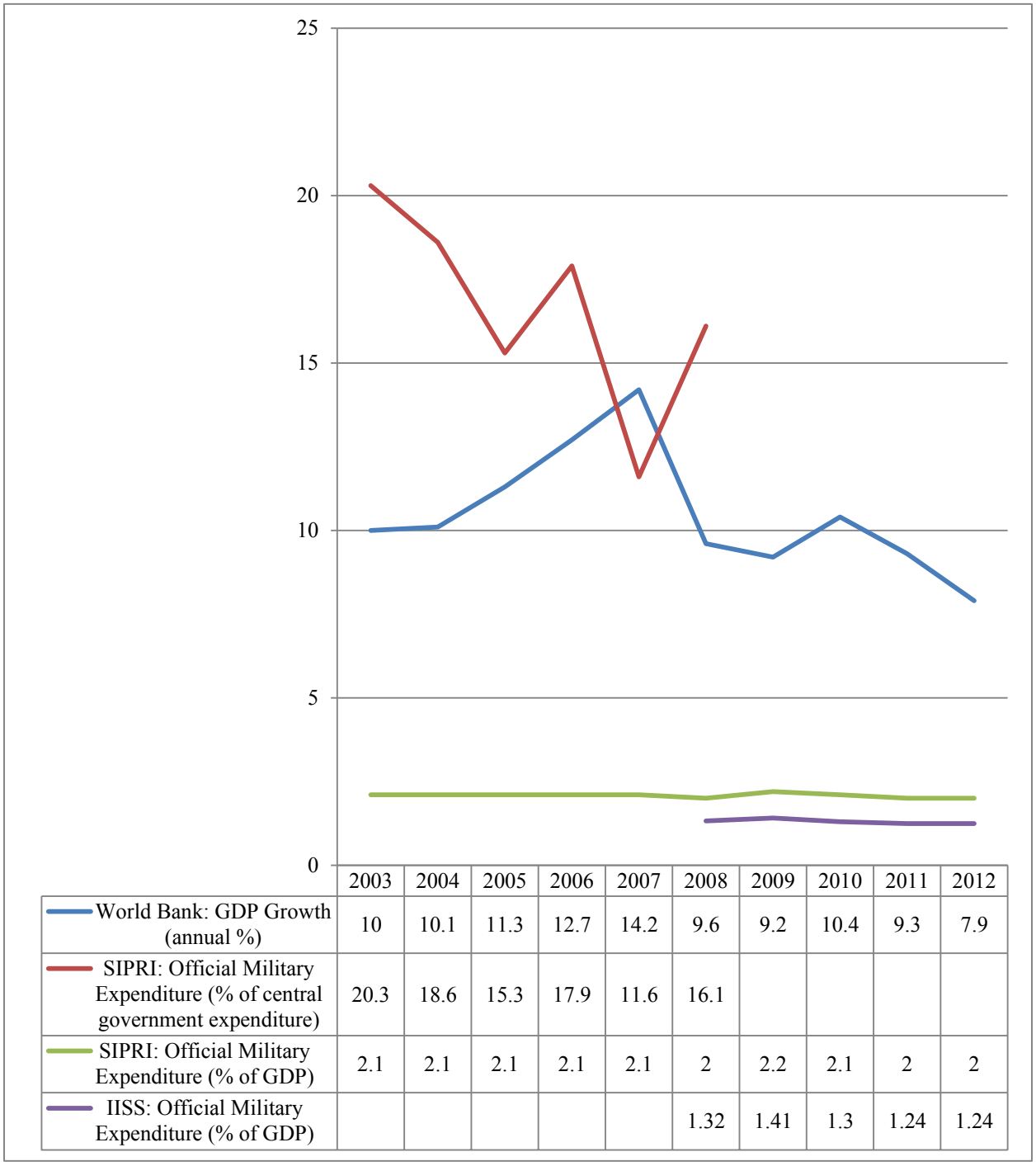
Source: World Bank, "World Development Indicators," 2013, accessed June 10, 2013 (for data 2000-2011; constant 2000 US dollars), http://data.worldbank.org/indicator; World Bank, "Global Economic Prospects January 2013," accessed June 10, 2013 (for data 2012-2015; constant 2005 US dollars), http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1322593305595/8287139-1358278153255/GEP13aEAPRegionalAnnex.pdf; IMF, "World Economic Outlook," updated April 2013, accessed June 10, 2013. http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx.

Figure 2.6: China's PPP GDP (2011-2018), International Monetary Fund Estimate



Source: IMF, "World Economic Outlook," updated April 2013, accessed June 10, 2013. http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx.

Figure 2.7: Comparing GDP, Central Government Expenditure, and Military Spending



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
World Bank: GDP Growth (annual %)	10	10.1	11.3	12.7	14.2	9.6	9.2	10.4	9.3	7.9
SIPRI: Official Military Expenditure (% of central government expenditure)	20.3	18.6	15.3	17.9	11.6	16.1				
SIPRI: Official Military Expenditure (% of GDP)	2.1	2.1	2.1	2.1	2.1	2	2.2	2.1	2	2
IISS: Official Military Expenditure (% of GDP)						1.32	1.41	1.3	1.24	1.24

Based primarily on material in International Institute for Strategic Studies (IISS), *The Military Balance 2009* and *2013* (London: Routledge, 2013); 2013 SIPRI Military Expenditure Database, *Stockholm International Peace Research Institute.* http://www.sipri.org/databases/milexWorld Bank, "World Development Indicators," 2013, accessed June 10, http://data.worldbank.org/indicator.

Economic Factors that May Impact China's Military Spending, Strategy and Modernization

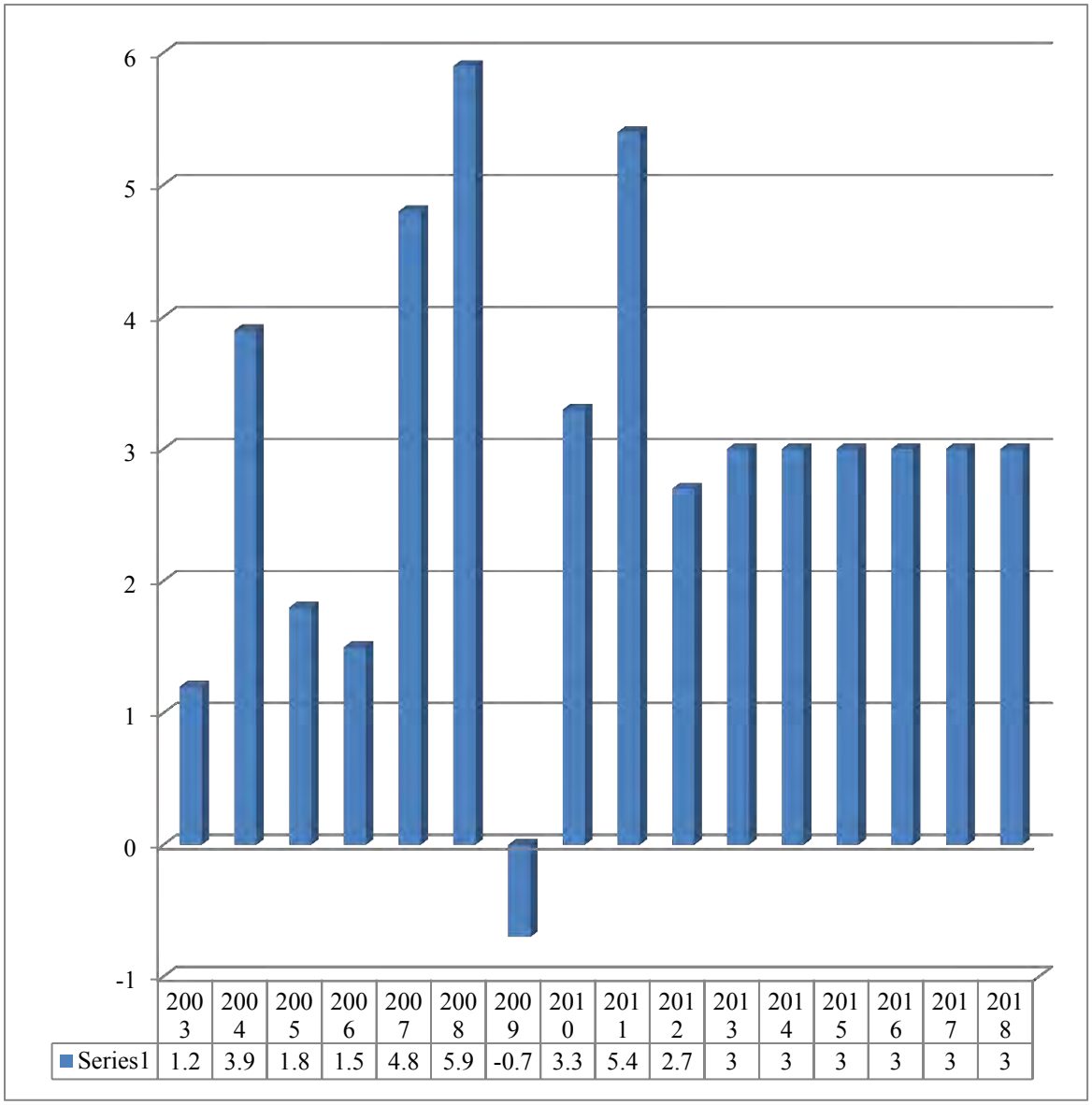
The tactical linkage between military expenditure to GDP may, however, still increase the importance of several key factors that augment or impede GDP growth. Inflation is one such factor. During the last several years, inflation rates in China have been high enough – the inflation rates for 2010 and 2011 were 3.3% and 5.4%, respectively, while inflation was reduced to 2.6% in 2012 – that the PRC has taken steps to prevent "overheating."[58]

In response to these relatively high rates of inflation, former PRC Premier Wen Jiabao announced on March 5, 2012, that the PRC would seek a relatively moderate growth rate of 7.5% in order to achieve "higher-level, higher-quality development over a longer period of time,"[59] though the country achieved a 7.8% growth rate for 2012. According to the World Bank's Chief Economist, Justin Yifu Lin, China lowered its growth rate because "there are some overheating in certain sectors," and "there are some inflation pressure[s]."[60]

Such trends could continue in the near term: *Xinhua* reported a statement from Zhang Ping, minister in charge of the National Development and Reform Commission and the country's top economic planner, in which he said that the government would not relax its efforts to manage inflation even though inflation trends were currently stabilizing.[61] As a result, the Chinese government set a target consumer price increase at 4% for 2012, though prices only rose 2.6% in 2012, while incomes rose approximately 10%. The 2013 economic growth target remained 7.5%, while the inflation target was set at 3.5%.[62] Inflation-control will continue to be a priority for Beijing and may act as a break on GDP growth, and thus also possibly on military expenditure.

Figure 2.8 below displays Chinese inflation rates for the years 2003-2018.

Figure 2.8: Estimates of Chinese Inflation Rates (CPI % increase)



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Series1	1.2	3.9	1.8	1.5	4.8	5.9	-0.7	3.3	5.4	2.7	3	3	3	3	3	3

Note: World Bank figures were only available through 2011 but were the same as the IMF figures and so were not included as a comparison. http://data.worldbank.org/indicator.

Source: IMF, "World Economic Outlook," updated April 2013, accessed June 10, 2013. http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx; 2013-2018 are estimates.

FDI and Current Account Balance

The inflow of foreign direct investment (FDI) has been a critical aid to Chinese economic development over the past decade. FDI reached a new record in 2011 as the country took in $116 billion – though FDI fell 4% in 2012, to $111.7 billion.[63] Outside estimates for China's FDI differ, as the EU, China's biggest trading partner, is currently experiencing a protracted financial crisis. FDI from Europe was $6.1 billion in 2012, a 3.8% decrease from 2011.[64] Despite the

consequences of Euro-area economic instability for FDI in China, the PRC Ministry of Commerce has targeted the years 2012-2015 for a four-year average of $120 billion in FDI.[65]

As of 2010, approximately 47% of all FDI was invested in the manufacturing sector, with services making up a roughly equivalent amount.[66] FDI in the services industry was larger than that of the manufacturing sector in 2012. In April 2013, it was reported that FDI rose 1.44% in the first three months of the year, compared to the first three months of 2012 – totaling $29.9 billion. Of that, the service sector received $14.4 billion, while the manufacturing sector received $13.2 billion.[67]

According to PRC statistics, US direct investment in China in 2012 increased 4.5% to $3.13 billion, accounting for roughly 2.8% of China's annual FDI total. However, the top Asian countries investing in China – Hong Kong, Japan, Singapore, Taiwan, and the ROK – accounted for 84.5% of FDI, or $94.46 billion. Hong Kong represented $71.29 billion of this, with Japan second at $7.38 billion; the US was the fifth-largest investor in China.[68]

FDI outflows from China are smaller, but still very substantial: the PRC Ministry of Commerce's figures for outward non-financial direct investment overseas in 2012 show that China invested $77.22 billion, up 28.6% from 2011.[69] In 2010, China was credited with $68.81 billion in total FDI ($8.63 billion financial and $60.18 billion non-financial).[70] China's fast-growing economic ties with countries in Latin America and Africa have the potential to make China a considerable investor in many regions of the world. However, it should also be noted that much of the current ODI is directed towards Hong Kong and Caribbean off-shore tax havens, such as the Cayman Islands.[71]

In light of these trends, China's current account balance has generated significant surpluses during the first decade of the 21st century. Ranked first in the world, China's 2012 current account balance stood at $213.8 billion and accounted for roughly 2.6% of China's nominal GDP and 1.7% of its PPP GDP.[72] Reserves of foreign exchange and gold in China have surpassed $3.3 trillion, and China has indicated an interest in diversifying its portfolio by targeting corporate equity assets abroad.[73]

The exact implications of these trends for the defense sector are unclear, although they give China steadily greater resources on which to draw and have led to a sustained modernization of China's manpower and industrial base. While China's military-industrial complex almost certainly does not attract as much FDI as other industry branches, other benefits from FDI, which are hard to quantify, must be kept in mind.

The Chinese government emphasizes innovation and business practices transfer (*kaifang zhengce* policy*)*, state-led dual-use production, and access to technology by acquisition of foreign companies. A possible result of such practices is the divergence between those defense enterprises which have "benefited from integration with a rapidly expanding civilian economy and science and technology sector, particularly elements that have access to foreign technology" and lesser performing defense companies producing goods which have "limited counterparts in the PRC civil-industrial sector."[74]

Demographic Trends

Population is another factor that will influence both China's economy and military development. China will remain the world's most populated nation – or it will be a close second – until the end of the twenty-first century. Sheer population size will be one foundation of China's power and

prestige in international affairs, although much will be determined by how the country will develop its pool of human resources.

China has been relying less and less on sheer manpower for its military strength, but demographic developments and a steadily better-educated population still give it immense resources to draw upon. With approximately 1.35 billion inhabitants, China is the most populous nation on Earth. India, too, has more than 1.2 billion citizens, yet the US as the third most populous country has a mere quarter of China's population.[75]

Chinese population growth rates have been slowing for most of the past 30 years. The official population growth rate for 2011 was 4.79%,[76] although such numbers may undercount growth in rural areas. In the absence of reliable migration data, it is difficult to estimate whether China's net population growth will be positive or negative in the years to come. However, under the assumption of negligible immigration, the US Census Bureau has, with all the caveats associated with long-term population prediction and assumptions of migration, predicted a Chinese population that peaks around 2025 and begins shrinking afterward.

As the trend depicted in **Figure 2.9** indicates, birthrates in China have been steadily decreasing, and are projected to decrease further in the coming decades. Currently, the fertility rate is approximately 1.4 children per woman; at the same time, life expectancy is rising, and has reached an estimated average of 75 years for the population.[77] **Figure 2.10** illustrates these birth and fertility rate trends.

These trends will affect China's economy and military manpower pool because the country will experience a significant shift in its population pyramid, moving to an age distribution with comparatively fewer young people and more elderly. In addition, some reports indicate the skewed ratio in recent years of approximately 120 males born for every 100 females will certainly contribute to slower population growth and have other social ramifications.[78] According to the US Census Bureau's International Database, this trend will peak in 2030 when the number of males aged 15-39 will be 13% larger than the corresponding number of females.[79]

Nevertheless, population projections indicate that the number of young women and men available for conscription will be more than sufficient to meet recruiting demands. This will be especially true if cuts in personnel strength of the armed forces persist or even if the number of security forces remains steady.

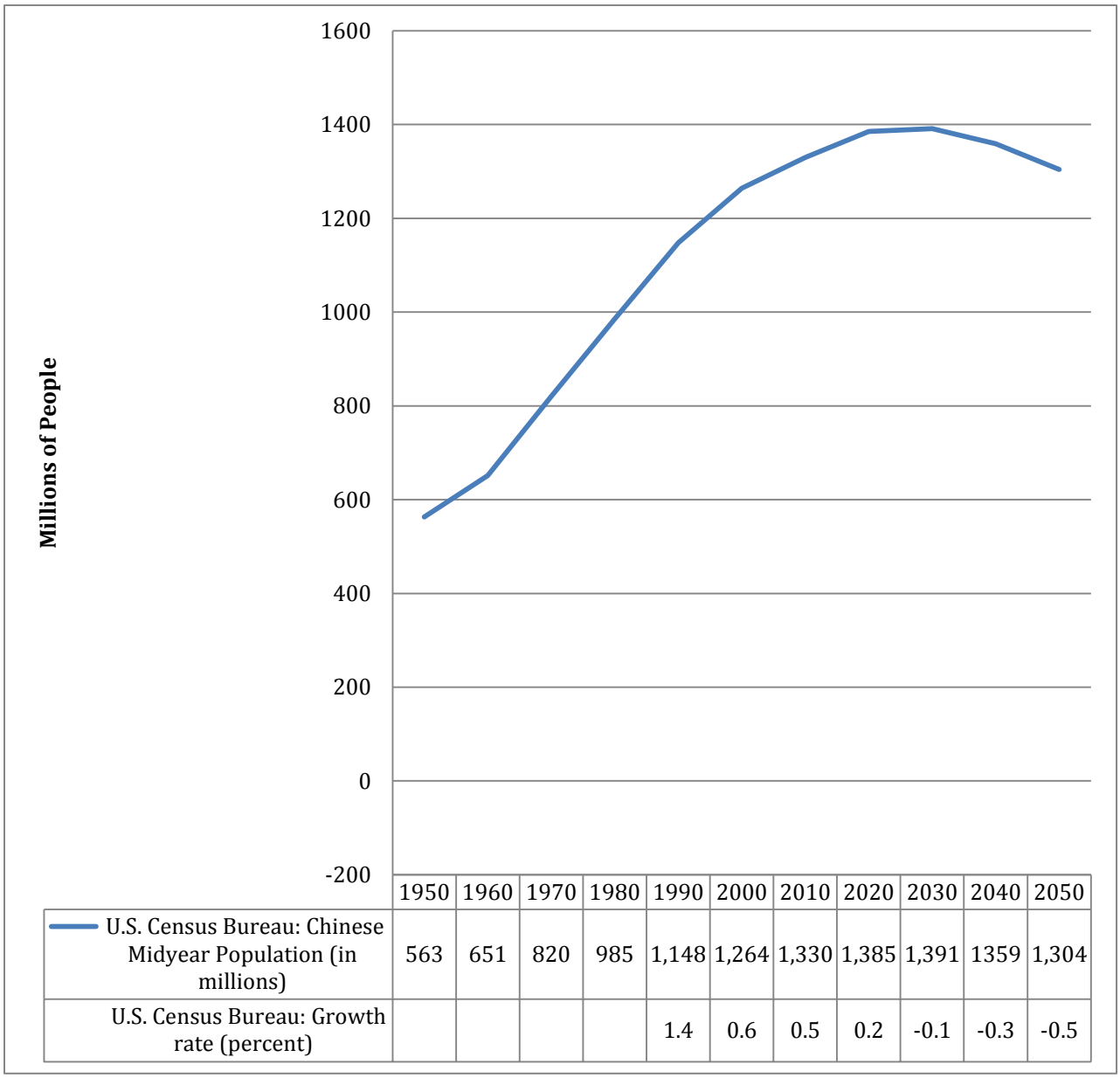
Societal Trends and Economic Transformation

The future nature of China's armed forces will also be affected by societal trends caused by population change in combination with economic transformation. The erosion of traditional social security networks in rural China already introduces difficulties for the recruitment of soldiers and absorption of veterans. Chinese armed forces will have to attract well-trained specialists and maintain a corps of noncommissioned and commissioned officers. This should be easier if Chinese overall economic development continues, because more and more skilled men and women will be available to draw upon if the armed forces can project themselves as attractive employers.

If demographic and economic trends should cause a shortage of skilled labor in the future, it could mean problems for the security forces in terms of recruiting and retaining qualified personnel, especially under tight budgets. One report notes that beginning in 2017 the Chinese working-age population will begin to decline in number.[80] Such circumstances would certainly

make military recruitment more difficult and limit economic growth. Furthermore, in light of social inequalities, selective conscription could cause political pressure to introduce a volunteer army.

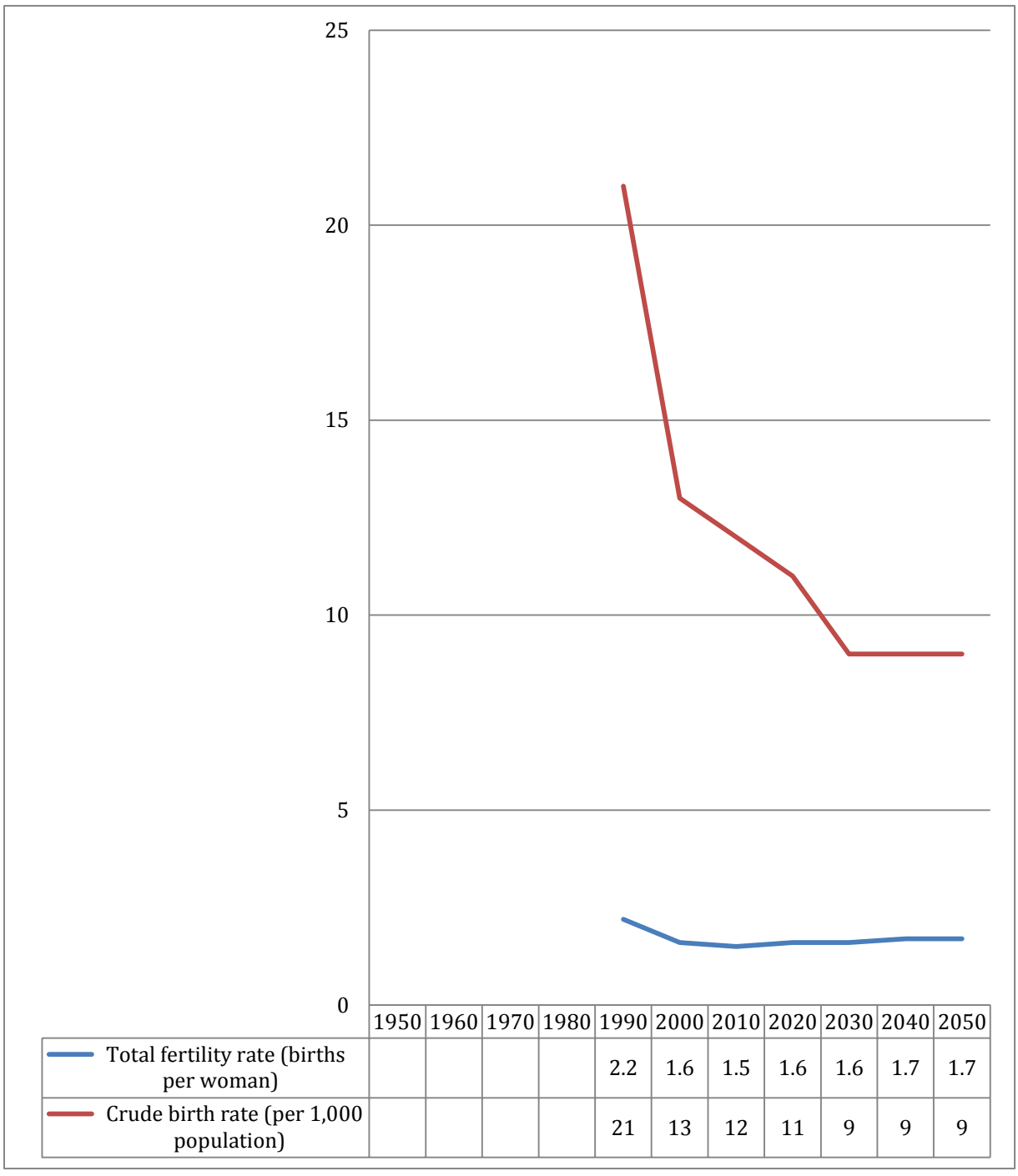
Figure 2.9: Chinese Population Projection (in millions)



	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
U.S. Census Bureau: Chinese Midyear Population (in millions)	563	651	820	985	1,148	1,264	1,330	1,385	1,391	1359	1,304
U.S. Census Bureau: Growth rate (percent)					1.4	0.6	0.5	0.2	-0.1	-0.3	-0.5

Source: US Census Bureau, International Programs, International Database, accessed March 2012. http://www.census.gov/population/international/data/idb/informationGateway.php.

Figure 2.10: Chinese Population Growth Indicators



	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Total fertility rate (births per woman)					2.2	1.6	1.5	1.6	1.6	1.7	1.7
Crude birth rate (per 1,000 population)					21	13	12	11	9	9	9

Source: US Census Bureau, International Programs, International Database, accessed March 2012. http://www.census.gov/population/international/data/idb/informationGateway.php.

Chapter 3: Chinese Strategy and PLA Military Doctrine

Developing broad conceptual approaches to strategy is easy. Actually implementing them in the form of real-world plans, budgets, force developments, and measures of effectiveness is much more difficult. China's unclassified literature tends to be far more conceptual and less focused on actual implementation than US and most other military reporting. This has led to significant debates in the Western open-source literature over China's strategy, force structure, military spending, and arms purchases, as well as over China's actual internal views of its strategic environment, its intentions, and the goals it is seeking to pursue.

This make it important to tie Chinese strategy and statements regarding its military developments to quantitative indicators of trends in Chinese military modernization and force development in order to better determine China's actual goals and how they relate to real-world changes in its military posture and forces. At the same time, simply measuring the shifts in the unclassified data on Chinese forces lacks context and perspective. They can only be understood in the context Chinese strategic doctrine.

Chinese Strategic Doctrine

An analysis of the trends in Chinese force development cannot cover all the issues affecting Chinese military doctrine. It is, however, necessary to have some picture of what China says as background for any portrayal of its force strength and modernization.

Of course, what China says is likely to not be a full reflection of what its leaders actually think and intend. Certainly no Western strategy document or force plan has ever passed this test nor has generally even come close to meeting it. It does, however, at least set the stage.

It is important to keep in mind the difficulties that arise from transcription, transliteration, and translation; the different cultural context; and the reality that all countries sometimes deliberately conceal facts or use misleading terms in official documents and statements. This holds especially true in non-democratic systems and when dealing with military policy, such as when trying to infer which objectives will be assigned to the PLA.

China does not make publicly available a unified, single doctrine for guiding military operations. Rather, Chinese doctrine must be understood as the combination of several documents and guidelines at different command levels of the armed forces, united into a hierarchical system that the Chinese refer to as a "Science of Military Strategy." At the top of this hierarchy, the "Military Strategic Guidelines" provide direction on the current and future development of the PLA. The 2012 DoD annual report to Congress on Chinese military and security developments notes this situation, stating:[81]

> China's 'Military Strategic Guidelines for the New Period,' completed in 1993 and revised as recently as 2004, contains the overarching strategic and operational guidance that directs the training, development, and employment of China's armed forces.

Attempts to discern a systematic hierarchy among Chinese war-fighting principles usually identify two concepts – "Active Defense" and "Local War under Conditions of Informatization" – at the top level of China's military doctrine. In addition, the old concept of "People's War" has been modified and updated to remain relevant in the 21st century.

Active Defense

Active defense is an operational guideline for military strategy that applies to all branches of the armed forces. It states that China's military engages in a policy of strategic defense and will only strike militarily once it has already been struck. However, Active Defense specifically states that such a defensive strategic posture is only viable if mated with an offensive operational posture. Moreover, the first strike that triggers a Chinese military response need not be military; actions in the political and strategic realm may also justify a Chinese military reaction, even if the PLA fires the first shot tactically.[82]

The *Science of Military Strategy*, a PLA textbook on strategy, presents the four pillars of active defense.[83]

- First, China will not fire the first shot and will attempt to settle any disputes by peaceful means for as long as possible.
- Second, China will attempt to deter war militarily or politically before it breaks out.
- Third, China will respond to an attack with offensive action and will seek to destroy the enemy's forces.
- A fourth pillar, but presented as part of pillar three, is that China would not be the first state to use or threaten to use nuclear weapons.

Thus, while Active Defense posits a strategically defensive orientation for the PLA, it specifically instructs the PLA to engage in operationally offensive action in order to thwart an invader. As the *Science of Military Strategy* states,[84]

> Strategically, we would fight only after the enemy has struck. But when foreign enemies forced war on us, we should be able to deal out powerful counterattack and stop the enemy's offense in predetermined areas. After gradually depriving the enemy of his strategic initiative, we would change strategic defensive to strategic offensive, so as to utterly defeat the enemy's invasion.

Local War under Conditions of Informatization

While Active Defense provides the basic strategic posture for the PLA, its concept of operations in the early 21st century is codified by the doctrine of Local War under Conditions of Informatization.

The Local War under Conditions of Informatization (Local Wars) concept has been the official military doctrine of the PLA since 1993.[85] This doctrine states that near-future warfare will be local geographically, primarily along China's periphery; limited in scope, duration, and means; and conducted under "conditions of informatization," which the DOD describes as "conditions in which modern military forces use advanced computer systems, information technology, and communication networks to gain operational advantage over an opponent."[86] The DOD further interprets the doctrine to refer to "high-intensity, information-centric regional military operations of short duration."[87] As the rest of this study will show, the PLA's ongoing modernization and force development has occurred along the lines necessitated by this doctrine.

Like many of the PLA's theoretical concepts, this prediction of the nature of modern war is based on a combined study of history and theory: PLA theorists reportedly identify the 1991 Gulf War as the beginning of a new era in warfare, a Revolution in Military Affairs (RMA), in which information technology completely revolutionized warfare and changed the way militaries were organized, led, and fought. Moreover, the same theorists assess that the dramatic changes in

international relations following the Cold War have decisively altered both the political drivers for war and the political constraints on war.[88]

The result of the RMA and the decisive change in international affairs is a new type of warfare dominated by two key characteristics: a dependence on information technology and a limitation in geographic scope, duration, and political objectives of future warfare. As the *Science of Military Strategy* asserts,[89]

> It has two distinctive features: one is the high-tech feature, and the other is the local feature. The former refers to the high-tech as the material and technological foundation of war, for a large amount of high-tech weapons and equipment are used and a lot of traditional military systems are improved by the employment of high technologies. The latter means that the war is controlled within the local range. Moreover, the aim, range, tools of war and time and space of engagements are all limited. These two features determine the fundamental orientation of the future development of local war.

With regard to the second characteristic, PLA theorists argue that in contrast to the previous PLA belief in "Total War," Local Wars are characterized by the pursuit of limited political goals through relatively constrained uses of force.[90] In this new conception, military force supports diplomatic strategies aimed at securing attainable, limited political goals rather than seeking the complete destruction of the enemy. To quote American analysts Roger Cliff *et al.*, "Military action is intended to create conditions for the achievement of the desired political outcome."[91]

Thus, military force operates in conjunction with, or possibly in support of, other instruments of national power. PLA Colonels Qiao Liang and Wang Xiangsui argue this point strongly in their book, *Unrestricted Warfare*, and assert that the effectiveness of military power has declined relative to the new, infinite means of coercing one's enemies. They contend that the dynamically changing external environment facing nation-states today makes "obsolete the idea of confining warfare to the military domain."[92] As a result, military means are a subsidiary means of comprehensive national power and but one instrument to complement others.

Despite the decreasing potency of the purely military sphere in future conflicts, the concept of Local Wars still has much to say about the specific conditions regarding military-on-military confrontations. The high level of technology present in Local Wars ensures that wars will be brief but highly destructive contests between military forces, both of which are linked and empowered by information technology.

Because of this extreme battlefield lethality, in combination with the limited geographic scope and objectives of Local Wars, the PLA expects to fight short wars in which the first campaign will be highly destructive at the military level and lead to a decision within the military sphere quickly. Moreover, the ability of military forces to communicate and coordinate rapidly through effective C4ISR networks means that, at the operational level, military forces in Local Wars will be agile, capable of high-tempo deep operations, resource-intensive, critically dependent on information, and present in all warfare domains.[93]

People's War

People's War is often wrongly confused with guerilla warfare. The Chinese concept of People's War is one in which the people actively support the military during times of warfare: this active support can be logistical, political, or operational. When describing arming the civilian population for military operations, PLA writings mostly refer to militia, civil defense, and reserve forces.[94] However, the use of civilian materiel and personnel for support and logistics

functions is still accepted in PLA doctrine and is still seen as necessary for victory in Local Wars:[95]

> The cooperation between the regular warfare and irregular warfare stresses that we should give full play to the creativity of the masses and servicemen on the basis of inheriting the glorious tradition of the people's war so that the new form of the people's war under modern conditions can be explored according to the reality of the war in different strategic directions. "Five combinations" should be dealt with well. The first is the combination of the regular troops with the masses participating in the war. The emphasis should be put on coastal regions or inland border regions. The masses should be mobilized to support defensive operations on the sea or counterattack in self-defense on the borders, and make use of local scientific and technical resources to launch all kinds of attacks against the enemy and provide various special supports.

The PLA sees no contradiction between People's War and Local Wars; instead, the two doctrines are seen as mutually reinforcing.[96] Moreover, this belief in complementarity is far more than purely theoretical: the PLA actively depends on the civilian population at all strategic levels, requiring the active logistical, and at times operational, support of the Chinese people for mobilization, mobility, and combat.

For example, a key role of local governments in wartime is to coordinate civilian support for military forces. Referencing transportation during wartime, the *Science of Second Artillery Campaigns* states,[97]

> With respect to engineering support, on one hand the destruction during wartime of the positions, roads, bridges within the battlefield would greatly magnify the work load and difficulty; while on the other hand, the magnanimous support and assistance from the local government and the masses would become a potent replenishment of our wartime engineering support. Moreover, within the battle zone, the financial potential, mechanical maintenance capability, loading and unloading transportation capability, medical first-aid ability, in addition to the quantity and quality of the population, would all constitute extremely direct influence towards the logistics, equipment technical support and personnel replenishment.

Consequently, the PLA identifies the Chinese population and local governments as vital resources during Local Wars. Given the predicted close proximity of China to future battlefields, as well as the necessary mobilization and maneuver that would take place within China, the PLA predicts that the local population can be decisive even in a local, high-technology war.

A key element of People's War is the necessity of maintaining good relations with the local populace. As a result, the *Science of Second Artillery Campaigns* specifically instructs SAF personnel to maintain good relations with the local populace for ethical and operational reasons:[98]

> Vigorously foster the PLA's good tradition of supporting the government and cherishing the people, and foster military-politics and military-civilian relationships. Under the premise of strict adherence to secrecy, obtain contact with pertinent departments of the local government in a timely manner, and actively seek the vigorous support of the regional government. Under the condition of satisfying campaign operations, strive to accommodate the masses by self-consciously safeguarding the masses' interests. Strictly abide by policy regulations and the masses discipline, resolve new issues that surface during the process of campaigns in a timely manner, and establish the fine image of a mighty and civilized army.

Chinese Campaign Doctrine

Active Defense, Local Wars, and People's War describe how China intends to posture itself, develop its forces, and fight at the strategic level. Operationally, or in the Chinese terminology, at the campaign level, the PLA has developed doctrines and principles of warfare that it believes will enable China to win Local Wars in the early 21st century, even against technologically superior adversaries. While every element of PLA campaign doctrine cannot be discussed in this

limited overview, the campaign doctrines most necessary for evaluating Chinese modernization are included below.

Integrated Joint Operations

Chinese military writings describe joint operations as a critical component of future military operations and a necessary means of defeating technologically superior adversaries. PLA doctrine holds that joint operations, or cooperation at the operational level between multiple services, are an essential means of augmenting combat power at the operational level and a necessary means for obtaining victory in Local Wars. Identifying future combat as a confrontation between military systems, the PLA believes that synergies obtained by multi-service cooperation, such as the use of SAF forces at the operational level to further PLAAF operations, create synergies that enable the PLA to achieve its objectives in a highly complex and lethal environment. As the *Science of Military Strategy* notes,[99]

> Under the high-tech conditions, the victory of war depends on the comprehensive confrontation capacity of the whole combat system. The composition of war power is developing in the direction of systematization, and the emphasis is laid on the combination of various forces so as to find new ways to increase their combat effectiveness through the integrated composition and employment of combat forces. The operations of individual service is disappearing, while the traditional division of labor among the Army, the Navy and the Air Force is blurring.
>
> Various combat forces are more closely connected with each other, and the operations are highly integrated. A very small-scale operation possesses the feature of jointness. The enormous power of various combat forces can only be given full play to in joint operations. Integrated and joint operation has become the basic pattern of high-tech local war. The principles of "systems confrontation" and "overall strike" have become more important than that of "independent operation".
>
> Sometimes strategic means might be used to attack tactical targets, and, sometimes, tactical means might be employed to attack strategic targets. Supported by information technology, various arms and services, different functional formations and various combat factors are woven into a unity. Hence, joint operation has become the inexorable operational pattern. Combined fighting capacity has become the fundamental symbol of combat effectiveness of the armed forces.

Traditionally, the PLA considered joint operations to be "operations under unified command and executed by two or more services at the level of the corps."[100] However in the last decade, the PLA has made two revisions to its joint operations concept. First, the PLA has renamed joint operations "integrated joint operations," partially in response to lackluster training practices that did not achieve the hoped-for level of jointness but also in order to emphasize the role of support, logistical, and civilian forces in the joint operations concept. The new concept also emphasizes the role of informatization in joint operations.[101]

Second, the PLA has begun the process of pushing joint operations down from the level of corps (Group Armies [GA's]) to that of divisions and even brigades.[102] As the above quote shows, the PLA intends to push down joint operations to "very small-scale operations." However, as one analyst writes,[103]

> It is evident that conducting joint operations at division level and below is still a relatively new concept for the PLA and that more time is necessary for them to experiment, encounter problems, find solutions, and communicate these experiences throughout the PLA.

Information Warfare

One of the main principles of the Local Wars concept is that Information Warfare (IW) will play a central role in future warfare. Within the realm of IW, the PLA must be capable of quickly

seizing and retaining information supremacy, or the ability to access and process information in effective C4ISR[104] networks while denying the enemy the same ability. Consequently, the PLA believes that advantages in collecting, transmitting, and processing information will lead to significant advantages at the operational and even strategic level. As the 2011 DoD Report states,[105]

> PRC military writings highlight the seizure of electromagnetic dominance in the early phases of a campaign as among the foremost tasks to ensure battlefield success. PLA theorists have coined the term 'integrated network electronic warfare' (*wangdian yitizhan*—网电一体战) to describe the use of electronic warfare, computer network operations, and kinetic strikes to disrupt battlefield information systems that support an adversary's warfighting and power projection capabilities. PLA writings identify 'integrated network electronic warfare as one of the basic forms of' integrated joint operations, suggesting the centrality of seizing and dominating the electromagnetic spectrum in PLA campaign theory.

The PLA has developed the Integrated Network and Electronic Warfare (INEW) doctrine to organize and structure its forces for seizing information supremacy. INEW calls for the immediate seizure of information supremacy at the beginning of a conflict or even before. According to INEW, the goal of IW forces is:[106]

> Controlling the dominant position in battlefield information within the scope of a particular time and space… It means having the rights of freedom and initiative when using information and controlling the battlefield initiative…

INEW holds that this objective can only be obtained by integrating means across the services. As a doctrine, INEW specifically focuses on integrating cyber and electronic warfare forces. However, other PLA forces will be used in conjunction with cyber/electronic attacks to create a hard/soft kill mix of attacking forces: PLA theorists argue that close coordination of operational systems provides the only means for victory in the system-on-system confrontation expected during a fight for information supremacy.[107]

Some reports see the focus on information warfare as an element of People's War. Chinese military writers reportedly envision the mobilization of millions of citizens skilled in IT applications as the heroes in a new online People's War.[108] Some military districts have already established reserve and militia units specializing in information warfare, thereby drawing on the vast, untapped potential of civilian software experts. As many as 20 city departments are believed to have information warfare regiments among their military reserve forces.[109]

The 2006 DoD report on China pointed out that China's increasing use of IT means that civilian computer hackers *may* support the PLA in protecting Chinese networks while disrupting those of the enemy. It also noted that a PLA cyber-warfare exercise was conducted in 2005. The 2011 report takes a firmer position, stating that such a linkage does exist:[110]

> These [information warfare] units include elements of the militia, creating a linkage between PLA network operators and China's civilian information technology professionals.

The 2012 report provides the following summaries of related trends in cyberwarfare, space, and espionage, and indicates that there is a rising level of tension between the US and China over some aspects of these trends:[111]

> China's IADS [integrated air defense system] … includes a C4ISR network to connect early warning platforms, SAM and AAA, and command posts in order to improve communication and response time during operations. The network is intended to include battle damage assessment capability. China continues to make progress on command, communication, and control systems. China's air defense brigades are training to use this information network and mobile C2 platforms to connect different types of weapons

> systems' operations together by sending automated targeting information to them simultaneously. Weapon systems that are geographically separate, in different units, and a mix of older and newer battalions could achieve compatibility through the use of networked C2. China is also using simulation systems to attempt to train for command of air defense operations in realistic operational conditions, including network warfare. China has deployed air defense brigades employing its newest SAM system to the western part of China to train for long-distance mobility and operations in high-altitude conditions, including operations in the conditions of network warfare. (p. 68)
>
> China has developed a large constellation of imaging and remote sensing satellites under a variety of mission families. These satellites can support military objectives by providing situational awareness of foreign military force deployments, critical infrastructure, and targets of political significance. Since 2006, China has conducted 16 Yaogan remote sensing satellite launches. The Yaogan satellites conduct scientific experiments, carry out surveys on land resources, estimate crop yield, and support natural disaster reduction and prevention. Additionally, China has launched two Tianhui satellites designed to conduct scientific experiments and support land resource surveys and territory mapping with a stereoscopic imaging payload. China has three Huanjing disaster monitoring satellites currently on orbit (the third of which was launched in November 2012). The Ziyuan series of satellites are used for earth resources, cartography, surveying, and monitoring. China also operates the Haiyang ocean monitoring constellation and Fengyun weather satellites in low Earth and geosynchronous orbits. China will continue to increase its on-orbit constellation with the planned launch of 100 satellites through 2015. These launches include imaging, remote sensing, navigation, communication, and scientific satellites, as well as manned spacecraft. (p. 65)
>
> In 2012, China conducted 18 space launches. China also expanded its space-based intelligence, surveillance, reconnaissance, navigation, meteorological, and communications satellite constellations. In parallel, China is developing a multi-dimensional program to improve its capabilities to limit or prevent the use of space-based assets by adversaries during times of crisis or conflict. (p. 9)
>
> During 2012, China launched six Beidou navigation satellites. These six satellites completed the regional network as well as the in-orbit validation phase for the global network, expected to be completed by 2020. China launched 11 new remote sensing satellites in 2012, which can perform both civil and military applications. China also launched three communications satellites, five experimental small satellites, one meteorological satellite, one relay satellite, and a manned space mission. (p. 9)
>
> China continues to develop the Long March 5 (LM-5) rocket, which is intended to lift heavy payloads into space. LM-5 will more than double the size of the Low Earth Orbit (LEO) and Geosynchronous Orbit (GEO) payloads China is capable of placing into orbit. To support these rockets, China began constructing the Wenchang Satellite Launch Center in 2008. Located on Hainan Island, this launch facility is expected to be complete around 2013, with the initial LM-5 launch scheduled for 2014. (p. 9)

Chinese Cyberwarfare

Cyberwarfare is become a major aspect of Chinese modernization and triggering a growing US, ROK, and Japanese response.

The PLA, under the "Integrated Network Electronic Warfare" doctrine, has been paying significant attention to information warfare in the past 10-15 years, not only looking at Cyberwarfare, but also battlefield EW. The doctrine promotes the PLA's capabilities in paralyzing an opponent's C4ISR capabilities through network warfare and EW tools. Recently, the PRC has apparently moved towards a new "information confrontation" (xinxi duikang) concept, integrating non-electronic and electronic information warfare under a single command. It is likely that the PLA perceives information warfare as a national exercise to be undertaken in times of both peace and war, as information sovereignty is an important aspect of national power. In a battle situation, each side would employ integrated air, ground, naval, and electromagnetic forces. As such, the PLA is working to improve battlespace situational awareness by linking all the military branches into one common operating platform.[112]

In an assessment of capabilities, the IISS noted,[113]

> Three PLA departments – Informatisation, Strategic Planning and Training – have either been established or re-formatted to help bring about this transformation. And since 2008, major PLA military exercises, including Kuayue 2009, Shiming Xingdong 2010 and Lianhe 2011, have all had significant cyber and information operations components that have been both offensive and defensive in nature. China's cyber assets fall under the command of two main departments of the General Staff Department (GSD). Computer network attacks and EW would, in theory, come under the 4th Department (Electronic Countermeasures), and computer network defence and intelligence gathering comes under the 3rd Department (Signals Intelligence). The 3rd Department is supported by a variety of 'militia units' comprising both military cyber-warfare personnel and civilian hackers.
>
> In July 2010, colours were presented by General Cheng Bingde, head of the PLA General Staff Department, to a new 'Information Safeguards Base' tasked with addressing cyber threats and safeguarding China's information security and infrastructure. Some PLA sources claim that the base is not an offensive cyber capability but rather is intended to bolster resilience. In 2011, the PLA said that a much-reported 'Cyber Blue Team' was a body designed to improve the PLA's 'ability to safeguard internet security'

A 2011 report by the US Office of the National Counterintelligence Executive noted that Chinese private companies and government intelligence agencies use Chinese citizens or people with family ties to China to exploit their insider access to US corporate networks to steal trade secretes using emails or thumb drives. Every year, tens of billions of dollars of intellectual property, trade secrets, and technology are copied from US corporations, government agencies, and research institutions, primarily by China and Russia.[114]

These Chinese activities have led to a growing US reaction. In early May 2013, the Obama administration – through the DOD – accused the Chinese military of attacking US government and defense contractors' computer systems. Some recent estimates believe that over 90% of cyberespionage in the US comes from China.[115]

The DoD report on Chinese military power for 2013 made it clear that China's cyberwarfare modernization had become a far more challenging issue for the US:[116]

> **Cyber Activities Directed Against the Department of Defense.** In 2012, numerous computer systems around the world, including those owned by the U.S. government, continued to be targeted for intrusions, some of which appear to be attributable directly to the Chinese government and military. These intrusions were focused on exfiltrating information. China is using its computer network exploitation (CNE) capability to support intelligence collection against the U.S. diplomatic, economic, and defense industrial base sectors that support U.S. national defense programs. The information targeted could potentially be used to benefit China's defense industry, high technology industries, policymaker interest in US leadership thinking on key China issues, and military planners building a picture of U.S. network defense networks, logistics, and related military capabilities that could be exploited during a crisis. Although this alone is a serious concern, the accesses and skills required for these intrusions are similar to those necessary to conduct computer network attacks. China's 2010 Defense White Paper notes China's own concern over foreign cyberwarfare efforts and highlighted the importance of cyber-security in China's national defense.
>
> **Cyberwarfare in China's Military.** Cyberwarfare capabilities could serve Chinese military operations in three key areas. First and foremost, they allow data collection for intelligence and computer network attack purposes. Second, they can be employed to constrain an adversary's actions or slow response time by targeting network-based logistics, communications, and commercial activities. Third, they can serve as a force multiplier when coupled with kinetic attacks during times of crisis or conflict.
>
> Developing cyber capabilities for warfare is consistent with authoritative PLA military writings. Two military doctrinal writings, *Science of Strategy,* and *Science of Campaigns* identify information warfare (IW) as integral to achieving information superiority and an effective means for countering a stronger foe. Although neither document identifies the specific criteria for employing computer network attack against an adversary, both advocate developing capabilities to compete in this medium.

> The *Science of Strategy* and *Science of Campaigns* detail the effectiveness of IW and CNO in conflicts and advocate targeting adversary C2 and logistics networks to affect their ability to operate during the early stages of conflict. As *Science of Strategy* explains, "In the information war, the command and control system is the heart of information collection, control, and application on the battlefield. It is also the nerve center of the entire battlefield."
>
> In parallel with its military preparations, China has increased diplomatic engagement and advocacy in multilateral and international forums where cyber issues are discussed and debated. Beijing's agenda is frequently in line with Russia's efforts to promote more international control over cyber activities. China and Russia continue to promote an Information Security Code of Conduct that would have governments exercise sovereign authority over the flow of information and control of content in cyberspace. Both governments also continue to play a disruptive role in multilateral efforts to establish transparency and confidence-building measures in international fora such as the Organization for Security and Cooperation in Europe (OSCE), ASEAN Regional Forum, and the UN Group of Governmental Experts. Although China has not yet agreed with the U.S. position that existing mechanisms, such as international humanitarian law, apply in cyberspace, Beijing's thinking continues to evolve.

US Government officials have noted that cyber issues will be a key aspect of the US-PRC relationship.[117] The DoD summarized the role of cyberspace and cyberwarfare in its new strategy as follows in its FY2014 defense budget overview:[118]

> In recognition of cyberspace as an operational domain and the emerging mission to Defend the Nation against cyber threats as directed by the President, this year's budget provides funds to increase defensive capabilities and develop the cyber Joint Force under a new force planning model.
>
> The unique attributes of cyberspace operations require trained and ready cyberspace forces to detect, deter, and, if directed, respond to threats in cyberspace. Securing and defending cyberspace requires close collaboration among Federal, state and local governments, private sector partners, and allies and partners abroad. This year's budget establishes dedicated cyber teams to execute this mission on Defense Department networks and in support of Combatant Command and national missions.
>
> This budget reflects an emphasis on enhancing our workforce to successfully execute defensive and offensive missions in cyberspace. The Department is implementing a new cyber force planning model that will realign military, civilian and contractor manpower positions (with associated support costs) under U.S. Cyber Command (USCYBERCOM) in a three-year phased build-up beginning in FY 2014.
>
> This provides manpower, training and support costs for regional cyber mission teams to be located in Maryland, Texas, Georgia, and Hawaii as well as other Combatant Command and military service locations. In addition, manpower at the National Security Agency continues to be funded to provide both cyber security and intelligence support to the USCYBERCOM teams. This overall force construct will provide capacity for the "Defend the Nation" mission, the cyber combat mission (in support of Combatant Command needs), and the cyberspace protection mission which defends Defense Department networks.
>
> - Other cyberspace operations highlights in the FY 2014 President's Budget are:
> - Continues to support the construction of the Joint Operations Center for USCYBERCOM at Fort Meade, Maryland. Planned construction begins in FY 2014 with occupancy scheduled in FY 2017.
> - Provides funding to develop tools to automate vulnerability detection on classified networks.
> - Provides funding for commercial software for data monitoring of defense networks that will identify and isolate suspect files for analysis.
> - Continues to robustly support cyberspace operations Science and Technology programs.
> - Continues to support defensive cyberspace operations providing information assurance and cyber security to the Defense networks at all levels.
> - Provide funding to enhance cyberspace range capabilities by increasing capacity, improving pre- and post- exercise analysis, and mainstreaming and sustaining capabilities of the National Cyber

> Range developed by the Defense Advanced Research Projects Agency under the oversight of the Department's Test Resource Management Center.

These US actions built on previous US efforts that an IISS analysis summarizes as follows:[119]

> Each arm of the US military is developing cyber capacity. US Army Cyber Command (ARCYBER) is mandated to 'plan, coordinate, integrate, synchronize, direct, and conduct network operations and defense of all Army networks'. The 24th Air Force manages cyber for the air force, which, in October 2010, issued a doctrine entitled 'Cyberspace Operations'. Fleet Cyber Command (the US 10th Fleet) delivers 'integrated cyber, information operations cryptologic and space capabilities' for the navy. Marine Force Cyber Command was established in 2009. These service groups are commanded by US Cyber Command (itself under US Strategic Command, and co-located with the NSA).
>
> DoD's November 2011 'Cyberspace Policy Report' report said that 'the Department has the capability to conduct offensive operations in cyberspace to defend our Nation, Allies and interests. If directed by the President, DoD will conduct offensive cyber operations in a manner consistent with the policy principles and legal regimes that the Department follows for kinetic capabilities, including the law of armed conflict.' According to the Cyber Command chief, in March 2012 the command element had 937 staff (with an FY2013 budget request of US$182m), while service cyber staff totalled over 12,000. For Cyber Command, the government's January 2012 Defense Strategic Guidance 'means we must pay attention to the ways in which nations and non-state actors are developing asymmetric capabilities to conduct cyber espionage – and potentially cyber attacks as well – against the United States'.

Presidential Policy Directive 20 was signed by President Barack Obama in October 2012 to give US federal agencies clear standards when facing cyberspace threats. Although the Directive's exact terms are unknown, it likely included a distinction between offensive cyber work and network defense.[120]

In early 2013, the computer security firm Mandiant released a report detailing the activities of Chinese hackers in stealing business information from companies around the world. One finding that did not receive much attention was that state-sponsored Chinese hackers had penetrated US energy and other critical infrastructure; one US official had said in 2010 that network inspections had "found software tools left behind that could be used to destroy infrastructure components" following hacks from China and Russia. Chinese state-sponsored hackers attacked one company with remote access to over 60% of gas and oil pipelines in North America.[121]

Mandiant documented systematic data theft from at least 141 organizations over seven years, tracing the attacks back to a Chinese military unit within the 2nd Bureau of the PLA's General Staff Department's 3rd Department – code named Unit 61398. This unit is just one of dozens working for the Chinese military in cyber-espionage all over the country – there are other units within the General Staff's 2nd Department and the Ministry of State Security. Unit 61398, employing hundreds or even thousands of employees, is one of the most prolific.[122]

Most of the targets were US companies, though approximately a dozen were smaller US local, state, and federal government agencies, as well as international governmental agencies. The hackers generally stayed in a companies' computer systems for about a year, and in many cases, terabyte-size amounts of intellectual property were stolen – including pricing documents, negotiation strategies, manufacturing processes, clinical trial results, technology blueprints, and other proprietary information. Mandiant named 115 victims in the US, along with several each in Britain, Canada, Israel, India, Taiwan, Singapore, Switzerland, Norway, Belgium, France, Japan, South Africa, Luxembourg, and the UAE. The top sectors targeted were aerospace, satellites and telecommunications, public administration, information technology, and scientific research and

consulting. Mandiant also stated that it had uncovered "only a small fraction of the cyber-espionage that 'Unit 61398" has committed."[123]

The Mandiant report came out at the same time as a classified US National Intelligence estimate, which concluded that China was the most aggressive perpetrator of a huge cyber-espionage campaign against US commercial targets.[124] In April 2013, China and the US held high-level military talks in which a senior Chinese general, Fang Fenghui, pledged to work with the US on cybersecurity. The general said he would be willing to set up a "mechanism" for such cooperation, though progress could be slow; however, the consequences of a major attack "may be as serious as a nuclear bomb."[125]

Integrated Firepower Operations

PLA doctrine states that integrated firepower comes from artillery, air forces, and missile strikes, and is supported by IW operations. As technology has improved, the PLA has identified four characteristics of modern firepower:[126]

- It is capable of attacking the enemy simultaneously at all depths on the battlefield.
- It can be used at any phase of the campaign.
- It can be highly effective (i.e. accurate) allowing for fewer platforms (aircraft, ships, artillery tubes, etc.) to deliver fewer munitions to achieve results faster and with fewer civilian casualties than in previous wars.
- It can be delivered in a joint manner by a diverse set of weapon systems from all the services appropriate to the type of target.

The PLA believes that modern weapons are more accurate than previous "dumb" weapons and that, as a result, fewer munitions are needed. Nevertheless, the PLA expects to expend large quantities of precision-guided munitions in the event of conflict.[127]

Mobility

PLA doctrine envisions campaign mobility as its basic method of defeating forces that may be technologically superior to its own. Through the use of agile maneuvering and clever operational deception, the PLA hopes to achieve local superiorities of force and defeat an otherwise stronger adversary. In addition, astute maneuvering enables the PLA to disrupt an adversary while avoiding an enemy's strengths.

The PLA expects that both sides in a military confrontation will seek to increase the range and ease of their own movements while impeding the ability of the enemy to do the same.[128] Advantages at the campaign level will be seized by the side that manages to secure relative freedom of movement. As the *Science of Campaigns* states,[129]

> In a modern campaign, the confrontation between maneuver and counter-maneuver will be extraordinarily intense. On the one hand, because maneuver is growing in significance for seizing campaign victory, counter-maneuver operations on the battlefield will receive a high level of attention. Counter-maneuver operations can delay the speed of an opponent's advance, disrupt their operational plans, kill their effective strengths, and weaken the sharp momentum of their attack.
>
> Highly effective counter-maneuver operations can even directly alter the force strength ratio between ours and their sides, and gain battlefield initiative. Thus, counter-maneuver operations are critical for winning a victory in a modern campaign. On the other hand, campaign maneuver under modern conditions will be implemented on a battlefield of unprecedented "transparency," and concealing the intention and activities of maneuver will be very difficult.

> At the same time, the means of modern operations and strikes will increase and firepower system assault will have high precision, long range, and large lethality. This will result in maneuver to encounter at any time an opponent's strikes and damage from the battlefield spaces such as air, ground, water surface (underwater) and various operational means.
>
> Hence, in a modern campaign, as both sides engaging in battle strive for and maintain battlefield initiative, not only must they implement initiative and flexible campaign maneuver, they must also adopt active and effective measures to oppose the counter- maneuver activities of the enemy. Maneuver and counter-maneuver have already become an important content of modern campaign confrontation and the struggle between maneuver and counter-maneuver will very intense.

One of the key means the PLA identifies for achieving campaign mobility is vertical envelopment, either by parachute, helicopter, or aircraft.[130] Vertical envelopment has been practiced in PLA exercises, such as in Peace Mission 2012, a Shanghai Cooperation Organization (SCO) military exercise that took place in June 2012.[131] This development is significant because, while the PLA has an entire airborne corps, it lacks significant air-mobile units. As a result, this doctrinal focus on vertical envelopment may precede the introduction of large-scale air-mobile formations by the PLA ground forces.

Comprehensive Support

Comprehensive support includes operational, logistics, and armament support. Several principles are central to comprehensive support.[132]

- First, the PLA intends to take advantage of People's War and utilize the potential of the civilian population's support capabilities.
- Second, support forces should be under a unified command and should give primacy to the primary combat mission.
- Third, support forces comprise organic forces, reinforcing forces (from higher echelons), and mobilized civilian forces.
- Lastly, defense of support elements is vital to the campaign as they will be targeted by adversary forces.

Utilizing these principles, the PLA has developed a single support system based on the Military Regions (MRs). Joint Logistics Sub-Departments (JLSDs) in each MR deploy during times of war to war zones and set up ad-hoc "logistics support brigades" using military and civilian personnel and material resources. As part of this system, support services will be pushed as far forward as possible and will be given "on the spot" as much as possible.[133]

Service Strategy

The PLAN, PLAAF, and SAF each have their own doctrinal concept of how they plan to achieve their objectives within the context of the PLA's shift to the Local Wars doctrine. The development of modern warfare since the 1980s has convinced the PLA that the PLAN, PLAAF, and SAF are capable of achieving strategic objectives independently and that their strength will be a key indicator of overall PLA combat power. Consequently, the PLAN, PLAAF, and SAF have developed independent doctrines outlining how each service and branch will modernize, develop its forces, and fight. As the *Science of Military Strategy* states,[134]

> Beneath the military strategy is China's service strategy. It comes up following the development of Chinese army from a single service to the armed forces of modern combined services and arms to meet requirements of modern war. China's navy and air force shoulder the important missions [of safeguarding] the security of China's territorial waters and territorial air [space] and protect China's maritime rights and

> interests. In modern war especially high-tech local war, the strategic status and effects of [the] navy and air force are improving day by day [the capabilities ….].
>
> [The] opportunity for [the] navy and air force to independently accomplish strategic tasks is increasing, and there are objective requirements at [the] strategic level to plan sea and air operations and [the] construction of [a] navy and air force. Accordingly under [the] unified guidance of China's military strategy of active defense, China's navy and air force need to establish the naval strategy of offshore defense and the air force strategy of offensive air defense. As one of the five nuclear power universally acknowledged, the nuclear force is [part of] China's important strategic means.
>
> The nuclear weapons of mass destruction will directly serve not only the purpose of securing the objectives of military strategy but also that of national strategy. This [allows] China's nuclear strategy of effective deterrence [to] have independent status in China's strategic structure, and concurrently have the characteristics of China's national strategy, military strategy, and service strategy, a triad of special strategic pattern.

Accordingly, the PLAN operates under a doctrine of "Near Seas" or "Offshore Defense" in which the PLAN prepares for combat beyond the coasts of China out towards the first island chain.[135] The PLAAF operates under a doctrine of "Integrated Air and Space Operations, Being Prepared for Simultaneous Offensive and Defensive Operations" that calls for the PLAAF to be capable not only of defending China from long-range attacks, but also of long-range strikes and power projection operations.[136]

The SAF operates under the doctrine of "Dual Deterrence, Dual Operations," which demands that the SAF be capable of long-range conventional strike missions *and* nuclear counter-attack missions, both under conditions of nuclear deterrence.[137] A more detailed discussion of these service strategies is presented in later chapters in the context of each service and branch's individual modernization and force development trends.

The Nine-Dash Line

These developments are affected as much by regional issues as any competition with the US. The nine-dash line, originally an eleven-dotted line, was officially drawn on the Chinese map in 1947 by the Chinese Nationalist Government. When the Chinese Communist Party formed the Republic of China in 1949, the line was adopted and Zhou Enlai endorsed a revised nine-dash line. The line, called by China a "traditional maritime boundary line," encloses many key features of the South China Sea – the Paracel Islands, the Pratas Islands, the Spratly Islands, and the Macclesfield Bank. Some areas in the South China Sea currently claimed by China also show up in 2,000-year-old records. From 1947 to the 1970s, no country, including those in Southeast Asia, protested or challenged the validity of the nine-dash line.[138]

In 1992, Taiwan gave the status of historic water to the maritime areas within the nine-dash line, and most Chinese scholars today support the nine-dash line by arguing for historic rights within this line, sovereignty over all features within the line, and sovereign right and jurisdiction as defined by the UN Convention on the Law of the Sea. According to China foreign policy expert Sun Yun, the ambiguity about the exact details of China's claims allow it to satisfy domestic public opinion and safeguard the government's legitimacy.[139]

China also uses paramilitary forces – in particular, the Coast Guard – to patrol the waters within the nine-dash line. The PLAN uses maritime tensions to justify modernization, while growing numbers of paramilitary and law enforcement vessels are playing an increased role in disputed territories and have been involved in many of the recent incidents. As the International Crisis Group noted in 2010,[140]

> …the extensive use of paramilitary and law enforcement forces in sovereignty disputes also lowers the threshold of entry into confrontation. Naval vessels are likely to behave with more restraint than domestic actors with a limited understanding of foreign policy implications, while paramilitary agencies often tend to take more assertive actions precisely due to the lesser political ramifications of incidents in which they are involved. Moreover, civilian vessels, such as fishing boats, are more willing to retaliate against paramilitary than military vessels, thus increasing the risk of violence. On the other hand, a study conducted by Chinese scholars at the Ningbo Coast Guard Academy proposed that creating an enlarged, unified maritime security apparatus would strengthen flexibility in maritime conflicts. They concluded that relying on the navy to resolve disputes runs the risk of dangerous escalation, while the current model of fragmented law enforcement agencies lacks coherence and thus can lead to unpredictable risks of conflict.
>
> Furthermore, when China sends law enforcement vessels to patrol all of the waters within the nine-dashed line, sometimes even entering into the economic zones of Vietnam and the Philippines, it appears to be exerting authority over areas claimed by other countries and to which it may not have a claim under UNCLOS. At the 2012 National People's Congress session, Liu Cigui, director of the State Oceanic Administration, indicated that China was serious about carrying out law enforcement activities in the South China Sea. He said that regular patrol activities would cover all the maritime zones under its jurisdiction. This could potentially include the entire nine-dashed line region, thus causing further confusion and anxiety among the other claimants.

Chinese Operations to Deal with the US Second Island Chain

In addition to achieving its security objectives in the first island chain – stretching from the Aleutians to the Philippines and containing Taiwan and Okinawa – China also wants control over the second island chain. This is a series of island groups running from the Japanese archipelago to the Bonin and Marshall islands. The US' control of La Perouse Strait, Tsugaru Strait, and Tsushima Strait allows the US military the capacity to react quickly to a North Korean provocation as well as defend the key naval and air base of Guam. **Figure 3.1** depicts these island chains on a map.

In 1982, Chinese Admiral Liu Huaqing, the mastermind of China's modern naval strategy and the former PLAN commander, said it would be necessary for China to control the first island chain by 2010 and the second island chain by 2020. Further, the PLAN should be ready to challenge US dominance over the Indian Ocean and Western Pacific in 2040.[141] As one US military analyst noted in 2011,[142]

> China's active defense strategy has a maritime component that aligns with the PRC's 1982 naval maritime plan outlined by then-Vice Chairman of the Military Commission, Liu Huaqing. This naval strategy delineated three stages. In the first stage, from 2000 to 2010, China was to establish control of waters within the first island chain that links Okinawa Prefecture, Taiwan and the Philippines. In the second stage, from 2010 to 2020, China would seek to establish control of waters within the second island chain that links the Ogasawara island chain, Guam and Indonesia. The final stage, from 2020 until 2040, China would put an end to U.S. military dominance in the Pacific and Indian Oceans, using aircraft carriers as a key component of their military force. Recent Chinese military developments, rhetoric, and actions reflect implementation of this maritime strategy, on pace with the projections to seek control of the first island chain.

In order to achieve these goals, China is increasing its territorial sovereignty claims over islands in the Pacific that are also claimed by its neighboring countries. Examples include the Senkaku/Diaoyou Islands and the Philippines' Scarborough Shoal. China has also built facilities on Mischief Reef, which is internationally recognized as part of the Philippines. These are actions many feel violate international law; however, the Philippines lacks the naval and air force capabilities to effectively confront China and negotiations have gone nowhere.[143]

The 2013 Japanese defense white paper addresses these Chinese sovereignty disputes in some depth:[144]

> China is strongly expected to recognize its responsibility as a major power, accept and stick to the international norms, and play a more active and cooperative role in regional and global issues. On the other hand, there have been disputes with other countries on issues relating to trade imbalances, currency rates, and human rights. In regard to the issues on conflicting interests with its surrounding countries, including Japan, China has attempted to change the status quo by force based on its own assertion which is incompatible with the existing order of international law. The attempts have been criticized as assertive and include risky behaviors that could cause contingencies. Thus, there is a concern over its future direction.
>
> …. In recent years, China is believed to be aiming to build up capabilities to conduct operations in more distant sea areas and airspace. Accordingly, China has been rapidly expanding its maritime activities both qualitatively and quantitatively. With regard to its activity in the sea/air area surrounding Japan, Chinese naval vessels and naval/air-force airplanes have been observed conducting what appeared to be training exercises or information gathering activities. A large number of Chinese government ships and aircraft belonging to maritime law-enforcement agencies have also been observed, which were engaged in monitoring activities for the protection of its maritime rights and interests. Some of these activities of China involve its intrusion into Japan's territorial waters, its violation of Japan's airspace and even dangerous actions that could cause a contingency situation, which are extremely regrettable. China should accept and stick to the international norms.
>
> Regarding the move of naval forces, the number of Chinese naval surface vessels advancing to the Pacific Ocean has increased in recent years and such advancements are being routinely conducted today. Their route between the East China Sea and the Pacific Ocean is becoming diverse; in addition to the sea between the main island of Okinawa and Miyako Island, which they have passed every year since 2008, they passed the Osumi Strait eastward in April 2012 for the first time and also navigated the sea area between Yonakuni Island and Nakanokami Island near Iriomote Island northward for the first time in October of the same year. It seems that they are trying to improve their deployment capabilities in the open ocean. In January 2013, a Chinese naval vessel directed fire-control radar at a JMSDF destroyer and is suspected to have directed fire-control radar at a helicopter based on the JMSDF destroyer.
>
> Regarding the move of air forces, in recent years, activities by Chinese naval/air-force planes, which appear to be some form of information gathering against Japan, have been observed frequently. The number of scrambles by the Japan Air Self Defense Force against Chinese aircraft is also rapidly increasing. Furthermore, in September 2007, multiple H-6 medium-range bombers flew into the Japanese air defense identification zone over the East China Sea and advanced near the Japan–China median line. Similarly, in March 2010, a Y-8 early warning aircraft advanced near the Japan–China median line. In March 2011, a Y-8 patrol aircraft and Y-8 intelligence gathering aircraft crossed the Japan-China median line and approached within approximately 50 km of Japan's airspace near the Senkaku Islands. These incidents indicate that Chinese aircraft are diversifying their flight patterns.
>
> In 2012, Chinese military aircraft, including its fighters, intensified its activities. In January 2013, the Chinese Ministry of National Defense made public the fact that Chinese military aircraft regularly conducted warning and surveillance activities and that Chinese fighters conducted activities believed to be Combat Air Patrols (CAP) in the East China Sea. "The Diversified Employment of China's Armed Forces" mentioned "air vigilance and patrols at sea" for the first time as a Chinese defense white paper. In 2013, Chinese military aircraft, including its fighters, has intensified its activities further. In March and April 2011 and in April 2012, there have been instances of Chinese helicopters that appeared to belong to the State Oceanic Administration (SOA) of the Ministry of Land and Resources flying close to Japanese destroyers which were engaged in vigilance monitoring in the East China Sea.
>
> Within Japan's territorial waters near the Senkaku Islands, in December 2008, Haijian ships which belong to the SOA of China conducted navigation operations which foreign ships are not permitted to conduct under international laws such as hovering and cruising. Then, in September 2010, a Chinese fishing trawler collided with patrol vessels of the Japan Coast Guard off the coast of the Senkaku Islands.
>
> After the incidence, "Haijian" ships and "Yuzheng" ships belonging to then the Bureau of Fisheries at the Ministry of Agriculture of China entered the same territorial waters in August 2011, March and July 2012.

> This way, "Haijian" and "Yuzheng" ships have gradually increased activities in the territorial waters in recent years. Since the Japanese government acquired ownership of the three islands (Uotsuri, Kitakojima and Minamikojima) of the Senkaku islands from a private Japanese citizen in September 2012, they have been frequently intruding into the territorial waters around the Senkaku Islands. On April 23, 2013, eight Haijian ships intruded into the same territorial waters. Meanwhile, in September 2012, upon making China's own assertion about the Senkaku Islands, a spokesman of the Ministry of National Defense of China made a statement that the patrol carried out by a Chinese naval vessel in sea areas under China's jurisdiction was totally just and legal.
>
> Regarding Japan's airspace over and around the Senkaku Islands, in December 2012, a fixed-wing aircraft belonging to the SOA violated the territorial airspace first as a Chinese aircraft. Since then, fixed-wing aircrafts belonging to the SOA have been frequently observed flying near the airspace.
>
> In October 2012, vessels of the East Sea Fleet of the Chinese Navy conducted a joint exercise with "Haijian" and "Yuzheng" ships with focus on preservation/protection of territorial sovereignty and maritime interests. Furthermore, the navy is believed to be handing over retired navy vessels to the SOA and other agencies. It is believed that the Navy is supporting maritime law-enforcement agencies both in operation and equipment.
>
> …. In other areas than waters near Japan as well, China is intensifying its activities in the South China Sea, including the Spratly Islands and Parcel Islands, over which it is engaged in territorial disputes with neighbors, including some ASEAN (Association of Southeast Asian Nations) countries. In March 2009, Chinese ships, including a naval vessel, a maritime research ship of the SOA, a Bureau of Maritime Fisheries patrol ship, and trawlers, approached a U.S. Navy acoustic research ship operating in the South China Sea to obstruct its operations. It is also reported that Chinese naval vessels fired warning shots at fishing boats of neighboring countries. Furthermore, in recent years, there has been growing friction between China and its neighboring countries over the South China Sea, as illustrated by protests by Vietnam and the Philippines against China's activities in these waters.

A Chinese Defense Ministry spokesman stated in response to the Japanese white paper's claims of repeated Chinese intrusion into Japanese territorial waters and airspace and Chinese use of aggressive tactics to expand its maritime power, that the Chinese military was "strongly discontented and resolutely against" the Japanese accusations. Further, the Chinese Defense Ministry said that Japan was undermining regional stability with its claims to the disputed Diaoyu/Senkaku Islands – an unusually strong rebuttal for the PRC, which rarely mentions other countries by name.[145]

The potential for conflict in the South China Sea is significant. As Bonnie S. Glaser of CSIS noted in 2012,[146]

> The risk of conflict in the South China Sea is significant. China, Taiwan, Vietnam, Malaysia, Brunei, and the Philippines have competing territorial and jurisdictional claims, particularly over rights to exploit the region's possibly extensive reserves of oil and gas. Freedom of navigation in the region is also a contentious issue, especially between the United States and China over the right of U.S. military vessels to operate in China's two-hundred-mile exclusive economic zone (EEZ). These tensions are shaping—and being shaped by—rising apprehensions about the growth of China's military power and its regional intentions. China has embarked on a substantial modernization of its maritime paramilitary forces as well as naval capabilities to enforce its sovereignty and jurisdiction claims by force if necessary. At the same time, it is developing capabilities that would put U.S. forces in the region at risk in a conflict, thus potentially denying access to the U.S. Navy in the western Pacific.

Furthermore, as one CSIS briefing pointed out, it appears that China has recently been increasing its sovereignty claims over territory and waters within and beyond the nine-dash lines:[147]

> China's policy of strategic ambiguity, as it has been euphemistically called, serves its purposes well. It allows China the flexibility to interpret its position to serve the audience at hand. This is why the Ministry of Foreign Affairs was able to issue its well-publicized statement in February 2012 stating that no nation

> claims sovereignty over the entire South China Sea and that the dispute is only about the "islands and adjacent waters." This raised hopes in the United States and among the other Asian claimants that China was backing away from the 9-dash lines claim and moving to bring its claims in line with international law.
>
> That, however, has clearly not been the case. This year's tensions in the sea started with a two-month standoff between Chinese and Philippine ships at Scarborough Shoal. That confrontation, despite pronouncements to the contrary from Beijing, served as an example of a creeping evolution in Beijing's claims. For years the Chinese territorial claims in the South China Sea extended only to the Spratlys (Nansha, or "South Banks") and Paracels (Xisha, or "West Banks"). Any claim to other features, like Scarborough Shoal, was only implied in so far as they fell within the ambiguous 9-dash lines. Then China extended its claim to the entirely submerged Macclesfield Bank via the imaginary Zhongsha, or "Middle Banks," despite there being no way under international law to claim title over a submerged feature as if it were an island. Further, in recent years, as Beijing has tried to move beyond an overreliance on the indefensible 9-dash lines, Scarborough Shoal has been incorporated as part of Zhongsha. The fact that it lies hundreds of miles from Macclesfield Bank or that it appears on none of the historical documents China puts forth to prove its title to the Spratlys and Paracels seemingly does not matter.
>
> Beijing showed similar disregard for the policy put forth in its February Ministry of Foreign Affairs statement when in early May it reinstated its annual unilateral fishing ban for all of the South China Sea above the 12th parallel. Such a ban would be possible only if China were claiming all the waters within the 9-dash lines, not only its "islands and adjacent waters." Then in late June, the China National Offshore Oil Corporation (CNOOC) fired a shot across Vietnam's bow by announcing the company would open nine oil and gas blocks in the South China Sea to foreign bids. The catch was that all nine blocks lie within the 200-nautical-mile exclusive economic zone (EEZ) of Vietnam, and many in fact overlap with existing blocks already leased by Vietnam, including those committed to Exxon-Mobil. More importantly, CNOOC's blocks are not defensible under a claim to the "islands and adjacent waters" of the South China Sea because there is no island within 200 nautical miles (the maximum allowable EEZ) of all the blocks.

These tensions have reinforced China's generally negative view of the US 'pivot' to Asia. For example, one Chinese newspaper called for the US "to rein in its unruly allies in the region including Japan and the Philippines," in direct reference to the recent island disputes. Further, because the US has a "responsibility for sowing the seeds of conflict," it "shoulders certain responsibilities for the chronic disputes."[148]

A report by Ronald O'Rourke of the Congressional Research Service also addressed some of these issues in a July 2013 report:[149]

> China's view that it has the legal right to regulate foreign military activities in its EEZ appears to be at the heart of multiple incidents between Chinese and U.S. ships and aircraft in international waters and airspace, including incidents in March 2001, September 2002, March 2009, and May 2009 in which Chinese ships and aircraft confronted and harassed the U.S. naval ships *Bowditch*, *Impeccable*, and *Victorious* as they were conducting survey and ocean surveillance operations in China's EEZ, and an incident on April 1, 2001, in which a Chinese fighter collided with a U.S. Navy EP-3 electronic surveillance aircraft flying in international airspace about 65 miles southeast of China's Hainan Island in the South China Sea, forcing the EP-3 to make an emergency landing on Hainan island.
>
> The issue of whether China has the right under UNCLOS to regulate foreign military activities in its EEZ is related to, but ultimately separate from, the issue of maritime territorial disputes in the SCS and ECS. The two issues are related because China can claim EEZs from inhabitable islands over which it has sovereignty, so accepting China's claims to islands in the SCS or ECS could permit China to expand the EEZ zone within which China claims a right to regulate foreign military activities.
>
> The EEZ issue is ultimately separate from the territorial disputes issue because even if all the territorial disputes in the SCS and ECS were resolved, and none of China's claims in the SCS and ECS were accepted, China could continue to apply its concept of its EEZ rights to the EEZ that it unequivocally derives from its mainland coast—and it is in this unequivocal Chinese EEZ that most of the past U.S.-Chinese incidents at sea have occurred.

If China's position on whether coastal states have a right under UNCLOS to regulate the activities of foreign military forces in their EEZs were to gain greater international acceptance under international law, it could substantially affect U.S. naval operations not only in the SCS and ECS, but around the world, which in turn could substantially affect the ability of the United States to use its military forces to defend U.S. interests overseas. Significant portions of the world's oceans are claimable as EEZs, including high-priority U.S. Navy operating areas in the Western Pacific, the Persian Gulf, and the Mediterranean Sea. The legal right of U.S. naval forces to operate freely in EEZ waters is important to their ability to perform many of their missions around the world, because many of those missions are aimed at influencing events ashore, and having to conduct operations from more than 200 miles offshore would reduce the inland reach and responsiveness of ship-based sensors, aircraft, and missiles, and make it more difficult to transport Marines and their equipment from ship to shore. Restrictions on the ability of U.S. naval forces to operate in EEZ waters could potentially require a change in U.S. military strategy or U.S. foreign policy goals.

Figure 3.1: DoD Representation of the First and Second Island Chains

Source: DoD*, Military and Security Developments Involving the People's Republic of China 2012*, p. 40. http://www.defense.gov/pubs/pdfs/2012_CMPR_Final.pdf.

The US View

Outside experts have many different views of Chinese strategy and doctrine – and the extent to which China's real strategy and doctrine may differ from its declared strategy and doctrine. It is also true of all countries that they make the best public case they can, and do so largely in

diplomatic terms. Once again, however, it is useful to examine the most recent US official commentary on China's strategy and doctrine:[150]

> China's leaders characterize the first two decades of the 21st century as a "strategic window of opportunity." They assess that during this period, both domestic and international conditions will be conducive to expanding China's "comprehensive national power," a term that encapsulates all elements of state power, including economic capacity, military might, and diplomacy. China's leaders anticipate that a successful expansion of comprehensive national power will serve China's strategic objectives, which include: perpetuating Chinese Communist Party (CCP) rule, sustaining economic growth and development, maintaining domestic political stability, defending national sovereignty and territorial integrity, and securing China's status as a great power.
>
> China's leaders routinely emphasize the goal of reaching critical economic and military benchmarks by 2020. These benchmarks include successfully restructuring the economy to maintain growth and increase the quality of living of China's citizens to promote stability; making major progress in military modernization; and attaining the capability to fight and win potential regional conflicts, including those related to Taiwan, protection of sea lines of communication (SLOCs), defense of territorial claims in the South China Sea and East China Sea, and the defense of western borders. Statements by Chinese leaders indicate that, in their view, the development of a modern military is necessary for China to achieve greater power status. These statements also indicate that the Chinese leadership views a modern military as a critical deterrent to prevent actions by outside powers that could damage Chinese interests, or to allow China to defend itself against such actions should deterrence fail.
>
> Since China launched its "reform and opening" in late 1978, the essential elements of China's strategy to accomplish these goals have remained relatively constant. Rather than challenge the existing global order, China has adopted a pragmatic approach to international relations and economic development that seeks to strengthen the economy, modernize the military, and solidify the CCP's hold on power. China balances the imperative to reassure countries that its rise is "peaceful" with the imperative to strengthen its control over existing sovereignty and territorial claims.
>
> China regards stable relations with its neighbors and the United States as essential to its stability and development. China continues to see the United States as the dominant regional and global actor with the greatest potential to both support and, potentially, disrupt China's rise. In addition, China remains concerned that should regional states come to view China as a threat, they might balance against China through unilateral military modernization or through coalitions, possibly with the United States. Many Chinese officials and the public see the U.S. rebalance to Asia as a reflection of "Cold War thinking" and as a way to contain China's rise.
>
> Despite its desire to project an image of a developing country engaged in a peaceful development strategy, China's efforts to defend national sovereignty and territorial integrity (underpinned by growing economic and military capabilities) have occasionally manifested in assertive rhetoric and behavior that generate regional concerns about its intentions. Prominent examples of this include China's response to Japan's arrest of a PRC fishing trawler captain following a collision with Japanese coast guard vessels in 2010, its use of punitive trade policies as an instrument of coercion, its actions to shield North Korea from the international response to its sinking of the South Korean naval vessel, *Cheonan*, and its action to pressure Vietnam and the Philippines in the South China Sea and Japan in the East China Sea. Official statements and media during these situations indicate that China sees itself as responding to perceived threats to its national interests or provocations by outside actors. China's lack of transparency surrounding its growing military capabilities and strategic decision-making has also increased concerns in the region about China's intentions. Absent a move towards greater transparency, these concerns will likely intensify as the PLA modernization progresses.

FACTORS SHAPING CHINA'S LEADERSHIP PERCEPTIONS

Chinese leaders continue to view themselves as operating in a "window of opportunity" to advance their priorities of economic development, territorial integrity, and domestic stability. Although domestic stability is believed to be China's top priority, official documents indicate that China sees its security environment becoming more "complex" as a result of several factors:

Economics. Continued economic development remains the bedrock of social stability. A wide range of economic factors could disrupt this trajectory, including a failure to shift away from its overreliance on investment and exports to drive growth. China's leaders scaled back GDP targets for 2011-2015 (from 8 percent to 7.5 percent) to mitigate risk of overheating and to manage expectations. Other potential economic risks for China include shifting global trade patterns, domestic resource constraints, rising wages driven by labor shortages, or attempts to challenge China's access to global resources, including energy.

Nationalism. Communist Party leaders and military officials continue to be affected by, and in some cases exploit, nationalism to bolster the legitimacy of the Party, deflect domestic criticism, and justify their own inflexibility in dialogues with foreign interlocutors. However, nationalist forces could ultimately restrict the leadership's decision-making on key policy issues or pressure the CCP if these forces perceive party leaders as insufficiently satisfying nationalist goals.

Regional Challenges to China's Interests. Tensions with Japan in the East China Sea and with South China Sea claimants challenge to China's desire to maintain a stable periphery. Combined with a greater U.S. presence in the region, these factors raise Chinese concerns that regional countries will strengthen their military capabilities or increase security cooperation with the United States to balance China. Domestic Unrest. The CCP continues to face long-term popular demands for limiting corruption and improving government responsiveness, transparency, and accountability. If unmet, these factors likely weaken the legitimacy of the CCP in the eyes of the Chinese people. The Arab Spring and fears of a Jasmine Revolution amplify historical concerns about internal stability.

Environment. China's economic development has come at a high environmental cost. China's leaders are increasingly concerned that environmental degradation could undermine regime legitimacy by threatening economic development, public health, social stability, and China's international image.

Demographics. China faces the dual threat of a rapidly aging population and a declining birth rate, one that now falls below replacement level. Longer life expectancies may force China to allocate more resources to social and health services, while the declining birth rate will continue to reduce China's supply of young and inexpensive labor, a key driver of the country's three decades of economic growth. This dual phenomenon could lead to economic stagnation that could threaten CCP legitimacy….

PLA MILITARY ENGAGEMENT

The PLA's level of engagement with foreign militaries continues to grow significantly. At the operational level, this engagement provides the PLA with opportunities to share doctrines, strategies, tactics, techniques, and procedures with other militaries - both modern and developing. At the strategic level, China uses military engagement as a platform for demonstrating the PLA's growing capabilities, its status as a modern military, and its potential role as a responsible security partner.

Senior-level visits and exchanges provide China with opportunities to increase military officers' international exposure, communicate China's positions to foreign audiences, better understand alternative world views, and advance foreign relations through interpersonal contacts and military assistance programs. Expanded PLA travel abroad enables China's military officers to observe and study foreign military command structures, unit formations, and operational training.

The PLA is participating in a growing number of bilateral and multilateral military exercises. The PLA derives political benefit from these exercises in terms of increased influence and enhanced ties with partner states and organizations. These exercises also contribute to PLA modernization by providing opportunities to improve capabilities in areas such as counterterrorism, mobility operations, and logistics. The PLA gains operational insight by observing tactics, command decision making, and equipment used by more advanced militaries.

This US perspective tracks with information in the 2010 South Korean defense white paper and other regional military studies.[151] It reflects concerns that help explain both the changes in US strategy and a range of concerns that are also shared by many of China's neighbors – although not as publically. At the same time, a careful reading of the US view shows that the US does not see China as a threat in terms of posing potential risks and problems for the future, and that it sees many aspects of China's strategy as a natural result of its national interests. It is also clear

that in virtually every area in which the US does note its concerns, there is room for dialog and compromise that can serve Chinese, US, and local interests.

These are not casual considerations. It is all too clear that one of the worst possible outcomes for China, the US, and Asia would be for the two powers to confront each other and engage in a major arms race focusing on the risk of war, forcing other Asian nations takes sides. One only has to recall the Anglo-German naval arms race before World War I, or the end result of US and Japanese confrontation before World War II to see the risks. It is also clear that even without any conflict, the end result would be far more costly to China and the US than making pragmatic compromises and taking steps to ensure that that the risk of any form of conflict was kept to an absolute minimum.

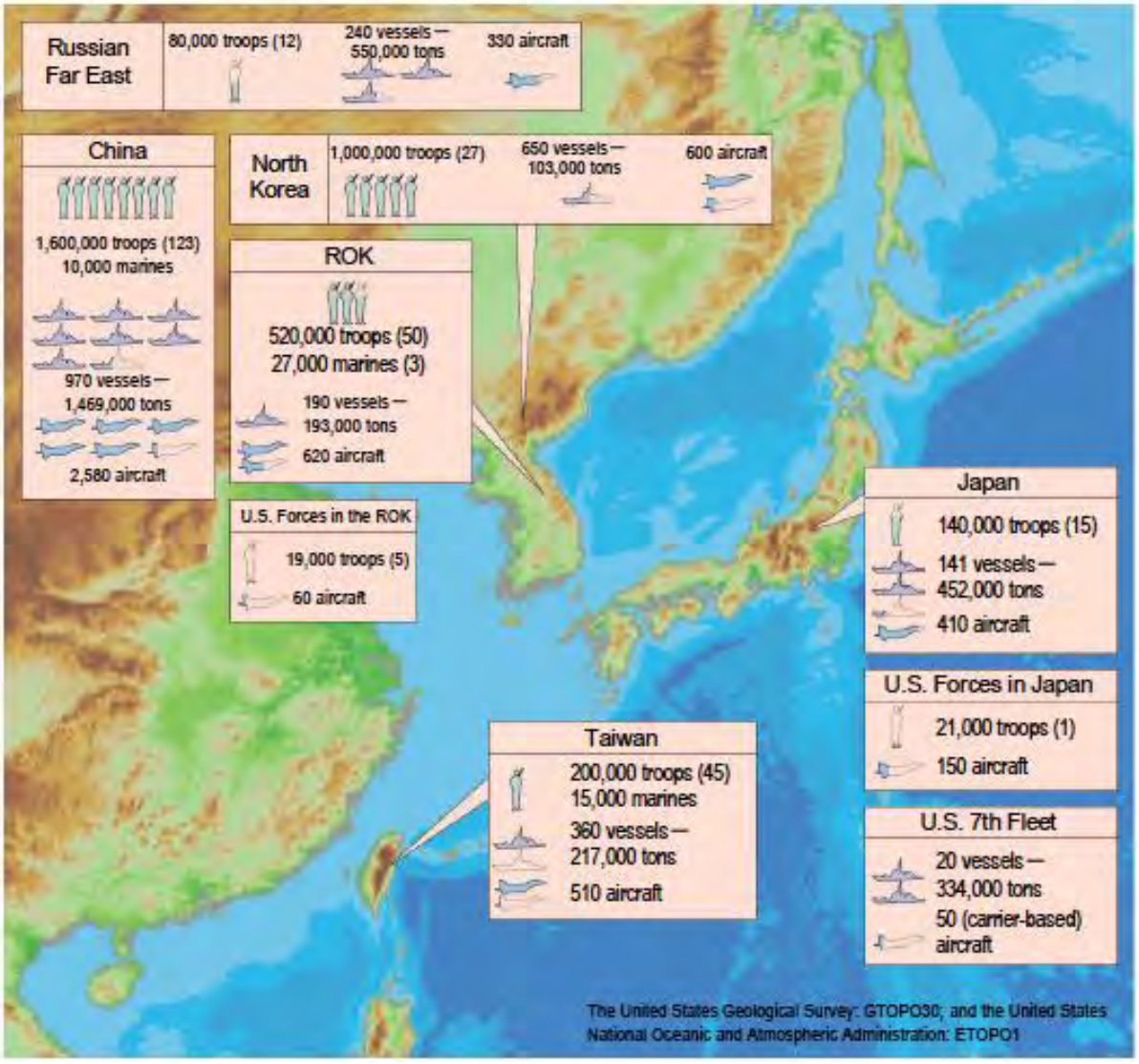
The same DoD report quoted above fully recognized these imperatives:[152]

> During their January 2011 summit, U.S. President Barack Obama and then-PRC President Hu Jintao jointly affirmed that a "healthy, stable, and reliable military-to-military relationship is an essential part of [their] shared vision for a positive, cooperative, and comprehensive U.S.-China relationship." Within that framework, the U.S. Department of Defense seeks to build a military-to-military relationship with China that is sustained and substantive, while encouraging China to cooperate with the United States, our allies and partners, and the greater international community in the delivery of public goods. As the United States builds a stronger foundation for a military-to-military relationship with China, it also will continue to monitor China's evolving military strategy, doctrine, and force development and encourage China to be more transparent about its military modernization program. In concert with its allies and partners, the United States will continue adapting its forces, posture, and operational concepts to maintain a stable and secure Asia-Pacific security environment.

Japanese and South Korean Perspectives on the Balance

The Japanese Ministry of Defense White Paper of 2013 provided a somewhat similar perspective, but also gives a relatively current estimate of how China's forces compare with the size of other forces in the region.[153] This comparison is shown in **Figure 3.2**. A 2010 South Korean estimate is shown in in **Figure 3.3.**

Figure 3.2: Japanese Ministry of Defense Summary of the Military Balance



Notes
1. Source: "The military Balance 2013" published by the U.S. Department of Defense, and others.
2. Figures for Japan, as of the end of 2012, indicate the strength of each SDF; the number of combat aircraft is the sum of ASDF aircraft (excluding transport aircraft) and MSDF aircraft (fixed-wing aircraft only).
3. Figures of U.S. ground forces in Japan and the ROK are those of Army and Marine Corps personnel combined.
4. Combat aircraft include Navy and Marine aircraft.
5. Figures in parentheses show the total number of central units, such as divisions and brigades. Only divisions are included in North Korea. Military police are included in Taiwan.
6. The number of the U.S. 7th Fleet vessels and aircraft indicates those which are forward-deployed in Japan and Guam.

Legend
Ground forces (200,000 troops)
Naval vessels (200,000 tons)
Combat aircraft (500 aircraft)

Source: Ministry of Defense of Japan, *Defense of Japan*, 2013, Chapter 1, Figure 1.

Figure 3.3: South Korean Ministry of Defense Summary of the Military Strength of the Major Northeast Asian Powers

Source: Ministry of Defense of South Korean, *Defense White Paper,* 2010, p. 16, http://www.mnd.go.kr/mndEng_2009/DefensePolicy/Whitepaper/index.jsp.

Chapter 4: Chinese Military Organization and Trends in Total Personnel

As is the case with strategy, the trends in China's forces need to be analyzed in the broader context of its force structure, military organization, and the relevant size and role of the personnel in each key element. Moreover, like all modern powers, China has a broadly structured national security system. Its military forces are supported by a wide range of other organizations, security structures, and paramilitary forces.

PLA Military Organization

China's strategic doctrine describes how China's armed forces will fight in the 21st century, in theory. However, it is necessary to examine the organizational structure of the PLA as well as summarize the effects of institutional modernization in order to provide a more detailed picture of the PLA's ability to fight as its doctrine demands and to understand the changes in each individual service's force structure.

China's High Command Structure

China officially described its overall command structure and military decision-making process in its 2006 defense white paper:[154]

> The state exercises unified leadership over national defense activities. China's armed forces are under the leadership of the Communist Party of China (CPC). The Central Military Commission (CMC) of the CPC and that of the People's Republic of China (PRC) are completely the same in their composition and in their function of exercising leadership over the armed forces. The CMC chairman has overall responsibility for its work.
>
> The National People's Congress (NPC) elects the chairman of the CMC of the PRC and, upon nomination by the chairman, decides on the choice of all other members of the CMC. The NPC decides on war and peace and exercises other functions and powers relating to national defense as prescribed by the Constitution. When the NPC is in recess, its Standing Committee decides on the proclamation of a state of war, decides on the general or partial mobilization of the country, and exercises other functions and powers relating to national defense as prescribed by the Constitution.
>
> The president of the PRC, in pursuance of the decisions of the NPC and its Standing Committee, may proclaim a state of war, issue mobilization orders, and exercise other functions and powers relating to national defense as prescribed by the Constitution.
>
> The State Council directs and administers national defense building in the following areas: making national defense development programs and plans, formulating principles, policies and administrative regulations for defense building, administering defense expenditure and assets, directing and administering national defense scientific research and production, directing and administering work related to mobilization of the national economy, mobilization of people's armed forces, people's air defense and national defense traffic, directing and administering the work of supporting the military and giving preferential treatment to families of servicemen and martyrs, as well as the resettlement of servicemen discharged from active service. It also directs national defense education and, jointly with the CMC, the building of the Chinese People's Armed Police Force (PAPF) and the militia, the work concerning enlistment and reserve service, and the administration of border, coastal and air defenses, and exercises other functions and powers relating to national defense building as prescribed by law.
>
> Under the State Council are the Ministry of National Defense (MND) and other departments concerning national defense building. The CMC directs and exercises unified command of China's armed forces. It has the following functions and powers: deciding on the military strategy and operational guidelines of the

> armed forces, directing and administering the building of the PLA, submitting proposals related to national defense to the NPC or its Standing Committee, formulating military regulations, issuing decisions and orders, deciding on the structure and organization of the PLA, appointing and removing, training, evaluating, and rewarding and punishing members of the armed forces, approving systems and development programs and plans for weaponry and equipment, and exercising other functions and powers as prescribed by law.

As the paper makes clear, the Central Military Commission (CMC) is at the top of China's military chain of command. It plays the decisive role in planning and decision-making for military-security policy and all issues related to the armed forces. Since 1982, the CMC has been the most senior decision-making body for military affairs and armed forces in China. The CMC is directly derived from the Central Committee of the CCP, thereby putting the Chinese armed forces under Party control.

The chairman of the CMC – currently China's president, Xi Jinping – is the commander-in-chief of all Chinese forces. The responsibilities of the CMC encompass operational command over all of China's armed forces and its branches, military doctrine development, logistics, and civil-military relations.

In practice, two CMCs – one for the party, one for the state – exist next to each other, but they are almost identical. The National People's Congress elects the state commission's 11 members; the Central Committee of the CCP elects the party commission.[155] The existence of two parallel CMCs shows that the PLA and the armed forces play a twin role in the Chinese body politic – the CMC, and therefore the PLA, on the one hand is an integral part of the CCP and on the other hand serves as the highest administrative body for the Chinese state's military. Both CMCs have the same membership structure; the most important difference between the two is the existence of the General Office in the party CMC. The General Office facilitates and manages interaction among China's most senior military leaders.

Organization of the PLA

The CMC maintains overall command and control over the armed forces through four general departments (GDs): the General Staff Department, the General Political Department, the General Logistics Department, and the General Armament Department. The GDs are the bureaucratic units that combine military planning and command in lieu of a ministry of defense. Each performs several distinct functions:

- **General Staff Department (GSD):** Responsible for all staff and personnel decisions regarding the entire PLA. Its primary mission is to execute and oversee defense policy vis-à-vis the armed forces and serve as the general command for the PLA. The GSD also holds the General Staff organization for the PLA ground forces. The GSD's second department is responsible for foreign military intelligence. During wartime, the GSD leads the entire PLA under its unified command.
- **General Political Department (GPD):** Oversees the implementation of the political doctrine into the armed forces and ensures political loyalty, high morale, and tight discipline among members of the PLA.
- **General Logistics Department (GLD):** Organizes supply and transport services within the armed forces and provides services like housing and medical treatment to the armed forces.
- **General Armament Department (GAD):** Manages all weapons and equipment testing, procurement, and maintenance. This includes almost exclusive oversight of the production and stockpiles of nuclear weapons.

The 2006 defense white paper described the organization and command structure of these forces as follows:[156]

The PLA's General Staff Headquarters, General Political Department, General Logistics Department and General Armaments Department are departments of the CMC respectively responsible for military, political, logistical and equipment work.

The General Staff Headquarters organizes and directs the development of China's armed forces, and organizes and commands their military operations. Under it are departments in charge of operations, intelligence, communications, military training and arms, adjutant and force structure, mobilization, electronic countermeasures, Army aviation, foreign affairs, etc. Its main functions and powers are to put forward proposals on major issues of military building and operations, organize and exercise strategic command, formulate programs, rules and regulations for military work, and organize and direct war preparations, as well as military training and mobilization.

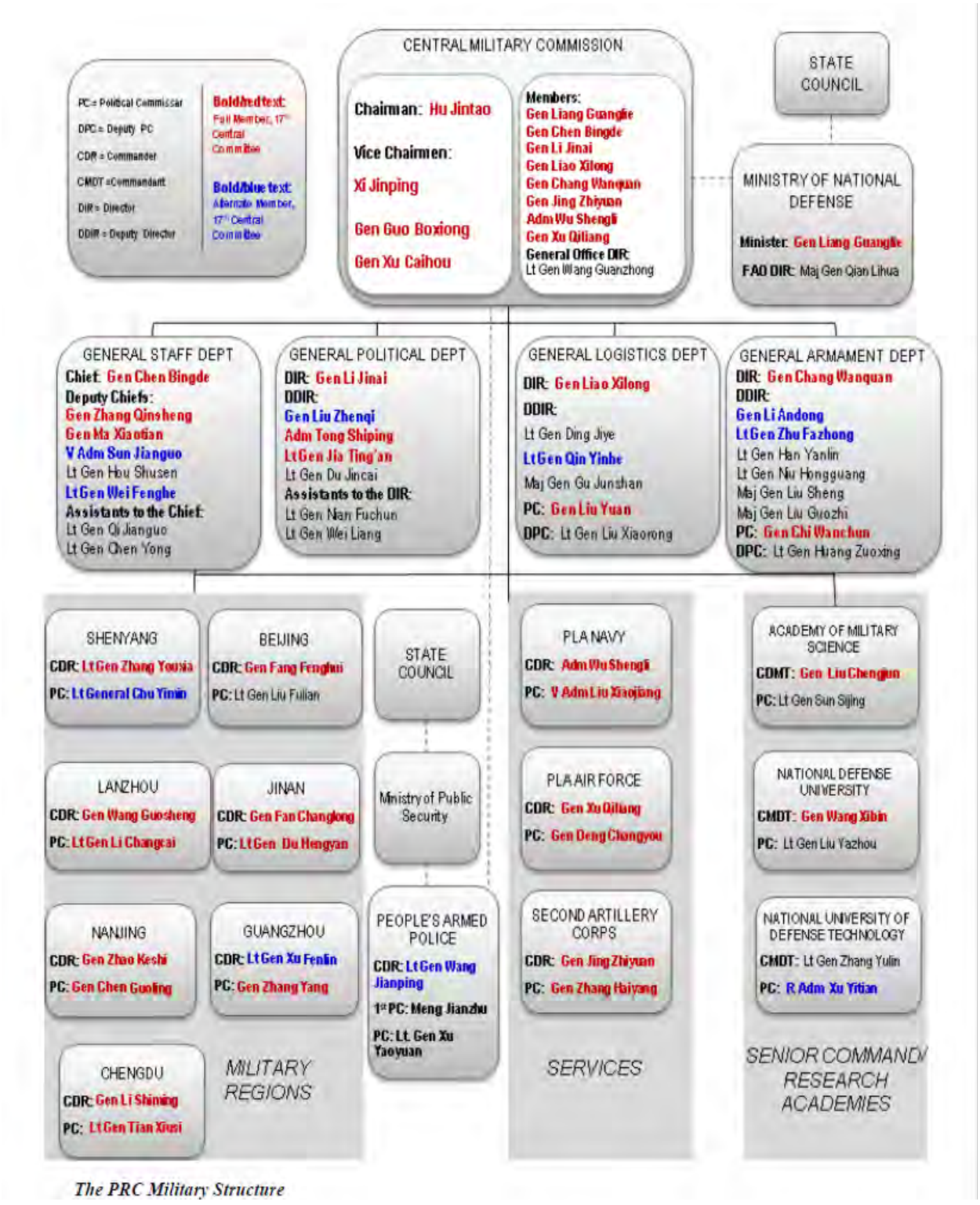
The General Political Department administers the armed forces' Party work, and organizes their political work. Under it are departments in charge of Party affairs, personnel, publicity, security, discipline inspection, civil-military affairs, etc. Its main responsibilities are to ensure the armed forces' compliance with and implementation of the lines, principles and policies of the Party and the Constitution and laws of the state, draw up general and specific policies for political work, formulate rules and regulations for political work, and make arrangements for, supervise and provide guidance to the political work of the armed forces.

The General Logistics Department administers the logistical work of the armed forces. Under it are departments in charge of financial matters, quartermaster materials and petroleum, oils and lubricants, health administration, military transportation, capital construction and barracks, auditing, etc. Its main responsibilities are to formulate programs, rules and regulations for logistical construction, deploy logistical forces, organize logistical mobilization and provide logistical support, carry out the application, allocation, budgeting and final accounting of military expenditure, and conduct material procurement.

The General Armaments Department administers the provision of equipment for the armed forces. Under it are departments in charge of overall planning, equipment for all services and arms, procurement for Army's military equipment R&D, general-purpose equipment support, electronic information infrastructure, etc. Its main responsibilities are to formulate strategies, programs and plans, policies, and rules and regulations for equipment development, organize equipment R&D, experimentation, procurement, combat service, maintenance and support, and administer the PLA's funds for equipment buildup.

Figure 4.1 provides a visual summary of this information.

Figure 4.1: High Command Structure of the PLA (as of 2011)



Source: DoD, *Military and Security Developments Involving the People's Republic of China 2011*, p. 11.

The operational command levels directly under the CMC and the GDs differ among the branches. China's 2006 defense white paper describes this command process as follows:[157]

> The Army has no independent leading body, and the leadership of it is exercised by the four general headquarters/departments. A military area command exercises direct leadership over the Army units under it.
>
> The Navy, Air Force and Second Artillery Force, each of which has a leading body consisting of the headquarters, the political department, the logistics department and the armaments department, direct the military, political, logistical and equipment work of their respective troops, and take part in the command of joint operations.
>
> The Navy organizes and commands maritime operations conducted independently by its troops or in support of maritime operations. There are three fleets under the Navy, namely, the Beihai Fleet, Donghai Fleet and Nanhai Fleet. Each fleet has flotillas, aviation divisions, etc. under its command.
>
> The Air Force organizes and commands air operations conducted independently by itself or with Air Force personnel as the main fighting force, as well as air defense operations in the capital area. It has an air command in each of the seven military area commands of Shenyang, Beijing, Lanzhou, Jinan, Nanjing, Guangzhou and Chengdu, respectively. Under an air command are aviation divisions, ground-to-air missile divisions (brigades and regiments), antiaircraft artillery brigades (regiments), radar brigades (regiments) and other support troops. In major directions and key target areas there are also corps- or division-level command posts.
>
> The Second Artillery Force organizes and commands its own troops in case of launching nuclear counterattacks with strategic missiles and conducting operations with conventional missiles. Under it are missile and training bases, and relevant support troops.
>
> Military area commands (theaters of war) are military organizations set up according to the administrative divisions of the state, geographical locations, strategic and operational directions, and operational tasks. They are CMC-appointed organs for commanding joint theater operations. They direct the military, political, logistical and equipment work of the troops under them. Under a military area command are the headquarters, the political department, the joint logistics department and the armaments department. A military area command is mainly in charge of formulating programs and plans for combat readiness and operations of troops in the theater and for the reserve force buildup of the theater, organizing and commanding joint theater operations involving different services and arms, and providing joint logistical support. At present, the PLA has seven military area commands, namely, Shenyang, Beijing, Lanzhou, Jinan, Nanjing, Guangzhou and Chengdu.

PLA Army (PLAA)

For the PLA ground forces, the command level below the CMC–GD structure is divided into seven military regions (MRs) that cover all of China's territory. These are further split into subordinate military districts, the number of which varies among the MRs. The MRs also oversee provincial military commands in their areas of responsibility. These provincial commands are responsible for reserve force mobilization, recruitment, and political services. The 2013 white paper noted,[158]

> The PLA Army (PLAA) is composed of mobile operational units, border and coastal defense units, guard and garrison units, and is primarily responsible for military operations on land. In line with the strategic requirements of mobile operations and multi-dimensional offense and defense, the PLAA has been reoriented from theater defense to trans-theater mobility. It is accelerating the development of army aviation troops, light mechanized units and special operations forces, and enhancing building of digitalized units, gradually making its units small, modular and multi-functional in organization so as to enhance their capabilities for air-ground integrated operations, long-distance maneuvers, rapid assaults and special operations. The PLAA mobile operational units include 18 combined corps, plus additional independent combined operational divisions (brigades), and have a total strength of 850,000. The combined corps, composed of divisions and brigades, are respectively under the seven military area commands (MACs):

> Shenyang (16th, 39th and 40th Combined Corps), Beijing (27th, 38th and 65th Combined Corps), Lanzhou (21st and 47th Combined Corps), Jinan (20th, 26th and 54th Combined Corps), Nanjing (1st, 12th and 31st Combined Corps), Guangzhou (41st and 42nd Combined Corps) and Chengdu (13th and 14th Combined Corps).

The operational level directly subordinate to the MRs comprises 18 group armies (GAs) for the PLA ground forces. GAs represent the highest, exclusively military command level. They command a mix of divisions and brigades, although some GAs utilize only brigades or divisions. It is reported that the average number of troops under GA command has declined and may decline further in the future, as the PLAA is shifting to a modular brigade structure[159] and already deploys GAs made exclusively of brigades.[160]

These changes have significant implications for the PLAA's force structure and order of battle. Although GAs are compared and roughly similar to a NATO corps, at 30,000-50,000 men, they command fewer men than a corps in the US military. Moreover, a GA with an all-brigade force structure would be more comparable to a US division.[161] Consequently, a shift in the PLAA force structure towards brigades would significantly reduce the number of personnel per GA and, unless additional GAs were added, such a trend would ultimately reduce PLAA force numbers.

Below the GA command level, ground forces are organized into divisions, brigades, regiments, battalions, companies, platoons, and squads. The exact order of battle varies between different MRs and GAs.

PLA Navy (PLAN)

For the PLAN, a naval staff headquarters represents the command level below the CMC–GD. The headquarters is responsible for maintaining combat readiness, force planning, and coordination with the GDs. The highest operational command level in the PLAN is made up of three fleets – the North Sea Fleet, the East Sea Fleet, and the South Sea Fleet. These are then divided into flotillas, groups, and squadrons.[162] All fleets maintain operational command over the forces in the areas of their responsibility. Each fleet is organized to oversee coastal, deep-water, and naval aviation operations. Forces afloat are divided into divisions, regiments, and squadrons. In wartime, command over naval forces may be transferred to the MRs.[163]

On the PLAN, the 2013 white paper noted,[164]

> The PLA Navy (PLAN) is China's mainstay for operations at sea, and is responsible for safeguarding its maritime security and maintaining its sovereignty over its territorial seas along with its maritime rights and interests. The PLAN is composed of the submarine, surface vessel, naval aviation, marine corps and coastal defense arms. In line with the requirements of its offshore defense strategy, the PLAN endeavors to accelerate the modernization of its forces for comprehensive offshore operations, develop advanced submarines, destroyers and frigates, and improve integrated electronic and information systems. Furthermore, it develops blue-water capabilities of conducting mobile operations, carrying out international cooperation, and countering non-traditional security threats, and enhances its capabilities of strategic deterrence and counterattack. Currently, the PLAN has a total strength of 235,000 officers and men, and commands three fleets, namely, the Beihai Fleet, the Donghai Fleet and the Nanhai Fleet. Each fleet has fleet aviation headquarters, support bases, flotillas and maritime garrison commands, as well as aviation divisions and marine brigades. In September 2012, China's first aircraft carrier Liaoning was commissioned into the PLAN. China's development of an aircraft carrier has a profound impact on building a strong PLAN and safeguarding maritime security.

PLA Air Force (PLAAF)

The PLAAF maintains a headquarters at a command level below the CMC. Operational command over the PLAAF, however, is dispersed among MR air force commands.[165] The MR headquarters retains control over combined operations, while the MR Air Force commander is responsible for flight operations within the MR.[166] Tactical units include divisions, brigades, regiments, groups, squadrons, battalions, companies, platoons, squads, and flights.[167]

China's 2013 white paper described the PLAAF as follows:[168]

> The PLA Air Force (PLAAF) is China's mainstay for air operations, responsible for its territorial air security and maintaining a stable air defense posture nationwide. It is primarily composed of aviation, ground air defense, radar, airborne and electronic countermeasures (ECM) arms. In line with the strategic requirements of conducting both offensive and defensive operations, the PLAAF is strengthening the development of a combat force structure that focuses on reconnaissance and early warning, air strike, air and missile defense, and strategic projection. It is developing such advanced weaponry and equipment as new-generation fighters and new-type ground-to-air missiles and radar systems, improving its early warning, command and communications networks, and raising its strategic early warning, strategic deterrence and long-distance air strike capabilities. The PLAAF now has a total strength of 398,000 officers and men, and an air command in each of the seven Military Area Commands (MACs) of Shenyang, Beijing, Lanzhou, Jinan, Nanjing, Guangzhou and Chengdu. In addition, it commands one airborne corps. Under each air command are bases, aviation divisions (brigades), ground-to-air missile divisions (brigades), radar brigades and other units.

PLA Second Artillery Force (SAF)

Although formally a branch of the PLA, not a separate service, the SAF – also known as the Second Artillery Corps or SAC – maintains its own headquarters. Beneath this headquarters are six corps also known as bases, which themselves command missile brigades, regiments, battalions, companies, and platoons. However, it is possible for both bases and brigades to operate independently directly under the CMC; according to the *Science of Second Artillery Campaigns*, the SAF has three command levels capable of independent action at the campaign level:[169]

> The participating strength of the Second Artillery Campaign is the Second Artillery Campaign large formation which normally contains the following three types: missile bases, missile base groups, and missile brigade at the campaign level.

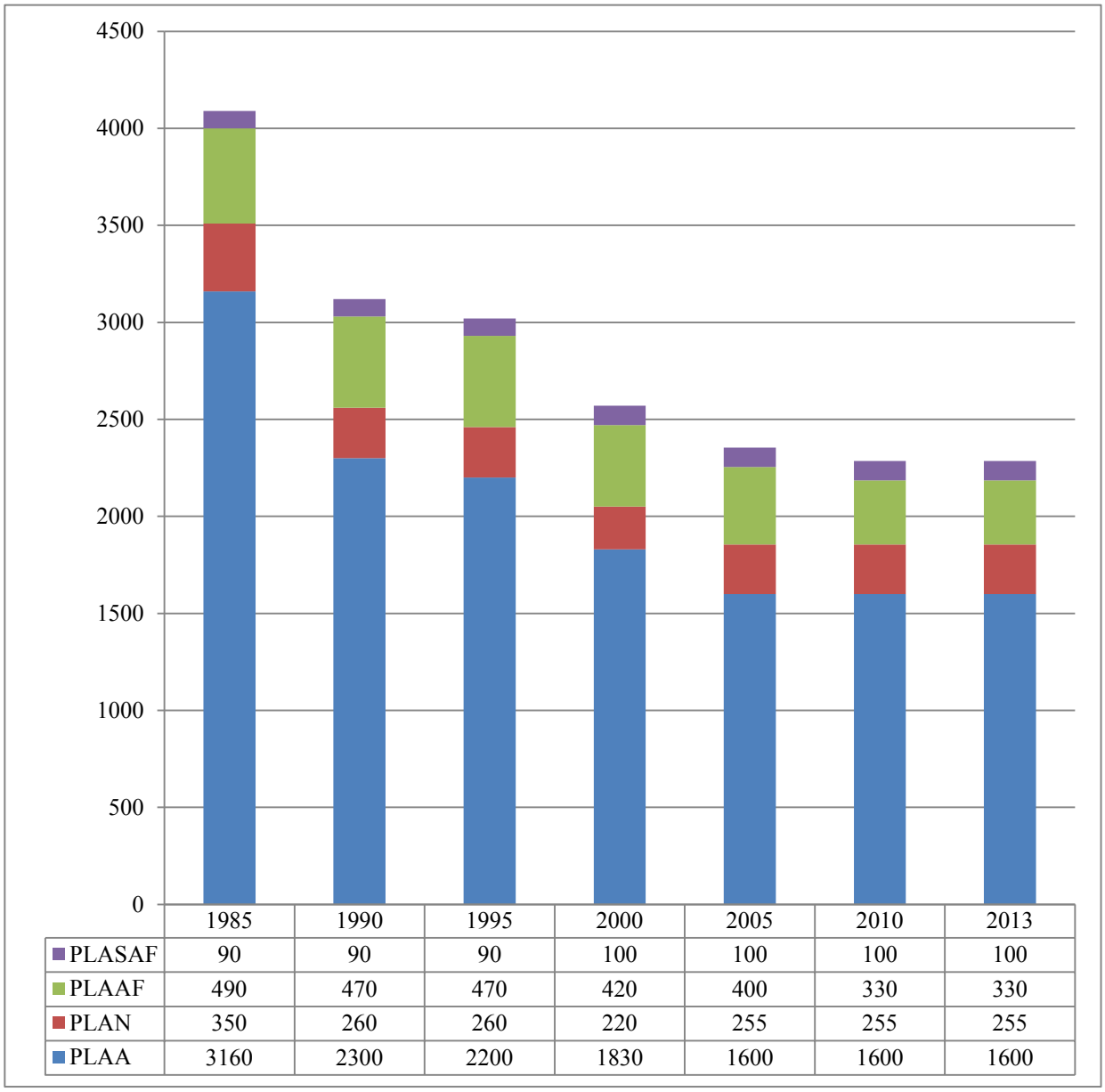
As regards the SAF, the PRC's 2013 white paper described,[170]

> The PLA Second Artillery Force (PLASAF) is a core force for China's strategic deterrence. It is mainly composed of nuclear and conventional missile forces and operational support units, primarily responsible for deterring other countries from using nuclear weapons against China, and carrying out nuclear counterattacks and precision strikes with conventional missiles. Following the principle of building a lean and effective force, the PLASAF is striving to push forward its informationization transform, relying on scientific and technological progress to boost independent innovations in weaponry and equipment, modernizing current equipment selectively by applying mature technology, enhancing the safety, reliability and effectiveness of its missiles, improving its force structure of having both nuclear and conventional missiles, strengthening its rapid reaction, effective penetration, precision strike, damage infliction, protection and survivability capabilities. The PLASAF capabilities of strategic deterrence, nuclear counterattack and conventional precision strike are being steadily elevated. The PLASAF has under its command missile bases, training bases, specialized support units, academies and research institutions. It has a series of "Dong Feng" ballistic missiles and "Chang Jian" cruise missiles.

Personnel Trends and Shifts in the PLA's Force Structure

One primary component of the PLA's modernization has been significant changes in personnel policies: key elements of the PLA's modernization, especially its new Local Wars military doctrine, have been the PLA's concurrent cuts to overall force strength and investments in human capital. The PLA has been significantly reduced in number three times since the 1980s, in 1985, 1997, and 2003. These were cuts of 1,000,000, 500,000, and 200,000, respectively. **Figure 4.2** below shows the absolute trends in the PLA's manpower since 1985.

Figure 4.2: Absolute Trends in PLA Manpower



	1985	1990	1995	2000	2005	2010	2013
PLASAF	90	90	90	100	100	100	100
PLAAF	490	470	470	420	400	330	330
PLAN	350	260	260	220	255	255	255
PLAA	3160	2300	2200	1830	1600	1600	1600

Source: IISS *Military Balance*, 1985-2013.
*Figures for SAF in 1985 not available: for purposes of comparison the SAF has been listed at 1990 levels.
*2013 PLAAF figures are listed as 300,000-330,000.

In 2013, Chinese military and security forces consist of about 2,285,000 active PLA, 660,000 People's Armed Police Force (PAPF) service personnel, and at least 510,000 military reserve forces.[171] Moreover, according to the defense white papers, there are over eight million militia members.

The 2006 Chinese white paper described some of the reasons for recent changes and cuts in China's military manpower:[172]

> To effectively fulfill its historic mission in the new stage of the new century, the PLA is speeding up the revolution in military affairs with Chinese features and enhancing in an all-round way its capabilities of defensive operations under conditions of informationization.
>
> **. . .** In 1985, 1997 and 2003, China announced that it would cut the size of the PLA by one million, 500,000 and 200,000 persons, respectively. By the end of 2005, China had completed reducing the PLA by 200,000 troops, and the PLA currently has 2.3 million troops. The PLA has made new progress towards the goal of being proper in size, optimal in structure, streamlined in organization, swift and flexible in command, and powerful in fighting capacity.
>
> Downsizing the PLA: The Army was the focus of force reduction, and its authorized number of personnel has been reduced by more than 130,000. Over 60,000 military personnel have been removed from the headquarters and directly affiliated units of military area commands and provincial military commands. Through restructuring, the proportion of the Navy, Air Force and Second Artillery Force in the PLA has been raised by 3.8 percent while that of the Army has been lowered by 1.5 percent.
>
> Streamlining the headquarters and directly affiliated units as well as educational institutions: More than 3,000 departments of and over 400 units directly affiliated to the headquarters at and above the regimental level have been cut. A considerable number of agricultural and sideline production units, cultural and sports units, military representative offices at railway stations and material supply organs have been closed. The PLA has also closed 15 educational institutions and 31 training organizations.
>
> Improving the structure of services and arms: The Army has cut a number of combined corps, divisions and regiments, increased the number of combined corps whose order of battle is corps, brigade and battalion, and set up units with new and high-tech weaponry and equipment. The Navy and Air Force have cut some ship groups and aviation divisions, regiments and stations, and set up some high-tech surface ship, aviation and ground-to-air missile units. A number of reserve infantry divisions have been dismantled, but the number of divisions (brigades) of other arms has increased.
>
> The PLA has reduced the number of its officers by 170,000. More than 150 officer posts at or above the corps level have been eliminated, nearly 70,000 posts formerly taken by officers are now filled with non-commissioned officers (NCOs), and over 20,000 posts formerly taken by NCOs are now filled with contract civilians.

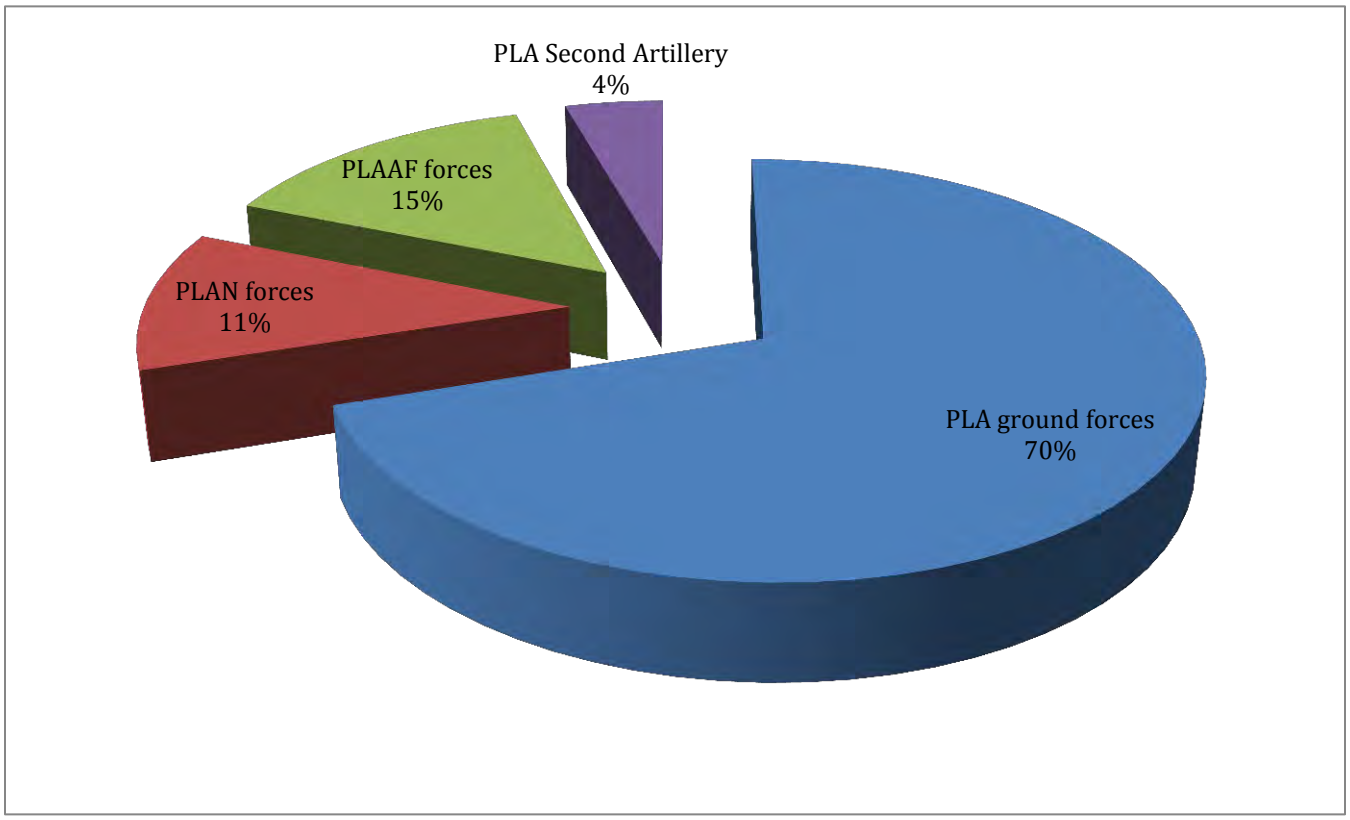
Aside from the SAF's almost steady level of personnel, the other PLA branches have decreased significantly over the past 30 years, as has been seen in **Figure 4.2**.

The PLAA's dominance, at least in terms of manpower, is clear – the Army accounts for more than two-thirds of all PLA forces (approximately 70%). Against the background of force reductions in the PLAA, the PLAN and the PLAAF have increased their relative share of PLA manpower; they currently command 11% and 15% of the PLA, respectively. The SAF's 100,000 personnel make up 4% of all PLA forces. This breakdown is shown in **Figure 4.3**.

Figure 4.4 shows historical changes in the PLA's force structure. Again, the trends indicate that the manpower reductions have disproportionately affected the PLAA, while the other services and the SAF have gained ground in relative terms. This changing force structure is in line with the imperatives generated by the Local Wars doctrine, as quick, decisive wars under conditions of informatization require relatively more naval, air, and missile assets than do total wars or even Deng Xiaoping's "Local Warfare under Modern Conditions" military doctrine. In addition, the

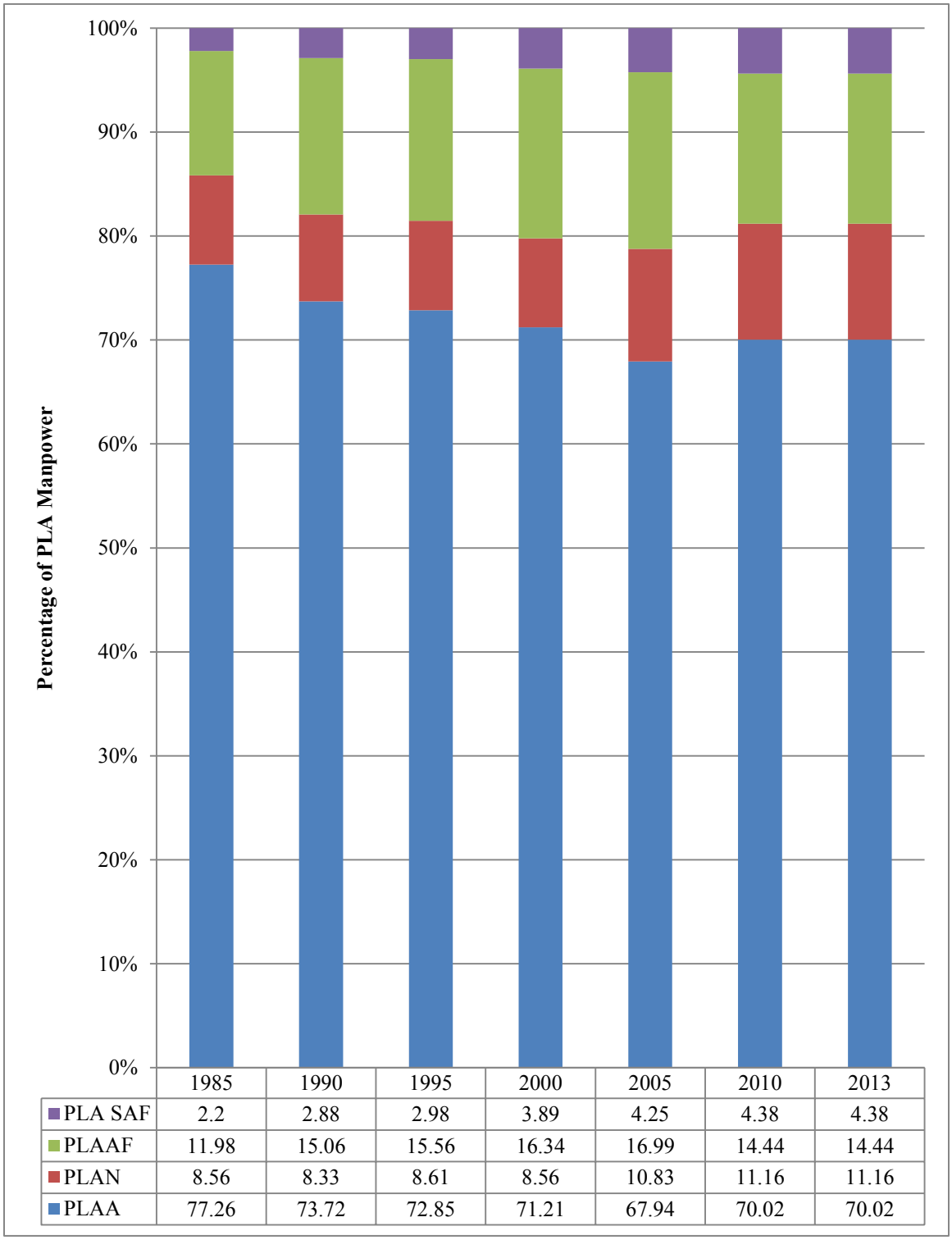
concept of "integrated joint operations" requires substantial forces other than ground forces; consequently, the dominance of the PLAA is eroding vis-à-vis the other services and the SAF. Combined with the inclusion of the heads of the PLAN, PLAAF, and SAF in the CMC,[173] it is possible to infer that the changes in manpower reflect changes in relative funding and prestige. At the same time, the Army is still by far the largest and most bureaucratically influential branch of the military and will likely retain its position of power for at least the next decade.

Figure 4.3: Force Structure of the PLA



Source: IISS, *Military Balance,* 2013.

Figure 4.4: Relative Changes in the PLA's Force Structure



	1985	1990	1995	2000	2005	2010	2013
PLA SAF	2.2	2.88	2.98	3.89	4.25	4.38	4.38
PLAAF	11.98	15.06	15.56	16.34	16.99	14.44	14.44
PLAN	8.56	8.33	8.61	8.56	10.83	11.16	11.16
PLAA	77.26	73.72	72.85	71.21	67.94	70.02	70.02

Source: IISS, *Military Balance,* 1985-2012

Shifts in the PLA's Personnel System

The PLA's personnel system is shifting in response to the increasing human capital requirements of both the PLA's modern military doctrine and its more complex technology. These requirements necessitate a PLA that retains qualified personnel, increases individual and small unit proficiency, and attracts highly-educated recruits.

As part of this effort, the PLA is attempting to build a professional NCO corps and increase the average level of education among the officer corps by rebalancing the personnel system, recruiting high-level human capital into the PLA, providing opportunities for increased qualification among the non-conscript PLA, and offering greater compensation for the entire force.

Rebalancing the Personnel System

The PLA is currently rebalancing its personnel system by replacing many conscript and officer positions with NCO positions. Prior to new regulations issued in 1999, conscripts had served for three to four years. However, in 1999, the CMC adjusted the conscription obligation to two years, and, in order to account for the drop in conscript numbers, augmented the authorized size of the NCO force.[174] This change occurred across the PLA, affecting all branches and the SAF. Complementing this change is a continuing reduction in the number of officers in the PLA and a transfer of many of their duties to the NCO corps.[175]

Recruiting High-Level Human Capital into the PLA

The PLA is attempting to recruit personnel with higher levels of education and/or technical proficiency into the PLA. By offering bonuses of up to $3,500 to college graduates who volunteer for the armed forces, the PLA managed to recruit more than 100,000 college graduates in 2009, a number still below the official goal of 130,000.[176] As part of this effort to recruit college-educated personnel, Chinese media regularly advertise the need for college-educated recruits.[177]

The PLA's efforts to recruit civilians with technical skills has led to regulations, issued in 2010, in which civilians with specialized skills can be recruited into the military and be granted an NCO rank.[178] This option enables skilled civilians to skip the hardships of the first two years of conscript ranks.

The PLA also directly targets college graduates for officer positions through the National Defense Students program, which is roughly equivalent to the US Reserve Officer Training Corps (ROTC).[179]

In 2011 and 2012, Chinese media reported a strengthened effort to obtain recruits currently in or graduated from college. Recently introduced benefits included relaxed restrictions on height, weight, tattoos, and ear piercings, as well as signing bonuses based on years of college completed, loans, and tuition subsidies.[180] Further targeting college graduates, the PLA offered benefits for veterans seeking advanced degrees and employment, providing exemptions from postgraduate entrance exams and preferential hiring for public sector positions.[181]

State media report trends that may indicate a successful effort by the PLA to recruit and retain college graduates. One report states that approximately half of the college students and graduates

recruited in 2009 entered officer training in 2011,[182] ostensibly after a two year period as an enlisted soldier.

Opportunities for Increased Qualification

The PLA has augmented its ability to provide education and training to military personnel. There currently exist military academies for officer and NCO training, with the NCO education accomplished at three specialized academies or at officer academies with specialized courses for NCOs.[183] Moreover, the PLA does more than merely offer qualifications to the NCO corps; as one analyst states, NCOs are required to take advantage of qualification opportunities:[184]

> As of 2008, all NCO's are required to earn one or more certificates of professional qualification relevant to their duties. Since 1999, when the professional skill appraisal system was started, more than 860,000 NCO's throughout the PLA are reported to have obtained professional qualification certificates recognized in the civilian community, as well as the army. The target date for all units to implement the full scope of professional skills testing is the end of 2012; those NCO's who do not pass their tests will not be promoted.

One way that NCOs and officers gain qualifications within the PLA is to take short-term specialty training at participating military academies. In addition to classroom instruction, the PLA has promoted and made available other means of qualification such as correspondence and online courses.[185]

The PLA has a large formal military education system for its officer corps, with three tiers of academy that offer technical, bachelor, master's, and doctorate degrees. Basic PLA academies offer three and four year technical and bachelor degrees that turn civilians into second lieutenants. In addition to intermediate and senior-level PLA academies that confer masters and doctoral degrees, the PLA has begun sending officers to civilian institutions to earn advanced degrees.[186]

Greater Compensation for PLA Personnel

The PLA is increasing the benefits and pay of its service members to encourage qualified personnel to enter and, just as importantly, remain with the PLA. Consequently, pay raises were authorized in 2006, 2008, and 2011. In particular, NCOs received a substantial pay raise in 2011 – rumored to be motivated in part by political rationales – that saw salaries and benefits increase up to 40%, though civil servants at comparable ranks still make up to twice as much.[187] In addition, in line with its efforts to attract educated personnel, the PLA is offering tuition allowances to college students who postpone their studies for service in the PLA.[188]

Shifts in Reserve and Militia Force Structure

An often overlooked element of China's military modernization program has been a sustained shift in the structure of the PLA's reserve and militia forces. While reliable quantitative data are unavailable, Chinese statements indicate that the reserve and militia forces are shifting from mass formations designed to reinforce PLA maneuver forces to smaller auxiliary formations dedicated to logistics, technical, and air defense roles.

PLA Reserve Forces

Chinese reserve forces consist of roughly 510,000 servicemen and servicewomen. Most reserve forces today are staffed by civilians, many of whom are demobilized from the ground force:[189]

> Reserve officers are chosen mainly from qualified retired servicemen, civil officials, cadres of the people's armed forces departments, cadres of the militia and civilian technicians with the appropriate military

> specialties. Reserve soldiers are chosen mainly from qualified discharged soldiers, trained primary militia members, and civilians with the appropriate military specialties.

Information about PLAN, PLAAF, and SAF reserves is largely unavailable, but their numbers are reported to have increased.[190] While quantitative data is unavailable, multiple reports, as well as China's white papers, indicate that the force structure of the PLA's reserve forces are shifting from their previous emphasis on combat/maneuver units to force structures based on specialized units and logistics units.[191] As the 2010 white paper stated,[192]

> To be able to respond to emergencies in peacetime and to fight in war, the focus of the reserve force is shifting from quantity and scale to quality and efficiency, from a combat role to a support role, and from the provision of general-purpose soldiers to soldiers with special skills. It is working to become an efficient auxiliary to the active force and a strong component of the national defense reserve.

It is likely that reserve forces are structured to provide support to regular PLA units during contingencies, especially in the field of logistics. Although some reserve units are staffed with personnel specializing in information warfare, it is unclear what role reserve forces will play in the future beyond basic service providers.

PLA Militia Forces

The PLA is supported by militias under the command of local military district governments, consisting of young men organized in a standard military command scheme. There are primary and ordinary militias: according to the 2010 white paper, primary militias comprise about 8 million men,[193] but numbers for ordinary militias are unavailable.

The militia forces are also undergoing a sustained shift in force structure. Once again, reliable quantitative indicators are unavailable. However, Chinese government statements indicate that the militia is shifting from a mass reserve of maneuver forces to a force dedicated to logistics and technical support as well as air defense and internal security. The 2006 white paper identified these trends:[194]

> Specialized technical units rather than infantry are becoming the backbone of the militia. The proportion of antiaircraft artillery, ground artillery, missile, communications, engineering, anti-chemical, reconnaissance, information and other specialized technical units in the overall militia force is being raised. The building of militia units of the Navy, Air Force and Second Artillery Force is being strengthened. A new organizational structure of the militia has taken shape, with specialized technical units and units with corresponding specialties serving as the main body, and air defense units, units of the Navy, Air Force and Second Artillery Force, and emergency response units playing a leading role.
>
> The state has increased investment in militia weaponry and equipment, with priority given to equipment for air defense, emergency response and maintenance of stability. The state has phased out a number of outdated weapons. Militia training reform has been deepened; a four-level system for organizing training is practiced, the four levels being provincial military commands, prefectural military commands, people's armed forces departments of counties (county-level cities or municipal districts) and basic-level people's armed forces departments. Through interlinked training as well as joint training and exercises with active PLA units, the militia has boosted its capabilities of conducting rapid mobilization and carrying out its specialized tasks.

The 2010 white paper further noted,[195]

> The militia force gives priority to reinforcing those units which are tasked with defending border and coastal areas, providing service support for different arms and services, and responding in emergencies. It has been realigned to extend from rural to urban areas as well as to areas along important communication lines, from ordinary locations to key sites and areas, and from traditional industries to new and high-tech ones. As a result, its structure and layout have been further improved….

> Its capabilities in dealing with both emergencies and wars have been greatly enhanced. The militia strengthens its building of equipment for the purposes of air defense, emergency response, and maintaining stability, supply of new types of air defense weaponry and equipment, and retrofitting and upgrading of existing weapons…
>
> The militia has taken an active part in such operations as counter-terrorism, stability maintenance, emergency rescue, disaster relief, border protection and control, and joint defense of public security, and has played a unique role in accomplishing diversified military tasks. Each year, it mobilizes more than 90,000 militiamen to serve as guards on bridges, tunnels and railways, more than 200,000 to take part in joint military-police-civilian defense patrols, more than 900,000 to participate in emergency response, rescue and relief operations following major natural disasters, and nearly 2 million to engage in the comprehensive control and management of social order in rural and urban areas.

The 2013 white paper provided less detail, describing the militia as follows:[196]

> The militia is an armed organization composed of the people not released from their regular work. As an assistant and backup force of the PLA, the militia is tasked with participating in the socialist modernization drive, performing combat readiness support and defensive operations, helping maintain social order and participating in emergency rescue and disaster relief operations. The militia focuses on optimizing its size and structure, improving its weaponry and equipment, and pushing forward reforms in training so as to enhance its capabilities of supporting diversified military operations, of which the core is to win local wars in informationized conditions. The militia falls into two categories: primary and general. The primary militia has emergency response detachments; supporting detachments such as joint air defense, intelligence, reconnaissance, communications support, engineering rush-repair, transportation and equipment repair; and reserve units for combat, logistics and equipment support.

Importantly, the militia's critical infrastructure protection mission is not only in response to domestic threats; SAF equipment, missile positions, and mobilizations require extensive PAPF and militia protection in light of the PLA's fear of espionage and adversary Special Forces missile suppression missions.[197]

Organization of the Chinese Security and Paramilitary Forces

At the same time, the Chinese armed forces are only one component of the overall Chinese security apparatus: security responsibilities are shared among the Ministry of State Security, the Ministry of Public Security, the People's Armed Police Force (PAPF), and the PLA. All of these organizations perform different functions, although the greatest burden in an armed conflict against a foreign power would naturally lie with the PLA.

Ministry of State Security (MSS)

The Ministry of State Security serves under the PRC's State Council and conducts foreign and domestic intelligence and counter-intelligence collection. MSS agents perform covert activities, both inside and outside of China.[198]

Ministry of Public Security (MPS)

Responsibility for internal security falls to the Ministry of Public Security, which is also under the State Council. It is the highest-level administrative body for Chinese law enforcement forces and oversees approximately 1.9 million police personnel throughout China. These police forces have "many functions including domestic patrol, traffic control, detective, anti-crime, anti-riot, and anti-terrorism."[199] In 2001, the MPS ordered major cities to each establish an anti-riot force of no fewer than 300 personnel, many of whom are equipped with armored cars and armored personnel carriers.[200]

People's Armed Police Force (PAPF)

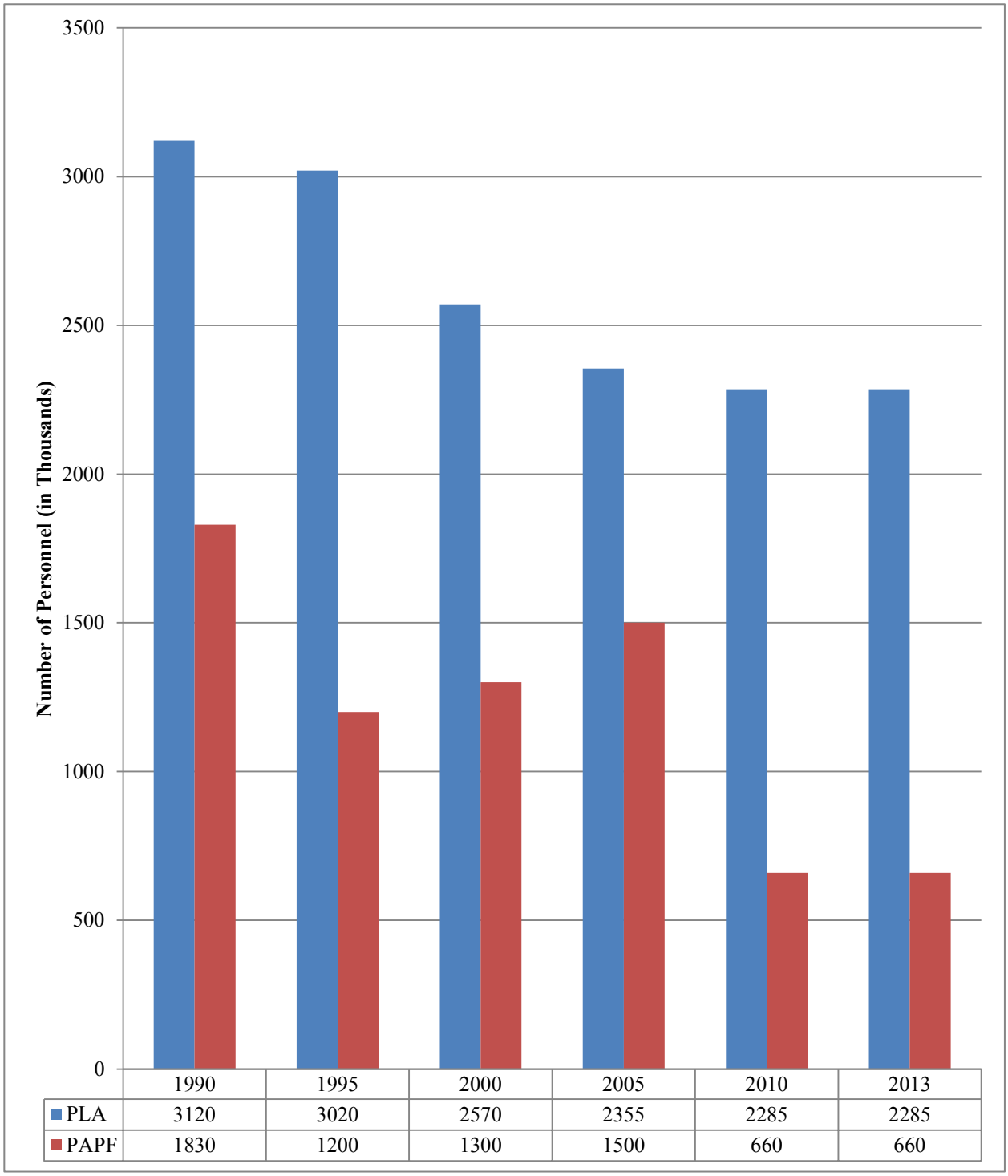
The People's Armed Police Force (PAPF; also called the People's Armed Police or PAP) serves under the command of the CMC and the State Council, but by definition it is not part of the PLA.[201] It serves as an internal security force and was described by the 2010 Chinese white paper as the "shock force in handling public emergencies."[202] In addition, it acts as a light infantry reserve in the event of war and also takes part in reconstruction and rescue efforts after national emergencies.[203] The PAPF's 660,000+ personnel are spread between the Internal Security Forces, the Border Defense Force (including the Coast Guard), the China Marine Surveillance Agency, the Maritime Safety Administration, and the Fisheries Enforcement Command. Some PAPF units are responsible for border security and for guarding critical infrastructure,[204] including critical military infrastructure.[205] In addition, China's 2010 white paper stated that the PAPF shares some territorial air defense duties with the PLAAF, PLAN, and PLA ground forces.[206] The 2013 white paper notes,[207]

> In peacetime, the PAPF's main tasks include performing guard duties, dealing with emergencies, combating terrorism and participating in and supporting national economic development. In wartime, it is tasked with assisting the PLA in defensive operations. Based on the national information infrastructure, the PAPF has built a three-level comprehensive information network from PAPF general headquarters down to squadrons. It develops task-oriented weaponry and equipment and conducts scenario-based training so as to improve its guard-duty, emergency-response and counter-terrorism capabilities. The PAPF is composed of the internal security force and other specialized forces. The internal security force is composed of contingents at the level of province (autonomous region or municipality directly under the central government) and mobile divisions. Specialized PAPF forces include those guarding gold mines, forests, hydroelectric projects and transportation facilities. The border public security, firefighting and security guard forces are also components of the PAPF.

Figure 4.5 below compares the historical manpower of the PLA and PAPF.

The PLA comprises China's main armed forces and can best be defined through its chain of command. All military units exclusively under the authority of the CMC are part of the PLA. Although it is called the People's Liberation *Army,* the PLA consists of three services and an independent branch – the PLA Army (PLAA), the PLA Navy (PLAN), PLA Air Force (PLAAF), and the PLA Second Artillery Force (SAF). China also uses paramilitary forces – in particular, the Coast Guard – to patrol the waters within the nine-dash line, as discussed previously.

Figure 4.5: Historical Trends in Absolute PLA and PAPF Manpower



Source: IISS, *Military Balance,* 1990-2013.

Chapter V: Chinese Strategy and Estimates of Military Spending

China now dominates Asian military spending and is becoming the largest regional military power in terms of power projection as well as total forces. Yet, an assessment of China's defense spending and modernization efforts shows that it plans to radically improve not only virtually every relevant aspect of its conventional and asymmetric warfare capabilities, but also every aspect of its sea-air-missile-nuclear capabilities – affecting US power projection capabilities and potentially the US' Asian partners' willingness to support any potential US action in the Asia-Pacific.

Critics of Chinese military spending and China's lack of transparency often do not discuss the strategic context in which Chinese military modernization and growth is taking place. Chinese analysts themselves point to the surrounding environment and other countries' military budgets as major drivers of defense spending. Two leading Western analysts, Adam P. Liff and Andrew S. Erikson, point out that,[208]

> First, in Beijing's view China faces numerous internal threats to stability ranging from secessionist movements in Tibet and Xinjiang to widespread – if localized – "mass incidents," i.e. anti-government protests. While there is no open-source evidence of PLA involvement in PAP operations other than the March 2008 suppression in Lhasa, continued domestic security concerns necessarily affect military prioritization. Second, China has land borders with 14 nations – including four nuclear weapons states – and territorial disputes with two of them (primarily India, also Bhutan). Third, China retains maritime boundary or island disputes with all its maritime neighbours.
>
> Thus, Beijing's political relations with all major military powers in its neighbourhood are, at best, tepid. Combined with Taiwan's unresolved status, this makes the Near Seas and their immediate approaches a critical area of strategic contention and assertion for China. Fourth, for these and other reasons, China has tense, albeit not unstable, political and military relations with the world's sole superpower (the US), whose leaders will probably remain suspicious of China's intentions as long as it retains an authoritarian political system. Despite increasingly global security interests of the kind often used to justify US defence policy (e.g. secure sea lanes of communication for safe passage of the resources and commerce) and sincere concerns about its external environment, China's defence budget increases remain focused on irredentist but regional concerns, however controversial the means and desired ends of that approach may be to other states with interests in the region.

Chinese Statements on Military Spending

The true extent of Chinese state spending on its armed forces remains uncertain, but China has provided a detailed description of the formulation and control of its military spending in its 2010 defense white paper, while also giving the following the rational for current trends:[209]

> China adheres to the principle of coordinated development of national defense and economy. In line with the demands of national defense and economic development, China decides on the size of defense expenditure in an appropriate way, and manages and uses its defense funds in accordance with the law.
>
> With the development of national economy and society, the increase of China's defense expenditure has been kept at a reasonable and appropriate level. China's GDP was RMB 31,404.5 billion in 2008 and RMB 34,090.3 billion in 2009. State financial expenditure was RMB 6,259.266 billion in 2008 and RMB 7,629.993 billion in 2009, up 25.7 percent and 21.9 percent respectively over the previous year. China's defense expenditure was RMB417.876 billion in 2008 and RMB495.11 billion in 2009, up 17.5 percent and 18.5 percent respectively over the previous year. In recent years, the share of China's annual defense

> expenditure in its GDP has remained relatively steady, while that in overall state financial expenditure has been moderately decreased.
>
> China's defense expenditure mainly comprises expenses for personnel, training and maintenance, and equipment, with each accounting for roughly one third of the total. Personnel expenses mainly cover salaries, allowances, housing, insurance, food, bedding and clothing for officers, non-ranking officers, enlisted men and contracted civilians. Training and maintenance expenses mainly cover troop training, institutional education, construction and maintenance of installations and facilities, and other expenses on routine consumables. Equipment expenses mainly cover R&D, experimentation, procurement, maintenance, transportation and storage of weaponry and equipment. Defense expenditure covers costs to support the active forces, reserve forces, and militia. It also covers part of the costs to support retired servicemen, servicemen's spouses, and education of servicemen's children, as well as national and local economic development and other social expenses.
>
> In the past two years, the increase in China's defense expenditure has primarily been used for the following purposes: (1) Improving support conditions for the troops: Along with the economic and social development and the improvement of people's living standards, the PLA has adjusted servicemen's salaries and allowances, increased funding for education and training, water and electricity supplies and heating, upgraded logistics support for grass-roots units in a comprehensive and coordinated way, and improved the on-duty, training and living conditions of border and coastal defense forces and units in remote areas and harsh environments. (2) Accomplishing diversified military tasks: China has increased investment in improving MOOTW capabilities, in supporting earthquake rescue and disaster relief operations, in escort operations in the Gulf of Aden and waters off Somalia, in flood control and emergency rescue operations, and in international rescue operations. (3) Pushing forward the Revolution in Military Affairs (RMA) with Chinese characteristics. In view of the upward trend in purchasing prices and maintenance costs, China has moderately increased the funds for high-tech weaponry and equipment and their supporting facilities.
>
> In 2010, confronted by the residual impact of the global financial crisis and other uncertainties, the tension between revenue and expenditure in China's finances persists. Giving priority to socially beneficial spending in agriculture, rural areas and farmers, as well as in education, science and technology, health, medical care and social security, China has increased its defense expenditure moderately as needed. China's defense budget for 2010 is RMB532.115 billion, up 7.5 percent over 2009. The growth rate of defense expenditure has decreased.
>
> China practices a strict system of financial supervision of defense funds. The annual defense budget is incorporated into the annual financial budget draft of the central government, and then submitted to the NPC for review and approval. The auditing offices of the state and the PLA conduct audit and supervision of the defense budget and its enforcement. In recent years, the Chinese government has strengthened systematic and meticulous management of defense expenditure, reformed and innovated financial management systems, pressed forward with reforms in asset management, reinforced budget implementation, supervision and management, and organized auditing of economic responsibilities of military leaders and special auditing of the use of funds and materials. In this way, transparency and standardization of defense expenditure are enhanced, and the proper and effective use of defense funds is ensured.

The 2013 white paper did not discuss military spending in any detail.

In 2013, the Chinese Ministry of Finance announced that the 11.2% increase in the 2012 military budget had been "used to improve living and training conditions for our troops, support the military in promoting IT application, strengthen development of new- and high-technology weapons and equipment, and enhance the country's modern military capabilities."[210]

According to the Twelfth National People's Congress, the 2013 budget was to "be used to support efforts to improve the working and living conditions of officers and enlisted personnel, make the armed forces more mechanized and information-based, and safeguard national security."[211] In early March 2013, China released its 2013 national budget, forecasting a military

expenditure of 720.2 billion yuan ($114.3 billion), a 10.7% increase. Official military spending in 2012 was approximately $106 billion, an 11.2% rise over 2011.

PRC white papers consistently state that the defense budget is split approximately equally between personnel, training and maintenance, and equipment expenditures. **Figure 5.1**, a chart published in the 2010 white paper, supports these government statements by providing an accounting breakdown of the PRC's 2009 defense budget: spending for personnel, training and maintenance, and equipment is almost equally distributed, with equipment expenses slightly higher. A more detailed breakdown of spending allocations is not available.

It is important to note that absolute defense expenditures do not illustrate the defense burden on a society or the priority given to defense outlays. Relative expenditure on defense, whether compared to national GDP or total central government expenditure, are better indicators of the defense burden on a given state and society. **Figure 5.2** compares a Chinese government graph depicting the percentage of total government expenditures devoted to the official defense budget to a similar estimate by Taiwan (Republic of China or ROC). Both estimates indicate that the total defense burden on the Chinese state and society is decreasing despite the significant increases in absolute defense expenditures.

While the DoD compares PRC defense expenditures to national GDP rather than state expenditures, it assesses that, despite significant increases in the defense budget, "the actual change in the implied burden of the official defense budget on the economy appears negligible," largely as a result of significant GDP growth.[212]

Regardless, a comparison of Chinese defense spending over time leaves no doubt that absolute military spending is on the rise. Annual average growth rates of over 11% over the past decade[213] (based on official reported numbers) are certainly high by international comparison, yet they appear to be sustained by almost equally high GDP growth rates. Predictions for further military expenditure growth thus depend on continuously high GDP growth rates – which may or may not happen. Social unrest or other domestic problems may lead to a diversion of funds away from defense expenditures, yet currently there is no sign that military spending is slowing, especially given the emphasis that Chinese leaders place on the modernization of the armed forces.

Figure 5.1: Official PRC Defense Budget Allocation for 2009 (in RMB billion)

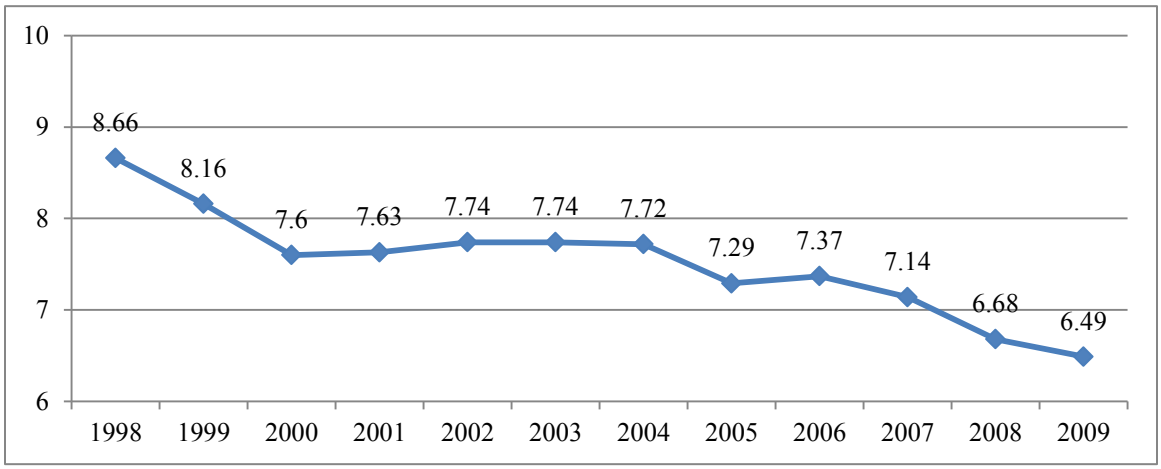
	Active Force	Reserve Force	Militia	Total	
				Amount	Percentage
Personnel	167.063	1.465	0	168.528	34.04
Training & Maintenance	152.171	1.965	12.859	166.995	33.73
Equipment	157.426	1.431	0.73	159.587	32.23
Total	476.66	4.861	13.589	495.11	100.00

Source: *China's National Defense in 2010*, March 30, 2011. http://english.gov.cn/official/2011-03/31/content_1835499_10.htm, Ch. 8.

Figure 5.2: Relative Burden of the PRC Defense Budget on State Finances: PRC vs. ROC Estimate

PRC Estimate of Percentage of the PRC's Government Expenditure Devoted to the Official Defense Budget, 1998-2009

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Percentage	8.66	8.16	7.6	7.63	7.74	7.74	7.72	7.29	7.37	7.14	6.68	6.49



Taiwan (ROC) Estimate of Percentage of the PRC's Government Expenditure Devoted to the Official Defense Budget, 2000-2011

Year	Defense Budget Total	Defense Budget Growth%	% of Overall Expenditure Total	% of Overall Expenditure%
2000	1,207.54	12.15	15,879	7.60
2001	1,442.04	19.42	18,844	7.65
2002	1,707.78	18.43	21,113	8.03
2003	1,907.87	11.70	24,649	7.74
2004	2,172.79	13.89	29,362	7.72
2005	2,474.28	13.88	33,709	7.34
2006	2,979.31	20.40	40,213	7.40
2007	3,509.21	17.80	46,789	7.50
2008	4,178.76	17.50	62,593	6.68
2009	4,951.10	18.50	76,300	6.49
2010	5,335.00	7.75	93,180	5.73
2011	6,011.00	12.70	100,220	6.00

Unit: 100 million RMB

Sources: *China's National Defense in 2010*. Ch. 8. http://english.gov.cn/official/2011-03/31/content_1835499_10.htm; Ministry of Defense Republic of China, *National Defense Report. 100th Anniversary,* July 2011, p. 58.

US Analyses of Chinese Defense Budgets

There are a variety of problems when attempting to assess China's actual defense spending. For one, China's official military budget does not include major categories of defense-related expenditures, while also including line items that are not usually included in other countries' military budgets. In addition, China still maintains a semi-command economy and a lack of accounting transparency.

The US DoD has long questioned Chinese reporting on the size of its defense budgets, issuing higher estimates of the growth in Chinese military spending. According to the DoD, China increased military spending by 12.7% in 2011; over the period from 2000-2010, China's official military budget grew at an average of 12.1% in inflation-adjusted terms. At the same time, due to overall economic growth of 10.2% over the same period, the actual burden on the economy of the increased official defense budget appears to have been negligible.

The DoD estimated that China's actual military-related spending for 2010 was over $160 billion.[214] The DoD estimated China's actual military spending at $120-180 billion in 2011, compared to the official figure of $91.5 billion. China argues that its defense budget expands in parallel with its economic growth, and is not directed at any other country. One Chinese Vice Foreign Minister remarked, "Strengthening China's defense capability will be conducive to further stability in the region and will be conducive to world peace."[215]

In his 2012 testimony before the Senate, DIA Director Ronald L. Burgess Jr. provided the following commentary on China's reported defense spending:[216]

> DIA estimates China spent as much as $183 billion on military-related goods and services in 2011, compared to the $93 billion Beijing reported in its official military budget. This budget omits major categories, but it does show spending increases for domestic military production and programs to improve professionalism and the quality of life for military personnel.

The 2012 edition of the DoD report on Chinese military power noted that,[217]

> Chinese military investments … have led to the fielding of equipment and capabilities that support the PLA's traditional set of core missions (such as defending China's security, sovereignty and territorial integrity), and an expanding array of new missions at home and abroad.
>
> On March 4, 2012, Beijing announced an 11.2 percent increase in its annual military budget to roughly $106 billion. This increase continues more than two decades of sustained annual increases in China's announced military budget. Analysis of 2000-2011 data indicates China's officially disclosed military budget grew at an average of 11.8 percent per year in inflation-adjusted terms over the period.
>
> Estimating actual PLA military expenditures is difficult because of poor accounting transparency and China's still incomplete transition from a command economy. Moreover, China's published military budget does not include several major categories of expenditure, such as foreign procurement. Using 2011 prices and exchange rates, DoD estimates China's total military-related spending for 2011 ranges between $120 billion and $180 billion.

The 2013 edition of the DoD report drew similar conclusions about these figures as in previous years:[218]

> On March 5, 2013, Beijing announced a 10.7 percent increase in its annual military budget to $114 billion, continuing more than two decades of sustained annual defense spending increases. Analysis of data from 2003 through 2012 indicates China's officially disclosed military budget grew at an average of 9.7 percent per year in inflation-adjusted terms over the period. China has the fiscal strength and political will to support defense spending growth at comparable levels, despite lowering its economic growth forecast in

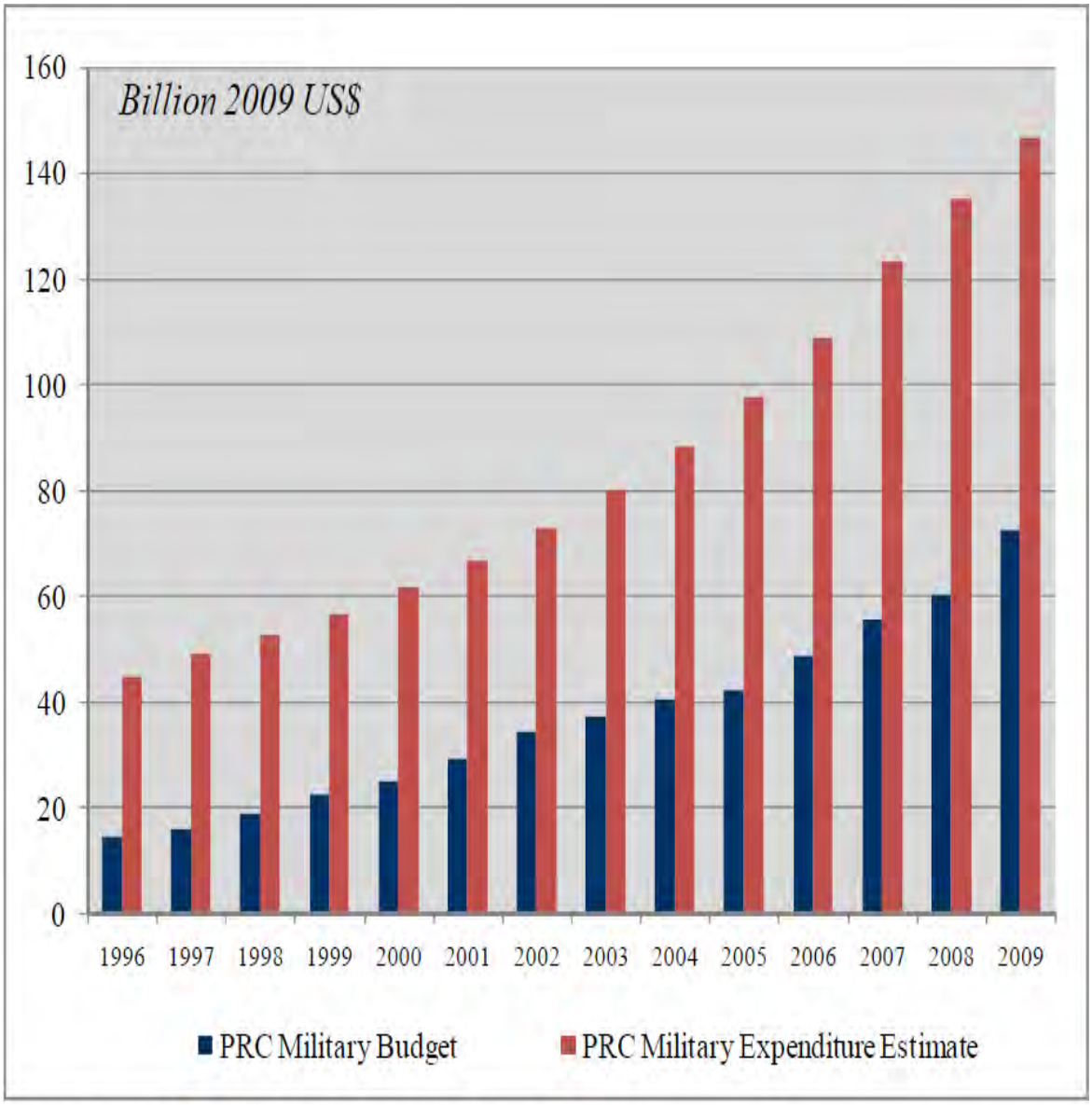
> 2012 to 7.5 percent from 8 percent in 2011. Continued increases will support PLA modernization efforts and facilitate China's move toward a more professional force.
>
> **...**Using 2012 prices and exchange rates, the DoD estimates that China's total actual military-related expenditure for 2012 falls between $135 billion and $215 billion. However, it is difficult to estimate actual PLA military expenses due to China's poor accounting transparency and incomplete transition from a command economy. China's published military budget omits several major categories of expenditure, such as procurement of foreign weapons and equipment.

Figure 5.3, taken from the now-dated 2010 DoD report on China, shows a comparison of official Chinese defense budgets and US estimates of the actual size of the Chinese budget over 1996-2009. These US figures tried to take into account all military-related expenses, as outlined above. This resulted in a low and a high estimate, suggesting that the real amount of Chinese defense spending, according to the DoD, is somewhere in between. A detailed methodology on how the estimates are arrived at is not available.

The DoD's estimates for 2012 Chinese military spending range from $135 billion to $215 billion, a variance of about 50%.[219] Using a median estimate of $175 billion, the PRC's DoD-reported defense budget is roughly 28% of the US defense budget – reported by the US DoD as $615 billion (including OCO).

For purposes of comparison, **Figure 5.4** details historical US defense spending from 1950-2017.

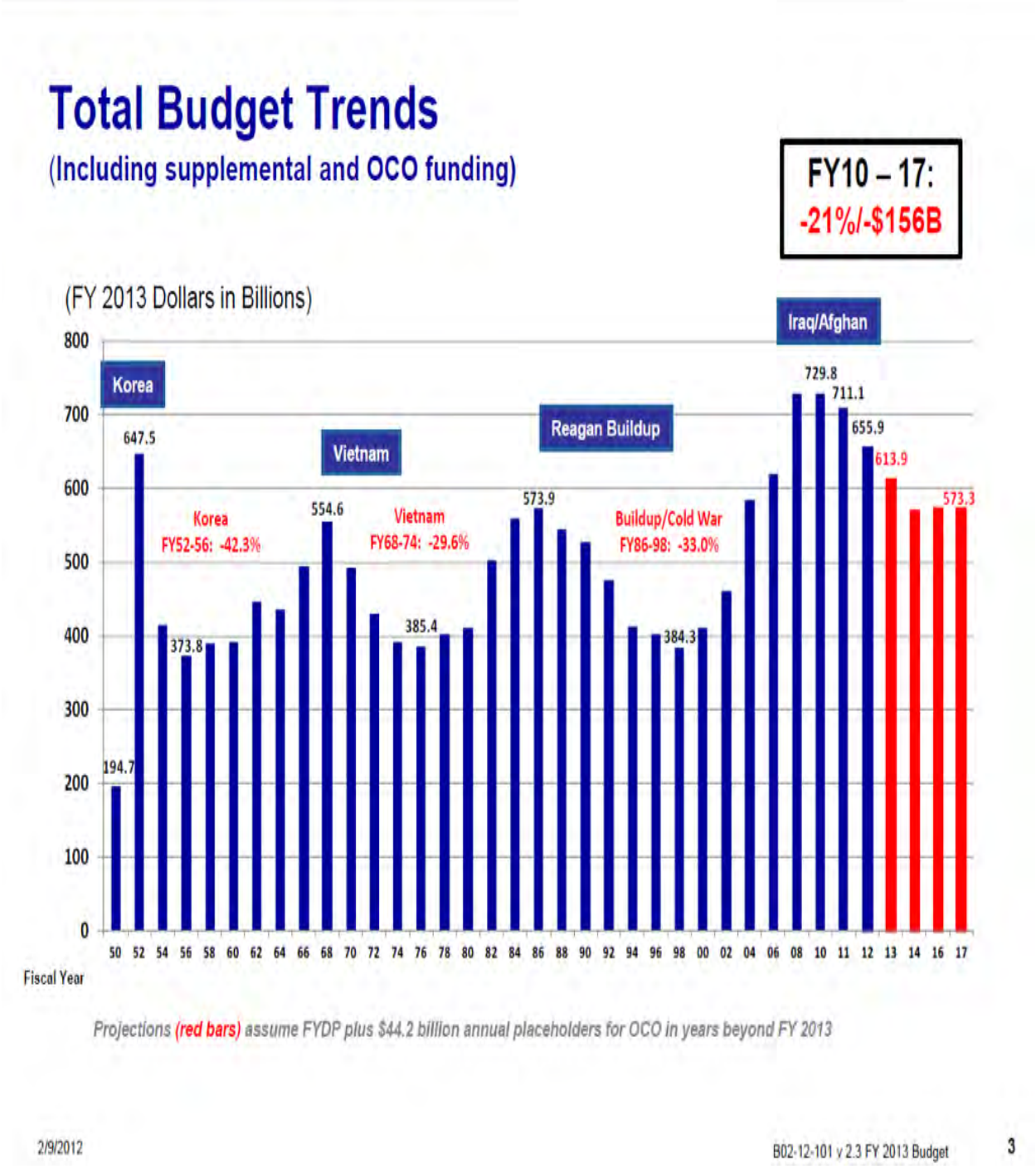
Figure 5.3: Historical PRC Defense Budget Compared to US Estimates of Total Defense Spending



China's Annual Real GDP and Military Budget Growth, 2000 - 2009.

Source: DoD, *Military and Security Developments Involving the People's Republic of China 2010*, Office of the Secretary of Defense. http://www.defense.gov/pubs/pdfs/2010_CMPR_Final.pdf, p. 42.

Figure 5.4: Historical US Defense Expenditures



Source: DoD, *Fiscal Year 2013 Budget Request*, Office of the Undersecretary of Defense (Comptroller)/Chief Financial Officer, February 2012.
http://comptroller.defense.gov/defbudget/fy2013/FY2013_Budget_Request_Overview_Book.pdf.

Other Outside Assessments of Chinese Military Spending

Outside experts also question China's reporting. **Figure 5.6 s**hows the 2013 IISS' analysis of China's defense budget trends and estimates over 2009-2011. The IISS projected a possible future convergence with US spending under a variety of scenarios that could take place as early as 2022 or as late as 2050:[220]

> …. [O]fficial Chinese defence budget figures probably underestimate the true extent of Beijing's defence spending. Although official figures include personnel, operations and equipment expenditure, it is widely held that other military-related expenditures are omitted – such as allocations for R&D and overseas weapons purchases. A fuller account of China's true military-spending levels should also include funding allocated to the People's Armed Police (PAP)… [I]f estimates of these additional items are included, Chinese defence spending rises by a factor of approximately 1.4–1.5 relative to officially published figures, to an estimated RMB883.3bn (US$136.7bn) using market exchange rates (MER). If these higher estimates of Chinese spending are projected into the future, convergence with US defence spending could occur as early as 2023 (if US FY13 proposed spending levels are accepted) or 2022 (if sequestration is instituted).
>
> Of course, several factors might delay or even prevent such convergence. A lower trajectory of economic growth in China as the global economy slows, or a downshift in economic activity as the country attempts to move away from an export-oriented growth model, or economic turbulence as China attempts to modernise its fledgling financial markets and uncompetitive banking sector – these are all factors that could diminish economic growth, limiting the resources available for defence and, at the very least, delaying the date of convergence.

A Western analysis by Adam P. Liff and Andrew S. Erikson reached somewhat different conclusions and provided the data on Chinese military spending shown in **Figures 5.7 and 5.8**. It also summarized the issues in measuring the trends in Chinese defense spending. In particular, while the official Chinese defense budget has nominally increased at an average annual rate that has exceeded 10% since 1990, there are important qualifications when assessing real spending. One qualification is the rampant inflation in the country, which has decreased the real-world impact of what look like large budget increases. Calculating China's defense budget at constant prices – and thus accounting for inflation effects – shows that China's effective defense spending growth rate has been much lower:[221]

> The differences between the nominal (current price) and real (constant price) average annual growth rates are remarkable: 1.6 per cent vs. –3.2 per cent (1980–1989); 15.7 per cent vs. 7.8 per cent (1990–1999); 16.5 per cent vs. 12.5 per cent (2000–2009); and 10.4 per cent vs. 3.1 per cent over the 2010–2011 period. In other words, when calculated in real terms the average annual increases in the budget exceeded 10 per cent during only one of the ten-year periods in [see **Figure 5.7]**: 2000–2009. This all suggests that unqualified statements along the lines of "China's official defence budget has increased by double-digits since year 19XX," while in most cases technically true in nominal terms, may exaggerate the real-world effects of these budget increases.

Furthermore, the PRC's official defense budget growth has consistently been outpaced by even bigger increases in total national financial expenditures – both of which are roughly correlated with China's large yearly GDP growth. The official defense budget's proportion of state expenditures has actually decreased from 9.5% in 1994 to 5.5% in 2011. Therefore, Chinese investment in its military forces has comprised a decreasing percentage of government spending, providing some support to official Chinese statements that China's principal objective is economic development – and thus that defense modernization is subordinate to that goal.[222]

The 2013 Japanese White Paper analysis of the PRC Defense Budget is given in **Figure 5.9**.

Figure 5.6: Chinese Defense Budget Trends and IISS Estimates, 2009-2011

	2009	2010	2011
Chinese GDP (RMB, billions)	34,090	40,151	47,156
Chinese GDP Growth	9.2%	10.4%	9.2%
Official Defense Budget (RMB, billions)	**495.1**	**533.3**	**583.0**
Nominal Percentage Change	18.5%	7.7%	9.3%
Real Percentage Change	19.2%	1.8%	4.7%
Official Defense Budget as a Percentage of Total Outlays	6.5%	5.9%	5.3%
Official Defense Budget as a Percentage of GDP	1.45%	1.33%	1.24%
Total Estimated Defense Spending (RMB, billions)	**671.8**	**753.4**	**883.3**
Nominal Percentage Change	16.3%	12.1%	17.2%
Real Percentage Change	17.0%	6.0%	9.1%
Total Estimated Defense Spending as a Percentage of Total Outlays	8.8%	8.4%	8.1%
Total Estimated Defense Spending as a Percentage of GDP	1.97%	1.88%	1.87%
Official Defense Budget (USD, billions)	**72.5**	**78.7**	**90.2**
Total Estimated Defense Spending (USD, billions)	**98.4**	**111.1**	**136.7**
Total Estimated Defense Spending	**6.83**	**6.78**	**6.46**

Source: IISS, *Military Balance,* 2013, p. 256.

Figure 5.7: PRC Defense Spending-related Comparative Statistics, 1980-2011

	1980-1989 (annual average)	1990-1999 (annual average)	2000-2009 (annual average)	2010-2011 (annual average)
Defense budget growth rate…				
... At current prices	1.6%	15.7%	16.5%	10.4%
... At constant prices (base year of 1980)	-3.2%	7.8%	12.5%	3.1%
GDP growth rate	9.8%	10.0%	10.3%	9.8%
State financial expenditures growth rate (aggregate – central and local)…				
... At current prices	8.6%	16.8%	19.3%	19.5%
... At constant prices (base year of 1980)	3.5%	8.8%	15.1%	11.6%

Source: Adam P. Liff and Andrew S. Erikson, "Demystifying China's Defence Spending: Less Mysterious in the Aggregate," *China Quarterly,* March 2013, p. 8.

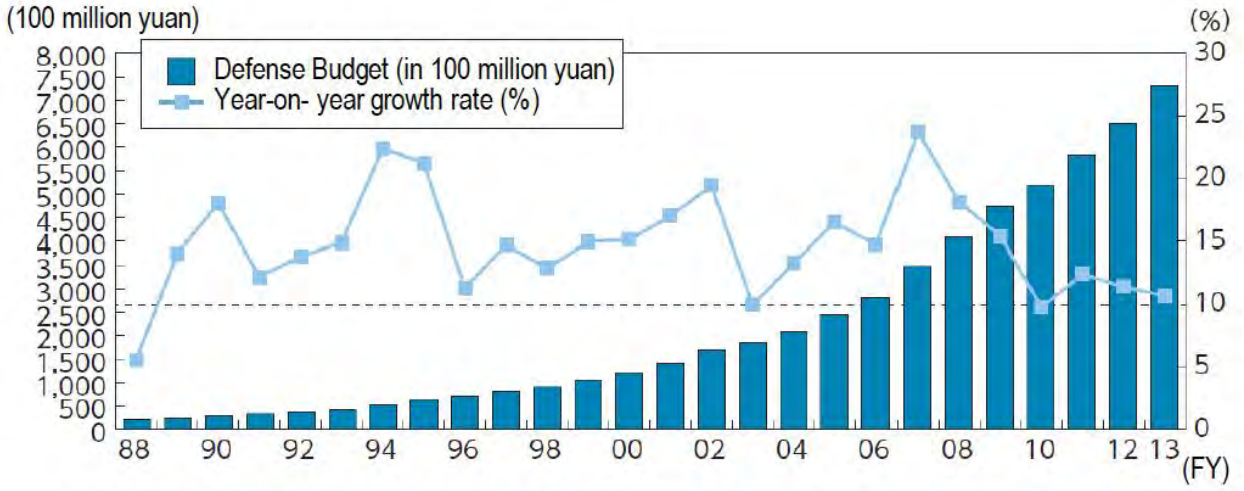
Figure 5.8: PRC Official Defense Budget Annual Data, 2002-2012

•	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012***
GDP growth rate at current prices	9.1%	10.0%	10.1%	11.3%	12.7%	14.2%	9.6%	9.2%	10.4%	9.2%	N/A
Defense budget (RMB billions)…											
… At current prices	170.8	190.8	220.0	247.5	297.9	355.5	417.9	495.1	533.3	602.7	670.0
… At 2002 constant prices	170.8	186.0	200.6	217.1	251.8	279.1	304.4	362.9	366.6	385.3	N/A
… As % of GDP	1.42%	1.40%	1.38%	1.34%	1.38%	1.34%	1.33%	1.45%	1.33%	1.28%	N/A
Defense budget growth rate…											
… At current prices	18.4%	11.7%	15.3%	12.5%	20.4%	19.3%	17.6%	18.5%	7.7%	13.0%	11.2%
… At 2002 constant prices	18.5%	11.4%	14.0%	11.0%	17.2%	15.2%	12.8%	13.6%	5.3%	8.3%	N/A

Note: 2012 defense budget is an estimated figure reported in Xinhua.

Source: Adam P. Liff and Andrew S. Erikson, "Demystifying China's Defence Spending: Less Mysterious in the Aggregate," *China Quarterly,* March 2013, p. 10.

Figure 5.9: Change in China's Official Defense Budget



Notes: The total defense budgets for FY2002 and FY2004 were not disclosed, and only the growth rates and the amount of increase for the two fiscal years were disclosed. Though we tried to calculate the total defense budgets for the two fiscal years based on the growth rates and the amount of increase in combination with the initial defense budgets of the previous years, we found the numbers we got as a result of the calculation to be inconsistent with the numbers China disclosed the following year. Therefore, this graph uses 168.4 billion yuan and 210 billion yuan for FY2002 and FY2004, respectively. These are calculated on the assumption that the disclosed growth rates and the amount of increase are based on the actual defense expenditures for FY2001 and FY2003.

Source: Japanese Ministry of Defense, *Defense of Japan 2013*, July 2013, Figure I-1-3-1.

A Lack of Transparency and Estimation Problems

There is a lack of consensus among military analysts regarding the real level of Chinese defense spending. Key problems that affect all reporting on international military expenditures are the lack of any clear standard for such reporting and the radically different costs a given government either faces or can assign to security expenditures. A command economy like China's can assign drastically lower costs to virtually any defense activity than a market economy can, and most of the world's command economies do so.

At the same time, free market attempts to guess at the market cost of such military efforts are notoriously inaccurate and uncertain. For example, the US intelligence community found after the Cold War that its attempts to determine the economic burden of Soviet defense expenditure and the equivalent cost of Soviet forces in US terms were little more than econometric nonsense.

What is clear is that Chinese government statistics do not include some outlays that are standard reporting for most other countries. The following items of China's military spending are believed by many observers to be outside of official disclosure:[223]

- Arms imports, foreign weapon procurement, military aid for and from foreign countries;
- Expenses for paramilitary forces;
- Expenses for strategic and nuclear forces;
- Government subsidies for military production;

- Expenses for military R&D; and
- The PLA's own fundraising.

Most outside experts believe that China's real military expenditures sharply exceed the officially stated numbers and that the announced Chinese defense expenditures do not suffice to support an organization that maintains 2.3 million service personnel and an increasingly sophisticated and therefore expensive arsenal of weapons systems. The US government has at least implied that China is hiding information about military spending that should be made public.

Others point out that pay increases and expenditures for social services among the armed forces have increased substantially in recent years. As previously noted, large pay raises have been authorized in 2006, 2008, and 2011. However, it is not clear whether pay increases have, in relative terms, outspent overall military expenditure growth.

Any statement about Chinese military spending must, therefore, at least consider the potential sum of dispersed, partly classified, and sometimes unreported numbers. In practice this has led to radically different estimates of real Chinese military spending.

Most estimates by non-Chinese analysts that put military expenses several times over PRC figures rely on PPP models. This conversion rate poses several problems:

- The assumed relative buying power of Chinese government funds in PPP terms refers to buying Chinese-made goods
- The market for military equipment and services in China is highly non-transparent, and transferring average PPP assumptions to the state-run military-industrial complex almost certainly will result in skewed results, even more so as China is importing military goods manufactured abroad
- Purchasing power theory loses its descriptive value when applied to goods, which are not homogenous; weapon systems and other military purchases are artificially protected by government regulation
- The return on investment in buying Chinese-made goods is unclear, and it is not unlikely that an indigenous product that meets state-of-the-art quality may actually cost more money than arrived at by PPP conversion

What is clear is that Chinese military spending is on the rise, and annual growth rates are high in comparison with most other countries. If low US estimates approximate real Chinese spending, China's defense spending would be the second largest in the world.

Western analysts sometimes criticize this lack of Chinese defense budget transparency and the exclusion of significant defense-related spending from the official budget, arguing that China underreports actual military spending intentionally. Adam P. Liff and Andrew S. Erikson provide an excellent summary of the issues involved; their list of things excluded from the official Chinese defense budget includes:[224]

- The budget of the 660,000-strong People's Armed Police (PAP);
- Some domestic procurement and research and development expenses;
- Overseas purchases of major weapons and platforms;
- Contributions from regional and local governments;
- Extra-budgetary revenues and resources from a limited number of military commercial enterprises (such as hospitals, and strategic infrastructure);
- Militarily- relevant portions of China's space programme;
- Central and local government defence mobilization funds;
- One-time entrance bonuses for college students;
- Authorized sales of land or excess food produced by some units;

- Personnel for motion pictures; and
- Donations of goods, services and money by local governments and enterprises to units and demobilized personnel.

One of the biggest exclusions from the official Chinese defense budget is the PAPF; however, this force's primary focus is domestic, with responsibilities like firefighting, border security, and natural disaster relief. In the event of a war, the PAPF would support the PLA in local defense, but neither supports the other in domestic operations in peacetime. The PAPF's budget is categorized under public security expenditures, not national defense expenditures (where the PLA's budget is located).[225]

Specific weapons and equipment procurement costs from domestic defense industries and defense-related R&D funds given to civilian defense contractors and PLA armament research institutions are also not publically released. This funding likely comes from several different parts of the government, such as the State Administration for Science, Technology, and Industry. Although much of PLA procurement is domestic, a significant cost-based percentage is imported – in particular, advanced weapons technology and some weapons platforms. The PRC both imports completed weapons systems and promotes foreign-assisted development, licensed production, and reverse engineering. It is believed that these exports are paid for from special accounts controlled by the State Council and thus are not part of the official defense budget. It is likely that China will continue to rely on such imports for at least several more years.[226]

China's defense budget also does not include provincial defense-related spending like military base operating costs. It is believed that this money comes from local governments and the Ministry of Civil Affairs. The former also contributes to militia and reserve expenses, including civilians working for some PLA departments. However, a 2010 government statistic showed that only 2.94% of defense expenditures were paid for by local governments, meaning that the exclusion of this spending from the official budget does not significantly affect the real spending numbers.[227]

Overall, these items and areas excluded from the official defense budget make guesstimating real Chinese defense spending relatively difficult; as Adam P. Liff and Andrew S. Erikson note,[228]

> China's general lack of transparency about how its official defence budget is calculated makes judging the validity of these Western criticisms very difficult. However, the potential significance of the above exclusions for assessing the size of China's actual defence budget is suggested in three important studies conducted by the International Institute for Strategic Studies (IISS). In 2006, IISS estimated that including the costs of foreign weapons purchases, subsidies, R&D spending, new product expenditures, arms exports and PAP funding revealed a 72 per cent gap (in RMB terms) between China's FY2005 official defence budget and "actual" (i.e. IISS-estimated) defence spending. In 2010, IISS estimated a roughly 39 per cent difference between the FY2008 official defence budget and "actual" (i.e. IISS-estimated) defence spending. In 2012, the estimated gap for the FY2010 budget was 41 per cent. It should be noted that, although large, the disparity between the official budget and IISS's estimates declined significantly over the initial three-year period before stabilizing. As argued in the next section, this shrinking gap, which is consistent with similar trends in estimates by the US Department of Defense, suggests that in recent years an increasing percentage of "actual" PLA funding has been placed "on the books"; that is, officially reported figures increasingly reflect actual spending.
>
> …. Although the exclusion of major items from China's official defence budget is undoubtedly an issue of concern, less widely known is that the budget also includes some items that are not included in those of its Western counterparts. For example, the PLA still engages in some infrastructure construction projects,

> although many are designed to be dual-use and paid for from local and national non-defence funds. It provides some medical help to civilians in remote areas and provides some support to domestic security operations (e.g. during the 2008 Olympics). The PLA also engages in disaster relief, such as the dispatch of over 200,000 personnel in response to the 2008 Wenchuan earthquake – the largest deployment of Chinese armed forces since the 1979 war with Vietnam. There are legal provisions for it to be reimbursed for these operations, but the processes, delays and extent of such reimbursements remain unclear. In Western countries, such tasks are assigned primarily to non-military organizations. The PLA also provides perquisites for retired senior officers (offices, assistants, cars, drivers, cooks, caregivers, and special hospital facilities) that their better-salaried Western counterparts do not receive.

The Chinese Response

Chinese commentators respond to Western criticisms of PRC military transparency in three different ways: they[229]

> (1) emphasize that there is no universal standard for military transparency; (2) compare the current level of transparency favourably to even greater opacity previously; or (3) contend that "the most fundamental and most important form of transparency" is the transparency of China's strategic intentions, as opposed to the transparency of military capabilities or doctrine.

As has been noted above, Western organizations and experts have tried to overcome the lack of PRC transparency by independently estimating "actual" defense spending – though many of these estimates are inconsistent for several reasons, as discussed previously: (1) the difficulty of defining "defense spending"; (2) conversion of China's RMB-denominated budget into US dollars, especially because of problems with the official exchange rates, application of PPP rates, and inflation and strengthening of the RMB since 2005 – meaning that conversions based on current exchange rates make recent budget increases look larger than they really are; and (3) the lack of transparency regarding the actual costs of individual items and which specific spending categories are already included in the official budget further complicates estimates of actual PLA military expenditures.[230]

> …[I]n 2009, the US Department of Defense estimated China's "actual" FY2008 defence budget at US$105–150 billion: 1.8–2.6 times the official figure of US$57.2 billion (RMB417.8 billion) and 2.5–3.6 per cent of GDP. Meanwhile, the Stockholm International Peace Research Institute (SIPRI)'s estimate that year was much lower: US$84.9 billion – 1.48 times the officially released figure. The difference between SIPRI's estimate and the upper bound of the Department of Defense's estimate was US$65.1 billion, a difference larger than China's entire official defence budget that year.
>
> While significant defence-related spending is undoubtedly excluded from China's official defence budget, some of the items included in foreign estimates of the "actual" figure are controversial. For example, some Western institutions include expenditures for the (domestically focused) PAP in their calculations, labeling it one of the largest extra-budgetary sources of defence spending. But they do so without offering explicit justification. This single line-item can inflate estimates of the budget by as much as one-fifth above the official figure. Take the 2010 figures as an example: adding only official PAP expenditures (RMB93.4 billion) to the official budget (RMB533.4 billion) results in an estimate of "actual" Chinese defence spending 18 per cent higher.

Furthermore, many other nations, including the US, also have defense-related spending that is outside of their official defense budgets:[231]

> For example, the US 051 (Department of Defense) budget excludes a significant amount of defence-related spending. In fact, one analysis of US "total defence-related spending" based on similar metrics to those regularly used by Western organizations to estimate China's "actual" defence budget found a US$187 billion gap between the United States' official FY2006 defence budget and what this group of American PLA experts calculated as "actual" US defence-related spending that year.

> The parallels they draw are intriguing: China is criticized for excluding some funding for officer pensions from its official defence budget, yet the Department of Veterans Affairs' entire budget, retirement costs paid by the Department of Treasury, and veterans' re-employment and training programmes paid by the Department of Labor are not included in Department of Defense's budget. China is criticized for excluding funding for its nuclear and strategic rocket programmes from its official defence budget, yet atomic energy activities related to defence are funded by the Department of Energy and fall outside the Department of Defense's budget. Finally, China is criticized for excluding the PAP's budget and various defence activities that are paid for by local governments from its official defence budget, yet neither the Department of Homeland Security budget nor state funding for some US National Guard functions is included in the Department of Defense's budget… [I]t is important to also stress that while "actual" US defence spending is larger than the official figure, most other relevant spending is relatively transparent, and can be assembled by a knowledgeable analyst. This is significantly less true of China's defence spending.

Therefore, when viewed in context, it seems that the PRC's limited military transparency is unlikely to be an attempt by its leadership to obscure Chinese strategic intentions. Other countries in the region with similar economic development levels – such as India, which is a similar size and is also growing quickly – have similar transparency (or lack thereof) in their military spending, meaning that China is not necessarily an exception in this regard.[232]

Chapter 6: Broad Patterns in PLA Modernization and the Role of Arms and Technology Imports and Exports

Virtually every aspect of the Chinese armed forces is undergoing modernization. According to the 2006 defense white paper, China is pursuing a three-step strategy to modernize its armed forces. It seeks to create a "solid foundation" by 2010 and reach another phase of "major progress" by 2020. It then seeks to be "capable of winning informationized wars by the mid-21st century."[233] As might be expected, however, trend analyses show that faster progress is occurring in some areas while other areas prove to be more resistant to change. Also important but frequently overlooked is that the results of equipment modernization are strongly influenced by the PLA's ability to modernize its tactics, strategy, training, and communications networks.

Uncertain Pattern of Change

As the Chinese white papers show, the modernization of the Chinese armed forces entails the whole spectrum of armed forces development: war-fighting doctrine, strategic and tactical guidelines, training methods, C4ISR, procurement services, interoperability among PLA services, equipment, and human resources management. Any meaningful assessment of this modernization must establish a benchmark against which the processes that constitute modernization can be judged.

When one uses the most modern technologies and management methods employed by world armies as a comparison, as is often the case, the modernization of the PLA presents a mixed picture that renders quick predictions baseless. It must be understood that any quantitative assessment of increases in modernization spending falls short of describing combat effectiveness.

Military modernization, especially in a large organization like the PLA, proceeds asymmetrically. While some units may use cutting-edge technology that provides war-fighting superiority, it is almost certain that large parts of the armed forces keep outdated and inoperable equipment and have a low standard of training. American PLA analysts have observed such outcomes.[234] At the same time, other countries continue developing new weapons systems and thereby raise the standards against which China's status quo capabilities can be judged.

Given the hazards mentioned above, this paper measures PLA modernization and force development, not in comparison to the US or other Western militaries, but according to the demands and required capabilities of PLA military doctrine. Given the centrality of the Local Wars theory, this paper will measure the progress of PLA modernization based on the trends in the PLA's ability to fight and win Local Wars.

This metric is difficult to utilize in practice. While changes in force structure and the modernization of certain equipment categories may ostensibly augment or harm the PLA's ability to prevail in Local Wars, the intangible, human variables such as combat, technical, and command proficiency also have marked effects on military effectiveness. Quantitative comparisons between third- and fourth-generation fighters, for instance, can blur the fact that well-trained pilots in third-generation aircraft might display higher combat effectiveness than their counterparts in newer planes. The same holds true for virtually all weapons systems.

China fought its last international war in 1979, a war that was relatively limited in scope and lasted barely a month. Virtually no members of the armed forces possess any war-fighting experience. Although the lack of experience is difficult to quantify and compare with other indicators, it has the potential to become a significant disadvantage in an armed conflict against experienced enemy forces.

With these caveats in mind, the remainder of this chapter will briefly survey key elements of Chinese modernization that will affect the quantitative and service-specific analyses of PLA military modernization and force development in the following chapters.

Shifts in PLA Training Practices

Over the last decade, the PLA has made a sustained effort to improve the quality and realism of the training received by its personnel. In addition, it has augmented its scenario-specific training, especially for situations that require specialized forces.

The CMC issued new training guidelines in 1999, which were codified by the GSD into an "Outline of Military Training and Evaluation" (OMTE) in 2002. The 2002 OMTE set uniform standards and led to an increased focus in many training areas such as combined arms and joint operations, force-on-force training, rapid reaction, information countermeasures, and comprehensive logistical support.[235]

It is impossible to determine the exact effects of the OMTE, but one analyst asserts that the new guidelines have considerably improved training quality.[236] He cites a lack of truly joint, large-scale, or force-on-force exercises in the PLA prior to the 1999 regulations and the 2002 OMTE. Specifically, he argues that the PLA's training before 1999 was heavily scripted and limited by a lack of funding, experience, and equipment.[237] Corroborating this view, multiple Chinese government media sources from the early 2000s speak of the need to add "realism" to training.[238] Over the course of the decade, this exhortation among official PRC media markedly increased, but changed in tone to a sense of accomplishment as "scripted" exercises were supposedly reduced and units began to "train as you fight."[239]

In the beginning of the second decade of the 21st century, the PLA's shift in training practices has reportedly broadened to include more challenging training subjects. Following the release of the 2009 OMTE, a revision of the 2002 document, additional training skills have been emphasized such as operating in complex weather, terrain, and electromagnetic conditions and conducting military operations other than war (MOOTW).[240]

The DoD has predicted that the PLA will assign greater importance to training and equipment integration in the second decade of the 21st century. Portraying the first decade of the new century as a period of procurement, the DoD stated:[241]

> The first decade of the 21st century can be characterized as a period of ambitious PLA acquisition and development. Although this trend will continue in the years ahead, the more dominant theme of the 2010-2020 decade is likely to be training and integration. Senior PRC leaders recognize that this period will prove critical to meeting the PLA's modernization objectives, and they have demanded that the military engage in more realistic training and organizational reform.

In addition, there are several key warfare areas that the PLA has made a specific focus of its training program, explained in the following sections.

Joint Operations

The PLA has made progress in its efforts to train its forces for joint operations. The PLA reportedly did not conduct truly joint operations during the 1980s and 1990s, as formations from different services carried out tasks in proximity to one another rather than truly coordinate actions under a single unified headquarters. However, by the middle of the first decade of the 21st century, the PLA was reportedly conducting joint training exercises with forces that were operating far from their garrison locations.[242]

The poor outcome of previous joint exercises led to the 2004 creation of a new term, "Integrated Joint Operations," to both capture the need for true joint operations and to emphasize the role of support forces in joint operations.[243] By the end of the decade, many official media reports on the SAF were keen to report on military exercises taking place under "complex electromagnetic conditions," or conditions in which an adversary is waging electronic warfare against a PLA unit.[244] Thus, there is evidence that the new term has led to tangible changes in training, such as the focus on the use of electronic warfare support forces.

For example, one recent multi-service military exercise was Joint Action 2010, in which formations at the GA-level conducted air-land operations, especially long-distance mobilization.[245] The PLA has also been carrying out trans-military area command exercises, such as campaign-level exercises and drills code-named "Mission Action." As the 2013 white paper noted, "In 2012, the Chengdu, Jinan and Lanzhou MACs and relevant PLAAF troops were organized and carried out the exercise in southwestern China."[246]

Amphibious Operations

Until the late 1990s, amphibious operations were not considered a high priority for training purposes. However by the turn of the millennium, the PLA had shifted its focus; in April 2000, the PLA acknowledged that the Nanjing and Guangzhou MRs had concentrated on amphibious operations. In addition, it has been reported that the Shenyang, Beijing, and Jinan MRs receive enough amphibious training to act as follow-on forces for any amphibious campaign.[247]

To build capacity in amphibious operations, the PLA has developed joint amphibious operation training areas and conducted amphibious exercises involving large numbers of forces. One analyst estimates that one-third to one-quarter of PLA forces have received some type of amphibious warfare training.[248]

Focus on C4ISR and Information Technology

Reports indicate that the PLA is investing heavily in the enhancement of all C4ISR and logistics capabilities, drawing on resources of the civilian computer and high-tech industries.[249] Given that military modernization is virtually impossible without comprehensive, modern C4ISR capabilities, China's efforts in this regard will certainly lie at the center of China's modernization strategy.

The PLA increasingly relies on modern IT applications. Evidence for this is the PLA's increased efforts to create an advanced C4ISR network among the PLA branches and services, IT-enabled weapon systems, the proliferation of information warfare units, and efforts to recruit highly qualified civilian IT experts. PLA leaders understand that conducting "integrated joint operations" is virtually impossible without effective, decentralized C4ISR networks, and they have identified the PLA's deficiencies in this sector as a key stumbling block to efforts at joint operations.[250]

While the PLA recognizes the great importance of exploiting C4ISR and information technology, security sector modernization is contingent upon both civilian and military determinants, most notably China's five-year economic development plans. An unexpected economic crisis or changes in technology accessibility may significantly delay the application of modern weapons systems as well as investments in human capital.

Arms Trade and Technology Transfer: The Role of Imports

Although China has significantly reduced weapon system imports both absolutely and relatively since the mid-2000s, the PRC imports completed weapons systems and promotes foreign-assisted development, licensed production, and reverse engineering – and also engages in cyber espionage of foreign weapons' systems plans, like the US' F-35 Joint Strike Fighter. It seems likely that China will continue to rely on such imports for at least several more years due to continuing difficulties in developing key technologies.[251] SIPRI ranked China the second largest arms importer over the 2008-2012 period,[252] with a total of $7.5 billion in agreements.[253]

Russia is a key player in this process. **Figure 6.1** shows the scale of military exports from Russia to China, while **Figure 6.2** shows the value of Russian exports to China relative to all of the PRC's military imports. On Russia's importance to China as a weapons supplier, the 2013 DoD report on China notes,[254]

> Russia has been China's primary weapons and materiel provider, selling China advanced fighter aircraft, helicopters, missile systems, submarines, and destroyers. Relying on Russian components for several of its production programs, China purchased production rights to Russian weapon designs. Though still committed to filling capability gaps with Russian equipment, this trend is changing as China becomes more self-sufficient in research, development, and production

At the same time, the DoD states that China goes far beyond the normal character of arms imports,[255]

> China relies on foreign technology, acquisition of key dual-use components, and focused indigenous research and development (R&D) to advance military modernization. The Chinese utilize a large, well-organized network to facilitate collection of sensitive information and export-controlled technology from U.S. defense sources. Many of the organizations composing China's military-industrial complex have both military and civilian research and development functions. This network of government-affiliated companies and research institutes often enables the PLA to access sensitive and dual-use technologies or knowledgeable experts under the guise of civilian research and development. The enterprises and institutes accomplish this through technology conferences and symposia, legitimate contracts and joint commercial ventures, partnerships with foreign firms, and joint development of specific technologies. In the case of key national security technologies, controlled equipment, and other materials not readily obtainable through commercial means or academia, China has utilized its intelligence services and employed other illicit approaches that involve violations of U.S. laws and export controls. (p. 12)
>
> A high-priority for China's advanced technology acquisition strategy is its Civil-Military Integration policy to develop an innovative dual-use technology and industrial base that serve both military and civilian requirements. China's defense industry has benefited from integration with its expanding civilian economy and science and technology sectors, particularly sectors with access to foreign technology. Examples of technologies include: advanced aviation and aerospace (hot section technologies, avionics and flight controls), source code, traveling wave tubes, night vision devices, monolithic microwave integrated circuits, and information and cyber technologies. (p. 12)
>
> Differentiating between civil and military end-use is very challenging in China due to opaque corporate structures, hidden asset ownership, and the connections of commercial personnel with the central government. Some commercial entities are affiliated with PLA research institutes, or have ties to and are

subject to the control of government organizations such as the State-owned Assets Supervision and Administration Commission. (p. 12)

…. PLA participation or observer status in military training exercises of nations in possession of U.S. military equipment, systems, and weapons may, in certain circumstances, have unintended consequences that could result in the unauthorized disclosure of defense articles, technical data, or defense services to China. Public Law 101-246 – the Tiananmen Sanctions – prohibits the transfer or disclosure of U.S.-origin defense articles, defense services, technical data, and/or technology to China. Additionally, Public Law 94-329 – the Arms Export Control Act - and the International Traffic in Arms Regulations list China as a nation for which U.S. policy denies the transfer or export of defense articles (including technical data) and defense services. (p. 23)

Beijing primarily conducts arms sales to enhance foreign relationships and to generate revenue to support its domestic defense industry. China's arms sales range from small arms and ammunition to joint development or transfer of advanced weapons systems. Chinese companies sell mostly to developing countries where China's low-cost weapons sales serve a strategic purpose. For example, China maintains strong and longstanding military–technical cooperation with Pakistan, which includes arms sales and defense industrial cooperation. With other countries of strategic importance to China, such as Sudan, arms sales and other security assistance deepen developing ties and balance China's energy imports. As China's regional and international interests grow more complex, the PLA's international engagement will expand, especially in the areas of peacekeeping operations, counter-piracy, humanitarian assistance/disaster relief (HA/DR), and joint exercises. In addition to furthering PLA modernization, the focus of these engagements will likely remain on building China's political ties, assuaging fears about China's rise, and building China's external influence, particularly in Asia. (p. 23-24)

…China utilizes a large, well-organized network of enterprises, defense factories, affiliated research institutes, and computer network operations to facilitate the collection of sensitive information and export-controlled technology, as well as basic research and science that supports U.S. defense system modernization. Many of the organizations comprising China's military-industrial complex have both military and civilian research and development functions. This network of government-affiliated companies and research institutes often enables the PLA to access sensitive and dual-use technologies or knowledgeable experts under the guise of civilian research and development. The enterprises and institutes accomplish this through technology conferences and symposia, legitimate contracts and joint commercial ventures, partnerships with foreign firms, and joint development of specific technologies. (p. 51)

As in previous years, China utilized its intelligence services and employed other illicit approaches that involve violations of U.S. laws and export controls to obtain key national security technologies, controlled equipment, and other materials not readily obtainable through commercial means or academia. Based on investigations conducted by the law enforcement agencies of the Department of Defense, Department of Justice, Department of Homeland Security, and Department of Commerce, China continues to engage in activities designed to support military procurement and modernization. These include economic espionage, theft of trade secrets, export control violations, and technology transfer. (p. 51)

- In August 2010, Noshir Gowadia was convicted of providing China with classified U.S. defense technology. This assisted China in developing a low-signature cruise missile exhaust system capable of rendering a cruise missile resistant to detection by infrared missiles. (p. 51)
- In September 2010, Chi Tong Kuok was convicted for conspiracy to illegally export U.S. military encryption technology and smuggle it to Macau and Hong Kong. The relevant technology included encryption, communications equipment, and Global Positioning System (GPS) equipment used by U.S. and NATO forces. (p. 52)
- In September 2010, Xian Hongwei and Li Li were arrested in Hungary and later extradited to the United States for conspiring to procure thousands of radiation-hardened Programmable Read-Only Microchips, classified as defense items and used in satellite systems, for the China Aerospace and Technology Corporation. Both defendants pleaded guilty and were sentenced in September 2011 to two years in prison.
- In January 2012, Yang Bin was arrested in Bulgaria and later extradited to the United States based on a

December 2011 criminal indictment related to the attempted export of military-grade accelerometers used in "smart" munitions, aircraft, and missiles.

- In July 2012, Zhang Zhaowei, a naturalized Canadian citizen, was arrested while entering the United States, based on a sealed January 2011 indictment alleging Zhang attempted to illegally acquire and export military gyroscopes used in unmanned aerial systems and for tactical missile guidance.
- In September 2012, Zhang Mingsuan was arrested in the United States and indicted after attempting to acquire up to two tons of aerospace-grade carbon fiber. In a recorded conversation, Zhang claimed he urgently needed the fiber in connection with a scheduled Chinese fighter plane test flight.
- In addition, multiple cases identified since 2009 involved individuals procuring and exporting export controlled items to China. These efforts included attempts to procure and export radiation-hardened programmable semiconductors and computer circuits used in satellites, restricted microwave amplifiers used in communications and radar equipment, export-restricted technical data, and thermal imaging cameras. There were also at least two cases in 2011 in which U.S. companies working on Department of Defense contracts subcontracted manufacturing work on small arms and replacement parts to Chinese companies in violation of the Arms Export Control Act. (p. 52)
- In March 2012, Hui Sheng Shen and Huan Ling Chang, both from Taiwan, were charged with conspiracy to violate the U.S. Arms Export Control Act after allegedly intending to acquire and pass sensitive U.S. defense technology to China. The pair planned to photograph the technology, delete the images, bring the memory cards back to China, and have a Chinese contact recover the images. (p. 12)
- In June 2012, Pratt & Whitney Canada (PWC), a subsidiary of U.S. aerospace firm and defense contractor United Technologies Corporation (UTC), pleaded guilty to illegally providing military software used in the development of China's Z-10 military attack helicopter.
- UTC and two subsidiaries agreed to pay $75 million and were debarred from license privileges as part of a settlement with the U.S. Department of Justice and State Department.
- PWC "knowingly and willfully" caused six versions of military electronic engine control software to be "illegally exported" from Hamilton Sundstrand in the United States to PWC in Canada and then to China for the Z-10, and made false and belated disclosures about these illegal exports.
- In September 2012, Sixing Liu, aka "Steve Liu," was convicted of violating the U.S. Arms Export Control Act and the International Traffic in Arms Regulations (ITAR) and possessing stolen trade secrets. Liu, a Chinese citizen, returned to China with electronic files containing details on the performance and design of guidance systems for missiles, rockets, target locators, and unmanned aerial vehicles. Liu developed critical military technology for a U.S. defense contractor and stole the documents to position himself for employment in China. (p. 13)

The acquisition of dual-use goods poses a serious problem when constructing a comprehensive picture of the PLA's overall technological capabilities. Recent DoD reports have stated that China is pursuing a systematic effort to exploit dual-use goods for modernizing its armed forces.[256] The dominance of state-run companies, in combination with a government-mandated policy of secrecy, makes it very difficult to track the potential applications of single items. In light of the information provided in the yearly DoD reports, it seems likely that China is undertaking systematic efforts to exploit dual-use goods for military purposes.

Overall it appears that China no longer *relies* on weapons imports to modernize its army: China has shown the ability to contribute to almost all areas of weaponry development to produce modern weapons systems without outside assistance. Examples of advanced indigenous weapons systems are the J-10 and J-20 aircraft; the PLAN also operates advanced, indigenously-designed surface combatants such as the *Luyang* guided missile destroyer and the *Jiankai* guided missile frigate. However, a sudden cessation of imports would certainly significantly delay weapon system development and procurement.

Underlining this trend is the decreasing value of Russian arms imports. **Figure 6.2** shows the decreasing absolute value of Russian arms imports to China. When compared to the double-digit growth in China's announced defense budgets, it becomes clear that the value of Russian arms imports, relative to the PRC's overall defense budget, is steadily decreasing. One report from the Congressional Research Service (CRS) stated that this trend is a result of Chinese efforts to integrate and reverse engineer existing technology. As the report noted,[257]

> A key Russian arms client in Asia has been China, which purchased advanced aircraft and naval systems. Since 1996, Russia has sold China Su-27 fighter aircraft and agreed to their licensed production. It has sold the Chinese quantities of Su-30 multi-role fighter aircraft, Sovremenny class destroyers equipped with Sunburn anti-ship missiles, and Kilo-class Project 636 diesel submarines. Russia has also sold the Chinese a variety of other weapons systems and missiles. Chinese arms acquisitions seem aimed at enhancing its military projection capabilities in Asia, and its ability to influence events throughout the region. One U.S. policy concern is to ensure that it provides appropriate military equipment to U.S. allies and friendly states in Asia to help offset any prospective threat China may pose to such nations.
>
> There have been no especially large recent Russian arms agreements with China. The Chinese military is currently focused on absorbing and integrating into its force structure the significant weapon systems previously obtained from Russia, and there has also been tension between Russia and China over China's apparent practice of reverse engineering and copying major combat systems obtained from Russia, in violation of their licensed production agreements.

While China is increasingly able to develop its own weapons, the reliance upon reverse engineering means a probable de facto Chinese reliance on foreign technology for at least another decade. Many of China's most modern weapons systems, especially in the aviation sector, are imports from Russia, such as the Su-27 and Su-30, or are copies of Russian goods, such as the J-11. Further, some weapons systems, even those that are indigenous, rely on certain foreign technologies. Helicopter, radar, and engine technologies, for example, are being developed, imported, or produced under licenses with a significant application of Russian and European technology.[258]

Arms Trade and Technology Transfer: The Role of Exports

Imports are partly offset by exports; Chinese weapons exports, though small relative to its demographic and geographic size, have been increasing rapidly; from the 2002-2006 period to the 2007-2011 period, they rose 95%. SIPRI announced in early 2013 that China had become the 5th largest arms exporter by volume in the world.[259]

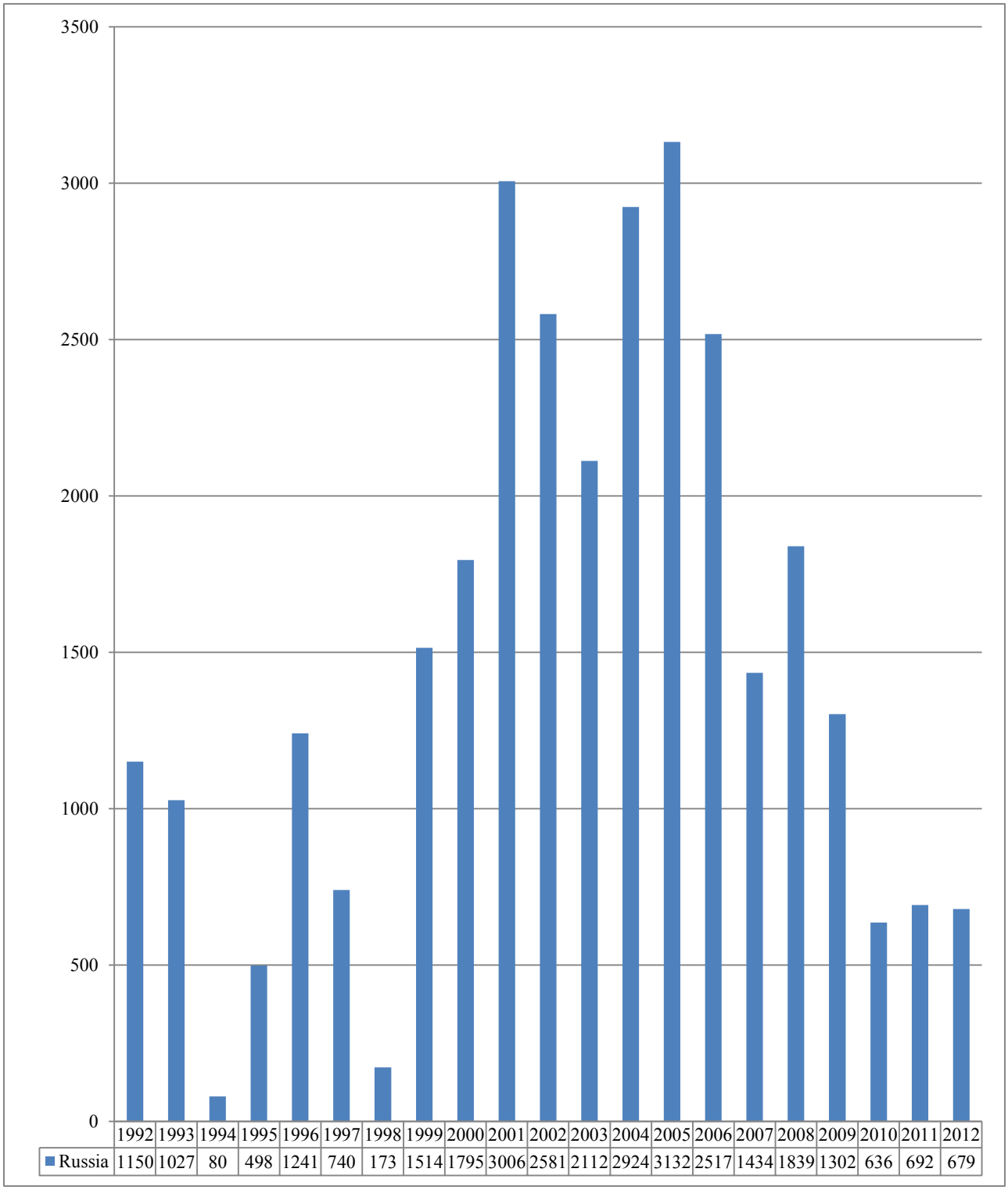
The DoD has estimated that from 2007 to 2011,[260]

> China signed approximately $11 billion in agreements for conventional weapons systems worldwide, ranging from general purpose materiel to major weapons systems. In 2012 and the coming years, China's arms exports will likely increase modestly as China's domestic defense industry improves. Chinese defense firms are marketing and selling arms throughout the world with the bulk of their sales to Asia and the Middle East/North Africa. In 2012, China unveiled the Yi Long tactical unmanned aerial vehicle, which will probably be marketed to developing countries.
>
> Pakistan remains China's primary customer for conventional weapons. China engages in both arms sales and defense industrial cooperation with Islamabad, including co-production of the JF-17 fighter aircraft, F-22P frigates with helicopters, K-8 jet trainers, F-7 fighter aircraft, early warning and control aircraft, tanks, air-to-air missiles, anti-ship cruise missiles, and cooperation on main battle tank production.
>
> Sub-Saharan African countries view China as a provider of low-cost weapons with fewer political strings attached compared to other international arms suppliers. China uses arms sales as part of a multifaceted approach to promote trade, secure access to natural resources, and extend its influence in the region.

One 2012 CRS report provided a brief history of Chinese arms exports:[261]

> It was not until the Iran-Iraq war in the 1980s that China became an important arms supplier, one willing and able to provide weaponry when other major suppliers withheld sales to both belligerents. During that conflict, China demonstrated that it was willing to provide arms to both combatants in quantity and without conditions. Subsequently, China's arms sales have been more regional and targeted in the developing world. From 2008 to 2011, the value of China's arms transfer agreements with developing nations has averaged over $2 billion annually. During the period of this report, the value of China's arms transfer agreements with developing nations was highest in 2005 and 2007 at $2.7 billion and $2.5 billion, respectively (in current dollars). China's arms agreements total in 2011 was $2.1 billion. China's totals can be attributed, in part, to continuing contracts with Pakistan, a key historic client. More broadly, China's sales figures reflect several smaller valued weapons deals in Asia, Africa, and the Near East, rather than to especially large agreements for major weapons systems….
>
> Most Chinese weapons for export are less advanced and sophisticated than weaponry available from Western suppliers or Russia. China, consequently, does not appear likely to be a key supplier of major conventional weapons in the developing world arms market in the immediate future. That said, China has indicated that increasingly it views foreign arms sales as an important market in which it wishes to compete, and has increased the promotion of its more advanced aircraft in an effort to secure contracts from developing countries. China's weapons systems for export seem based upon designs obtained from Russia through previous licensed production programs. Nonetheless, China's likely client base will be states in Asia and Africa seeking quantities of small arms and light weapons, rather than major combat systems.
>
> China has also been an important source of missiles to some developing countries. For example, China has supplied battlefield and cruise missiles to Iran and surface-to-surface missiles to Pakistan. According to U.S. officials, the Chinese government no longer supplies other countries with complete missile systems. However, Chinese entities are suppliers of missile-related technology. Such activity raises questions about China's willingness to fulfill the government's stated commitment to act in accordance with the restrictions on missile transfers set out in the Missile Technology Control Regime (MTCR). Because China has military products—particularly its missiles—that some developing countries would like to acquire, it can present an obstacle to efforts to stem proliferation of advanced missile systems to some areas of the developing world.
>
> China continues to be source of a variety of small arms and light weapons transferred to African states. The prospects for significant revenue earnings from these arms sales are limited. China likely views such sales as one means of enhancing its status as an international political power, and increasing its ability to obtain access to significant natural resources, especially oil. The control of sales of small arms and light weapons to regions of conflict, especially to some African nations, has been a matter of concern to the United States, and others. The United Nations also has undertaken an examination of this issue in an effort to achieve consensus on a path to curtail this weapons trade comprehensively. During July 2012, the U.N. attempted to reach agreement on the text of an Arms Trade Treaty (ATT), aimed at setting agreed standards for member states regarding what types of conventional arms sales should be made internationally, and what criteria should be applied in making arms transfer decisions. At the end the month-long period, set aside for negotiations, this effort failed to achieve the necessary consensus on a treaty draft, and the future success of this effort is in doubt. China, while not a member of the group of U.N. states negotiating the final draft, made it publicly clear that it did not support any treaty that would prevent any state from making its own, independent, national decision to make an arms sale.

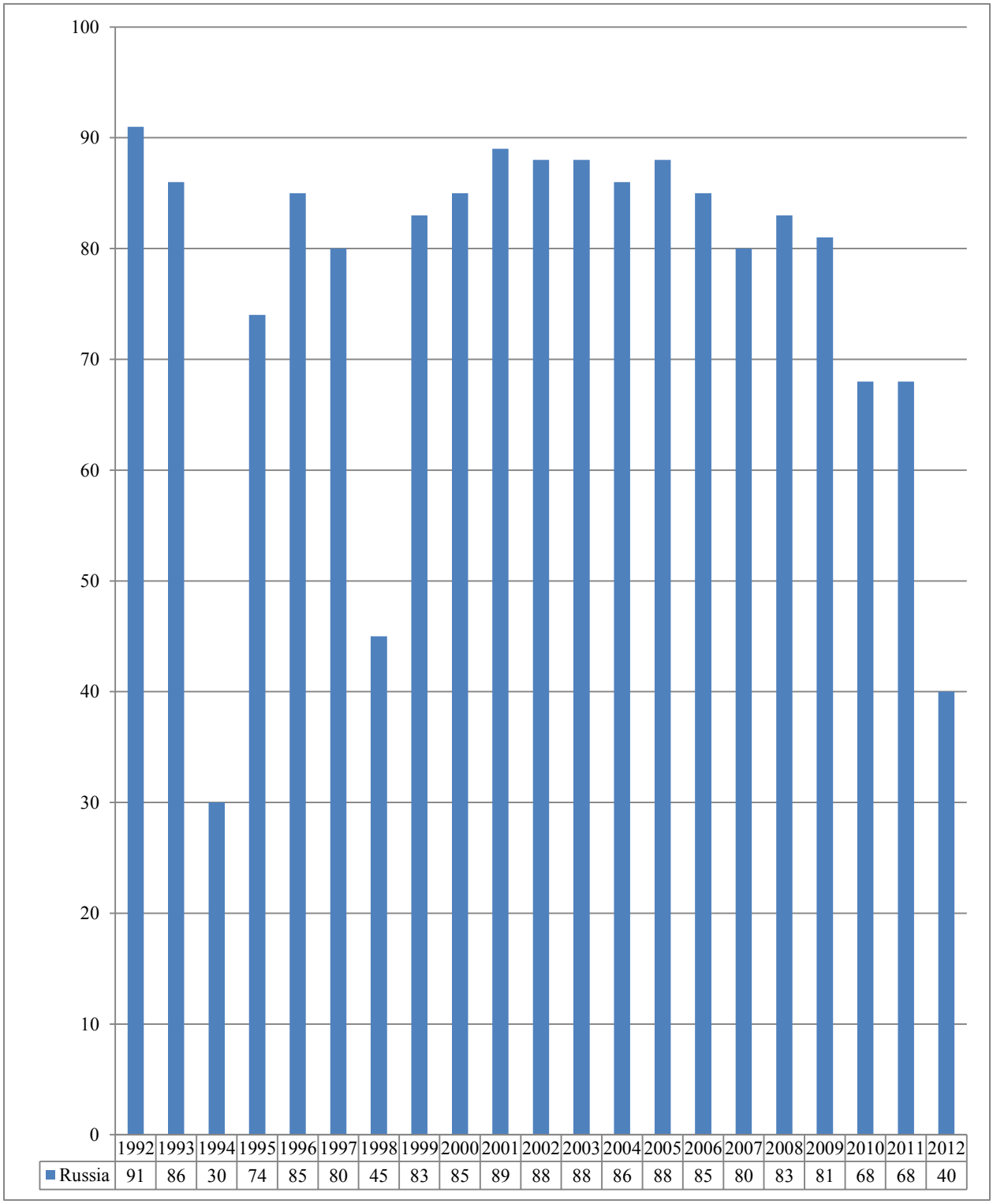
Figure 6.1: Value of Russian Arms Exports to China, 1992-2012 (US$ millions)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Russia	1150	1027	80	498	1241	740	173	1514	1795	3006	2581	2112	2924	3132	2517	1434	1839	1302	636	692	679

Source: SIPRI, "Arms Transfers Database, Importer/Exporter TIV Tables," accessed June 18, 2013. http://armstrade.sipri.org/armstrade/page/values.php.

Figure 6.2: Percentage of Overall PRC Arms Imports from Russia, 1992-2012



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Russia	91	86	30	74	85	80	45	83	85	89	88	88	86	88	85	80	83	81	68	68	40

Source: SIPRI, "Arms Transfers Database, Importer/Exporter TIV Tables," accessed June 18, 2013. http://armstrade.sipri.org/armstrade/page/values.php.

Chapter 7: The PLA Army

Since the mid-1980s, the PLAA has steadily reduced its overall force size and developed modern capabilities and systems in critical areas of the future battlefield. Main Battle Tanks (MBTs), Armored Infantry Fighting Vehicles (AIFVs), Armored Personnel Carriers (APCs), self-propelled artillery, and Air Defense (AD) weaponry have all seen significant improvement with the introduction of newer classes of weapons and upgrades to existing models.

China has steadily restructured its forces to rely more on quality and modernization rather than quantity. **Figure 7.1** below shows a DoD map of the deployment of the PLAA Group Armies issued in May 2013, and **Figure 7.2** shows the DoD's estimate of the PLAA's current strength.

One key goal behind these changes has been improving the PLAA's ability to fight "Local War under Conditions of Informatization" by improving its ability to move quickly, deliver devastating blows without relying on sheer mass, and defending itself from enemy electronic warfare (EW) and air attacks. As a result, the PLAA is more capable of responding to regional contingencies on the Eurasian mainland than it was in the past.

The US Official View

The DoD's 2012 report on China included the following assessment of the impact of modernization on the PLAA:[262]

> The PLA has about 1.25 million ground force personnel, roughly 400,000 of whom are based in the three MRs opposite Taiwan. China continues to gradually modernize its large ground force. Much of the observed upgrade activity has occurred in units with the potential to be involved in a Taiwan contingency. Examples of ground unit modernization include the Type-99 third-generation main battle tank, a new-generation amphibious assault vehicle, and a series of multiple rocket launch systems.
>
> Along with other branches of the PLA, China's large ground force is undergoing significant modernization, and has steadily improved capabilities in most areas. In mid-2011, the PLA began to transform its ground forces into a modular combined arms brigade-focused force structure.
>
> The PLA fielded new rotary wing aviation assets in 2011, with the initial fielding of a new, domestically-produced attack helicopter, the Z-10, as well as major growth in the number of multi-purpose helicopters in army aviation units across the force. As 2011 ended, numerous indicators pointed to the start of an expansion of the majority of army special forces units. An improved amphibious assault vehicle has also entered service in key PLA units.
>
> Throughout the PLA, growing numbers of modern heavy-armor, long-range strike artillery, and increased-range air defense weapons have entered service in selected units. Concurrent with this modernization, the ground force has emphasized combined arms operations and long-range mobility.
>
> China's ground forces remain challenged by a lack of combat experience and self-identified limitations in the leadership abilities of its command staff, particularly at operational levels.
>
> These problems have long been exacerbated by a lack of realism in training. However, the PLA began executing plans in 2011 designed to help overcome these issues by 2020, including increased force-on-force training against dedicated opposing force units, adopting simulator use for training, developing automated command tools to aid command decisions, and increasing the education levels and science and technology training of PLA commanders and staff officers.

It also provided the following background on PLAA missions, capabilities, and potential force utilization,[263]

The PLA is investing heavily in modernizing its ground force, emphasizing the ability to deploy campaign-level forces across long distances quickly. This modernization is playing out with wide-scale restructuring of PLA ground forces that includes a more rapid, flexible special operations force equipped with advanced technology; improved army aviation units utilizing ultra-low altitude mobility helicopters armed with precision-guided munitions; and command and control (C2) capabilities with improved networks providing real-time data transmissions within and between units.

In addition, the PLA has focused its modernization efforts on transforming from a motorized to a mechanized force, as well as improving the ground force's armored, air defense, aviation, ground-air coordination, and electronic warfare (EW) capabilities. PLA ground forces have benefited from increased production of new equipment, including the Z-10 and Z-19 attack helicopters. New air defense equipment includes the PLA ground force's first medium-range SAM, the CSA-16, as well as domestically-produced CSA-15s (a copy of the Russian SA-15) and a new advanced self-propelled air defense artillery system, the PGZ-07. PLA ground force restructuring is highlighted by the development of brigades as a key operational echelon for combat in diverse terrain and under complex electromagnetic conditions.

The ground force is a proponent of joint operations since it requires transport from other forces to operate beyond China's borders. To assist with its power projection needs, PLA ground forces have practiced using commercial transport assets such as roll-on/roll-off ships, to conduct maritime crossing operations. However, broader joint operations capability are still the primary goal for the ground force, a goal that is now a mandate for all the military services following the General Staff Department's (GSD) December 2011 creation of the Military Training Department to oversee all PLA training, ensuring all military services realize the "prominence of joint training."

…. Although Taiwan continues to dominate the PLA's force modernization agenda… Beijing is investing in military programs and weapons designed to improve extended-range power projection and operations in emerging domains such as cyber, space, and electronic warfare. Current trends in China's weapons production will enable the PLA to conduct a range of military operations in Asia well beyond Taiwan, in the South China Sea, western Pacific, and Indian Ocean. Key systems that have been either deployed or are in development include ballistic missiles (including anti-ship variants), anti-ship and land attack cruise missiles, nuclear submarines, modern surface ships, and an aircraft carrier. The need to ensure trade, particularly oil supplies from the Middle East, has prompted China's navy to conduct counter-piracy operations in the Gulf of Aden. Disputes with Japan over maritime claims in the East China Sea and with several Southeast Asian claimants to all or parts of the Spratly and Paracel Islands in the South China Sea have led to renewed tensions in these areas. Instability on the Korean Peninsula could also produce a regional crisis involving China's military. The desire to protect energy investments in Central Asia, along with potential security implications from cross-border support to ethnic separatists, could also provide an incentive for military investment or intervention in this region if instability surfaces.

China's political leaders have also charged the PLA with developing capabilities for missions such as peacekeeping, disaster relief, and counterterrorism operations. These capabilities will increase Beijing's options for military influence to press its diplomatic agenda, advance regional and international interests, and resolve disputes in its favor.

China has become more involved in HA/DR operations in response to the "New Historic Missions." China's ANWEI-class military hospital ship (the *Peace Ark*) has deployed throughout East Asia and to the Caribbean.

China has conducted more than ten joint military exercises with the SCO members, the most prominent being the PEACE MISSION series, with China and Russia as the main participants.

China continues its Gulf of Aden counter-piracy deployment that began in December 2008. Outside of occasional goodwill cruises, this represents the PLA Navy's only series of operational deployments beyond the immediate western Pacific region.

The Japanese Official View

The 2013 Japanese white paper provided the following summary description of the PLA:[264]

The size of the Chinese ground forces is the largest in the world with approximately 1.6 million personnel.

> Since 1985, China has continuously sought to modernize its armed forces by curtailing the number of personnel and streamlining organizations and systems in order to improve efficiency. China aims to develop highly capable military forces, while reducing units inferior in equipment and technologies.
>
> Specifically, it is improving mobility by such measures as switching from the past regional-defense model to a nationwide-mobile model, working to motorize and mechanize its infantry. In addition, China is believed to be strengthening its airborne troops (belonging to the Air Force) and special operations forces and helicopter units. It is continuing its efforts to make its military units multi-functional, to build a command system for improvement of its integrated strategic abilities and efficient operations, and also to work on reforms to improve its logistical support capabilities.
>
> In 2009, China carried out "Stride 2009" exercises which traversed across military regions and were deemed its largest ever exercises of this type, and it also carried out similar "Mission Action 2010" exercises in 2010. These exercises are believed to have been designed to verify and improve capabilities necessary for deployment of army units to distant areas, such as the army's long-range maneuvering capabilities and logistical support capabilities, including mobilization of militia and public transportation.

Overall Trends in Manpower and Equipment

Figure 7.3 portrays the declining manpower of the PLAA as well as the shifts in equipment holdings from 1985-2013. Key indicators shown in later figures relate to force structure, manpower, and equipment. Regarding force structure, these key indicators include the decreasing number of large formations such as divisions, especially infantry divisions, and the simultaneously increasing number of smaller units, such as brigades and specialized regiments. Manpower changes are listed at the top of the table and record a nearly 50% decrease in PLAA manpower. Key indicators regarding equipment trends include the retirement of vintage Soviet systems and the deployment of advanced 90s-type MBTs, 00s-type AIFV/APCs, self-propelled artillery, and self-propelled AD systems.

The **Figures** that follow reinforce the assessment of the growing impact of modernization and show consistent movement from a large force dependent on masses of manpower and lower quality weaponry to a smaller force reliant on better-trained personnel and improving weapon systems. The balance between modern and non-modern equipment is shown in later figures. It is important to note that a range of sources exists with different figures and estimators. With the exception of the figures that rely on DoD data, the data used in most graphs and tables in Chapter 7 are taken with minor modifications from various editions of the IISS' *Military Balance*.

Figure 7.1: Deployment of PLAA Group Armies

CHINA: Group Armies (GA) Primary Missions

Shenyang MR	**Nanjing MR**	**Lanzhou MR**
16 GA – Defensive, Offensive CT	1 GA – Amphibious, Offensive CT	47 GA – Defensive, Offensive CT
39 GA – RRU, Offensive MF	12 GA – Amphibious, Offensive CT	21 GA – Offensive MF, Defensive
40 GA – Defensive, Offensive CT	31 GA – Amphibious, Offensive CT	
Beijing MR	**Guangzhou MR**	
65 GA – Defensive	15 Airborne – RRU, Offensive MF	
38 GA – RRU, Offensive MF	41 GA – Offensive CT, Amphibious	MR – Military Region
27 GA – Defensive	42 GA – Amphibious	MF – Mobile Force
Jinan MR	**Chengdu MR**	RRU – Rapid Reaction Unit
26 GA – Offensive CT, Defensive	13 GA – Defensive, Offensive CT	CT – Complex Terrain (mountain, urban, jungle, etc.)
20 GA – Offensive CT, Defensive	14 GA – Defensive, Offensive CT	
54 GA – Offensive MF, Amphibious		

Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 77.

Figure 7.2: PLAA Force Strength in 2013

	Total
Personnel (Active)	1.25 million
Group Armies	18
Infantry Divisions	15
Infantry Brigades	16
Mechanized Infantry Divisions	6
Mechanized Infantry Brigades	17
Armor Divisions	1
Armor Brigades	16
Artillery Divisions	2
Artillery Brigades	17
Airborne Divisions	3
Amphibious Divisions	2
Amphibious Brigades	3
Tanks	7,000
Artillery Pieces	8,000

Note: PLA ground forces are organized into group armies. Most infantry, armor, and artillery units are organized into a combination of divisions and brigades deployed throughout the PLA's seven MRs.

Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2013, Appendix 2.

Shifts in Force Structure

Figure 7.3 reveals a number of key changes in force structure. The first is a nearly 50% reduction in Group Armies (GAs) within the PLAA. This reduction coincides with a significant decrease in army divisions within the PLAA, much of which can be accounted for by the nearly 100% reduction in infantry, artillery, and air defense divisions. In addition, there have been moderate reductions in motorized and armored divisions. The two exceptions to this general trend have been the development of a moderate increase in mechanized divisions and air defense reserve divisions.

The reductions in large unit formations also coincide with significant increases in smaller formations such as brigades and specialized regiments. Although reliable data before 1995 on brigade numbers within the PLAA are not available, the trends since 1995 indicate moderate increases in armored and mechanized brigades, as well as significant increases in motorized, artillery, and AD brigades. In addition, there have been considerable increases in the number of specialized signals regiments, and, despite a decline earlier in the 2000s, there are also significant numbers of engineering regiments. These changes indicate that mechanization and specialization have increased relatively within the PLAA.

These general trends toward smaller forces and specialization indicate that the PLAA has and is reforming itself to meet the demands of winning "Local War under Conditions of Informatization." The reduction of larger formations, the increase of smaller and specialized formations, and the reduction in the number of GAs all enable the creation of a leaner, more agile, and more mobile force capable of quickly moving from one Military Region (MR) within China to a contingency on any of China's borders. This skill would better enable the PLAA to win local contingencies which, according to the Local Wars construct, would be immediate instances of conflict that would be limited in time and place: the goal of the PLAA would be to create the circumstances needed for a Chinese victory at the negotiating table, for which speed is a requirement of political success.

Shifts in Manpower

Figure 7.3 also shows that there has been a nearly 50% reduction in PLAA manpower since 1985. This manpower trend, in combination with the increase in specialized and smaller formations, indicates a PLAA focus on agility and mobility over mass, a shift that necessitates higher human capital and higher quality equipment.

In addition, manpower reduction, all else being equal, indicates lower maintenance costs for the PLAA and thus greater resource availability for modernization efforts and improvements in human capital. **Figure 7.4** displays this manpower trend over the years 1985-2013.

Figure 7.3: PLA Ground Forces – Force Structure, 1985-2013

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
Manpower (all PLA + paramilitary forces + reserves)*	9,000,000+	4,230,000	4,130,000	3,570,000	4,655,000	3,455,000	3,425,000-3,455,000
Active	4,000,000	3,120,000	3,020,000	2,470,000	2,355,000	2,285,000	2,285,000
Conscript	?	1,350,000	1,275,000	1,000,000	990,000	?	840,000+
Army	3,160,000	2,300,000	2,200,000	1,700,000	1,600,000	1,600,000	1,600,000
Navy	350,000	260,000	260,000	220,000	255,000	255,000	255,000
Air Force	490,000	470,000	470,000	420,000	400,000	330,000	300,000-330,000
Strategic Missile Forces	?	90,000	90,000	100,000+	100,000	100,000	100,000
Paramilitary	?	incl. in reserve	1,200,000	1,100,000	1,500,000	660,000	660,000
Reserve	5,000,000	1,200,000 Paramil.)	?	500-600,000	800,000	510000	510,000

	1985	1990	1995	2000	2005	2010	2013
Army Combat Units							
Army Group	35	24	24	21	18	18	18
Armored Division	13	10	10	10	9	8	5
Infantry division	118	80	78	44	15	0	0
Mechanized Infantry Division	?	?	2	7	5	8	9
Motorized Infantry division	?	?	0	0	24	15	14
Amphibious Assault division	?	?	0	0	2	2	0
Artillery Division	17	some	5	5	7	2	2
Air-Defense Artillery Division	16	5-6	0	0	0	0	0
Armored Brigade	?	?	2	12	12	8	11
Mechanized Infantry brigade	?	?	0	?	1	7	10
Motorized Infantry Brigade	?	?	0	?	22	21	21
Infantry Brigade	?	?	0	13	0	0	0
Artillery Brigade	some	?	0	20	14	16	17
Air-Defense Artillery Brigade	?	?	5	4	12	?	?
Anti-Tank Brigade	?	?	0	0	1	0	0
Air-Defense Brigade	some	some	0	0	9	21	21
Anti-Tank Regiment	?	?	0	0	4	0	0
Helicopter Regiment	?	2 groups	some	7	0	0	0
Engineer Regiment	50	50	15	0	0	15	13
Signals Regiment	21	?	0	0	0	50	50

Army Reserves							
	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
Infantry Division	?	30+	?	50 inf, arty, AD, 100 inf, arty reg	30	?	18
Air-Defense Division	?	?	?	some	13	?	17
Logistic support brigade	?	?	?	?	7	?	?
Artillery Division	?	?	?	some	3	?	3
Army Equipment							
	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
Major Battle Tanks	**8,650** (+lt. tank)	**7,500-8,000**	**7,500-8,000**	**7,060**	**7,580**	**6,550**	**7,430**
T-34	some	0	700	0	0	0	0
T-54	some	some	some	0	0	0	0
Type-59/59D/59-II	some	6,000	6,000	5,500	5,000	4,000+	4,300
Type-69-I	some	200	200	150	0	0	0
Type-79	0	some	some	500	300	300	300
Type-80	0	some	some	0	0	0	0
Type-85	0	0	some	0	0	0	0
Type-88A/88B	0	0	0	900	1,000	500	500
Type-96/96A/88C	0	0	0	0	1,200	1,500	1,500
Type-96G	0	0	0	0	0	0	0
Type-98A/99	0	0	0	10+	80	250	500
Type-99A2	0	0	0	0	0	0	30+

	1985	1990	1995	2000	2005	2010	2013
Light Tanks	**?**	**2,000**	**2,000**	**2,000**	**1,000**	**1,000**	**800**
Type-62	some	1,200	800	800	400	400	400
Type-63/63A	some	800	1,200	1,200	600	400	200
	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
	0	0	0	0	0	200	200
Armored Infantry Fighting Vehicle	**?**	**some**	**some**	**4,800 (+ APC)**	**1,000**	**1,140**	**2,150**
Type-03	0	0	0	0	0	40	0
Type-04	0	0	0	0	0	300	500
Type-05	?	0	0	some	1,000	200	250
Type-08	0	0	0	0	0	0	100
Type-86/86A	?	0	0	some	1,000	600	500
Type-92	0	0	0	0	0	0	650
Type-92A	0	0	0	0	0	0	150
Armored Personnel Carrier	**2,800**	**2,800**	**2,800**	**5,500**	**3,500+**	**3,300+**	**2,900**
Type-531C/D/E	some	some	some	0	0	0	0
YW-534	0	some	some	0	0	0	0
Type-85 (Type 89 or WZ 534)	0	some	some	0	0	0	0
Type-55 (BTR-40)	some	some	some	0	0	0	0
Type-56 (BTR-152)	some	some	some	0	0	0	0
Type-09	0	0	0	0	0	100	300
Type-63	some	some	some	1,800	2,300	2,000	1,650
Type-89I	0	0	0	some	300	300	350
Type-77II	0	0	0	some	200	200	0
Type-92 (WZ 551)	0	0	0	some	600+	600+	500
WZ-523/553	0	0	0	some	100	100	100
BMD-3	0	0	0	100	0	0	0

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
Artillery	**12,800**	**14,500+**	**14,500+**	**15,800+**	**17,700+**	**17,700+**	**12,367+**
Towed	*some*	*14,500*	*14,500*	*12,000*	*14,000*	*14,000*	*6,140*
85mm - Type-56	some	0	0	0	0	0	0
100mm	some	some	some	some	some	some	0
Type-59 (M-1944)	?	some	some	some	some	some	0
Type-89	0	some	some	0	0	0	0
122mm	some	some	6,000	some	some	some	3,800
Type-54-1 (M-30)	some	some	some	some	some	some	some
Type-60 (D74)	some	some	some	some	some	some	some
Type-83	0	some	some	some	some	some	some
Type-96 (D-30)	some	some	some	0	0	some	some
130mm - Type-59/59-I (M-46)	some	some	1,000	some	some	some	234
152mm	some	some	1,400+	some	some	some	2,106
Type-54 (D1)	0	some	some	some	some	some	some
Type-56	some	0	0	0	0	0	0
Type-66 (D20)	some	some	1,400	some	some	some	some
Type-83	0	some	some	some	0	0	0
155 mm - Type-88 WAC-21	0	0	30	300+	150	150	150

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
Self-Propelled	*some*	*some*	*some*	*1,200*	*1,200*	*1,280+*	*1,821*
122mm	some	some	some	some	700	700+	1,371
Type-53I	some	0	0	0	0	0	0
Type-54I	0	some	some	0	0	0	0
Type-70I	0	0	0	some	200	200	some
Type-85	0	0	some	0	0	0	0
Type-89	0	0	0	some	500	500	some
Type-07	0	0	0	0	0	some	some
Type-09	0	0	0	0	0	0	75
152mm - Type-83	0	some	some	some	500	500	324
155mm - Type-05	0	0	0	0	0	80	126
Multiple Rocket Launcher	*4,500*	*3,800*	*3,800*	*2,500*	*2,400*	*2,400+*	*1,770+*
107mm - Type-63 (towed)	some	some	some	0	0	some	54
107mm (self-propelled)	0	0	0	0	0	0	some
122mm	some	some	some	some	some	some	1,620
Type-63	some	0	0	0	0	0	0
Type-81	0	some	some	some	some	some	some
Type-83	0	some	some	0	0	0	0
Type-89 SP	0	0	0	some	some	some	some

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
130mm	some	some	some	some	some	some	0
Type-63	some	some	some	0	0	some	0
Type-70 SP	0	some	some	some	some	some	0
Type-82	0	0	some	some	some	some	0
Type-85	0	0	some	0	0	0	0
132 mm - BM-13-16	some	some	some	0	0	0	0
140mm - BM-14-16	some	some	some	0	0	0	0
180mm	some	0	0	0	0	0	0
273mm - Type-83	0	some	some	some	some	0	0
284mm - Type-74 minelayer	0	some	some	0	0	0	0
300mm - Type-03	0	0	0	0	0	some	96
320mm - Type-96 (WS-1)	some	some	some	some	some	0	0
400mm - WS-2/Ws-2D	0	some	some	0	0	some	0
425mm - Type-762 mine clearance	0	some	some	0	0	0	0
Gun/Mortar	*some*	*some*	*some*	*some*	*some*	*some*	*2,586*
81mm - Type-W87	0	0	0	some	some	some	some
82mm	some	some	some	some	some	some	some
Type-53(M-37)	some	some	Some	some	some	some	some
Type-67	0	0	0	some	some	some	some
Type-82	0	0	0	some	some	some	some
Type-84	0	some	0	0	0	0	0
YW-304 SP	0	some	0	0	0	0	0
100mm - Type-71	0	0	0	some	some	some	some

	1985	1990	1995	2000	2005	2010	2013
120mm	some	some	some	some	some	some	some
Type-55	some	some	some	some	some	some	some
Type-W86	0	some	0	0	0	0	0
2S23 NONA-SVK	0	0	0	0	0	100	0
Type-05 (PLL-05)	0	0	0	0	0	50	50+
160mm - Type-56(M-160)	some	some	some	some	some	some	some

	1985	1990	1995	2000	2005	2010	2013
Anti-Tank	**?**	**some**	**some**	**7,300+**	**7,200+**	**7,460+**	**some**
Missiles	*?*	*some*	*some*	*7,000*	*7,200*	*7,200*	*some*
MANPATS	?	some	some	some	some	7,176	some
HJ-73A	?	some	some	some	some	some	some
HJ-73B	?	0	some	some	some	some	some
HJ-73C	?	0	some	some	some	some	some
HJ-8A	?	some	some	some	some	some	some
HJ-8C	?	0	some	some	some	some	some
HJ-8E	?	0	some	some	some	some	some
Self-Propelled	0	0	0	0	24	24	276
HJ-9	?	0	0	0	24	24	276
AT-5 Sagger	some	0	0	0	0	0	
Recoilless	*some*	*some*	*?*	*some*	*some*	*some*	*3,966+*
40mm	some	0	?	0	0	0	0
57mm	some	0	?	0	0	0	0
62mm - Type70-1	?	0	0	some	some	some	0
75mm	some	some	some	some	some	some	some
Type-52	?	some	some	0	0	0	0
Type-56	?	some	some	some	some	some	some
82mm - Type-65 (B-10)/Type-78	some	some	some	some	some	some	some
90mm - Type-51	some	some	some	0	0	0	0
105mm - Type-75	0	0	0	some	some	some	some
120mm	0	0	0	0	0	some	some
Type-98	0	0	0	0	0	some	some
Guns	*some*	*some*	*some*	*300+*	*?*	*260+*	*1,888*
57mm - Type-55	some	some	some	0	0	0	0
76mm - Type-54	some	some	some	0	0	0	0

	1985	1990	1995	2000	2005	2010	2013
100mm	0	some	some	some	?	some	1,658
Type-73 (T12)/ Type-86	0	some	some	some	?	some	1,308
Type-02	0	0	0	0	0	160	350
120mm - Type-89 SP	0	0	0	300+	?	100+	up to 230
Air Defense	**some**	**some**	**some**	**some**	**some**	**some**	**some**
Surface-to-Air Missile	*0*	*some*	*some*	*some*	*284+*	*290+*	*302+*
Self-Propelled	some	some	some	some	284	290	302
HQ-61(CSA-N-2)	0	some	some	some	24	0	0
HQ-7/7A	0	0	0	some	200	200	200
9K331 Tor-M1 (SA-15 *Gauntlet*)	0	0	0	some	60	60	60
HQ-6D	0	0	0	0	0	0	30
HQ-16	0	0	0	0	0	0	12
MANPAD	0	some	some	some	some	some	some
HN-5A/B	0	some	some	some	some	some	some
FN-6	0	0	0	0	0	some	some
QW-1	0	0	0	some	some	some	some
QW-2	0	0	0	some	some	some	some
Guns	*15,000*	*15,000*	*15,000*	*some*	*7,700*	*7,700+*	*7,700+*
Self-Propelled	0	0	0	0	0	some	some
25mm - Type-95/Type-04	0	0	0	0	0	some	some
35mm - Type-07	0	0	0	0	0	0	some

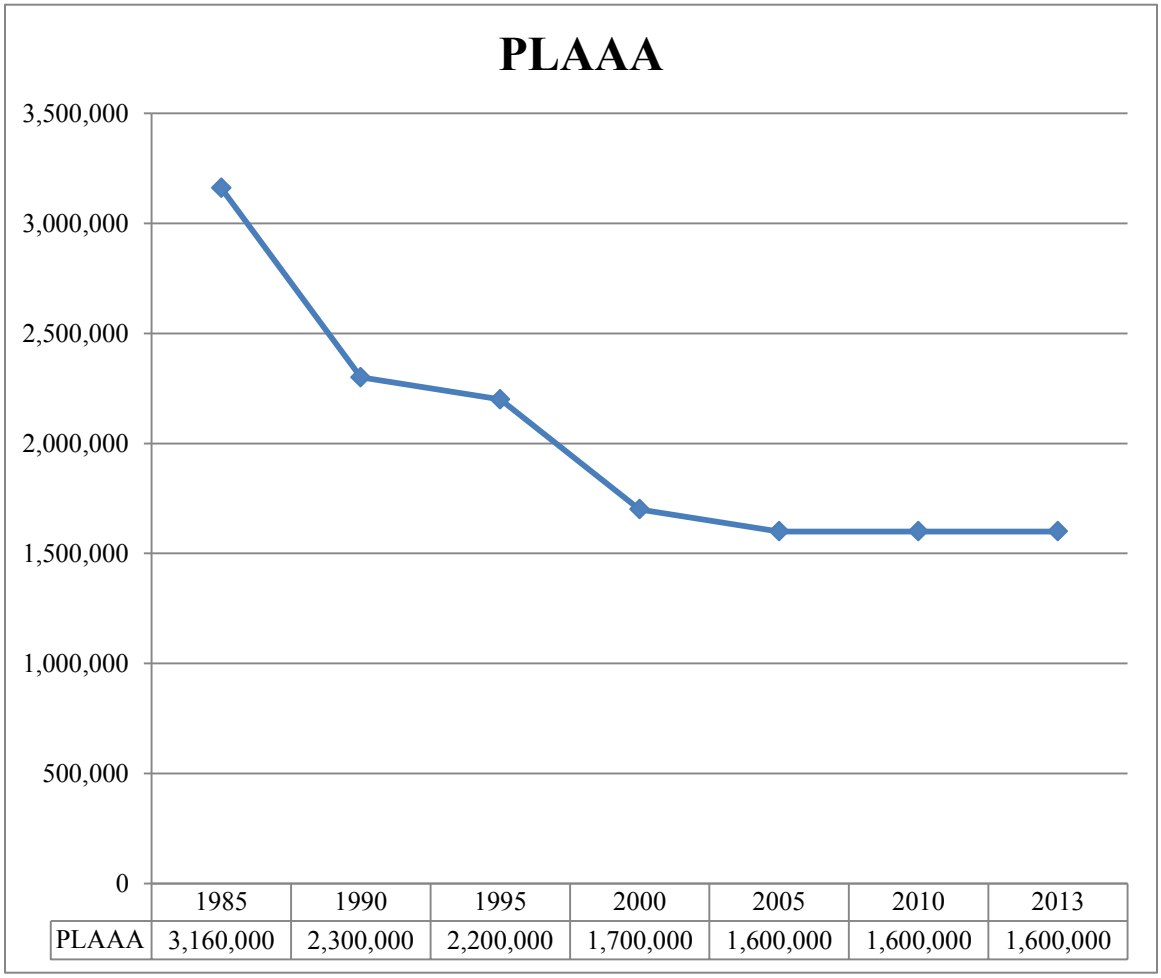
	1985	1990	1995	2000	2005	2010	2013
37mm - Type-88	0	0	0	0	0	some	some
57mm - Type-80	0	0	0	0	0	some	0
Towed	some	some	some	some	some	some	some
23mm – Type-80 (ZU-23-2)	0	some	some	some	some	some	some
25mm - Type-85	0	0	0	some	some	some	some
35mm - Type-90 (GDF-002)	0	0	0	some	50+	some	some
37mm	0	some	some	some	?	some	some
Type-55	0	0	0	0	0	some	some
Type-63	some	some	some	0	0	0	0
Type-65	0	some	some	some	some	some	some
Type-74	0	some	some	some	some	some	some
57mm - Type-59 (S60)	some	some	some	some	some	some	some
85mm - Type-56 (KS-12)	some	some	some	some	some	some	some
100mm - Type-59 (KS-19)	some	some	some	some	some	some	some
Radar, land-based	**?**	**?**	**some**	**some**	**some**	**some**	**some**
Cheetah (Arty)	?	?	some	some	some	some	some
RASIT (Arty)	?	?	some	some	some	some	some
Type-378	?	?	some	some	some	some	some
Y-8 aircraft	?	?	0	2	0	0	0
Missile, Tactical	**0**	**some**	**some**	**0**	**?**	**some**	**some**
M-9 (CSS-6/DF-15)	0	some	some	0	some	96	0

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
M-11 (CSS-7/DF-11)	0	0	some	0	some	108	0
HY-1 (CSS-N-2) Silkworm	0	0	0	0	0	some	some
HY-2 (CSS-C-3) Seerseeker	0	0	0	0	?	some	some
HY-4 (CSS-C-7) Sadsack	0	0	0	0	?	some	some
YJ-62C (C-602C)	0	0	0	0	0	some	0
KD-10	0	0	0	0	0	0	some
Helicopters	**0**	**?**	**62**	**212+**	**381**	**499+**	**677**
Attack	*0*	*?*	*0*	*0*	*some*	*0*	*42*
Z-10	0	?	0	0	some	0	30
Z-19	0	0	0	0	0	0	12
Multi-role	*0*	*?*	*38*	*105*	*193*	*211*	*401*
Mi-17	0	?	0	24	47	22	22
Mi-17-V	0	0	0	0	0	9	0
Mi-17-V5	0	?	0	?	69	42	33
Mi-17-V7	0	0	0	0	0	12	24
Z-9/A/B	0	?	30	73	61	0	80
Z-9WA	0	0	0	0	0	100	200
Z-9W	0	0	0	0	0	26	26
SA-342/342L	0	?	8	8	8	0	8
SA-316	0	?	0	0	8	0	8
Transport	*0*	*?*	*24*	*107+*	*188*	*200*	*234*
Mi-8/8T	0	?	0	30	30	50	50
Mi-171	0	?	0	30	45	57	69
Mi-172	0	0	0	0	0	8	8
Mi-6	0	?	0	3	3	3	0
Mi-26	0	0	0	0	0	4	4
Z-8/SA-321	0	?	0	4	7	7	17
WZ-9	0	?	0	some	31	0	0

	1985	1990	1995	2000	2005	2010	2013
S-70C2	0	?	24	20	19	18	18
Z-11/AS-350	0	?	0	20	53	53	53
HC120/EC120	0	0	0	0	0	0	15

Source: IISS, *IISS Military Balance,* 1984-2013.
*Numbers vary widely due to inconsistent reporting and classification. Some reported numbers do not add up in the original source.

Figure 7.4: Historical Trends in total PLAA Manpower, 1985-2013



Source: IISS. *Military Balance,* 1985-2013.

Trends in Major Equipment Strength

Total manning, however, is one the least insightful aspects of force quality – a fact confirmed by how rarely force ratios in manpower have shaped the outcome of battles and war relative to strategy, tactics, leadership, force organization, training, and the quality of arms. **Figures 7.5 and 7.6** supplement the data in **Figure 7.3** by showing the historical changes in the PLAA's inventory of MBTs, AIFV/APCs, Artillery, and Multiple Rocket Launchers (MRLs).

These systems have been chosen for analysis both because they are integral to any land force's combat power and because there exist consistent data on Chinese holdings of these systems. While it would be useful to include PLAA AD holdings, there is simply not enough data on AD to meaningfully analyze it quantitatively.

- **Figure 7.5** shows that the number of MBTs and MRLs in the PLAA have dropped significantly since 1985, and the number of artillery pieces has also significantly dropped since its peak in 2010. In contrast, the number of AIFV/APCs has markedly increased during this time period, an outcome that is unsurprising given the increased mechanization within the PLAA's force structure.
- **Figure 7.6** compares PLAA weapon system numbers to the size of the PLAA's modern weapons system inventory. Such a comparison is necessary in order to better ascertain the PLAA's combat power as well as to track its development towards a force capable of winning Local Wars.

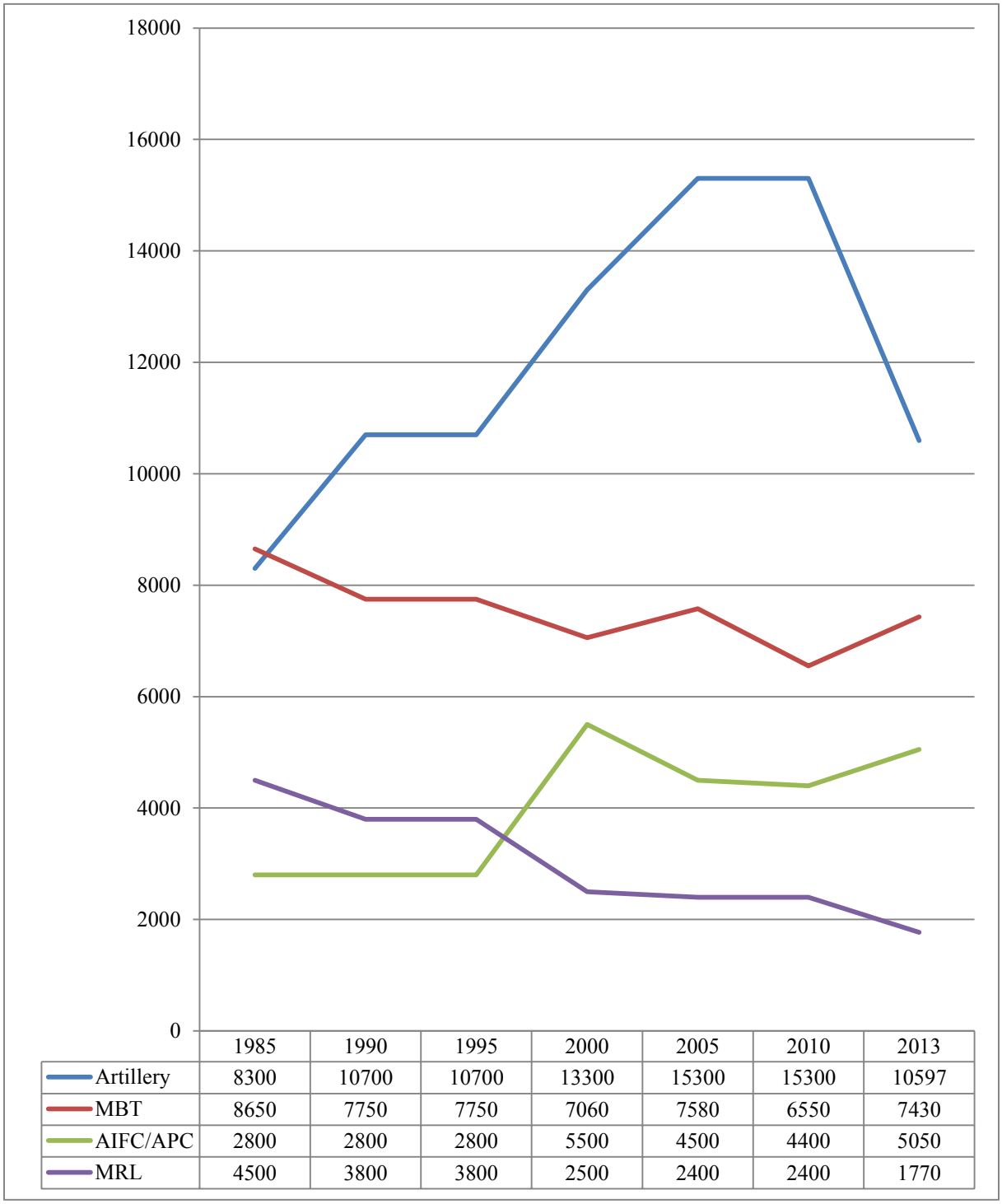
As **Figure 7.6** shows, the relative reduction in major PLA weapons systems shown in **Figure 7.5** coincides with an overall increase in the number of modern systems in the PLAA inventory. Consequently, the PLAA, while reducing its overall force size, is replacing large numbers of its obsolete equipment with much more capable systems.

The weapons systems considered modern are defined as follows:

- Modern MBTs are tanks with sufficient armor, firepower, and electronics to hold third generation or near-third generation capabilities. Third generation tanks have composite and reactive armor, typically fire rounds of 120 mm or larger, and have gun-stabilizers and advanced fire control electronics.
- Modern AIFV/APCs are personnel carriers capable of keeping pace with third generation tanks and surviving in a comparable battlefield environment.
- Self-propelled artillery comprises artillery pieces that are built into motorized chassis and capable of movement without the aid of supporting vehicles.
- MRLs are generally not differentiated between towed and self-propelled because reliable data on self-propelled MRLs are not available.

This practice has implications for the PLAA's tactics and strategy. The Local Wars concept requires the PLAA to rapidly overwhelm a regional adversary before political dynamics end the conflict. Moreover, in that short time, the PLAA must obtain the military advantages necessary to ensure success in subsequent negotiations. A more modern force, especially one with modern equipment concentrated into elite units, enables the PLAA to conduct this type of warfare while still in the process of modernization. In fact, the DoD's *Military and Security Developments Involving the People's Republic of China 2011* indicated that the PLAA was deploying its modern weaponry in this manner with a special focus on units suitable for a Taiwan contingency, such as the PLA's amphibious divisions.[265]

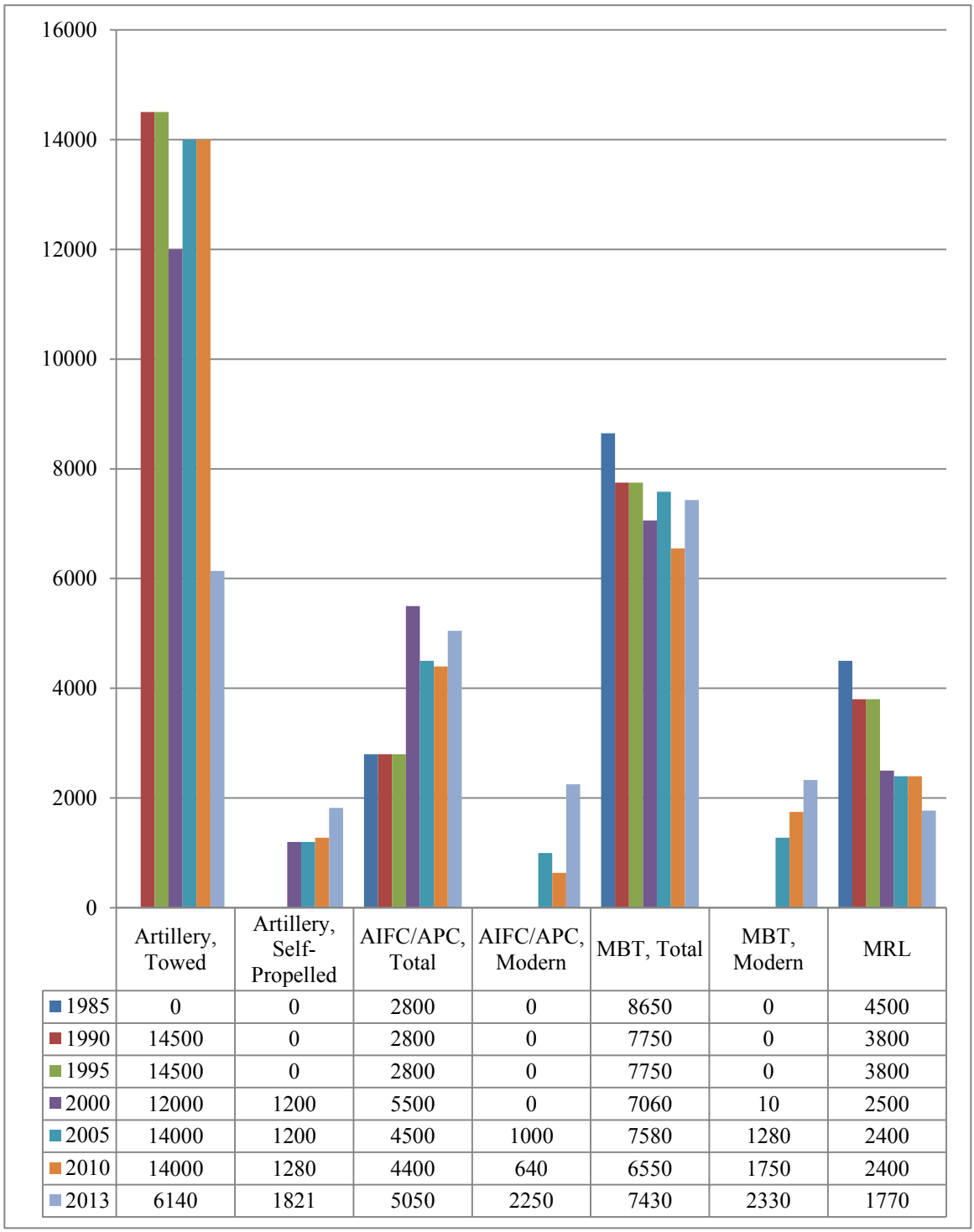
Figure 7.5: Summary Trends in PLA Major Weapon System Inventory, 1985-2013



	1985	1990	1995	2000	2005	2010	2013
Artillery	8300	10700	10700	13300	15300	15300	10597
MBT	8650	7750	7750	7060	7580	6550	7430
AIFC/APC	2800	2800	2800	5500	4500	4400	5050
MRL	4500	3800	3800	2500	2400	2400	1770

Source: IISS, *Military Balance,* 1985-2013.

Figure 7.6: Historical PLAA Equipment Inventory of Major Weapon Systems, 1985-2013



	Artillery, Towed	Artillery, Self-Propelled	AIFC/APC, Total	AIFC/APC, Modern	MBT, Total	MBT, Modern	MRL
1985	0	0	2800	0	8650	0	4500
1990	14500	0	2800	0	7750	0	3800
1995	14500	0	2800	0	7750	0	3800
2000	12000	1200	5500	0	7060	10	2500
2005	14000	1200	4500	1000	7580	1280	2400
2010	14000	1280	4400	640	6550	1750	2400
2013	6140	1821	5050	2250	7430	2330	1770

Source: IISS, *Military Balance,* 1985-2013.

Equipment Modernization

The PLAA's major weapons system modernization has occurred through a combination of discarding obsolete equipment and procuring modern, information technology-enabled equipment. The larger effect of the PLAA's modernization has been to mechanize a force once heavily comprised of infantry and motorized forces and to integrate weaponized information technology into mechanized systems.

The PLAA's efforts to develop third generation armored systems, as well as high-end MBTs in the Type-99, have led to concentrations of powerful armored formations. These concentrations of modern combat power, especially in the regions opposite Korea and Taiwan as well as in Beijing, are seen by some military analysts as forming quick reaction forces for the most likely contingencies the PLAA may have to face.[266]

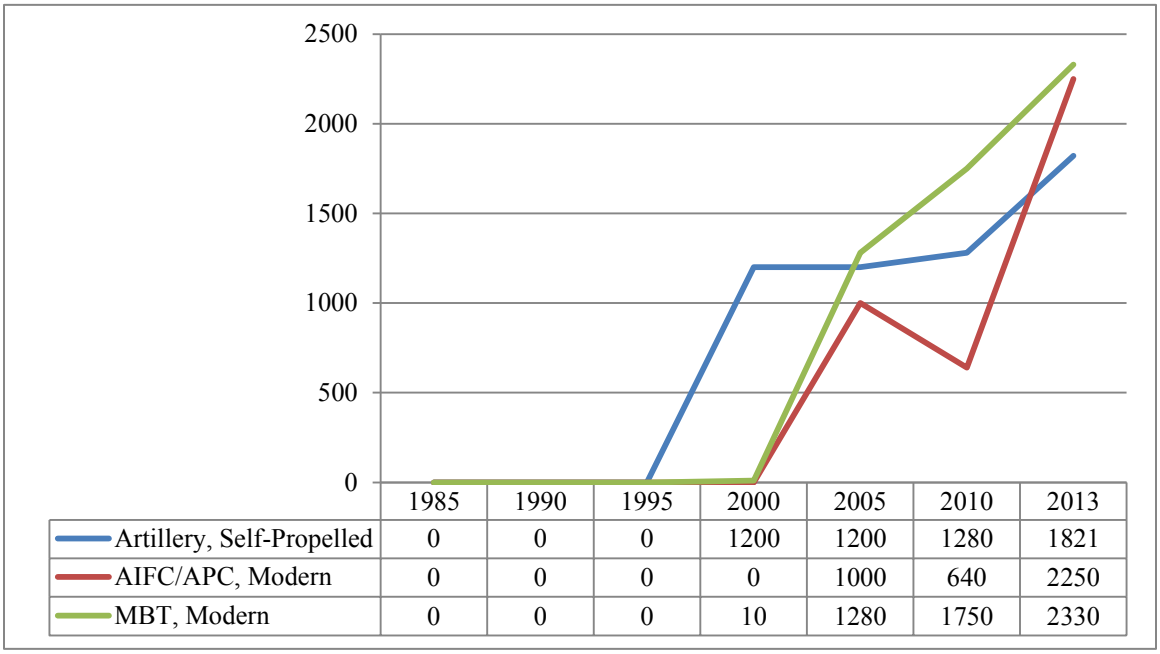
- **Figure 7.7** displays the PLAA's procurement of modern main weapon systems. The procurement began with artillery in 1995 and included MBTs and AIFV/APCs in 2000. Over the last two decades, the modernization of the PLAA has continued at a sustained pace.
- **Figure 7.8** provides indicators of the PLAA's modernization progress. As the data indicate, the PLAA has experienced a sharp rise in the percentage of its equipment that is considered modern. Approximately 15% of all artillery is self-propelled, 31% of MBTs are third generation, and 45% of AIFV/APCs are modern. These numbers are in stark contrast to 9%, 0%, and 0.1%, respectively, in the year 2000. Consequently, the PLAA has engaged in an effective modernization program that has absolutely and relatively increased the modern equipment of the PLAA, significantly altering the composition of the PLAA.

The PLAA's ability to successfully fight Local Wars, as well as its combat power, is strongly affected by the composition of its ground force. This metric enables the observer to track PLAA modernization progress, determine how much or which part of the PLAA is capable of fighting Local Wars, and, in turn, observe indicators of the PLA's total combat power. However, it is important to reiterate that quantitative measures do not show the intangibles of leadership, morale, training, and combat skill and thus, alone, cannot provide a full picture of combat power.

In the case of the PLAA, a relatively more modern force, assuming the personnel manning that force have been adequately trained and led, enables more demanding strategic and tactical maneuvers and battle plans. The ability to rapidly shift MRs and then fight in a border region in good order requires excellent communications, reliable equipment, and potent combat power concentrated in relatively smaller formations.

Moreover, given the time sensitivity predicted by the Local Wars construct, it is unlikely that slow-moving, obsolete secondary or tertiary echelons will reach the battlefield in time to determine diplomatic outcomes. Consequently, the level of modernization of the PLAA has direct effects both on the combat power of the PLAA and also on the types of missions it can conduct and the number of adversaries it can simultaneously fight or deter.

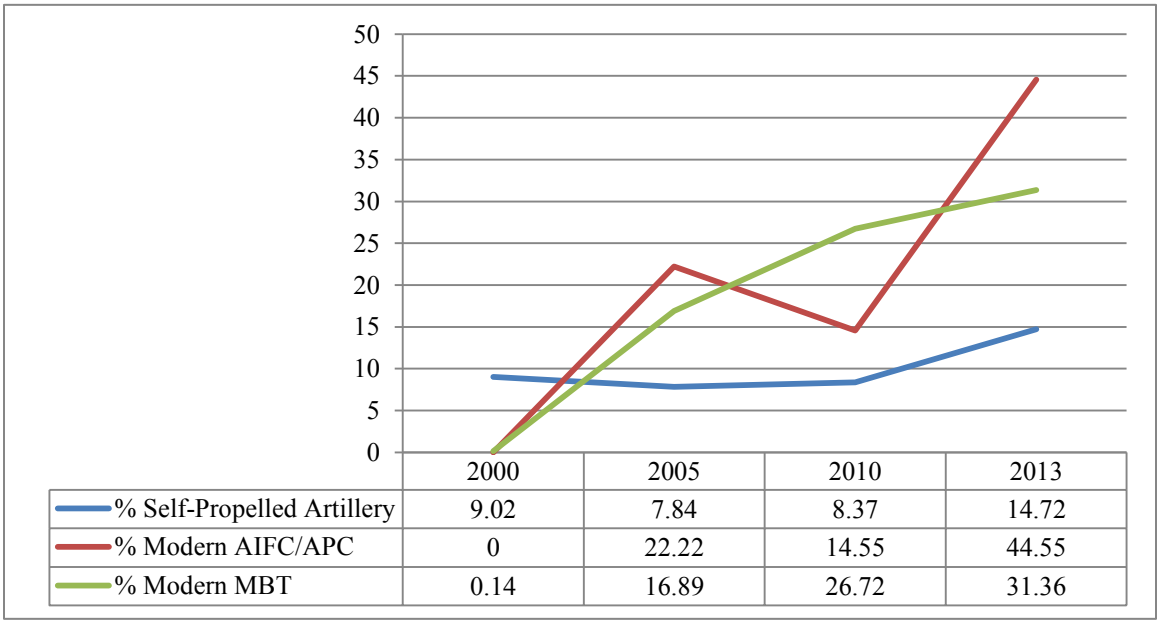
Figure 7.7: Historical Trends in the PLAA's Modern Major Weapon Inventory, 1985-2013



	1985	1990	1995	2000	2005	2010	2013
Artillery, Self-Propelled	0	0	0	1200	1200	1280	1821
AIFC/APC, Modern	0	0	0	0	1000	640	2250
MBT, Modern	0	0	0	10	1280	1750	2330

Source: IISS, *Military Balance,* 1985-2013.

Figure 7.8: Pace of PLAA Modernization – Percent of Modern Weapon Systems, 2000-2013



	2000	2005	2010	2013
% Self-Propelled Artillery	9.02	7.84	8.37	14.72
% Modern AIFC/APC	0	22.22	14.55	44.55
% Modern MBT	0.14	16.89	26.72	31.36

Source: IISS, *Military Balance,* 2000-2013.

Shifts in Unit Training

The previous sections provided quantitative data regarding the PLAA's force structure, manpower, and weapons system holdings. It must again be noted that such figures do not account for the vital combat power elements of morale, skill, and leadership. This brief assessment of the PLAA's training indirectly estimates these intangible attributes.

The last decade has seen significant changes in PLAA training that indicate a shift towards more realistic training, joint operations, and trans- and multi-MR operations; the latter two are capabilities needed to fulfill the requirements of the Local Wars doctrine. The most recent edition of the *Outline of Military Training and Evaluation* has promoted unscripted training based on facing an opposition force,[267] and multiple PLAA exercises during the decade required forces to mobilize across long distances that involved multiple MRs. Of one recent, large-scale PLAA exercise, Mission Action 2010, the DoD wrote,[268]

> In October 2010, the PLA conducted its first Group Army-level exercise, which it called ―MISSION ACTION (SHIMING XINGDONG). The primary participants from the Beijing, Lanzhou, and Chengdu Military Regions practiced maneuver, ground-air coordination, and long-distance mobilization via military and commercial assets as they transited between MRs. Given that these MRs are located along China's land borders, the exercise scenario was likely based on border conflict scenarios. In addition to providing large-scale mobility and joint experience, the exercise allowed PLA command staff to test their ability to plan and execute a large joint campaign while practicing communication between command elements across dispersed forces. This skill is critical to responding to crises along China's periphery.

The DoD's assessment illustrates a PLAA in the process of testing and refining its training, combat skills, and leadership for the likely scenarios predicted by the Local Wars doctrine.

The PLAA and Power Projection

The character of the PLAA is changing fundamentally as it invests in greater technology, human resources, and a modern force structure; improves its ability to fight wars "under conditions of informatization;" and increases its ability to quickly maneuver forces throughout the country in response to regional contingencies. All of the shifts in force structure, manpower, and equipment indicate an active PLAA effort to become capable of winning Local Wars. These include reduction of large formations, the development of smaller and more specialized formations, the reduction in manpower, and the increasing modernity of the PLAA's equipment, all of which indicate efforts to achieve this goal.

Moreover, the PLAA is enabling these tangible aspects of military modernization with the necessary training. The quantitative data presented indicate that, while the PLAA has yet to establish a truly modern force, it has made decisive efforts to transform itself and improve its ability to respond to regional contingencies. However, it is important to note that the effects of these modernization efforts have not been evenly spread across the PLAA. For example, the 2011 DoD report on China noted that, "much of the observed upgrade activity has occurred in units with the potential to be involved in a Taiwan contingency."[269]

The quantitative comparisons presented here do not and cannot provide all of the indicators needed to adequately judge intangible qualities such as combat skill, leadership, and morale, and therefore cannot alone predict PLAA capabilities. However, the data do provide indicators that chart the development of the PLAA and the trends that influence its ability to fight Local Wars. These indicators – force structure, manpower, and equipment – point to the conclusion that the PLAA is becoming more capable of fulfilling the missions demanded by the Local Wars doctrine.

These changes are already important concerns to China's neighbors, particularly India, South Korea, and Vietnam, although they potentially affect other countries like Taiwan, Pakistan, the rest of Southeast Asia, the Central Asian states to the west of China, and Russia. China is not simply a growing Pacific or East Asian power, and the expanding capabilities of the PLAA and the PLA's other services affect all of Asia.

The growth of the PLAA also has an important impact on US power projection capability and strategy. A Chinese army intervention in a Korean conflict seems unlikely but it would have far more impact, and far more air, naval, and missile support than in 1950. It also could come far more quickly than the US could deploy new US Army or Marine Corps combat units in any serious strength. This makes South Korea far more dependent on US air, missile, and naval power.

More broadly, the US military is debating ways to secure "forced entry" into Asia in the case of conflicts involving China, but this raises the question of forced entry by what elements of US forces and to do what?

The US might send key specialized force elements like trainers or surface-to-air missile and ballistic missile defense units, but once again, the expansion of the PLAA seems likely to drive US security partnerships towards contingency plans focused on projecting US sea, air, and missile power. Moreover, while the following analyses show that Chinese sea and airpower are still very much in development – particularly in terms of competing with the US in power projection – the existing limits to the PLAA's modernization already seem to bound the extent to which US ground forces could play a role in or close to China's mainland outside of South Korea and Japan.

It might have been possible for the US to play a serious role on the ground in a land war in China or Taiwan involving Chinese ground forces in the 1950s – although this was highly debatable even then. That role does not seem credible today, nor does such a US role in Vietnam or any other state on China's borders.

Chapter 8: The PLA Navy

The PLA Navy (PLAN) has seen impressive transformation and growth since the 1980s. A "fortress navy" once dependent on land-based support and comprised mostly of patrol craft has begun shifting towards a force more capable of independent action, comprised of major combatants, and better able to project power along China's periphery and into the Pacific.

As Ronald O'Rourke of Congressional Research Service report has noted,[270]

> China's naval modernization effort, which began in the 1990s, encompasses a broad array of weapon acquisition programs, including anti-ship ballistic missiles (ASBMs), submarines, and surface ships. China's naval modernization effort also includes reforms and improvements in maintenance and logistics, naval doctrine, personnel quality, education, training, and exercises. Observers believe that the near-term focus of China's military modernization effort has been to develop military options for addressing the situation with Taiwan.
>
> Consistent with this goal, observers believe that China wants its military to be capable of acting as a so-called anti-access force—a force that can deter U.S. intervention in a conflict involving Taiwan, or failing that, delay the arrival or reduce the effectiveness of intervening U.S. naval and air forces. Observers believe that China's military modernization effort, including its naval modernization effort, is increasingly oriented toward pursuing additional goals, such as asserting or defending China's territorial claims in the South China Sea and East China Sea; enforcing China's view—a minority view among world nations—that it has the right to regulate foreign military activities in its 200- mile maritime exclusive economic zone (EEZ); protecting China's sea lines of communications; protecting and evacuating Chinese nationals in foreign countries; displacing U.S. influence in the Pacific; and asserting China's status as a major world power.

The US Official View

The US sees the modernization of Chinese seapower, the expansion of Chinese naval power projection capability, and the PLAN's slow conversion into a true blue water navy as a far more serious challenge than the modernization of Chinese ground forces. **Figure 8.1** provides a DoD estimate of the size of the PLAN in 2013. The DoD report on *Military and Security Developments Involving the People's Republic of China* for 2013 describes the current structure and trends in the PLAN as follows:[271]

> The PLA Navy has the largest force of major combatants, submarines, and amphibious warfare ships in Asia. China's naval forces include some 79 principal surface combatants, more than 55 submarines, 55 medium and large amphibious ships, and roughly 85 missile-equipped small combatants.
>
> In the most publicized PLA Navy modernization event of 2012, after a year of extensive sea trials, China commissioned its first aircraft carrier, the *Liaoning,* in September 2012. The PLA Navy successfully conducted its first launch and recovery of the carrier-capable J-15 fighter on November 26, 2012. The *Liaoning* will continue integration testing and training with the aircraft during the next several years, but it is not expected to embark an operational air wing until 2015 or later. China also continues to pursue an indigenous aircraft carrier program (the *Liaoning* is a refurbished vessel, purchased from Ukraine in 1998), and will likely build multiple aircraft carriers over the next decade. The first Chinese-built carrier will likely be operational sometime in the second half of this decade.
>
> The PLA Navy places a high priority on the modernization of its submarine force. China continues the production of JIN-class nuclear-powered ballistic missile submarines (SSBN). Three JIN-class SSBNs (Type 094) are currently operational, and up to five may enter service before China proceeds to its next generation SSBN (Type 096) over the next decade. The JIN-class SSBN will carry the new JL-2 submarine

launched ballistic missile with an estimated range of more than 4,000 nm. The JIN-class and the JL-2 will give the PLA Navy its first credible sea-based nuclear deterrent.

China also has expanded its force of nuclear-powered attack submarines (SSN). Two SHANG-class SSNs (Type 093) are already in service, and China is building four improved variants of the SHANG-class SSN, which will replace the aging HAN-class SSNs (Type 091). In the next decade, China will likely construct the Type 095 guided-missile attack submarine (SSGN), which may enable a submarine-based land-attack capability. In addition to likely incorporating better quieting technologies, the Type 095 will fulfill traditional anti-ship roles with the incorporation of torpedoes and anti-ship cruise missiles (ASCMs).

The current mainstay of the Chinese submarine force is modern diesel powered attack submarines (SS). In addition to 12 KILO-class submarines acquired from Russia in the 1990s and 2000s (eight of which are equipped with the SS-N-27 ASCM), the PLA Navy possesses 13 SONG-class SS (Type 039) and eight YUAN-class SSP (Type 039A). The YUAN-class SSP is armed similarly to the SONG-class SS, but also includes an air-independent power system. China may plan to construct up to 20 YUAN-class SSPs.

Since 2008, the PLA Navy has embarked on a robust surface combatant construction program of various classes of ships, including guided missile destroyers (DDG) and guided missile frigates (FFG). During 2012, China continued series production of several classes, including construction of a new generation of DDG. Construction of the LUYANG II-class DDG (Type 052C) continued, with one ship entering service in 2012, and an additional three ships under various stages of construction and sea trials, bringing the total number of ships of this class to six by the end of 2013. Additionally, China launched the lead ship in a follow-on class, the LUYANG III- class DDG (Type 052D), which will likely enter service in 2014. The LUYANG III incorporates the PLA Navy's first multipurpose vertical launch system, likely capable of launching ASCM, land attack cruise missiles (LACM), surface-to-air missiles (SAM), and anti-submarine rockets. China is projected to build more than a dozen of these ships to replace its aging LUDA-class destroyers (DD). China has continued the construction of the workhorse JIANGKAI II-class FFG (Type 054A), with 12 ships currently in the fleet and six or more in various stages of construction, and yet more expected. These new DDGs and FFGs provide a significant upgrade to the PLA Navy's area air defense capability, which will be critical as it expands operations into "distant seas" beyond the range of shore-based air defense.

Augmenting the PLA Navy's littoral warfare capabilities, especially in the South China Sea and East China Sea, is a new class of small combatant. At least six of the JIANGDAO-class corvettes (FFL) (Type 056) were launched in 2012. The first of these ships entered service on February 25, 2013; China may build 20 to 30 of this class. These FFLs augment the 60 HOUBEI-class wave-piercing catamaran missile patrol boats (PTG) (Type 022), each capable of carrying eight YJ-83 ASCMs, for operations in littoral waters.

The PLA Navy also increased its amphibious force in 2012. Two YUZHAO-class amphibious transport docks (LPD) (Type 071) were accepted into service during the year bringing the total of YUZHAO LPDs to three.

…. The PLA Navy remains at the forefront of the military's efforts to extend its operational reach beyond East Asia and into what China calls the "far seas." Missions in these areas include protecting important sea lanes from terrorism, maritime piracy, and foreign interdiction; providing humanitarian assistance and disaster relief; conducting naval diplomacy and regional deterrence; and training to prevent a third party, such as the United States, from interfering with operations off China's coast in a Taiwan or South China Sea conflict. The PLA Navy's ability to perform these missions is modest but growing as it gains more experience operating in distant waters and acquires larger and more advanced platforms. The PLA Navy's goal over the coming decades is to become a stronger regional force that is able to project power across the globe for high-intensity operations over a period of several months, similar to the United Kingdom's deployment to the South Atlantic to retake the Falkland Islands in the early 1980s. However, logistics and intelligence support remain key obstacles, particularly in the Indian Ocean.

In the last several years, the PLA Navy's distant seas experience has primarily derived from its ongoing counter-piracy mission in the Gulf of Aden and long-distance task group deployments beyond the first island chain in the western Pacific. China continues to sustain a three-ship presence in the Gulf of Aden to protect Chinese merchant shipping from maritime piracy. This operation is China's first enduring naval operation beyond the Asia region.

> Additionally, the PLA Navy has begun to conduct military activities within the Exclusive Economic Zones (EEZs) of other nations, without the permission of those coastal states. Of note, the United States has observed over the past year several instances of Chinese naval activities in the EEZ around Guam and Hawaii. One of those instances was during the execution of the annual Rim of the Pacific (RIMPAC) exercise in July/August 2012. While the United States considers the PLA Navy activities in its EEZ to be lawful, the activity undercuts China's decades-old position that similar foreign military activities in China's EEZ are unlawful.
>
> The PLA Navy has made long-distance deployments a routine part of the annual training cycle. In 2012, it deployed task groups beyond the first island chain seven times with formations as large as seven ships. These deployments are designed to complete a number of training requirements, including long-distance navigation, C2, and multi-discipline warfare in deep sea environments beyond the range of land-based air defense.
>
> The PLA Navy's force structure continues to evolve, incorporating more platforms with the versatility for both offshore and long-distance operations. In addition to the recently-commissioned KUZNETSOV-class aircraft carrier (CV) *Liaoning*, China is engaged in series production of the LUYANG-class III DDG, the JIANGKAI-class II FFG, and the JIANGDAO-class FFL. China will also begin construction on a new Type 081-class landing helicopter assault ship within the next five years. China will probably build several aircraft carriers over the next 15 years.
>
> Limited logistical support remains a key obstacle preventing the PLA Navy from operating more extensively beyond East Asia, particularly in the Indian Ocean. China desires to expand its access to logistics in the Indian Ocean and will likely establish several access points in this area in the next 10 years (potential sites include the Strait of Malacca, Lomboc Strait, and Sunda Strait). These arrangements will likely take the form of agreements for refueling, replenishment, crew rest, and low-level maintenance. The services provided will likely fall short of U.S.-style agreements permitting the full spectrum of support from repair to re-armament.

A separate analysis by Andrew Erikson, Lyle Goldstein, and Carnes Lord reported that,[272]

> The platforms and weapons systems that have emerged… are asymmetric in nature and anti-access in focus; they target a full spectrum of vulnerabilities inherent in CSGs and other power-projection platforms. Navigation satellites, new-generation submarines, sea mines and cruise and ballistic missiles promise to give China an ability to defend its maritime periphery in ways that were simply impossible 15 years ago. It is unlikely, however, that the Chinese think they can or should prepare to challenge the United States in a head-to-head clash of major surface forces in the Pacific. For the time being, they value the U.S. Seventh Fleet as a means to reassure regional stability that underwrites Chinese commerce and costs China nothing. However, they have recently shown signs of moving beyond a maritime strategy heavily reliant on submarines and land-based air and missile attack… toward one that also includes major surface combatants….
>
> … [C]ommerce protection and the importance of sea lines of communication clearly resonate with the Chinese leadership. As China has become more dependent on seaborne oil imports from the Persian Gulf and Africa in recent years—a dependence that no amount of overland pipeline construction is likely to reduce anytime soon—it is plainly worried about a potential threat to its oil tankers in transit through the Strait of Malacca and the Indian Ocean… it appears to be in the process of helping to develop facilities and infrastructure of various kinds (most notably, the deep-water port at Gwadar in Pakistan) in friendly countries throughout this region.

As Andrew Erikson and Gabe Collins r noted in a later analysis, , the PLAN has been developing two key layers, aside from homeland defense: high-end navy and "anti-Navy" capabilities as well as low-end capabilities. While China is creating a limited out-of-area operational capability in order to protect its citizens abroad, extend political influence, and protect important vital economic interests. However, the majority of the PLAN's focus is on areas closer to China, especially the contested claims in the South China, East China, and Yellow Seas. The PRC is focusing on building a navy able to engage in a high-intensity conflict near its borders, where it

has a large fleet of submarines and land-based missiles and aircraft. Conversely, there is not much evidence that China is building a blue-water capability to take on a modern navy beyond their home region. As Erikson and Collins write,[273]

> The PLAN is acquiring the hardware it needs to prosecute a major regional naval showdown. Simultaneously, an increasingly-capable, but still limited number, of vessels can fight pirates, rescue Chinese citizens trapped by violence abroad, and make "show-the-flag" visits around the world. But the PLAN is not set up to confront the U.S. at sea more than 1,000 miles from China. Even if the PLAN surged production of key vessels such as replenishment ships, the resources and steps needed to build a globally-operational navy leave Beijing well over a decade away from achieving such capability in hardware terms alone. Building the more complex human software and operational experience needed to become capable of conducting large-scale, high-end out-of-area deployments could require at least another decade. Meanwhile, however, China's challenges at home and on its contested periphery remain so pressing as to preclude such focus for the foreseeable future.
>
> The bottom line is that China's present naval shipbuilding program aims to replace aging vessels and modernize the fleet, not to scale-up a modern fleet to the size and composition necessary to support and sustain high-end blue water power projection. China is building a two-layered navy with a high-end Near Seas component and a limited, low-end capability beyond, not the monolithic force that some assume.

The Japanese Official View

The 2013 Japanese white paper provided the following summary description of the PLAN:[274]

> The naval forces consist of three fleets—the North Sea, East Sea, and South Sea Fleets. The Chinese Navy has approximately 970 ships (including approximately 60 submarines), with a total displacement of approximately 1.47 million tons. The Navy is in charge of maritime national defense and protection of the sovereignty of territorial waters and maritime rights and interests. The Chinese Navy introduced Kilo-class submarines from Russia and is actively constructing new types of domestic submarines in order to enhance its submarine force. Additionally, the Navy is increasing surface combatant ships with improved air defense and anti-ship attack capabilities, large landing ships, and supply ships. Also, it commissioned a large hospital ship in October 2008.
>
> …With regard to aircraft carriers, China has renovated the Varyag, an incomplete Kuznetsov-class aircraft carrier purchased from Ukraine. After 10 trial navigations during the period from August 2011 to August 2012, China named the carrier "Liaoning" and put it into commission...China seems to be continuing training of carrier-based aircraft pilots and research and development of necessary technologies including the development of a domestic carrier based fighter, J-1528. It is also pointed out that China may be constructing its first domestic aircraft carrier…
>
> In view of these developments in the modernization of the naval forces, it is believed that China is trying to build capabilities for operations in more distant areas in addition to the near sea defense. It is necessary to continue to monitor the development of the Chinese naval forces.

PLAN Service Strategy

The PLAN's modernization vision developed during the 1980s, prior to the 1993 promulgation of the Local Wars doctrine. Pioneered by Admiral Liu Huaqing, the PLAN devised "Offshore Defense" (alternatively translated as "Near Seas Defense") as a successor to the previous "Coastal Defense" PLAN mission.

The coastal defense doctrine had promoted a PLAN capable of conducting a defense of China's coasts from the Soviet Pacific fleet in what was predicted to be a largely land-based war.[275] In contrast, offshore defense envisioned a PLAN structured to conduct combat in an area bounded by the first island chain. Proponents of the new doctrine argued that it was necessary to extend

China's maritime active defense perimeter in order to protect China's vulnerable maritime flank and to reduce the efficacy of adversary long-range precision strike.[276]

In order to achieve these objectives, the PLAN needed the ability to operate at longer ranges, to rapidly concentrate combat power, and to be capable of defeating an opposing navy in the open ocean. These capabilities in turn necessitated the procurement of more modern vessels and the personnel qualified to crew them.

This theory behind offshore defense fit well into the Local Wars doctrine when the latter was promulgated in 1993. The focus on warfare in local areas, high technology capabilities, and modern vessels all fit into the CMC's overarching concept.

- **Figure 8.2** below illustrates the DoD's understanding of the first and second island chains.
- **Figure 8.3 and Figure 8.4** show how these island chains interact with many of China's territorial claims.
- **Figure 8.5 and Figure 8.6** show China's dependence on maritime lines of communication and transit routes as well as efforts to find ways to reduce that dependence.

Figure 8.1: Size of the PLAN in 2013

	Total
Aircraft Carriers	1
Destroyers	23
Frigates	52
Tank Landing Ships/ Amphibious Transport Dock	29
Medium Landing Ships	26
Diesel Attack Submarines	49
Nuclear Attack Submarines	5
Coastal Patrol (Missile)	85

Note: The PLA Navy has the largest force of principal combatants, submarines, and amphibious warfare ships in Asia. After years of neglect, the force of missile-armed patrol craft is also growing.

Source: DoD, *Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 76.

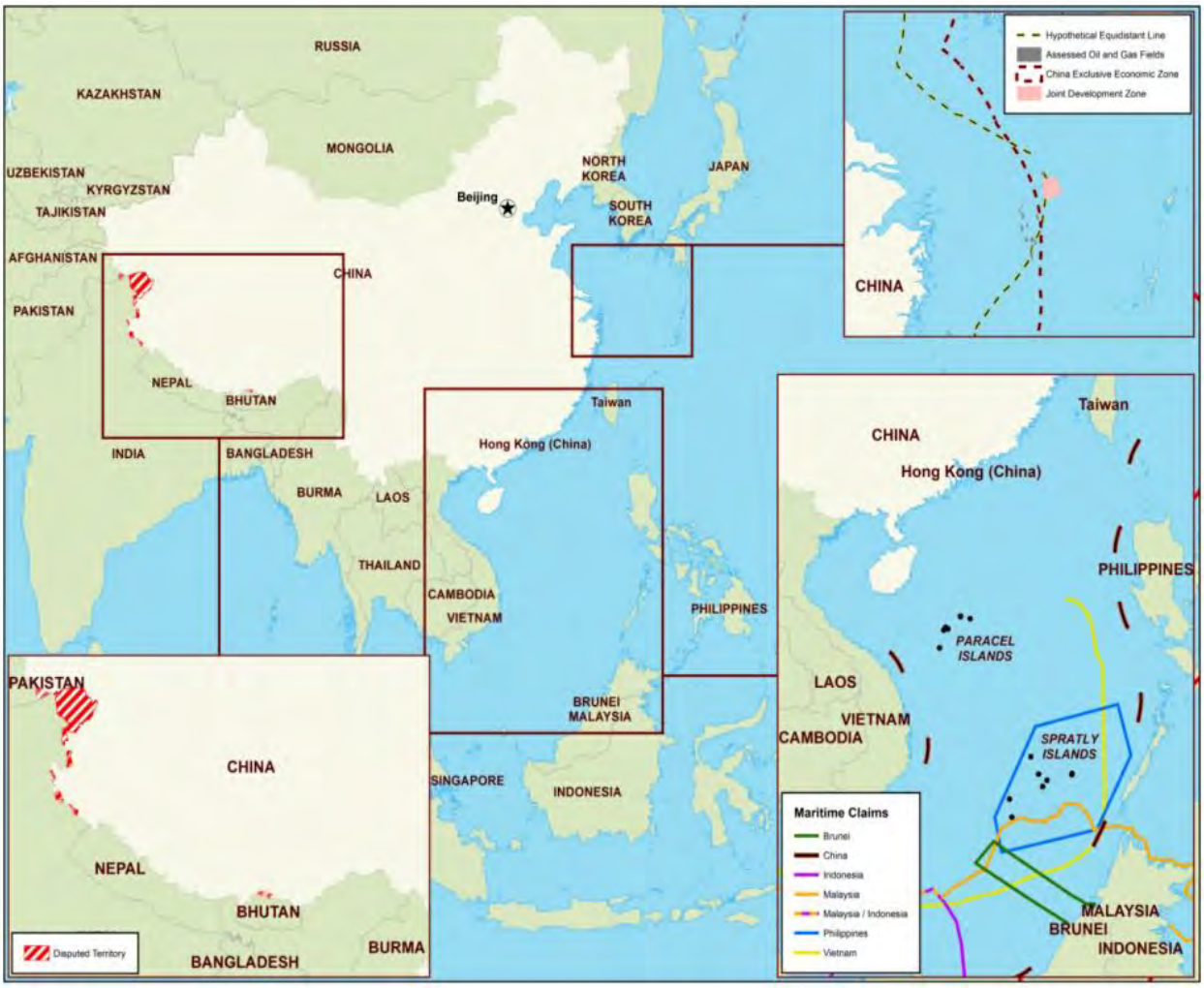
Figure 8.2: DoD Representation of the First and Second Island Chains

Source: DoD, *Military and Security Developments Involving the People's Republic of China 2012*, p. 40. http://www.defense.gov/pubs/pdfs/2012_CMPR_Final.pdf.

Figure 8.3: Competing Sovereignty Claims in the South China Sea (2012)

Source: DoD, *Military and Security Developments Involving the People's Republic of China 2012*. http://www.defense.gov/pubs/pdfs/2012_CMPR_Final.pdf.

Figure 8.4: Competing Sovereignty Claims (2013)

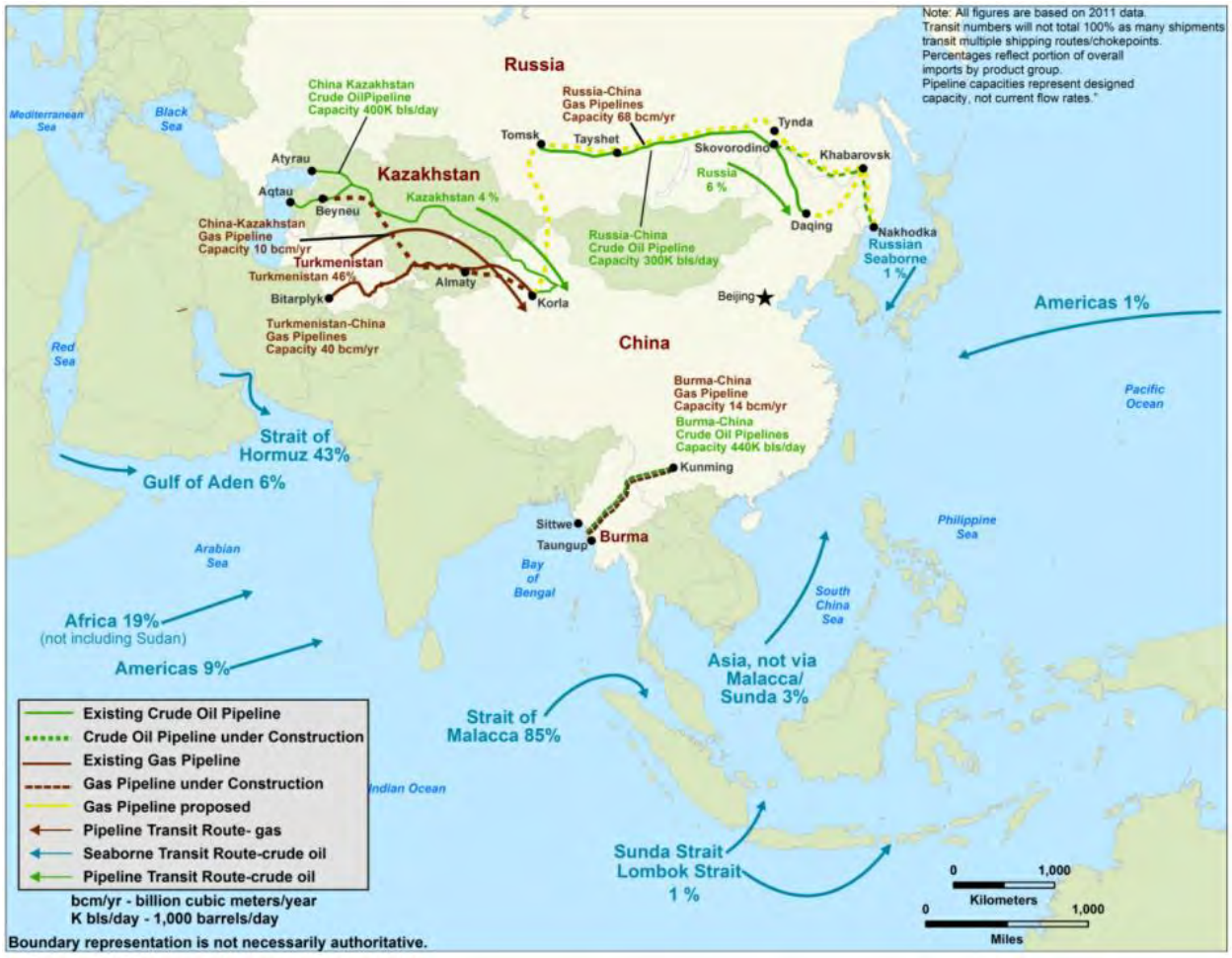


Source: DoD, *Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 79.

Figure 8.5: China's Dependence on Maritime Lines of Communication and Efforts to Reduce that Dependence

Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2012*, May 2012, p. 37.

Figure 8.6: China's Import Transit Routes



Source: DoD, *Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 80.

Shifts in Force Structure, Equipment Composition, and Manpower

The result of the PLAN's modernization and development along these doctrinal lines has been a sustained shift from a navy of large numbers of single-mission vessels, mostly patrol craft, to a navy boasting significant numbers of modern major combatants, as well as modernized patrol craft. The PLAN has modernized by changing its force structure to meet new doctrinal needs, increasing the categories of ships under its command and developing new capabilities and their necessary systems.

Regarding its equipment holdings, the PLAN has modernized its weapon systems in a manner similar to the PLAA. Large numbers of obsolete vessels, mostly coastal combatants, have been discarded and replaced by modernized imported and indigenously-manufactured ocean-going combatants. New PLAN frigates and destroyers are multi-mission combatants capable of effectively conducting a variety of missions, in stark contrast to their single-mission predecessors. Additionally, the PLAN is replacing its patrol craft with modern variants such as the *Houbei,*

which has a wave-piercing hull design and can carry eight anti-ship cruise missiles. Large numbers of obsolete vessels, mostly coastal combatants, have been discarded and replaced by modernized imported and indigenously-produced designs. Furthermore, the PLAN's procurement of new diesel and nuclear-powered submarines has significantly modernized its undersea combatant arsenal. The introduction of the *Liaoning* aircraft carrier, as well as flight-testing of the J-15 (Su-33) carrier-fighter, indicate future PLAN developments toward greater power-projection capabilities.

Manpower policies cannot be neglected, and the PLAN has not done so. In addition to reducing its manpower, it has conducted exercises and deployments that are developing the skills necessary to perform offshore defense and producing experiences vital for a service that has little combat experience.

The combination of these modernization and force development efforts is an increase in the capabilities of the PLAN. In particular, the PLAN has recently augmented its anti-surface warfare, naval air defense, and force projection capabilities.[277] In contrast, one area in which the PLA lacks significant improvement is its anti-submarine warfare capability. However, the PLAN has been shifting rotary wing assets into the anti-submarine role to mitigate this deficiency. Thus, overall, the PLAN's force modernization trends are augmenting China's naval capabilities and improving the PLAN's ability to react to regional contingencies in line with the Local Wars doctrine.

Shift in Force Structure

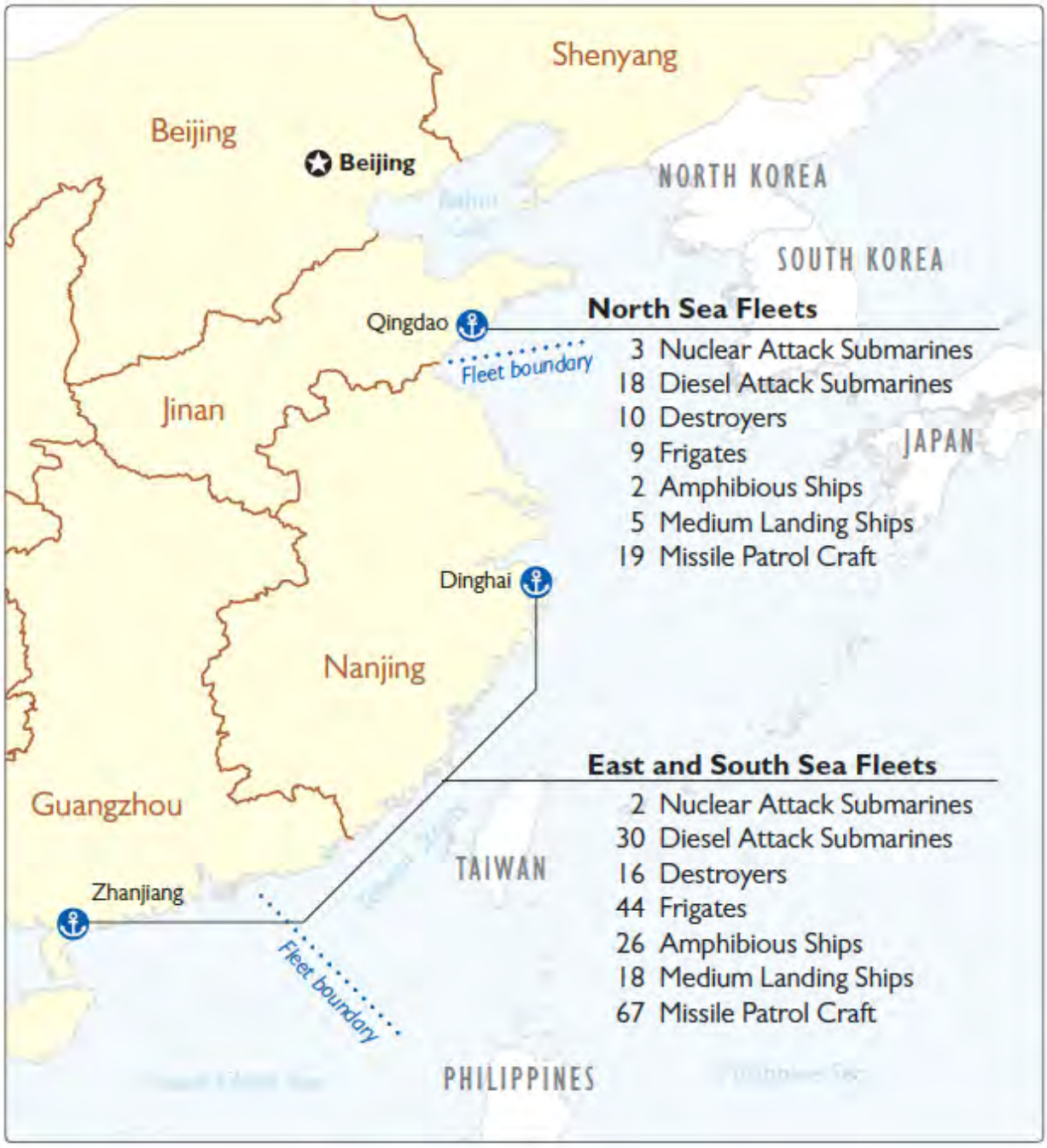
Figure 8.7 shows the current structure of the PLAN's fleets. **Figure 8.7** displays the trends in PLAN forces in detail. The period 1985-2013 is a story of the PLAN rapidly discarding obsolete coastal naval assets and procuring, by foreign import if necessary, advanced major surface combatants capable of creating a hazardous environment in East Asia for adversary surface forces.

Figure 8.8 displays significant changes in the manpower, force structure, and mix of naval assets between 1985 and 2013. The most significant change is the relative growth of major combatants in the PLAN. The period 1990-2000 saw significant reductions in coastal craft while, throughout the period, the numbers of major surface combatants increased. The PLAN submarine force suffered an initial decrease in force size during the period as obsolete submarines were retired, but has since regrown. These changes indicate the doctrinal shift from coastal combat by swarms of single-mission ships to combat within the first island chain by major combatants.

Figure 8.9 shows the growth of the PLAN in a line graph format to better illustrate force structure trends. **Figure 8.9** also displays the historical PLAN combatant holdings and compares them with the future trends. Furthermore, **Figure 8.9** illustrates the significant decrease in PLAN coastal combatants and a roughly 30% decrease in its submarine holdings.

These losses were compensated by increases in major surface combatants such as frigates and destroyers. In addition, much of the increase in major surface combatants is due to increases in modern equipment. Consequently, the force structure indicates a navy in transition towards deeper water operations by smaller numbers of multi-mission ships.

Figure 8.7: Size and Deployments of China's Fleets (as of 2012)



Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2012*, May 2012, p. 37.

Figure 8.8: Force Structure of the PLA Navy 1985-2013

	1985	1990	1995	2000	2005	2010	2012
Manpower	350,000	295,000	300,000	260,00	295,000	255,000	255,000
Navy	350,000	260,000	260,000	220,000	255,000	215,000	215,000
Conscript	?	35,000	40,000	40,000	40,000	40,000	40,000
Reserve	?	?	?	?	?	?	?
Naval Aviation	some	25,000	25,000	26,000	26,000	26,000	26,000
Marines	some	6,000	5,000	5,000	10,000	10,000	10,000
Submarines	**103**	**93**	**49**	**65**	**68**	**65**	**65**
Strategic (SSBN/SLBM trial)	*1*	*1*	*0*	*1*	*1*	*3*	*4*
Golf (SLBM trial)	1	1	1	1	1	1	0
Xia (Type 092)	0	0	0	0	1	1	1
Jin (Type 094)	0	0	0	0	0	2	3
Qing (SLBM trials / SSB)	0	0	0	0	0	0	1
Tactical	*102*	*92*	*48*	*64*	*67*	*62*	*61*
SSN	2	4	5	5	5	6	5
Han (Type 091)	2	4	5	5	5	4	3
Shang (Type-093)	0	0	0	0	0	2	2
SSG	0	1	1	1	1	1	0
Romeo (Type S5G)	0	1	1	1	1	1	0
SSK	100	87	42	57	61	54	55
Kilo (RF Type EKM 636/636N)	0	0	0	3	2	10	10
Kilo (RF Type EKM 877)	0	0	0	2	2	2	2
Ming (Type-035)	0	3	0	2	3	3	4
Ming (Type-035G/B)	0	0	9	15	16	16	16
Romeo (E3SB)	79	85	34	35	36	8	0
Song (Type-039/039G)	0	0	0	1	3	13	16
Yuan (Type-041)	0	0	0	0	0	2	0
Yuan (Type-039A/B)	0	0	0	0	0	0	7
W-class	21	0	0	0	0	0	0
Aircraft Carriers	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Liaoning	0	0	0	0	0	0	1
Guided Missile Destroyers	**14**	**19**	**18**	**20**	**21**	**28**	**14**
Hangzhou (Sovremmeny)	0	0	0	1	2	4	4
Luda III (Type-051GII)	0	0	0	1	1	1	0
Luda (Type-051)	10	16	15	13	11	10	0
Luda (Type-051DT)	0	0	0	0	2	3	0

	1985	1990	1995	2000	2005	2010	2013
Luda II (Type-051G)	0	1	2	2	2	1	0
Luhai (Type-051B)	0	0	0	1	1	1	1
Luhu (Type-052)	0	0	1	2	2	2	2
Luyang I (Type-052B)	0	0	0	0	0	2	2
Luyang II (Type-052B)	0	0	0	0	0	2	3
Luzhou (Type-052)	0	0	0	0	0	2	2
Anshan (Soviet Gordy)	4	2	0	0	0	0	0
Frigates	**22**	**37**	**37**	**40**	**42**	**52**	**62**
Guided Missile Frigate	*17*	*32*	*35*	*40*	*42*	*52*	*62*
Jianghu I (Type-053H)	11	13	13	26	26	11	8
Jianghu II (Type-053H1)	0	9	9	1	1	9	5
Jianghu III (Type-053H2)	0	2	5	3	3	3	3
Jianghu IV (Type-053H1Q)	0	2	2	0	0	1	1
Jianghu V (Type-053H1G)	0	0	0	0	0	6	6
Jiangwei I (Type-053H2G)	0	0	3	4	4	4	4
Jiangwei II (Type-053H3)	0	0	0	6	8	10	10
Jiangdong	2	2	1	0	0	0	0
Chengdu	4	4	2	0	0	0	0
Jiangkai I (Type-054)	0	0	0	0	0	2	2
Jiangkai II (Type-054A)	0	0	0	0	0	6	13
Luda II (Type-05)	0	0	0	0	0	0	6
Luda III (Type-051DT/G)	0	0	0	0	0	0	4
Patrol and Coastal Combatants	**48**	**915**	**870**	**368**	**331**	**253**	**211+**
Patrol Craft, Coastal	*48*	*110*	*100*	*118*	*109*	*120*	*75*
Haijui (Type-037/I)	0	10	4	2	2	2	3
Haiqing (Type-037/IS)	0	0	0	20	19	25	22
Kronshtadt	20	10	0	0	0	0	0
Hainan (Type-037)	28	90	96	96	88	93	50
Patrol Boats	*0*	*290*	*350*	*111*	*87*	*50*	*34+*
Haizui (Type-062/I)	0	0	0	11	8	15	some
Shanghai III (Type-072/I)	305	290	300	100	79	35	some
Huludao	0	0	5	0	0	0	0
Shantou	0	0	45	0	0	0	0
Patrol Craft with Guided Missile	*0*	*215*	*217*	*93*	*96*	*83+*	*102+*
Houkou	0	0	0	30	31	0	0
Houxin (Type-037/IG)	0	0	6	20	22	16	20
Huang	0	0	1	5	5	0	0

	1985	1990	1995	2000	2005	2010	2013
Huangfeng/Hola (Type-021)	0	125	120	38	38	0	11
Hegu/Hema	0	90	90	0	0	0	0
Houjian (Type-037/II)	0	0	0	0	0	7	6
Houbei (Type-022)	0	0	0	0	0	60+	65+
Hydrofoil Torpedo Boat	*290*	*160*	*100*	*16*	*9*	*0*	*0*
Huchuan	140	100	100	16	9	0	0
P-4	80	0	0	0	0	0	0
P-6	70	60	0	0	0	0	0
Haikou	3	0	0	0	0	0	0
Swatow	30	0	0	0	0	0	0
Shandong	3	0	0	0	0	0	0
Unknown type	56	0	0	0	0	0	0
Mine warfare	*23*	*56*	*121*	*39*	*34*	*68*	*47*
Mine Sweeper Coastal/Countermeasures	?	?	81	57	55	8	23
Lienyun	?	?	80	50	50	0	0
Wosao	?	?	1	7	5	4	16
Wochi	0	0	0	0	0	4	6
Wozang	0	0	0	0	0	0	1
Mine Sweeper Drone	?	60	60	4	4	46	7
Futi	0	0	0	0	0	46	4[278]
Other	?	60	60	4	4	0	3
Mine Sweeper Inshore	?	?	4	4	4	0	0
Shanghai	?	?	1	3	1	0	0
Wochang	?	?	3	3	3	0	0
Mine Sweeper Ocean	23	35	35	27	24	14	16
T-43	23	35	35	27	24	14	16
Minelayer	?	?	1	1	1	1	1
Belejan	?	?	1	0	0	0	0
Wolei	?	?	0	1	1	1	1
Amphibious	**73**	**58**	**50**	**70**	**50**	**244**	**238**
Landing Ship Medium	*35*	*42*	*34*	*41*	*31*	*56*	*59*
Yubei	0	0	0	0	0	0	10
Yudao	?	1	4	1	1	1	0
Yudeng Yuliang (Type-073)	?	0	0	0	1	1	1
Yuhai	?	0	0	12	12	13	10
Yuliang (Type-079)	?	30	30	28	17	31	28
Yuling	?	1	0	0	0	0	0

	1985	1990	1995	2000	2005	2010	2013
Yunshu Yuliang (Type-073A)	0	0	0	0	0	10	10
Hua (US LSM-1)	0	10	0	0	0	0	0
Landing Ship Tank	*18*	*16*	*16*	*18*	*19*	*27*	*26*
511-1152	18	0	0	0	0	0	0
Shan	0	13	13	3	3	0	0
Yukan	0	3	3	7	7	7	7
Yuting	0	0	0	8	9	10	9
Yuting II	0	0	0	0	0	10	10
Landing Craft	*470+*	*400*	*400*	*285+*	*285+*	*160*	*151*
Landing Craft, Utility (Yunnan)	0	0	0	0	0	130	120
Landing Craft, Medium (Yuchin)	0	0	0	0	0	20	20
Landing Craft, Air Cushion	0	0	0	0	0	0	1
Utility Craft, Air Cushion	0	0	0	0	0	10	10
Landing Platform Dock	*0*	*0*	*0*	*0*	*0*	*1*	*2*
Yuzhao (Type-071)	0	0	0	0	0	1	2
Logistics and support	*46+*	*118*	*164*	*159*	*163*	*205*	*205*
Sea-going buoy tender	0	0	0	0	0	7	7
Storage	23	1	14	14	14	23	23
Miscellaneous auxiliary	0	0	0	0	0	6	6
Icebreaker	0	3	4	4	4	4	4
Intelligence collection vessel	0	0	0	0	0	1	1
Space and missile tracking	0	0	0	0	0	5	5
Oceanographic research	0	35	33	33	33	5	5
Survey ship	0	0	0	0	0	6	6
Hospital ship	0	0	0	2	6	1	1
Tanker	0	3	2	2	3	5	5
Tanker and transport	23	25	33	33	33	50	50
Tanker with helicopter	0	0	0	0	0	5	5
Repair/rescue ship	0	2	2	2	2	2	2
Submarine support	0	0	0	10	10	8	8
Submarine rescue	0	0	2	1	1	1	1
Tug, ocean-going	0	23	25	25	25	51	51
Water tanker	0	0	0	0	0	18	18
Transport	?	17	30	30	30	0	0
Training ship	?	1	1	1	2	2	2
Degaussing ship	0	0	0	0	0	5	5

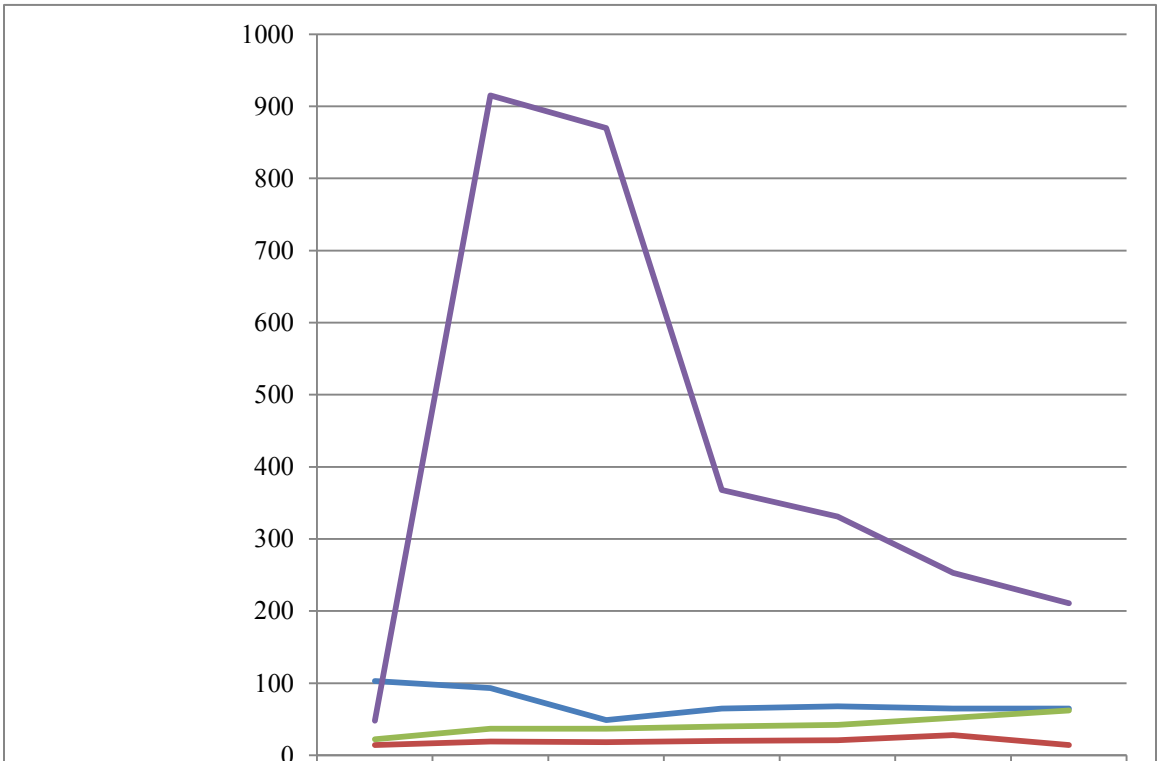
	1985	1990	1995	2000	2005	2010	2013
Naval Aviation[279]							
Bombers	*150+*	*180+*	*155+*	*75*	*68*	*50*	*30*
H-5/ F-5/ F-5B	100	130	130	50	50	20	0
H-6	some	50	25	7	0	0	0
H-6D	0	some	some	18	18	30	30
IL-28	50	0	0	0	0	0	0
Fighter	*600*	*600*	*600*	*378*	*74*	*84*	*72*
J-5	some	some	some	0	0	0	0
J-6	some	some	some	250	0	0	0
J-7/7E Fishbed (MiG-21)	some	some	some	66	26	36	24
J-8/8A/B/D/F Finback	0	0	some	52	42	24+	24
J-8IIA	0	0	some	0	12	0	0
J-8H Finback	0	0	0	0	0	0	24
Fighter Ground Attack	*0*	*100*	*100*	*50*	*250*	*138*	*200*
JH-7/7A	0	0	0	20	20	84	120
Q-5 Fantan	0	100	10	30	30	30	0
Su-30Mk2	0	0	0	0	0	0	0
J-6 (MiG-19S)	0	0	0	0	200	0	0
J-10A/S	0	0	0	0	0	0	28
J-11B/BS	0	0	0	0	0	0	28
Su-30MK2 Flanker	0	0	0	0	0	24	24
Anti-Submarine Warfare	*8*	*14*	*20*	*4*	*4*	*4*	*4*
PS-5 (SH-5)	0	4	5	4	4	4	4
Be-6 Madge	8	10	15	0	0	0	0
ISR	*some*	*some*	*some*	*7*	*7*	*13*	*7*
H-5	some	some	some	0	0	0	0
HZ-5 Beagle	0	0	0	7	7	7	7
Y-8J/Y-8JB	0	0	0	0	0	6	0
ELINT	*0*	*0*	*0*	*4*	*4*	*4*	*7*
Y-8X	0	0	0	4	4	4	3
Y-8JB High New 2	0	0	0	0	0	0	4
AEW&C	*0*	*0*	*0*	*0*	*0*	*0*	*6*
Y-8J	0	0	0	0	0	0	4
Y-8W High New 2	0	0	0	0	0	0	2
Tanker	*0*	*0*	*0*	*0*	*3*	*3*	*3*
HY-6	0	0	0	0	3	3	0
H-6DU	0	0	0	0	0	0	3

	1985	1990	1995	2000	2005	2010	2013
Transport	*60*	*60*	*some*	*68*	*66*	*66*	*66*
Y-8 (An-12)	?	?	0	0	4	4	4
Y-5 (An-2)	?	?	0	50	50	50	50
Y-7 (An-24)	?	?	0	4	4	4	4
Y-7H (An-26)	?	?	0	6	6	6	6
Y-8	?	?	some	6	0	0	0
Yak-42	?	?	0	2	2	2	2
Training	*?*	*?*	*some*	*73*	*73*	*122*	*106+*
JJ-5	?	?	some	0	0	0	0
JJ-6 (Mig-19)	?	?	some	16	16	14	14
JJ-7	?	?	0	4	4	4	4
PT-6 (CJ-6)	?	?	0	53	53	38	38
HJ-5	0	0	0	0	0	33	5
HY-7	0	0	0	0	0	21	21
JL-8 (K-8)	0	0	0	0	0	12	12
JL-9	0	0	0	0	0	0	12+
Helicopters	**some**	**68**	**68**	**35**	**51**	**78**	**104+**
Search and Rescue	*some*	*68*	*53*	*21*	*27*	*40*	*6*
SA-321	0	12	0	9	15	15	0
Z-5	some	50	40	0	0	0	0
Z-8/Z-8A	0	0	3	12	12	20	0
Z-8S	0	0	0	0	0	2	2
Z-8JH	0	0	0	0	0	3	4
Z-9	0	6	10	0	0	0	0
Z-9C	0	0	0	12	0	0	0
Anti-Submarine Warfare	*12*	*0*	*15*	*4*	*8*	*13*	*44*
Super Frelon	12	0	0	0	0	0	0
SA-321	0	0	15	0	0	0	0
Ka-28 (Ka-27PL) Helix A	0	0	0	4	8	13	19
Z-9C (AS-565SA)	0	0	0	0	0	0	25
Assault	*0*	*0*	*0*	*0*	*8*	*25*	*0*
Z-9C (AS-565SA)	0	0	0	0	8	25	0
Support	*0*	*0*	*0*	*10*	*8*	*8*	*0*
Mi-8	0	0	0	10	8	8	0
Airborne Early Warning	*0*	*0*	*0*	*0*	*0*	*0*	*10+*
Ka-31	0	0	0	0	0	0	9
Z-8 AEW	0	0	0	0	0	0	1+

	1985	1990	1995	2000	2005	2010	2013
Transport	*0*	*0*	*0*	*0*	*0*	*0*	*43*
SA-321 Super Frelon	0	0	0	0	0	0	15
Z-8/Z-8A	0	0	0	0	0	0	20
Mi-8 Hip	0	0	0	0	0	0	8
Missile, Tactical	**?**	**some**	**some**	**some**	**some**	**some**	**some**
YJ-6/C-601 (CAS-1)	?	some	some	some	some	0	0
YJ-61/C-611 (CAS-1)	?	0	0	some	some	some	some
YJ-8K (CSS-N-4)	?	0	0	0	some	some	some
YJ-83 (CSSC-8)	0	0	0	0	0	some	some
YJ-81/C-801K	?	0	0	some	some	0	0
Kh-31A (AS-17B Krypton)	0	0	0	0	0	0	some
KD-88	0	0	0	0	0	0	some

Source: IISS, *The Military Balance,* 1984–1985 and various volumes ending with *The Military Balance,* 2013 (London: Routledge, 1985–2013). Some reported numbers do not add up in the original source.

Figure 8.9: Trends in PLAN Combatants Holdings



	1985	1990	1995	2000	2005	2010	2013
Submarines	103	93	49	65	68	65	65
Destroyers	14	19	18	20	21	28	14
Frigates	22	37	37	40	42	52	62
Patrol and Coastal Combatants	48	915	870	368	331	253	211

Source: IISS, *Military Balance,* 1985-2013.

Shift in Equipment Composition and Modernization

In addition to changes in force structure, the PLAN's modernization program is generating significant changes in the composition of the Navy's major weapons systems. Concurrent with relative increases in major combatants, especially surface combatants, the proportion of combatants that can be considered modern is also steadily increasing. Through a combination of domestic production and foreign purchases, the PLAN has created a powerful core of a modern navy in its modern system holdings.

Submarines

A CRS report by Ronald O'Rourke provides the following an overview of Chinese submarine modernization:[280]

> China since the mid-1990s has acquired 12 Russian-made Kilo-class non-nuclear-powered attack submarines (SSs) and put into service at least four new classes of indigenously built submarines, including the following:
>
> - a new nuclear-powered ballistic missile submarine (SSBN) design called the Jin class or Type 094…;
> - a new nuclear-powered attack submarine (SSN) design called the Shang class or Type 093;
> - a new SS design called the Yuan class or Type 039A…; and
> - another (and also fairly new) SS design called the Song class or Type 039/039G.
>
> The Kilos and the four new classes of indigenously built submarines are regarded as much more modern and capable than China's aging older-generation submarines. At least some of the new indigenously built designs are believed to have benefitted from Russian submarine technology and design know-how.
>
> DOD and other observers believe the Type 093 SSN design will be succeeded by a newer SSN design called the Type 095. The August 2009 ONI report includes a graph… that shows the Type 095 SSN, along with the date 2015, suggesting that ONI projects that the first Type 095 will enter service that year.
>
> China in 2011 commissioned into a service a new type of non-nuclear-powered submarine, called the Qing class according to *Jane's Fighting Ships 2012-2013*, that is about one-third larger than the Yuan-class design. It is not clear whether this boat is the lead ship of a new class, or a one-of-a-kind submarine built for testing purposes. *Jane's Fighting Ships 2012-2013* refers to the boat as an auxiliary submarine (SSA).
>
> Press reports in December 2012 and March 2013 stated that China had signed an agreement with Russia to purchase two dozen Su-35 fighters and four Amur/Lada class Russian-designed nonnuclear- powered attack submarines for China's Navy, with two of the submarines being built in Russia and two being built in China. Russia, however, reportedly denied that such an agreement had been signed.
>
> China's submarines are armed with one or more of the following: ASCMs, wire-guided and wake-homing torpedoes, and mines. The final eight Kilos purchased from Russia are reportedly armed with the highly capable Russian-made SS-N-27 Sizzler ASCM. In addition to other weapons, Shang-class SSNs may carry LACMs. Although ASCMs are often highlighted as sources of concern, wake-homing torpedoes are also a concern because they can be very difficult for surface ships to counter.
>
> Although China's aging Ming-class (Type 035) submarines are based on old technology and are much less capable than China's newer-design submarines, China may decide that these older boats have continued value as minelayers or as bait or decoy submarines that can be used to draw out enemy submarines (such as U.S. SSNs) that can then be attacked by other Chinese naval forces.
>
> In related areas of activity, China reportedly is developing new unmanned underwater vehicles, and has modernized its substantial inventory of mines. DOD stated in 2012 that "China has developed torpedo and mine systems capable of area denial in a Taiwan scenario. Estimates of China's naval mine inventory exceed 50,000 mines, with many more capable systems developed in the past 10 years."

The PLAN's tactical submarine force has undergone significant qualitative improvements since 1985. With the procurement of Russian *Kilo*-class SSKs and the production of the *Yuan* class SSKs, the PLAN has made significant improvements in submarine quieting. Moreover, the *Yuan, Song,* and *Kilo* class submarines are Anti-Ship Cruise Missile (ASCM) capable.[281] The PLAN has also advanced its SSN fleet with the Type-095 SSN, quieter than previous PLAN SSNs and with an ASCM capability, expected by the US Office of Naval Intelligence to reach initial operational capability by 2015.[282]

The PLAN also has 4 strategic ballistic missile submarines (SSBN): one *Xia* and three *Jin* class. The one first-generation *Xia* class SSBN is not considered operational, but the more modern *Jin* class SSBNs "give the PLA Navy its first credible second-strike capability."[283] Consequently, the PLAN's submarine modernization efforts are generating results. **Figure 8.10** illustrates the advances made in submarine modernization.

China has worked to develop its submarine force with both conventional and nuclear submarines over the past 15 years: Andrew S. Erickson summarizes such developments as follows:[284]

> China's submarine force is one of its core strengths, but it contains considerable variety. On the nuclear-powered ballistic-missile submarine (SSBN) front, three Type 094 hulls are already in service. Their armament awaits deployment of the JL-2 submarine-launched ballistic missile (SLBM), which is currently undergoing flight testing. The underground base at Yalong Bay on Hainan Island, which is emerging as a likely center of Chinese SSBN operations, offers proximity to deep water in otherwise cluttered and possibly closely monitored water space.
>
> …The Office of Naval Intelligence's most recent unclassified report characterizes the Type 094 as relatively noisy compared to equivalent Russian platforms. This noisiness, and the lack of an operational SLBM, leave it unable as yet to take full advantage of its South China Sea location. Follow-on variants of both hull and missile, as well as further training and operational experience, may be required before the system as a whole is capable of effective deterrence patrols. Moreover, command and control issues inherent in successful SSBN operations may give Beijing pause and slow development. Meanwhile, China's land-based, partially mobile nuclear-missile forces are already extensive and highly capable. Their stealth is greatly enhanced by use of decoys and secure fiber-optic communications, options unavailable to submarines. While China is heading toward a nuclear dyad (Second Artillery and PLAN), it is likely to be a slow and cautious road.
>
> For current nonnuclear operations, the key platforms are not SSBNs but rather conventional and nuclear-powered attack submarines (SSN). The relative emphasis between them is an important indicator of China's prioritization of near-seas versus far-seas operations. China's conventionally powered submarines, already quiet but constrained by the speed and power limitations of their type, are relevant primarily to near-seas operations. This applies even to the advanced Yuan-class, whose likely air-independent propulsion (AIP) would permit several weeks of low-speed submerged operations without snorkeling, which makes antisubmarine warfare against them more difficult. AIP also saves batteries to support several hours of high-speed engagement and escape maneuvers. SSNs, by contrast, are important for far-seas power projection because of their unparalleled power and endurance. China's numbers and capabilities remain limited here, but this will be an important indicator to watch.

Within the surface force, PLAN modernization has resulted in reductions in low-capability single-mission ships and the development of multi-mission major surface combatants. Moreover, these multi-mission capabilities are extending beyond self-defense and certain classes are developing fleet-defense capabilities.

For example, the *Crotale*-based HHQ-7 was the longest-range ship-borne surface-to-air missile (SAM) approximately a decade ago. Now, the PLAN has new ships with at least four different SAMs of varying Area-Air Defense (AAD) capabilities.[285] The *Luzhou* guided missile destroyer

(DDG), armed with the SA-N-20, is capable of attacking air threats within 80 nautical miles (nm) of the ship.[286]

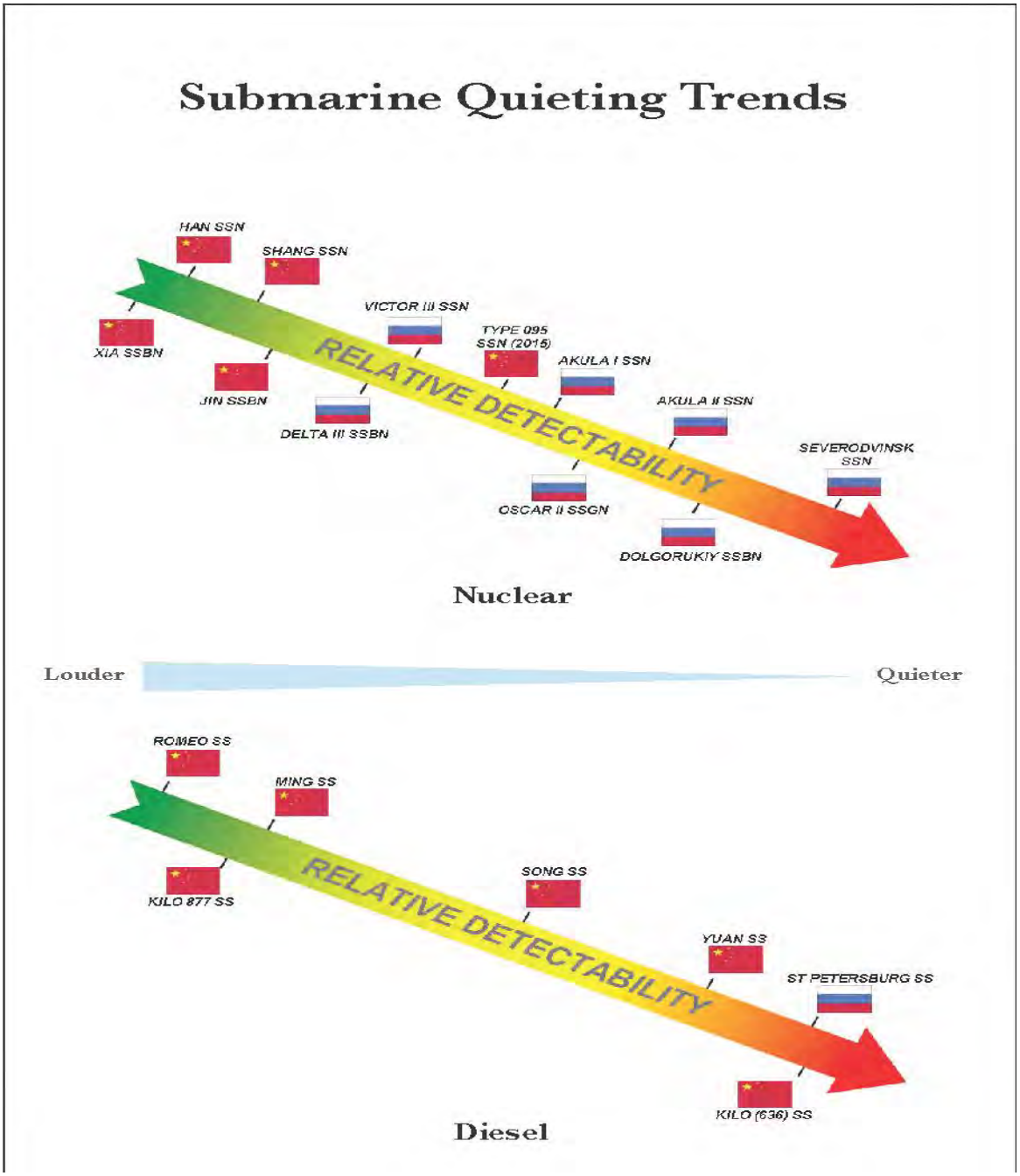
As a result, PLAN surface ships are now more secure when venturing beyond land-based air cover. A similar trend is occurring with the PLAN's growing anti-surface warfare capability. Ships such as the *Sovremeny* I/II DDGs armed with ASCMs and Over-the-Horizon (OTH) radar are capable of targeting opposing surface vessels at ranges of 130 nm.[287]

In terms of acquisition, Ronald O'Rourke t notes,[288]

> **[Figure 8.11]** shows actual and projected commissionings of Chinese submarines by class since 1995, when China took delivery of its first two Kilo-class boats. The table includes the final nine boats in the Ming class, which is an older and less capable submarine design. As shown in **[Figure 8.11]**, China by the end of 2012 is expected to have a total of 40 relatively modern attack submarines— meaning Shang, Kilo, Yuan, Song, and Qing class boats—in commission. As shown in the table, much of the growth in this figure occurred in 2004-2006, when 18 attack submarines (including 8 Kilo-class boats and 8 Song-class boats) were added, and in 2011-2012, when 9 attack submarines (including 8 Yuan-class boats and one Qing-class boat) were added or are expected to be added.
>
> The figures in **[Figure 8.11]** show that between 1995 and 2012, China placed or was expected to place into service a total of 51 submarines of all kinds, or an average of about 2.8 submarines per year. This average commissioning rate, if sustained indefinitely, would eventually result in a steady state submarine force of about 57 to 85 boats of all kinds, assuming an average submarine life of 20 to 30 years.
>
> Excluding the 12 Kilos purchased from Russia, the total number of domestically produced submarines placed into service between 1995 and 2012 is 39, or an average of about 2.2 per year. This average rate of domestic production, if sustained indefinitely, would eventually result in a steady-state force of domestically produced submarines of about 43 to 65 boats of all kinds, again assuming an average submarine life of 20 to 30 years.
>
> The August 2009 ONI report states that "Chinese submarine procurement has focused on smaller numbers of modern, high-capability boats," and that "over the next 10 to 15 years, primarily due to the introduction of new diesel-electric and [non-nuclear-powered] air independent power (AIP) submarines, the force is expected to increase incrementally in size to approximately 75 submarines."
>
> A May 16, 2013, press report quotes Admiral Samuel Locklear, the Commander of U.S. Pacific Command, as stating that China plans to acquire a total of 80 submarines.

The larger picture of this sustained modernization effort is a PLAN that is simultaneously shifting its force structure to ship types capable of fighting Local Wars while procuring modern vessels in categories more capable of fighting Local Wars than the PLAN's older ship classes. Thus, to track the PLAN's modernization efforts, it is necessary to compare both the shifts in force structure and force composition.

Figure 8.10: PLAN Progress in Submarine Technology



Source: Office of Naval Intelligence, *People's Liberation Army Navy: A Modern Navy with Chinese Characteristics*, p. 22. http://www.oni.navy.mil/Intelligence_Community/docs/china_army_navy.pdf.

Figure 8.11: PLA Navy Submarine Commisionings

Actual (1995-2011) and *Projected (2012-2016)*

	Jin (Type 094) SSBN	Shang (Type 093) SSN	Kilo SS (Russian-made)	Ming (Type 035) SS[b]	Song (Type 039) SS	Yuan (Type 039A) SS[a]	Qing SS	Annual total for all types shown	Cumulative total for all types shown	Cumulative total for modern attack boats[c]
1995			2[d]	1				3	3	2
1996				1				1	4	2
1997				2				2	6	2
1998			1[d]	2				3	9	3
1999			1[d]		1			2	11	5
2000				1				1	12	5
2001				1	2			3	15	7
2002				1				1	16	7
2003					2			2	18	9
2004			1		3			4	22	13
2005			4		3			7	29	20
2006		1	3		2[e]	1		7	36	27
2007	1	1[f]						2	38	28
2008								0	38	28
2009						2		2	40	30
2010	1					1		2	42	31
2011						3	1[g]	4	46	35
2012	*1*					*5*		*6*	*51*	*40*
2013	*1*					*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
2014	*1*					*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
2015						*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
2016	*1*[h]					*n/a*	*n/a*	*n/a*	*n/a*	*n/a*

Source: *Jane's Fighting Ships 2012-2013*, and previous editions.

Note: n/a = data not available.

a. Some observers believe the Yuan class to be a variant of the Song class and refer to the Yuan class as the Type 039A.

b. Figures for Ming-class boats are when the boats were launched (i.e., put into the water for final construction). Actual commissioning dates for these boats may have been later.

c. This total excludes the Jin-class SSBNs and the Ming-class SSs.

d. *Jane's Fighting Ships 2012-2013* lists the commissioning date of one of the two Kilos as December 15, 1994.

e. No further units expected after the 12th and 13th shown for 2006.

f. *Jane's Fighting Ships 2012-2013* states that production of the two Shang-class boats shown in the table is expected to be followed by production of a new SSN design known as the Type 095 class, of which a total of five are expected. A graph on page 22 of *2009 ONI Report* (reprinted in this CRS report as **Figure 3**) suggests that ONI expects the first Type 095 to enter service in 2015.

g. It is unclear whether this is the lead ship of a new class, or a one-of-a-kind submarine built for test purposes. *Jane's Fighting Ships 2012-2013* refers to the boat as an auxiliary submarine (SSA).

h. A total of six Jin-class boats is expected by *Jane's*, with the sixth unit projected to be commissioned in 2016.

Source: Ronald O'Rourke, *Chinese Naval Modernization: Implications for U.S. Navy Capabilities – Background and Issues for Congress*, Congressional Research Service, July 5, 2013, p. 18.

Major Combatant Holdings

Figures 8.12 and 8.13 track the development of the PLAN's force composition. They illustrate the sustained procurement of modern vessels and their growth, absolutely and relatively, in the PLAN arsenal. Moreover, as **Figure 8.12** indicates, the PLAN's modern major combatant inventory is larger than most of the region's navies'.[289]

It is important to note the parameters for "modern" combatants:

- Submarines: quiet and capable of firing ASCMs
- Major Surface Combatants: multi-mission capable, containing strong capabilities in at least two warfare areas

In assessing China's major surface combatants, O'Rourke's July 2013 CRS report provides the following analysis:[290]

> China since the early 1990s has purchased four Sovremenny-class destroyers from Russia and put into service 10 new classes of indigenously built destroyers and frigates (some of which are variations of one another) that demonstrate a significant modernization of PLA Navy surface combatant technology. DOD states: "Since 2008, the PLA Navy has embarked on a robust surface combatant construction program of various classes of ships, including guided missile destroyers (DDG[s]) and guided missile frigates (FFG[s]). During 2012, China continued series production of several classes, including construction of a new generation of DDG[s]." DOD states that China's new destroyers and frigates "provide a significant upgrade to the PLA Navy's area air defense capability, which will be critical as it expands operations into 'distant seas' beyond the range of shore-based air defense." China reportedly is also building a new class of corvettes (i.e., light frigates) and has put into service a new kind of missile-armed fast attack craft that uses a stealthy catamaran hull design.
>
> …. China in 1996 ordered two Sovremenny-class destroyers from Russia; the ships entered service in 1999 and 2001. China in 2002 ordered two additional Sovremenny-class destroyers from Russia; the ships entered service in 2005 and 2006. Sovremenny-class destroyers are equipped with the Russian-made SS-N-22 Sunburn ASCM, a highly capable ASCM.
>
> …. China since the early 1990s has put into service six new classes of indigenously built destroyers, two of which are variations of another. The classes are called the Luhu (Type 052), Luhai (Type 051B), Luyang I (Type 052B), Luyang II (Type 052C), the Luyang III (Type 052D), and Louzhou (Type 051C) designs. Compared to China's remaining older Luda (Type 051) class destroyers, which entered service between 1971 and 1991, these six new indigenously built destroyer classes are substantially more modern in terms of their hull designs, propulsion systems, sensors, weapons, and electronics. The Luyang II-class ships… and the Luyang III-class ships appear to feature phased-array radars that are outwardly somewhat similar to the SPY-1 radar used in the U.S.-made Aegis combat system. Like the older Luda-class destroyers, these six new destroyer classes are armed with ASCMs.
>
> As shown in **[Figure 8.14]**, China between 1994 and 2007 commissioned only one or two ships in its first four new indigenously built destroyers classes, suggesting that these classes were intended as stepping stones in a plan to modernize the PLA Navy's destroyer technology incrementally before committing to larger-scale series production of Luyang II-class destroyers. As also shown in **[Figure 8.14]**, after commissioning no new destroyers in 2008-2011, commissionings of new Luyang II-class destroyers appears to have resumed. Regarding the 2008-2011 gap in commissionings, one observer states, "The relocation of JiangNan shipyard and indigenization of DA80/DN80 gas turbine (QC-280) delayed the production of follow-on units [of Luyang II-class destroyers] for several years."
>
> …. China since the early 1990s has put into service four new classes of indigenously built frigates, two of which are variations of two others. The classes are called the Jiangwei I (Type 053 H2G), Jiangwei II (Type 053H3), Jiangkai I (Type 054), and Jiangkai II (Type 054A) designs. Compared to China's remaining older Jianghu (Type 053) class frigates, which entered service between the mid-1970s and 1989, the four new frigate classes feature improved hull designs and systems, including improved AAW

> capabilities. As shown in **[Figure 8.15]**, production of Jiangkai II-class ships… continues, and *Jane's* projects an eventual total of at least 16.
>
> …. China is building a new type of corvette (i.e., a light frigate, or FFL) called the Jiangdao class or Type 056… DOD states that "At least six of the JIANGDAO-class corvettes (FFL[s]) (Type 056) were launched in 2012. The first of these ships entered service on February 25, 2013; China may build 20 to 30 of this class."
>
> …. As an apparent replacement for at least some of its older fast attack craft, or FACs (including some armed with ASCMs), China in 2004 introduced a new type of ASCM-armed fast attack craft, called the Houbei (Type 022) class… that uses a stealthy, wave-piercing, catamaran hull. Each boat can carry eight C-802 ASCMs. The August 2009 ONI report states that "the Houbei's ability to patrol coastal and littoral waters and react at short notice allows the PLA(N)'s larger combatants to focus on offshore defense and out-of-[home]area missions without leaving a security gap along China's coastline." The Houbei class was built in at least six shipyards; construction of the design appeared to stop in 2009 after a production run of about 60 units.
>
> …. In addition to the PLAN surface combatants discussed above, China operates numerous additional surface ships in several paramilitary maritime law enforcement agencies that are outside the PLAN. These agencies include, but may not be limited to, China Marine Surveillance (CMS), the Fisheries Law Enforcement Command (FLEC), the China Coast Guard (CCG), the Maritime Safety Administration (MSA), and the Customs Anti-Smuggling Bureau (CASB). China often uses ships operated by these agencies, rather than PLAN ships, to assert and defend its maritime territorial claims and fishing interests in the South China Sea and East China Sea. While the ships operated by these agencies are unarmed or lightly armed, they can nevertheless be effective in confrontations with unarmed fishing vessels or other ships. The CMS, FLEC, and MSA fleets reportedly are being modernized rapidly, and some of the newest ships operated by these agencies are relatively large.

Analyst Andrew S. Erikson also provides useful background on China's commissioning of its first aircraft carrier on September 25, 2012:[291]

> According to China's Ministry of National Defense, Liaoning will facilitate PLAN integrated combat force modernization, help address sovereignty issues, and advance new historic missions by "developing far seas cooperation" and capabilities to deal with nontraditional security threats. Particularly important is its future significance for "enhancing protection operations capabilities" (*zengqiang fangwei zuozhan nengli*) by using air power to cover vessels operating out of area.
>
> While *Liaoning* will initially serve as a training and test platform, and cannot threaten capable forces such as the U.S. Navy or the Japan Maritime Self-Defense Force, PLAN-affiliated experts advocate using its formidable symbolism and potential for future air power to deter smaller neighbors such as Vietnam from pursuing competing claims in the South China Sea. [C]arriers will constitute part of… lower-intensity tertiary layer of Chinese naval and air power development… China will probably develop multiple aircraft carriers so that one can always remain at sea while the others are undergoing refitting or being used for training.
>
> *Liaoning* is a short takeoff but arrested recovery (STOBAR) carrier, which combines an un-catapulted, rolling takeoff assisted by a ski jump with a traditional arrested recovery system that permits the landing of fighter aircraft in short deck space. The STOBAR design entails several major limitations…. To increase its deck aviation capabilities substantially, China must develop a catapult-assisted takeoff but arrested recovery (CATOBAR) carrier; the question is how soon it will actually do so. It is uncertain whether China has started "indigenous construction," and how that might be defined. Chinese shipyards may already be working on components. More broadly, will China seek to construct its own version of *Liaoning* first?…. Alternatively, might China wait to master more complex processes, and then construct a CATOBAR carrier? The nature of China's second indigenously constructed aircraft carrier will tell much about its deck aviation trajectory.

On the *Liaoning* and future carrier plans, a July 2013 CRS report notes,[292]

> The *Liaoning* has an estimated full load displacement of about 60,000 tons, and might accommodate an air wing of 30 or more aircraft, including short-takeoff, vertical landing (STOVL) fixed-wing airplanes and

some helicopters. By comparison, a U.S. Navy aircraft carrier has a full load displacement of about 100,000 tons and can accommodate an air wing of 60 or more aircraft, including conventional takeoff and landing (CTOL) airplanes (which tend to have a greater range/payload than STVOL airplanes) and some helicopters.

…. DOD states that "China also continues to pursue an indigenous aircraft carrier program ... and will likely build multiple aircraft carriers over the next decade. The first Chinese-built carrier will likely be operational sometime in the second half of this decade." DOD also states that "Although reports have surfaced regarding the construction of a second Chinese aircraft carrier in Shanghai, the Chinese Ministry of National Defense has dismissed these claims." DOD stated in 2012 that "some components of China's first indigenously-produced carrier may already be under construction."

An April 23, 2013, press report stated:

> A senior officer with the People's Liberation Army (PLA) Navy said on Tuesday [April 23, 2013] that "China will have more than one aircraft carrier." Song Xue, deputy chief of staff of the PLA Navy, told foreign military attaches at a ceremony to celebrate the Navy's 64th founding anniversary in Beijing, "The next aircraft carrier we need will be larger and carry more fighters."

…. A May 21, 2012, press report stated:

> Taiwan's intelligence chief said May 21 that China plans to build two aircraft carriers, in addition to the first in its fleet, a refitted former Soviet carrier currently undergoing sea trials.... Tsai [Teh-sheng, head of the island's National Security Bureau,] said construction of the warships is slated to start in 2013 and 2015, respectively, with delivery dates of 2020 and 2022, and that they would be conventionally powered.

.... Although aircraft carriers might have some value for China in Taiwan-related conflict scenarios, they are not considered critical for Chinese operations in such scenarios, because Taiwan is within range of land-based Chinese aircraft. Consequently, most observers believe that China is acquiring carriers primarily for their value in other kinds of operations, and to symbolize China's status as a major world power. DOD stated in 2011 that "Given the fact that Taiwan can be reached by land-based aviation, China's aircraft carrier program would offer very limited value in a Taiwan scenario and would require additional naval resources for protection. However, it would enable China to extend its naval air capabilities elsewhere."

Chinese aircraft carriers could be used for power-projection operations, particularly in scenarios that do not involve opposing U.S. forces. Chinese aircraft carriers could also be used for humanitarian assistance and disaster relief (HA/DR) operations, maritime security operations (such as anti-piracy operations), and non-combatant evacuation operations (NEOs). Politically, aircraft carriers could be particularly valuable to China for projecting an image of China as a major world power, because aircraft carriers are viewed by many as symbols of major world power status. In a combat situation involving opposing U.S. naval and air forces, Chinese aircraft carriers would be highly vulnerable to attack by U.S. ships and aircraft, but conducting such attacks could divert U.S. ships and aircraft from performing other missions in a conflict situation with China.

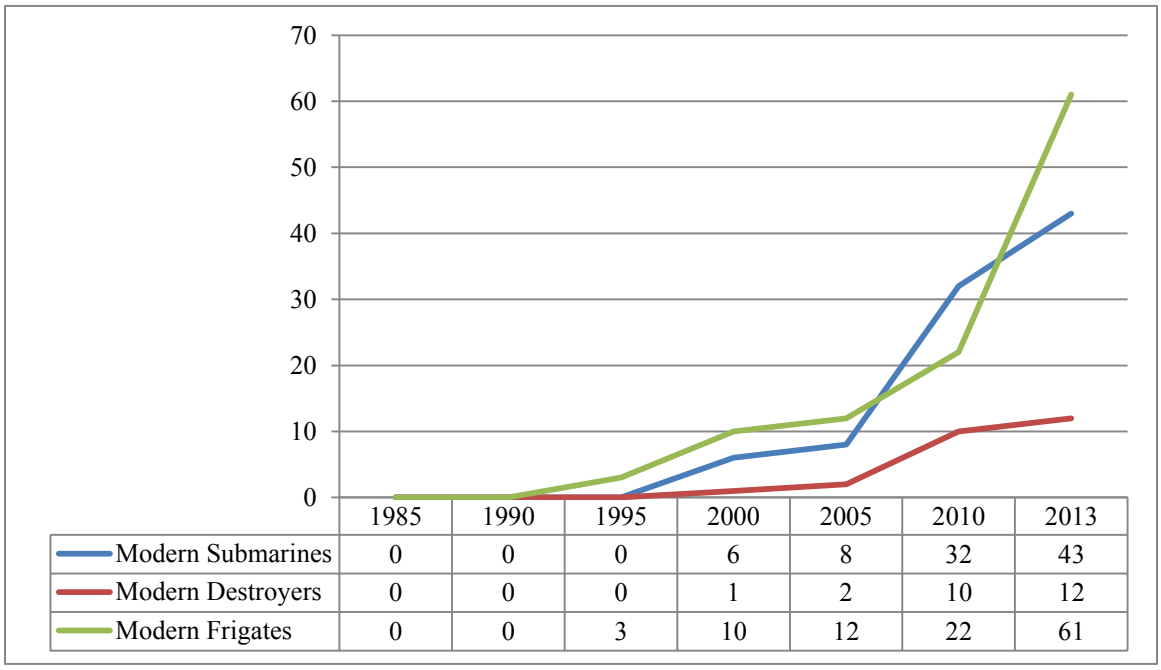
The US DoD has reported that Chinese carrier-based jets – evidently the Shenyang J-15 – were conducting take-off and landing training on the *Liaoning* in late 2012.[293] Furthermore, the deputy chief designer of the *Liaoning* said in an interview that China was planning for more aircraft carriers: "China's perception of interest demands has a bearing on the number of aircraft carriers. How many aircraft carriers China should have depends on its needs. What I can tell you is that the 'Liaoning Ship' is just a beginning."[294]

One additional issue addressed in a July 2013 CRS report was that of electromagnetic pulse weapons (EMPs):[295]

> A July 22, 2011, press report states that "China's military is developing electromagnetic pulse weapons that Beijing plans to use against U.S. aircraft carriers in any future conflict over Taiwan, according to an intelligence report made public on Thursday [July 21].... The report, produced in 2005 and once labeled

'secret,' stated that Chinese military writings have discussed building lowyield EMP warheads, but 'it is not known whether [the Chinese] have actually done so.'"

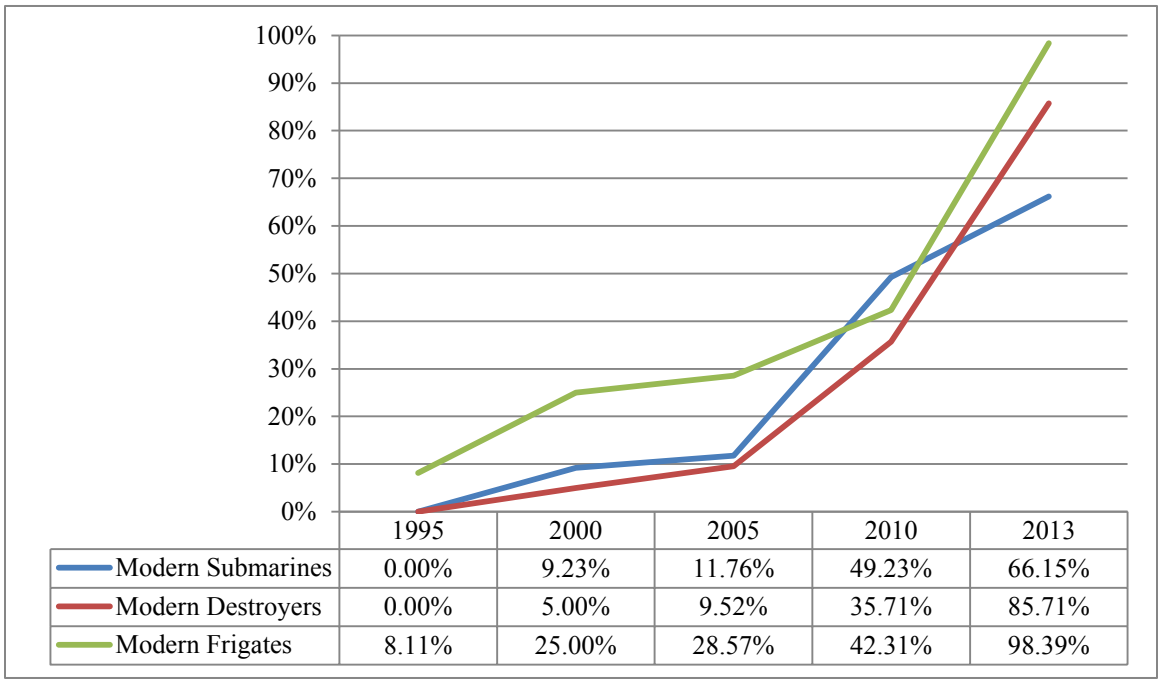
Figure 8.12: PLAN Major Combatant Holdings



	1985	1990	1995	2000	2005	2010	2013
Modern Submarines	0	0	0	6	8	32	43
Modern Destroyers	0	0	0	1	2	10	12
Modern Frigates	0	0	3	10	12	22	61

Source: IISS, *Military Balance,* 1985-2013.

Figure 8.13: Relative PLAN Major Combatant Holdings



	1995	2000	2005	2010	2013
Modern Submarines	0.00%	9.23%	11.76%	49.23%	66.15%
Modern Destroyers	0.00%	5.00%	9.52%	35.71%	85.71%
Modern Frigates	8.11%	25.00%	28.57%	42.31%	98.39%

Source: IISS, *Military Balance,* 1985-2013.

Figure 8.14: PLA Navy Destroyer Commissionings

Actual (1994-2011) and *Projected (2012-2014)*

	Sovre-menny (Russian-made)	Luhu (Type 052)	Luhai (Type 051B)	Luyang I (Type 052B)	Lyugang II (Type 052C)	Louzhou (Type 051C)	Luyang III (Type 052D)	Annual total	Cumulative total
1994		1						1	1
1995								0	1
1996		1						1	2
1997								0	2
1998								0	2
1999	1		1					2	4
2000								0	4
2001	1							1	5
2002								0	5
2003								0	5
2004				2	1			3	8
2005	1				1			2	10
2006	1					1		2	12
2007						1		1	13
2008								0	13
2009								0	13
2010								0	13
2011								*0*	*13*
2012					*1*			*1*	*14*
2013					2			2	*16*
2014					*1*		*n/a*	*n/a*	*n/a*

Source: *Jane's Fighting Ships 2012-2013*, and previous editions.

Source: Ronald O'Rourke, *Chinese Naval Modernization: Implications for U.S. Navy Capabilities – Background and Issues for Congress*, Congressional Research Service, July 5, 2013, p. 26.

Figure 8.15: PLA Navy Frigate Commissionings

Actual (1991-2011) and *Projected (2012-2013)*

	Jiangwei I (Type 053 H2G)	Jiangwei II (Type 053H3)	Jiangkai I (Type 054)	Jiangkai II (Type 054A)	Annual total	Cumulative total
1991	1				1	1
1992	1				1	2
1993	1				1	3
1994	1				1	4
1995					0	4
1996					0	4
1997					0	4
1998		1			1	5
1999		4			4	9
2000		1			1	10
2001					0	10
2002		2			2	12
2003					0	12
2004					0	12
2005		2	1		3	15
2006			1		1	16
2007					0	16
2008				4	4	20
2009					0	20
2010				3	3	23
2011				2	2	25
2012				*2*	2	27
2013				*5*	5	32

Source: *Jane's Fighting Ships 2012-2013*, and previous editions.

Source: Ronald O'Rourke, *Chinese Naval Modernization: Implications for U.S. Navy Capabilities – Background and Issues for Congress*, Congressional Research Service, July 5, 2013, p. 28.

Shifts in Manpower

The requirements of fighting Local Wars under Conditions of Informatization and of using modern naval systems generate the need for high human capital within the PLAN. As a result, the PLAN has significantly reduced its manpower since 1985 and has initiated a campaign to develop a professional naval force. In addition, it has augmented investments in its human capital with military exercises and long-distance deployments. **Figure 8.16** shows the historical manpower of the PLAN.

The PLAN's efforts to develop a professional force rest on three pillars: professional NCOs, academically-qualified officers, and improved advancement and educational opportunities for currently-serving enlisted personnel. Since 1999, the PLAN has reduced the conscription

obligation from four to two years, while doubling the maximum years of service for NCOs from 15 to 30. Furthermore, now NCOs are taking over many of the shipboard jobs previously performed by officers or conscripts.[296] The number of officers is shrinking as the PLAN aims to attract fewer but more qualified personnel. In order to realize these efforts, the PLAN has expanded reserve officer academic scholarships, increased technical training in the fleet, and targeted higher degree holders for officer positions.[297] Regarding opportunities for currently serving personnel, the PLAN has developed on-the-job, short-term, and on-line training programs.[298]

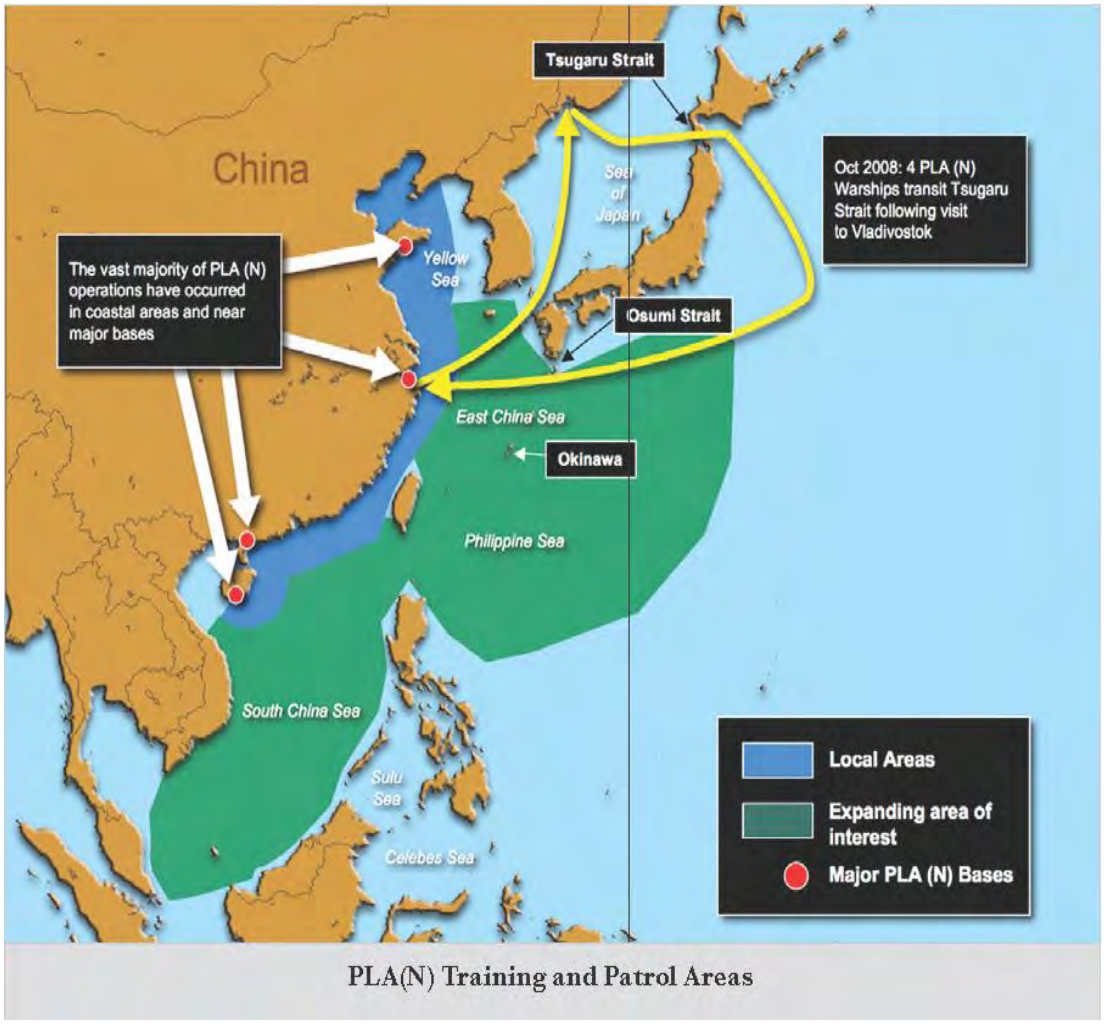
The PLAN has also utilized military exercises and deployments to measure and improve the leadership and combat skills of its personnel. Over the last decade, military exercises have become more realistic and integrated opposition forces. At least once a year, each fleet undertakes a major fleet-level exercise, and there are occasional multi-fleet exercises.[299] **Figure 8.17** shows the geographical expansion of these exercises.

Figure 8.16: PLAN Manpower Trends

	1985	1990	1995	2000	2005	2010	2013
Total Manpower	350,000	295,000	300,000	260,000	295,000	255,000	255,000
Navy	350,000	260,000	260,000	220,000	255,000	215,000	215,000
Conscript	0	35,000	40,000	40,000	40,000	40,000	40,000

Source: IISS, *Military Balance,* 1985-2013.

Figure 8.17: Geographic Expansion in PLAN Military Exercises Locations



Source: Office of Naval Intelligence, *People's Liberation Army Navy: A Modern Navy with Chinese Characteristics*, p. 38.

The PLAN and Power Projection

The shift in PLAN force structure, the changing composition of the PLAN's combatant inventory, and the efforts to develop personnel proficient with their equipment and expert at their jobs indicate that the PLAN is modernizing and developing a force suited for the Local Wars and offshore defense concepts. The PLAN's modern combatants provide each of the three PLAN fleets a core of concentrated combat power, ideally suited to rapidly achieving military objectives within the first island chain and capable of producing significant combat power in a limited, local war.

The Chinese View

These shifts in the strategy and capability of the Chinese Navy, coupled with equally important shifts in Chinese air and missile power, also have broader implications throughout the Pacific

and are beginning to affect naval operations in the Indian Ocean. China has already deployed some units in anti-piracy missions off the coast of Somalia and has asked to join in US joint naval exercises in the Gulf.

The PLAN has recently been conducting long-range naval patrols, the longest of which occurs in the Gulf of Aden. Within the Asia-Pacific, there has been a seemingly concerted effort to get PLAN forces to patrol farther from China's coastline. As the Office of Naval Intelligence states:[300]

> The PLA(N) has conducted surface deployments to the Sea of Japan, South China Sea, Philippine Sea, Eastern Pacific, and, for the first time in China's modern naval history, deployed task groups made up of two combatants and a naval auxiliary to the Gulf of Aden.

Given the PLAN's lack of recent combat experience, these efforts are critical to Chinese efforts to develop the combat and leadership skills necessary to fight Local Wars in the manner of Offshore Defense. They also indicate a growing PLAN proficiency in its doctrinal combat capabilities. The geographic expansion of PLAN naval exercises is shown in **Figure 8.14**.

As has been noted previously, China has been increasing the use of paramilitary and policing forces in interventions relating to nine-dash line sovereignty cases, as well as increasing its ability to expand on the concept of Local Wars at a distance and challenge the US for control of the second island chain and the Asian-Pacific maritime region overall.

The 2013 Chinese defense white paper highlighted the expanding "blue water" range of Chinese naval forces, improved readiness and training, and joint warfare capabilities – all of which increase Chinese capabilities to project power and execute area denial activities. If all of the various sections in the white paper that deal with the PLAN are assembled together, they provide a considerable amount of detail on both current PLAN capabilities and the trends in these forces:[301]

> The PLA Navy (PLAN) is China's mainstay for operations at sea, and is responsible for safeguarding its maritime security and maintaining its sovereignty over its territorial seas along with its maritime rights and interests. The PLAN is composed of the submarine, surface vessel, naval aviation, marine corps and coastal defense arms. In line with the requirements of its offshore defense strategy, the PLAN endeavors to accelerate the modernization of its forces for comprehensive offshore operations, develop advanced submarines, destroyers and frigates, and improve integrated electronic and information systems. Furthermore, it develops blue-water capabilities of conducting mobile operations, carrying out international cooperation, and countering non-traditional security threats, and enhances its capabilities of strategic deterrence and counterattack. Currently, the PLAN has a total strength of 235,000 officers and men, and commands three fleets, namely, the Beihai Fleet, the Donghai Fleet and the Nanhai Fleet. Each fleet has fleet aviation headquarters, support bases, flotillas and maritime garrison commands, as well as aviation divisions and marine brigades. In September 2012, China's first aircraft carrier Liaoning was commissioned into the PLAN. China's development of an aircraft carrier has a profound impact on building a strong PLAN and safeguarding maritime security.
>
> …The PLAN strengthens maritime control and management, systematically establishes patrol mechanisms, effectively enhances situational awareness in surrounding sea areas, tightly guards against various types of harassment, infiltration and sabotage activities, and copes promptly with maritime and air incidents and emergencies. It advances maritime security cooperation, and maintains maritime peace and stability, as well as free and safe navigation. Within the framework of the Military Maritime Consultative Agreement (MMCA), the Chinese and US navies regularly exchange maritime information to avoid accidents at sea. According to the Agreement on Joint Patrols by the Navies of China and Vietnam in the Beibu Gulf, the two navies have organized joint patrols twice a year since 2006.

…Intensifying blue water training…The PLAN is improving the training mode of task force formation in blue water. It organizes the training of different formations of combined task forces composed of new types of destroyers, frigates, ocean-going replenishment ships and shipborne helicopters. It is increasing its research and training on tasks in complex battlefield environments, highlighting the training of remote early warning, comprehensive control, open sea interception, long-range raid, anti-submarine warfare and vessel protection at distant sea. The PLAN organizes relevant coastal forces to carry out live force-on-force training for air defense, anti-submarine, anti-mine, anti-terrorism, anti-piracy, coastal defense, and island and reef sabotage raids. Since 2007, the PLAN has conducted training in the distant sea waters of the Western Pacific involving over 90 ships in nearly 20 batches. During the training, the PLAN took effective measures to respond to foreign close-in reconnaissance and illegal interference activities by military ships and aircraft. From April to September 2012, the training vessel Zhenghe completed global-voyage training, paying port calls to 14 countries and regions.

To fulfill China's international obligations, the Chinese navy carries out regular escort missions in the Gulf of Aden and waters off Somalia. It conducts exchanges and cooperation with other escort forces to jointly safeguard the security of the international SLOCs. As of December 2012, Chinese navy task groups have provided protection for four WFP ships and 2,455 foreign ships, accounting for 49% of the total of escorted ships. They helped four foreign ships, recovered four ships released from captivity and saved 20 foreign ships from pursuit by pirates.

Chinese navy escort task forces have maintained smooth communication with other navies in the areas of joint escort, information sharing, coordination and liaison. They have conducted joint escorts with their Russian counterparts, carried out joint anti-piracy drills with naval ships of the ROK, Pakistan and the US, and coordinated with the European Union to protect WFP ships. It has exchanged boarding visits of commanders with task forces from the EU, NATO, the Combined Maritime Forces (CMF), the ROK, Japan and Singapore. It has exchanged officers for onboard observations with the navy of the Netherlands. China takes an active part in the conferences of the Contact Group on Piracy off the Coast of Somalia (CGPCS) and "Shared Awareness and Deconfliction" (SHADE) meetings on international merchant shipping protection.

Since January 2012, independent deployers such as China, India and Japan have strengthened their convoy coordination. They have adjusted their escort schedules on a quarterly basis, optimized available assets, and thereby enhanced escort efficiency. China, as the reference country for the first round of convoy coordination, submitted its escort timetable for the first quarter of 2012 in good time. India and Japan's escort task forces adjusted their convoy arrangements accordingly, thereby formulating a well-scheduled escort timetable. The ROK joined these efforts in the fourth quarter of 2012.

…The routine combat readiness work of the PLAN serves to safeguard national territorial sovereignty and maritime rights and interests. It carries out diversified patrols and provides whole-area surveillance in a cost-effective way. The PLAN organizes and performs regular combat readiness patrols, and maintains a military presence in relevant sea areas. All fleets maintain the necessary number of ships patrolling in areas under their respective command, beef up naval aviation reconnaissance patrols, and organize mobile forces to conduct patrols and surveillance in relevant sea areas, as required.

Joint maritime exercises and training are being expanded. In recent years, the Chinese navy has taken part in the "Peace-07," "Peace-09" and "Peace-11" multinational maritime exercises hosted by Pakistan on the Arabian Sea. The PLA and Russian navies held the "Maritime Cooperation-2012" military drill in the Yellow Sea off China's east coast focusing on joint defense of maritime traffic arteries. Chinese and Thai marine corps held the "Blue Strike-2010" and "Blue Strike-2012" joint training exercises. During mutual port calls and other activities, the Chinese navy also carried out bilateral or multilateral maritime exercises and training in such tasks as communications, formation movement, maritime replenishment, cross-deck helicopter landing, firing at surface, underwater and air targets, joint escort, boarding and inspection, joint search and rescue and diving with its counterparts of India, France, the UK, Australia, Thailand, the US, Russia, Japan, New Zealand and Vietnam.

… In combination with its routine combat readiness activities, the PLAN provides security support for China's maritime law enforcement, fisheries, and oil and gas exploitation. It has established mechanisms to coordinate and cooperate with law-enforcement organs of marine surveillance and fishery administration, as well as a joint military-police-civilian defense mechanism. Further, the PLAN has worked in

coordination with relevant local departments to conduct maritime survey and scientific investigation; build systems of maritime meteorological observation, satellite navigation, radio navigation and navigation aids; release timely weather and sea traffic information; and ensure the safe flow of traffic in sea areas of responsibility.

Together with the marine surveillance and fishery administration departments, the PLAN has conducted joint maritime exercises and drills for protecting rights and enforcing laws, and enhanced its capabilities to coordinate command and respond to emergencies in joint military-civilian operations to safeguard maritime rights. The "Donghai Collaboration-2012" joint exercise was held in the East China Sea in October 2012, involving 11 ships and eight planes.

As an important armed maritime law-enforcement body, the border public security force exercises jurisdiction over both violations of laws, rules and regulations relating to public security administration and suspected crimes committed in China's internal waters, territorial seas, contiguous zones, exclusive economic zones and continental shelf. In recent years, the border public security force has endeavored to guarantee the security of sea areas, strengthened patrols, surveillance and management along the sea boundary in the Beibu Gulf and around the Xisha sea areas, and effectively maintained maritime public order and stability.

The US View

The 2012 DoD report on Chinese military power summarized such developments in China's naval forces as follows:[302]

Since the 1990s, the PLA Navy has transformed from a large fleet of single mission platforms to a leaner force equipped with more modern, multi-mission platforms. In contrast to the fleet of just a decade ago, many PLA Navy combatants are equipped with advanced area air-defense systems, modern ASCMs, and torpedoes. These capabilities not only increase the lethality of PLA Navy platforms, particularly in the area of anti-surface warfare, but also enable them to operate beyond the range of land-based air cover. The PLA Navy possesses some 79 principal surface combatants (destroyers and frigates), 50 submarines, 51 amphibious and medium landing ships, and 86 missile-equipped patrol craft.

The PLA Navy has now completed construction of a major naval base at Yalong, on the southernmost tip of Hainan Island. The base is large enough to accommodate a mix of nuclear-powered attack and ballistic-missile submarines and advanced surface combatants, including aircraft carriers. Submarine tunnel facilities at the base could also enable deployments from this facility with reduced risk of detection.

China's aircraft carrier research and development program includes renovation of the KUZNETSOV-class aircraft carrier Hull 2 (formerly the Varyag), which began sea trials in 2011. It will likely serve initially as a training and evaluation platform. Once China deploys aircraft capable of operating from a carrier, it should offer a limited capability for carrier-based air operations.

Some components of China's first indigenously-produced carrier may already be under construction; that carrier could achieve operational capability after 2015. China likely will build multiple aircraft carriers and associated support ships over the next decade. China currently has a land-based training program for carrier pilots; however, it will still take several additional years for China to achieve a minimal level of combat capability for its aircraft carriers.

The PLA Navy is improving its long-range surveillance capability with sky-wave and surface wave over-the-horizon (OTH) radars. In combination with early-warning aircraft, unmanned aerial vehicles (UAVs), and other surveillance and reconnaissance equipment, the radars allow China to carry out surveillance and reconnaissance over the western Pacific. These radars 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 ASBMs.

China has developed torpedo and mine systems capable of area denial in a Taiwan scenario. Estimates of China's naval mine inventory exceed 50,000 mines, with many more capable systems developed in the past 10 years.

China is producing a new class of nuclear-powered ballistic missile submarine (SSBN). The JIN-class SSBN (Type-094) will eventually carry the JL-2 submarine-launched ballistic missile with an estimated range of some 7,400km. The JIN-class SSBN and the JL-2 will give the PLA Navy its first credible sea-based nuclear capability. The JL-2 program has faced repeated delays, but may reach initial operating capability within the next two years.

China has expanded its force of nuclear-powered attack submarines (SSN). Two second generation SHANG-class (Type-093) SSNs are already in service and as many as five third generation SSNs will be added in the coming years. When complete, the new class of SSNs will incorporate better quieting technology, improving China's capability to conduct a range of missions from surveillance to the interdiction of surface vessels with torpedoes and ASCMs.

The current mainstay of modern diesel powered attack submarines (SS) in the PLA Navy submarine force are the 13 SONG-class (Type-039) units. Each can carry the YJ-82 ASCM. The follow-on to the SONG is the YUAN-class (a Type-039 variant), as many as four of which are already in service. The YUAN-class probably includes an air-independent power system. The SONG, YUAN, SHANG and the still-to-be-deployed new SSN-class all will eventually be capable of launching a new long-range ASCM.

China has deployed approximately 60 of its HOUBEI-class (Type-022) wave-piercing catamaran-hull guided missile patrol craft. Each boat can carry up to eight YJ-83 ASCMs. These boats have increased the PLA Navy's littoral warfare capabilities. The PLA Navy has acquired modern, domestically-produced surface combatants.

These include at least two LUYANG II-class (Type-052C) guided missile destroyers (DDG) fitted with the indigenous HHQ-9 long-range SAM, with additional hulls under construction; two LUZHOU-class (Type-051C) DDGs equipped with the Russian SA-N-20 long-range SAM; and at least nine JIANGKAI II-class (Type-054A) guided-missile frigates, fitted with the medium range HHQ-16 vertically launched SAM. These ships improve the PLA Navy's area air defense capability significantly, which will be critical as the PLA Navy expands its operations into areas beyond the range of shore-based air defense.

The updated DoD report for 2013 again provided more details:[303]

The PLA Navy remains at the forefront of the military's efforts to extend its operational reach beyond East Asia and into what China calls the "far seas." Missions in these areas include protecting important sea lanes from terrorism, maritime piracy, and foreign interdiction; providing humanitarian assistance and disaster relief; conducting naval diplomacy and regional deterrence; and training to prevent a third party, such as the United States, from interfering with operations off China's coast in a Taiwan or South China Sea conflict. The PLA Navy's ability to perform these missions is modest but growing as it gains more experience operating in distant waters and acquires larger and more advanced platforms. The PLA Navy's goal over the coming decades is to become a stronger regional force that is able to project power across the globe for high-intensity operations over a period of several months, similar to the United Kingdom's deployment to the South Atlantic to retake the Falkland Islands in the early 1980s. However, logistics and intelligence support remain key obstacles, particularly in the Indian Ocean. (p. 38)

In the last several years, the PLA Navy's distant seas experience has primarily derived from its ongoing counter-piracy mission in the Gulf of Aden and long-distance task group deployments beyond the first island chain in the western Pacific. China continues to sustain a three-ship presence in the Gulf of Aden to protect Chinese merchant shipping from maritime piracy. This operation is China's first enduring naval operation beyond the Asia region.

Additionally, the PLA Navy has begun to conduct military activities within the Exclusive Economic Zones (EEZs) of other nations, without the permission of those coastal states. Of note, the United States has observed over the past year several instances of Chinese naval activities in the EEZ around Guam and Hawaii. One of those instances was during the execution of the annual Rim of the Pacific (RIMPAC) exercise in July/August 2012. While the United States considers the PLA Navy activities in its EEZ to be lawful, the activity undercuts China's decades-old position that similar foreign military activities in China's EEZ are unlawful. (p. 38)

The PLA Navy has made long-distance deployments a routine part of the annual training cycle. In 2012, it deployed task groups beyond the first island chain seven times with formations as large as seven ships.

These deployments are designed to complete a number of training requirements, including long-distance navigation, C2, and multi-discipline warfare in deep sea environments beyond the range of land-based air defense.

The PLA Navy's force structure continues to evolve, incorporating more platforms with the versatility for both offshore and long-distance operations. In addition to the recently-commissioned KUZNETSOV-class aircraft carrier (CV) *Liaoning*, China is engaged in series production of the LUYANG-class III DDG, the JIANGKAI-class II FFG, and the JIANGDAO-class FFL. China will also begin construction on a new Type 081-class landing helicopter assault ship within the next five years. China will probably build several aircraft carriers over the next 15 years.

Limited logistical support remains a key obstacle preventing the PLA Navy from operating more extensively beyond East Asia, particularly in the Indian Ocean. China desires to expand its access to logistics in the Indian Ocean and will likely establish several access points in this area in the next 10 years (potential sites include the Strait of Malacca, Lomboc Strait, and Sunda Strait). These arrangements will likely take the form of agreements for refueling, replenishment, crew rest, and low-level maintenance. The services provided will likely fall short of U.S.-style agreements permitting the full spectrum of support from repair to re-armament. (p. 39)

Regular Naval Forces

The PLA Navy has the largest force of major combatants, submarines, and amphibious warfare ships in Asia. China's naval forces include some 79 principal surface combatants, more than 55 submarines, 55 medium and large amphibious ships, and roughly 85 missile-equipped small combatants. (p. 6)

The current mainstay of the Chinese submarine force is modern diesel powered attack submarines (SS). In addition to 12 KILO-class submarines acquired from Russia in the 1990s and 2000s (eight of which are equipped with the SS-N-27 ASCM), the PLA Navy possesses 13 SONG-class SS (Type 039) and eight YUAN-class SSP (Type 039A). The YUAN-class SSP is armed similarly to the SONG-class SS, but also includes an air-independent power system. China may plan to construct up to 20 YUAN-class SSPs. (p. 7)

Since 2008, the PLA Navy has embarked on a robust surface combatant construction program of various classes of ships, including guided missile destroyers (DDG) and guided missile frigates (FFG). During 2012, China continued series production of several classes, including construction of a new generation of DDG. Construction of the LUYANG II-class DDG (Type 052C) continued, with one ship entering service in 2012, and an additional three ships under various stages of construction and sea trials, bringing the total number of ships of this class to six by the end of 2013. Additionally, China launched the lead ship in a follow-on class, the LUYANG III- class DDG (Type 052D), which will likely enter service in 2014. The LUYANG III incorporates the PLA Navy's first multipurpose vertical launch system, likely capable of launching ASCM, land attack cruise missiles (LACM), surface-to-air missiles (SAM), and anti-submarine rockets. China is projected to build more than a dozen of these ships to replace its aging LUDA-class destroyers (DD). China has continued the construction of the workhorse JIANGKAI II-class FFG (Type 054A), with 12 ships currently in the fleet and six or more in various stages of construction, and yet more expected. These new DDGs and FFGs provide a significant upgrade to the PLA Navy's area air defense capability, which will be critical as it expands operations into "distant seas" beyond the range of shore-based air defense. (p. 7)

Augmenting the PLA Navy's littoral warfare capabilities, especially in the South China Sea and East China Sea, is a new class of small combatant. At least six of the JIANGDAO-class corvettes (FFL) (Type 056) were launched in 2012. The first of these ships entered service on February 25, 2013; China may build 20 to 30 of this class. These FFLs augment the 60 HOUBEI-class wave-piercing catamaran missile patrol boats (PTG) (Type 022), each capable of carrying eight YJ-83 ASCMs, for operations in littoral waters. (p. 7)

The PLA Navy also increased its amphibious force in 2012. Two YUZHAO-class amphibious transport docks (LPD) (Type 071) were accepted into service during the year bringing the total of YUZHAO LPDs to three. (p. 7)

The PLA Navy remains at the forefront of the military's efforts to extend its operational reach beyond East Asia and into what China calls the "far seas." Missions in these areas include protecting important sea lanes

from terrorism, maritime piracy, and foreign interdiction; providing humanitarian assistance and disaster relief; conducting naval diplomacy and regional deterrence; and training to prevent a third party, such as the United States, from interfering with operations off China's coast in a Taiwan or South China Sea conflict. The PLA Navy's ability to perform these missions is modest but growing as it gains more experience operating in distant waters and acquires larger and more advanced platforms. The PLA Navy's goal over the coming decades is to become a stronger regional force that is able to project power across the globe for high-intensity operations over a period of several months, similar to the United Kingdom's deployment to the South Atlantic to retake the Falkland Islands in the early 1980s. However, logistics and intelligence support remain key obstacles, particularly in the Indian Ocean. (p. 38)

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Additionally, the PLA Navy has begun to conduct military activities within the Exclusive Economic Zones (EEZs) of other nations, without the permission of those coastal states. Of note, the United States has observed over the past year several instances of Chinese naval activities in the EEZ around Guam and Hawaii. One of those instances was during the execution of the annual Rim of the Pacific (RIMPAC) exercise in July/August 2012. While the United States considers the PLA Navy activities in its EEZ to be lawful, the activity undercuts China's decades-old position that similar foreign military activities in China's EEZ are unlawful. (p. 39)

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Limited logistical support remains a key obstacle preventing the PLA Navy from operating more extensively beyond East Asia, particularly in the Indian Ocean. China desires to expand its access to logistics in the Indian Ocean and will likely establish several access points in this area in the next 10 years (potential sites include the Strait of Malacca, Lomboc Strait, and Sunda Strait). These arrangements will likely take the form of agreements for refueling, replenishment, crew rest, and low-level maintenance. The services provided will likely fall short of U.S.-style agreements permitting the full spectrum of support from repair to re-armament. (p. 39)

Maritime Paramilitary Forces

During the 2012 Scarborough Reef and Senkaku Island tensions, the China Maritime Surveillance (CMS) and Fisheries Law Enforcement Command (FLEC) ships were responsible for directly managing the disputes on a daily basis, while the PLA Navy maintained a more distant presence away from the immediate vicinity of the contested waters. China prefers to use its civilian maritime agencies in these disputes, and use the PLA Navy further ashore from disputed areas or as an escalatory measure. The five civilian agency entities, commonly referred to as the "Five Dragons" are:

- *Anti-Smuggling Bureau (ASB):* Subordinate to the General Administration of Customs and Ministry of Public Security. Armed entity responsible for criminal investigations and smuggling cases along China's inland border posts and rivers. (p.40)
- *China Coast Guard (CCG):* Subordinate to the Ministry of Public Security. Active duty maritime police force responsible for combating maritime crime. (p.40)

- *China Maritime Surveillance (CMS):* Subordinate to the State Oceanic Administration and Ministry of Land and Resources. Responsible for asserting China's marine rights and sovereignty claims in disputed maritime regions. (p.40)
- *Fisheries Law Enforcement Command (FLEC*): Subordinate to the Ministry of Agriculture. Enforces PRC fisheries laws and handles fishery disputes with foreign entities across China's exclusive economic zone (EEZ).
- *Maritime Safety Administration (MSA):* Subordinate to the Ministry of Transport. Responsible for safety of life at sea (SOLAS), maritime pollution control, and cleanup, port inspection, and maritime investigation.

In the next decade, an expanded and modernized force of civilian maritime ships will afford China the capability to more robustly patrol its territorial claims in the ECS and SCS. China is continuing with the second half of a modernization and construction program for its maritime law enforcement agencies. The first half of this program, from 2004-2008, resulted in the addition of almost 20 ocean-going patrol ships for the CMS (9), Bureau of Fisheries (BOF) (3), Maritime Safety Administration (MSA) (3), and China Coast Guard (2). The second half of this program, from 2011-2015, includes at least 30 new ships for the CMS (23), BOF (6), and MSA (1). Several agencies have also acquired ships that were decommissioned from the PLA Navy. Some old patrol ships will be decommissioned during this period. In addition, MLE agencies will likely build more than 100 new patrol craft and smaller units, both to increase capability and to replace old units. Overall, CMS total force level is expected to increase 50 percent by 2020 and BOF by 25 percent. MSA, China Coast Guard, and Maritime Customs force levels will probably remain constant, but with larger and more capable units replacing older, smaller units. Some of these ships will have the capability to embark helicopters, a capability that only a few MLE ships currently have. The enlargement and modernization of China's MLE forces will improve China's ability to enforce its maritime sovereignty. (p.40)

The Japanese View

The 2013 Japanese defense white paper provides another useful perspective on these developments:[304]

In recent years, China is believed to be aiming to build up capabilities to conduct operations in more distant sea areas and airspace. Accordingly, China has been rapidly expanding its maritime activities both qualitatively and quantitatively. With regard to its activity in the sea/air area surrounding Japan, Chinese naval vessels and naval/air-force airplanes have been observed conducting what appeared to be training exercises or information gathering activities. A large number of Chinese government ships and aircraft belonging to maritime law-enforcement agencies have also been observed, which were engaged in monitoring activities for the protection of its maritime rights and interests. Some of these activities of China involve its intrusion into Japan's territorial waters, its violation of Japan's airspace and even dangerous actions that could cause a contingency situation, which are extremely regrettable. China should accept and stick to the international norms.

Regarding the move of naval forces, the number of Chinese naval surface vessels advancing to the Pacific Ocean has increased in recent years and such advancements are being routinely conducted today. Their route between the East China Sea and the Pacific Ocean is becoming diverse; in addition to the sea between the main island of Okinawa and Miyako Island, which they have passed every year since 2008, they passed the Osumi Strait eastward in April 2012 for the first time and also navigated the sea area between Yonakuni Island and Nakanokami Island near Iriomote Island northward for the first time in October of the same year. It seems that they are trying to improve their deployment capabilities in the open ocean. In January 2013, a Chinese naval vessel directed fire-control radar at a JMSDF destroyer and is suspected to have directed fire-control radar at a helicopter based on the JMSDF destroyer.

Regarding the move of air forces, in recent years, activities by Chinese naval/air-force planes, which appear to be some form of information gathering against Japan, have been observed frequently. The number of scrambles by the Japan Air Self Defense Force against Chinese aircraft is also rapidly increasing Furthermore, in September 2007, multiple H-6 medium-range bombers flew into the Japanese air defense identification zone over the East China Sea and advanced near the Japan–China median line.

Similarly, in March 2010, a Y-8 early warning aircraft advanced near the Japan–China median line. In March 2011, a Y-8 patrol aircraft and Y-8 intelligence gathering aircraft crossed the Japan-China median line and approached within approximately 50 km of Japan's airspace near the Senkaku Islands. These incidents indicate that Chinese aircraft are diversifying their flight patterns. In 2012, Chinese military aircraft, including its fighters, intensified its activities. In January 2013, the Chinese Ministry of National Defense made public the fact that Chinese military aircraft regularly conducted warning and surveillance activities and that Chinese fighters conducted activities believed to be Combat Air Patrols (CAP) in the East China Sea.

"The Diversified Employment of China's Armed Forces" mentioned "air vigilance and patrols at sea" for the first time as a Chinese defense white paper. In 2013, Chinese military aircraft, including its fighters, has intensified its activities further. In March and April 2011 and in April 2012, there have been instances of Chinese helicopters that appeared to belong to the State Oceanic Administration (SOA) of the Ministry of Land and Resources flying close to Japanese destroyers which were engaged in vigilance monitoring in the East China Sea.

Within Japan's territorial waters near the Senkaku Islands, in December 2008, Haijian ships which belong to the SOA of China conducted navigation operations which foreign ships are not permitted to conduct under international laws such as hovering and cruising. Then, in September 2010, a Chinese fishing trawler collided with patrol vessels of the Japan Coast Guard off the coast of the Senkaku Islands.

After the incidence, "Haijian" ships and "Yuzheng" ships belonging to then the Bureau of Fisheries at the Ministry of Agriculture of China entered the same territorial waters in August 2011, March and July 201243. This way, "Haijian" and "Yuzheng" ships have gradually increased activities in the territorial waters in recent years. Since the Japanese government acquired ownership of the three islands (Uotsuri, Kitakojima and Minamikojima) of the Senkaku islands from a private Japanese citizen in September 2012, they have been frequently intruding into the territorial waters around the Senkaku Islands. On April 23, 2013, eight Haijian ships intruded into the same territorial waters. Meanwhile, in September 2012, upon making China's own assertion about the Senkaku Islands, a spokesman of the Ministry of National Defense of China made a statement that the patrol carried out by a Chinese naval vessel in sea areas under China's jurisdiction was totally just and legal.

Regarding Japan's airspace over and around the Senkaku Islands, in December 2012, a fixed-wing aircraft belonging to the SOA violated the territorial airspace first as a Chinese aircraft. Since then, fixed-wing aircrafts belonging to the SOA have been frequently observed flying near the airspace. In October 2012, vessels of the East Sea Fleet of the Chinese Navy conducted a joint exercise with "Haijian" and "Yuzheng" ships with focus on preservation/protection of territorial sovereignty and maritime interests. Furthermore, the navy is believed to be handing over retired navy vessels to the SOA and other agencies. It is believed that the Navy is supporting maritime law-enforcement agencies both in operation and equipment.

In other areas than waters near Japan as well, China is intensifying its activities in the South China Sea, including the Spratly Islands and Parcel Islands, over which it is engaged in territorial disputes with neighbors, including some ASEAN (Association of Southeast Asian Nations) countries. In March 2009, Chinese ships, including a naval vessel, a maritime research ship of the SOA, a Bureau of Maritime Fisheries patrol ship, and trawlers, approached a U.S. Navy acoustic research ship operating in the South China Sea to obstruct its operations. It is also reported that Chinese naval vessels fired warning shots at fishing boats of neighboring countries. Furthermore, in recent years, there has been growing friction between China and its neighboring countries over the South China Sea, as illustrated by protests by Taking into general consideration such factors as China's geographical location and economic globalization as well as the fact that China explicitly states in its laws and other documents that its Navy assumes the role of safeguarding maritime rights and interests and protecting maritime safety, the Chinese Navy and other organizations are considered to have the following objectives in their maritime activities.

The first one is to intercept naval operations by enemies in waters as far as possible from China in order to defend its territory and territorial waters. Behind this objective is an increase in effectiveness of long-range attacks due to recent progress in science and technology.

The second one is to develop military capabilities to deter and prevent Taiwan's independence. For example, China maintains that it will not allow any foreign intervention in solving the Taiwan issue and

realizing the unification of China. In order for China to try to prevent by force foreign intervention into Taiwan, which is surrounded by the sea, it needs to enhance its military operational capabilities at sea.

The third one is to weaken the effective control of other countries over the islands which China claims its territorial rights over, while strengthening the claim of its territorial right to, through various surveillance activities and use of force in the seas surrounding the islands.

The fourth one is to acquire, maintain, and protect its maritime rights and interests. China I engaged in oil and gas drilling as well as building facilities and surveying for the drilling in the East China Sea and South China Sea.

The fifth one is to defend its sea lanes of communications. In this background is the fact that its sea lanes of communications, including its crude oil transportation routes from the Middle East, are extremely important for the globalizing the Chinese economy. What part of its sea lanes of communication the Chinese Navy thinks it should defend depends on such factors as international situations, but given the recent modernization of the Chinese Navy and Air Force, the areas which they can defend is believed to grow larger beyond the waters near China.

Given these objectives and recent trends in China's maritime activities, it is believed that China plans to further expand the sphere of its maritime activities, and expand its operations as an ordinary routine practice in waters surrounding Japan, including the East China Sea and the Pacific Ocean as well as the South China Sea. Therefore, more attention needs to be paid to such activities as operations of naval vessels and various surveillance operations near Japan, developments of facilities that serve as bases for these activities, and developments of its own interpretations regarding the legal status of coastal areas in China's exclusive economic zones.

The US Reaction and the Air Sea Battle

As noted in earlier discussions of the modernization of the PLAA, these increases in Chinese long-range naval capacity have already affected US power projection planning – although no clear decisions have yet been taken as to how US forces will change as a result. They have led the DoD to put a new emphasis on the role of the air sea battle in the Pacific and Asia:[305]

Recognizing that antiaccess/area-denial capabilities present a growing challenge to how joint forces operate, the Secretary of Defense directed the Department of the Navy and the Department of the Air Force to develop the Air-Sea Battle Concept.

The intent of Air-Sea Battle is to improve integration of air, land, naval, space, and cyberspace forces to provide combatant commanders the capabilities needed to deter and, if necessary, defeat an adversary employing sophisticated antiaccess/area-denial capabilities.

It focuses on ensuring that joint forces will possess the ability to project force as required to preserve and defend U.S. interests well into the future.

The Air-Sea Battle Concept is both an evolution of traditional U.S. power projection and a key supporting component of U.S. national security strategy for the 21st Century. However, it is important to note that Air-Sea Battle is a limited operational concept that focuses on the development of integrated air and naval forces in the context of antiaccess/area-denial threats. The concept identifies the actions needed to defeat those threats and the materiel and nonmateriel investments required to execute those actions.

There are three key components of Air-Sea Battle designed to enhance cooperation within the Department of the Air Force and the Department of the Navy.

The first component is an *institutional* commitment to developing an enduring organizational model that ensures formal collaboration to address the antiaccess/area-denial challenge over time.

The second component is *conceptual* alignment to ensure that capabilities are integrated properly between Services.

The final component is doctrinal, organizational, training, materiel, leadership and education, personnel, and facilities *initiatives* developed jointly to ensure they are complementary where appropriate, redundant

when mandated by capacity requirements, fully interoperable, and fielded with integrated acquisition strategies that seek efficiencies where they can be achieved.

In 2013, a US military report on Air-Sea Battle discussed the concept at more length:[306]

ASB is a limited objective concept that describes what is necessary for the joint force to sufficiently shape A2/AD environments to enable concurrent or follow-on power projection operations. The ASB Concept seeks to ensure freedom of action in the global commons and is intended to assure allies and deter potential adversaries. ASB is a supporting concept to the Joint Operational Access Concept (JOAC), and provides a detailed view of specific technological and operational aspects of the overall A2/AD challenge in the global commons. The Concept is not an operational plan or strategy for a specific region or adversary. Instead, it is an analysis of the threat and a set of classified concepts of operations (CONOPS) describing how to counter and shape A2/AD environments, both symmetrically and asymmetrically, and develop an integrated force with the necessary characteristics and capabilities to succeed in those environments. ASB is about building conceptual alignment, programmatic collaboration and institutional commitment in an integrated way, across the military Services in order to develop forces and capabilities that can jointly address A2/AD challenges. The purpose of ASB is not to simply conduct operations more jointly. It is to increase operational advantage across all domains, enhance Service capabilities and mitigate vulnerabilities. In addition to other joint and service concepts, ASB will help ensure the U.S.'s ability to gain and maintain freedom of action in the global commons, and to the conduct of concurrent or follow-on operations against a sophisticated adversary.

Central Idea. The ASB Concept's solution to the A2/AD challenge in the global commons is to develop networked, integrated forces capable of attack-in-depth to disrupt, destroy and defeat adversary forces (NIA/D3). ASB's vision of networked, integrated, and attack-in-depth (NIA) operations requires the application of cross-domain operations across all the interdependent warfighting domains (air, maritime, land, space, and cyberspace, to disrupt, destroy, and defeat (D3) A2/AD capabilities and provide maximum operational advantage to friendly joint and coalition forces.

Cross-domain operations are conducted by integrating capabilities from multiple interdependent warfighting domains to support, shape, or achieve objectives in other domains. Cross-domain operations are those that can exploit asymmetric advantages in specific domains to create positive and potentially cascading effects in other domains. For cross-domain operations to be fully effective, commanders, whether defending or attacking, must have ready access to capabilities, no matter what domain they reside in or which commander owns them, to support or achieve operational objectives and create the effects required for advantage over an adversary. This interoperability may require multi-pathing, or the ability to use multiple, alternative paths from among all domain capabilities to achieve a desired end. While cross-domain operations are more complex than single domain or single Service options, their multi-pathing possibilities can provide distinct operational advantages over single domain or single Service solutions to operational problems.

The ability to integrate capabilities, equipment, platforms, and units across multiple domains and to communicate, interact, and operate together presents a joint force commander with more numerous and powerful options, which in turn, offer greater probability of operational success. For example, cyber or undersea operations can be used to defeat air defense systems, air forces can be used to eliminate submarine or mine maritime threats, or space assets can be used to disrupt adversary command and control. Put simply, traditional understandings of Service missions, functional responsibilities, or employment of capabilities from particular domains should not be barriers that hamper imaginative joint operations in an A2/AD environment. Each of the elements of ASB's construct offer joint force commanders increased flexibility and capability.

Networked. In the ASB Concept, networked actions are tightly coordinated in real time by mission-organized forces to conduct integrated operations across all domains without being locked into Service-specific procedures, tactics, or weapons systems. A networked force is people and equipment linked in time and purpose with interoperable procedures; command control (C2) structures; and appropriate authorities capable of translating information into actions. These joint forces are able to attack the adversary A2/AD system-of-systems in depth and across all domains to create and exploit vulnerabilities.

Networked capabilities are both the physical means by which forces communicate and exchange information and the relationships, protocols, and procedures used by warfighters to complete their assigned missions. To be effective, networked forces need interoperable procedures, (C2) structures, and equipment. Authorities must also be provided at the appropriate C2 level in order for joint and coalition forces to gain and maintain decision advantage. In the ASB Concept, networked does not only mean having assured communications and access to data; it also means having a force trained to conduct operations using mission-type orders and being able to operate even in the absence of continuous connectivity. The joint force can achieve that ability in part by establishing habitual relationships across Service, component, and domain lines so that forces can be effectively trained to operate together in a contested and degraded environment.

Integrated. Integration is the arrangement of military forces and their actions to create a force that operates networked across domains as a whole. An integrated joint force is better able to combine capabilities across multiple domains to conduct specific missions. The basic concept of integration has further evolved into seeking the development of pre-integrated joint forces. In order to maintain an advantage over potential adversaries, air, naval, and land forces must fully integrate their operations. Integration, traditionally viewed as strictly the combatant commander's job, needs to begin across Service lines as part of force development.

Forces should be integrated prior to entering a theater. Effective integration requires enhanced joint and combined training against A2/AD capabilities, including training and exercise for cross-domain operations before deployment. In some cases, pre-integration will also require Services' collaboration in materiel programming to ensure interoperability to avoid overly redundant or incompatible systems.

Attack-in-depth to Disrupt, Destroy and Defeat. The attack-in-depth methodology is based on adversary effects chains, or an adversary's process of finding, fixing, tracking, targeting, engaging and assessing an attack on U.S. forces. Attack-in-depth is offensive and defensive fires, maneuver, and command and control with the objective of disrupting, destroying, or defeating an adversary's A2/AD capabilities, conducted across domains in time, space, purpose, and resources. Attack-in-depth seeks to apply both kinetic and non-kinetic means to address adversary critical vulnerabilities without requiring systematic destruction of the enemy's defenses (e.g., a rollback of an adversary's integrated air defense system).

D3 represents the 3 lines of effort of the ASB Concept:

- **Disrupt** Adversary Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR or C4I);
- **Destroy** adversary A2/AD platforms and weapons systems; and,
- **Defeat** adversary employed weapons and formations.

Disrupting these effects chains includes impacting an adversary's C4ISR or C4I capabilities, ideally precluding attack on friendly forces. **Destroying** or neutralizing adversary weapons platforms enhances friendly survivability and provides freedom of action. **Defeating** employed weapons post-launch defends friendly forces from an adversary's attacks and allows sustained operations.

Due to the nature of A2/AD threats and potentially short indications and warning timelines posed by adversaries, joint forces must be capable of effective offensive operations as soon as conflict begins, while simultaneously defending or re-positioning deployed forces, protecting land and sea bases, and bringing forces forward from garrison with acceptable levels of risk. The ability to attack and defend through the entire depth of the desired battlespace, in all the interdependent warfighting domains, is critical to establishing joint freedom of action.

These concepts are not targeted against China or the Pacific. They are equally important in US contingency planning for dealing with Iran and power projection missions throughout the world. At the same time, their development will be critical to US security partnerships throughout Asia and the Pacific, and in cases that do involve land forces, they mean that the US must pay far more attention to securing its lines of access and resupply, and that air and missile power are likely to play a far greater role compared to US land power.

Chapter 9: PLA Air Force

The PLAAF is an air force in transition. For much of the Cold War, it was designed to act as a mass air defense force flying second and third generation aircraft. During the 1990s, the PLAAF began to shift to a more diversified force structure; since 2000, the PLAAF has fully embraced a shift from a singular focus on air defense and interceptor fighter aircraft to a multi-mission force, capable of carrying out AD, strike, transport, ISR, and, since 2010, electronic warfare missions.[307]

These changes in force structure, as well as the procurement of modern aircraft, have augmented the ability of the PLAAF to conduct both defensive and offensive missions, thereby increasing the PLAAF's utility to the wider PLA in the context of the Local Wars doctrine.

Figure 9.1: The Size of the PLAAF in 2013

Aircraft	Total
Fighters	1,700
Bombers/Attack	600
Transport	475

Note: The PLAAF and the PLA Navy have about 2,300 operational combat aircraft. These consist of air defense and multi-role fighters, ground attack aircraft, fighter-bombers, and bombers. An additional 1,450 older fighters, bombers and trainers are employed for training and R&D. The two air arms also possess roughly 475 transports and over 100 surveillance and reconnaissance aircraft with intelligence, surface search, and airborne early warning capabilities. The majority of PLAAF and PLA Navy aircraft are based in the eastern half of the country.

Source: DoD, R*eport to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 76.

The US Official View

Like the modernization of Chinese seapower and the expansion of Chinese naval power projection capability, the US sees the expansion of Chinese air and missile power, and overall air-sea capabilities, as a far more serious challenge than the modernization of Chinese ground forces. **Figure 9.1** shows a DoD estimate of the size of the PLAAF in 2013. The 2013 DoD report on *Military and Security Developments Involving the People's Republic of China* described the current structure and trends in the PLAAF as follows:[308]

> China bases approximately 500 combat aircraft within unrefueled operational range of Taiwan and has the airfield capacity to expand that number by hundreds. China continues to field increasingly modern 4th generation aircraft, but the force still consists mostly of older 2nd and 3rd generation aircraft, or upgraded variants of those aircraft.
>
> Within two years of the J-20 stealth fighter's first flight in January 2011, China tested a second next generation fighter prototype. The prototype, referred to as the "J-31," is similar in size to a U.S. F-35

> fighter and appears to incorporate design characteristics similar to the J-20. It conducted its first flight on October 31, 2012.
>
> China continues upgrading its H-6 bomber fleet (originally adapted from the late 1950s Soviet Tu-16 design) with a new variant that possesses greater range and will be armed with a long-range cruise missile. China also uses a modified version of the H-6 aircraft to conduct aerial refueling operations for many of its indigenous aircraft, increasing their combat range.
>
> The PLA Air Force possesses one of the largest forces of advanced SAM systems in the world, consisting of a combination of Russian-sourced SA-20 battalions and domestically produced HQ-9 battalions.
>
> China's aviation industry is developing a large transport aircraft (likely referred to as the Y-20) to supplement China's small fleet of strategic airlift assets, which currently consists of a limited number of Russian-made IL-76 aircraft. These heavy lift transports are needed to support airborne command and control (C2), logistics, paradrop, aerial refueling, and reconnaissance operations, as well as humanitarian assistance and disaster relief missions.
>
> Developments in China's commercial and military aviation industry indicate improved aircraft manufacturing, associated technology, and systems development capabilities. Some of these advances have been made possible by business partnerships with Western aviation and aerospace firms (including cleared U.S. defense contractors), which provide overall benefit to China's military aerospace industry. China will continue to seek advancement in aerospace technology, capability, and proficiency to rival Western capabilities.
>
> …. China has developed a national integrated air defense system (IADS) to defend key strategic cities and borders, territorial claims, and forces against threats from the air. Overall, China's IADS represents a multilayered defense consisting of weapons systems, radars and C4ISR platforms working together to counter multiple types of air threats at various ranges and altitudes. One of China's primary goals is to defend against precision strike munitions such as cruise and ballistic missiles, especially those launched from long distances. In order to counter precision strike munitions, China has developed advanced long-range SAM systems, airborne early warning platforms, and C2 networks. Defense against stealth aircraft and unmanned aerial vehicles is also a growing priority. Another aspect of China's IADS development is the deployment of land-based air defense brigades beyond the eastern coast of China and improving the air defense of China's naval fleets in the ECS and SCS. This is part of China's longstanding effort to expand its capabilities from focusing on territorial defense to supporting both defensive and offensive operations.

PLAAF Strategy

The PLAAF has fundamentally changed its force structure, composition, and manpower policies since 1985. Originally meant as a large air defense force, the PLAAF's force structure was made up primarily of obsolete interceptor aircraft. Its objective was largely to destroy aircraft attacking China and to maintain a small, air-based nuclear deterrent.

The promulgation of the Local Wars concept altered this situation. The CMC had concluded that air power, especially when utilizing precision-guided munitions, would be decisive in future conflicts. Thus, the PLAAF was expected to obtain a long-range precision strike capability.[309] However, given the PLAAF's large inventory of second- and third-generation interceptor aircraft which lacked Beyond-Visual-Range (BVR) capability, advanced radar, and specialized electronic warfare (EW) support aircraft, the PLAAF would have to fundamentally change in order to successfully fight and win Local Wars.

In particular, it would have to be restructured to comprise more heavily of strike, rather than interceptor, aircraft. Furthermore, it would have to procure more advanced aircraft that were capable of carrying out these missions despite adversary defenses. Most importantly, the PLAAF would have to develop the human capital needed to utilize advanced systems and operate according to the Local Wars doctrine.

In response to this challenge, the PLAAF released its own service strategy in 2004, "Integrated Air and Space Operations, Being Prepared for Simultaneous Offensive and Defensive Operations."[310] A response to the Local Wars doctrine, it stated that the PLAAF was to become a force capable of defending China's air space and of strike operations against China's adversaries. Moreover, the PLAAF was expected to augment the operational reach of the PLA and function as a "strategic service" capable of obtaining China's political objectives in concert with the rest of the PLA or separately.[311]

Shift in Force Structure, Equipment Composition, and Manpower

The PLAAF has altered its force structure in response to the necessities of the Local Wars concept and its own service strategy by both increasing aircraft types and dramatically reducing the proportion of aircraft allocated to the interception role. Currently, the PLAAF has large inventories of fighter, ground attack, and transport aircraft, as well as the beginnings of ISR, command and control (C2), Airborne Early Warning and Control (AEW&C), EW, and Electronic Intelligence (ELINT) aircraft. Its force structure and major headquarters are shown in **Figure 9.2**.

The PLAAF has also changed its force composition. It is currently in the midst of replacing obsolete, single-purpose aircraft with multi-role modern aircraft. At this time, the PLAAF is roughly 1/3 modern. This development is a significant improvement from the 1990s when the PLAAF was dependent on a handful of Russian fourth generation fighters to provide modern aircraft capabilities.

Manpower policies are also furthering the development of a force capable of fighting Local Wars. PLAAF manpower has declined significantly since 1985, while policies are in place to improve the combat capability of the PLAAF's personnel. A combination of improved academic performance in recruits, more intensive training, and joint military exercises are developing the skills needed for Local Wars.

Shift in Force Structure

The shift in force structure has been decisive and has significant implications for the PLAAF's ability to conduct the missions required by the Local Wars concept: precision strike, air defense, ISR, EW, and strategic airlift.

As the data in **Figure 9.3** show, the PLAAF has altered its force structure by increasing the categories of aircraft in its inventory. Some aspects important to note are the significant drop in fighter aircraft numbers over the period, the absolute and relative increase in ground attack aircraft, the steady decline of bomber numbers, and the development of different aircraft categories.

Figure 9.2: Deployment of China's Air Forces

Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2012*, May 2012, p. 77.

Figure 9.3: Force Structure of the PLA Air Force, 1985-2013

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
Personnel	**490,000**	**470,000**	**470,000**	**420,000**	**400,000**	**330,000**	**300,000-330,000**
Air Force	490,000	470,000	470,000	420,000	400,000	330,000	300,000-330,000
Reserve	?	?	?	?	?	?	?
Total combat-capable aircraft	**5,300**	**5,000**	**4,970**	**3,000**	**1,900+**	**1,617**	**1,903**
Bombers	*620*	*395+*	*470*	*120*	*180*	*82*	*up to 82*
H-5/F-5/F-5B	500	275+	350	0	40	0	0
H-6 (Tu-16)	120	120	120	0	0	0	0
H-6A/E/H/K/M	0	0	0	120	140	82	up to 82
Possibly with YJ-63 missiles	0	0	0	0	20	some	some
Fighters	*4,000*	*4,000*	*4,000*	*1,015*	*936*	*1,100+*	*842*
J-5	400	400	400	0	0	0	0
J-6B/D/E	3,000	3,000	3,000	0	0	0	0
J-7	200	300	500	0	0	48	216
J-7II/B	0	0	0	400	400	192	0
J-7IIH/J-7H	0	0	0	?	50	48	0
J-7IIM	0	0	0	?	24	0	0
J-7III	0	0	0	100	0	0	0
J-7C	0	0	0	0	50	48	0
J-7D	0	0	0	0	0	24	0
J-7E	0	0	0	200	150	144	192
J-7G	0	0	0	0	0	48	96
J-8	30	200	100	100	20	24	0
J-8IIA	0	0	0	0	40	60	0
J-8IIB/J-8B	0	0	0	150	50	108	24
J-8IID	0	0	0	0	24	36	0

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
J-8IIE	0	0	0	0	50	12	0
J-8F	0	0	0	0	0	24	48
J-8H	0	0	0	0	0	48	96
J-10	0	0	0	0	0	120+	0
Su-27SK	0	0	24	65	78	some	43
Su-27UBK	0	0	0	0	0	0	32
J-11	0	0	0	0	0	116	95
Fighter, Ground Attack	*500*	*500*	*500*	*1,800*	*626*	*283*	*543+*
J-4	some	0	0	0	0	0	0
J-6	0	0	0	0	300	0	0
J-6A	0	0	0	0	50	0	0
J-6B/D/E	0	0	0	1,500	0	0	0
JH-7/HJ-7A	0	0	0	0	0	72	120
Q-5	some	500	500	0	0	0	0
Q-5C/D/E	0	0	0	300	300	120	120
MiG-19	0	0	0	0	0	0	0
J-10A/S	0	0	0	0	0	0	240+
J-11B/BS	0	0	0	0	0	18+	110+
Su-30MKK	0	0	0	40 (delivered)	76	73	73
ISR	*130*	*290*	*290*	*290*	*290*	*120*	*51*
HZ-5	some	40	40	40	40	0	0
JZ-5	0	150	150	0	0	0	0
JZ-6 (MiG-19R)	some	100	100	100	100	72	0
JZ-7 (MiG-21)	0	0	0	some	some	0	0
JZ-8 Finback	0	0	0	0	20	24	24
JZ-8F Finback	0	0	0	0	0	24	24
Y-8H1	0	0	0	0	0	3	3

	1985	1990	1995	2000	2005	2010	2013
Tu-154M	0	0	0	2	4	0	0
Tanker	*0*	*0*	*0*	*6*	*10*	*10*	*10*
HY-6	0	0	0	6	10	0	0
H-6U	0	0	0	0	0	10	10
Transport	*550*	*420*	*600*	*425*	*513*	*296*	*326+*
Bae Trident 1E/2E	18	18	18	0	0	0	0
An-12	some	25	25 (some tankers)	68	49	0	0
B-737-200 (VIP)	0	0	0	6	8	15	9
CL 601 Challenger	0	0	0	2	5	5	0
CRJ-200	0	0	0	0	0	0	5
CRJ-700	0	0	0	0	0	0	5
Il-14	some	30	30	0	0	0	0
Il-18	some	10	10	2	2	2	0
Il-76MD/TD Candid	0	0	10	14	20	18	15
Li-2	some	50	50	0	0	0	0
Tu-154	0	0	0	15	15	17	12
Y-11	0	some	15	15	15	20	20
Y-12	0	some	2	8	8	8	8
Y-5 Colt	300	300	300	300	300	170	170
Y-7/Y-7H (An-26)	10	20	25	45	93	41	41
Y-8	0	0	0	0	0	some	40
Y-9	0	0	0	0	0	0	1+
EW	*0*	*0*	*0*	*0*	*0*	*10*	*13*
Y-8CB	0	0	0	0	0	0	4
Y-8G	0	0	0	0	0	0	7
Y-8XZ	0	0	0	0	0	0	2
Y-8D	0	0	0	0	0	10	0

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
ELINT	*0*	*0*	*0*	*0*	*0*	*0*	*4*
Tu-154M/D	0	0	0	0	0	0	4
Airborne Early Warning & Control	*0*	*0*	*0*	*0*	*0*	*8*	*8+*
KJ-200	0	0	0	0	0	4	4+
KJ-2000	0	0	0	0	0	4	4
Command and Control (C2)	*0*	*0*	*0*	*0*	*0*	*0*	***5***
B-737-200	0	0	0	0	0	0	2
Y-8T	0	0	0	0	0	0	3
Training	*some*	*some*	*some*	*200*	*200*	*522*	*950*
CJ-5	some	some	some	0	0	0	0
CJ-6/6A/6B	some	some	some	0	0	400	400
HJ-5	some	some	some	some	some	0	0
J-2	0	some	some	0	0	0	0
JJ-2	0	some	some	0	0	0	0
JJ-4	some	some	some	0	0	0	0
JJ-5	some	some	some	0	0	0	0
JJ-6 (MiG-19UTI)	some	some	some	some	0	0	0
JJ-7 Mongol A	0	0	0	some	50+	50	200
JL-8 (K-8)	0	0	0	some	8+	40	350
PT-6 (CJ-6)	0	0	0	some	0	0	0
Su-27UBK	0	0	0	0	0	32	0
Helicopters	**400**	**400**	**400**	**170**	**90-100**	**80+**	**40+**
Multi-role	*some*	*36*	*36*	*36*	*46*	*20*	*22*
Z-9 (AS-365N Dauphin 2)	some	10	50	30	20	20	20
Mi-17-V5	0	0	0	0	0	0	2
Transport	*some*	*338+*	*465+*	*134*	*24*	*60*	*28+*
S-70C-2	0	24	20	0	0	0	0

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
Z-5	some	300	250	100	0	0	0
Z-6	some	some	100	0	0	0	0
Z-8/SA321	some	0	15	0	0	some	18+
AS-332 Super Puma	0	6	6	6	6	6	6+
Mi-8	0	30	30	30	50	50	0
Mi-17	0	0	28	0	0	0	0
Mi-171	0	0	0	0	0	some	4+
Bell 214	0	4	4	4	4	4	0
UAVs	**0**	**0**	**0**	**some**	**some**	**some**	**some**
CH-1 *Chang Hong*	0	0	0	some	some	some	some
Chang Kong 1	0	0	0	0	0	some	some
BQM-32	0	0	0	0	0	some	some
Harpy	0	0	0	0	0	some	some
Air defense	**0**	**some**	**some**	**some**	**some**	**some**	**some**
SAMs	*0*	*0*	*0*	*100+*	*100+*	*600+*	*600+*
Towed	0	some	some	500+	500+	300+	300+
HQ-2 (SA-2)/HQ-2A/2B(A)	0	some	some	500+	500+	300+	300+
HQ-61	0	some	some	0	0	0	0
SP	0	0	0	240+	228+	300+	300+
HQ-7	0	0	0	100+	60+	60+	60+
HQ-9	0	0	0	0	24	32	32
HD-6D	0	0	0	0	0	24	24
HQ-12 (KS-1A)	0	0	0	0	0	24	24
S-300PMU (SA-10B)	0	0	some	120	0	32	32
S-300PMU1 (SA-20)	0	0	0	0	some	64	64
S-300PMU2 (SA-20)	0	0	0	0	some	64	64
HQ-15 FT-2000	0	0	0	20+	0	0	0
Guns	*16,000*	*16,000*	*16,000*	*16,000*	*16,000*	*16,000*	*16,000*

	1985	**1990**	**1995**	**2000**	**2005**	**2010**	**2013**
35mm	0	some	some	0	0	0	0
57mm	some	some	some	0	0	0	0
85mm	some	some	some	some	some	some	some
100mm	some	some	some	some	some	some	some
Missiles	**some**	**some**	**some**	**?**	**4,500+**	**4,500+**	**some**
ASMs/LACM	*0*	*some*	*some*	*some*	*some*	*some*	*some*
HY-2	0	0	0	Some	0	0	0
HY-4	0	0	0	some	0	0	0
C-601	0	some	some	0	0	0	0
C-801	0	some	some	0	0	0	0
Kh-29 (AS-14 Kedge)	0	0	0	0	some	some	some
Kh-31A/P (AS-17 Krypton)	0	0	0	0	some	some	some
Kh-59 (AS-18 Kazoo)	0	0	0	0	some	some	some
YJ-61	0	0	0	some	0	0	0
YJ(KD)-63	0	0	0	0	some expected	some	some
YJ-81K	0	0	0	some	0	0	0
KD/YJ-88	0	0	0	0	0	some	some
YJ-91 (X-31 II)	0	0	0	0	0	some	some
CJ-10	0	0	0	0	0	0	some
AAM/ARH	*0*	*0*	*0*	*600+*	*4,500+*	*some*	*some*
R-77/AA-12 Adder	some	some	some	100 on order for Su-30	100	some	some
R-27/P-27 (AA-10 Alamo)	0	0	0	250+	1,200	some	some
R-73/P-37 (AA-11 Archer)	0	0	0	250+	3,200	some	some
PL-2/2B	some	some	some	some	some	some	some
PL-5B/C	0	0	0	some	some	some	some
PL-7	0	some	some	?	?	0	0

PL-8	0	some	some	some	some	some	some
PL-9	0	0	some	some	0	0	0
PL-11	0	0	0	0	0	0	some
PL-12	0	0	0	0	some	some	some

Source: IISS, *Military Balance,* 1985-2013.

The Pace of Modernization

The PLAAF has made major progress in many areas. **Figures 9.4 through 9.6** summarize several of key trends as follows:

- **Figure 9.4** provides a visualization of the force trends presented in **Figure 9.3**.
- **Figure 9.5** aggregates these numbers to show both a historical comparison of overall combat aircraft numbers and also the relative size of the PLAAF dedicated to each mission category.
- **Figure 9.6** illustrates change over time for each individual aircraft category, and charts the changes in the relative portion of each category in the PLAAF.

There are a number of indicators that are best observed visually. The first is the magnitude and speed of the decline in fighter-interceptor aircraft, both absolutely and relatively. Between 1995 and 2013, roughly 3,000 fighter-interceptors were removed from the PLAAF's inventory: fighter-interceptor aircraft dropped from ~80% of the PLAAF to ~50%. Fighter-ground attack aircraft faced a different trend; overall numbers did not markedly increase but their relative share of the PLAAF's inventory increased by more than 2.5 times. Training and transport aircraft both increased in absolute numbers significantly, but their impact is best shown by their relative share of the PLAAF's aircraft holding.

The 2013 Japanese defense white paper summarized the modernization of Chinese air forces as follows:[312]

> The Chinese Air Force and Navy have approximately 2,580 combat aircraft in total. The number of fourth generation modern fighters is rising steadily. China imported from Russia and produced under license the Su-27 fighters, and imported from Russia the Su-30 fighters equipped with anti-surface and anti-ship attack capabilities. China is also mass-producing the J-11B which is pointed out to be an imitation of Su-27 fighters as well as domestic J-10 fighters. Some point out that in addition to developing the J-20, which is pointed out to become a next-generation fighter...
>
> China is developing another next-generation fighter. It is also making continuous efforts to improve capabilities which are essential for operations of modern air forces by introducing the H-6 tanker and KJ-2000 Airborne Early Warning and Control system. Furthermore, it is reported that China has a plan to import large cargo aircraft from Russia and is developing a new Y-20 large cargo aircraft in order to improve its transportation capability. In addition to domestically developing, producing and deploying a variety of aircraft and introducing them from Russia.
>
> China seems to be domestically developing, producing and deploying unmanned aircraft… Judging from the modernization of air forces, it is believed that China is not only improving its air defense capabilities for its national territory, but also aiming to build up capabilities for air superiority and anti-surface and anti-ship attacks in areas which are as distant from China as possible, and improving long-range transportation capabilities. Further attention needs to be paid to these activities conducted by Chinese air forces.

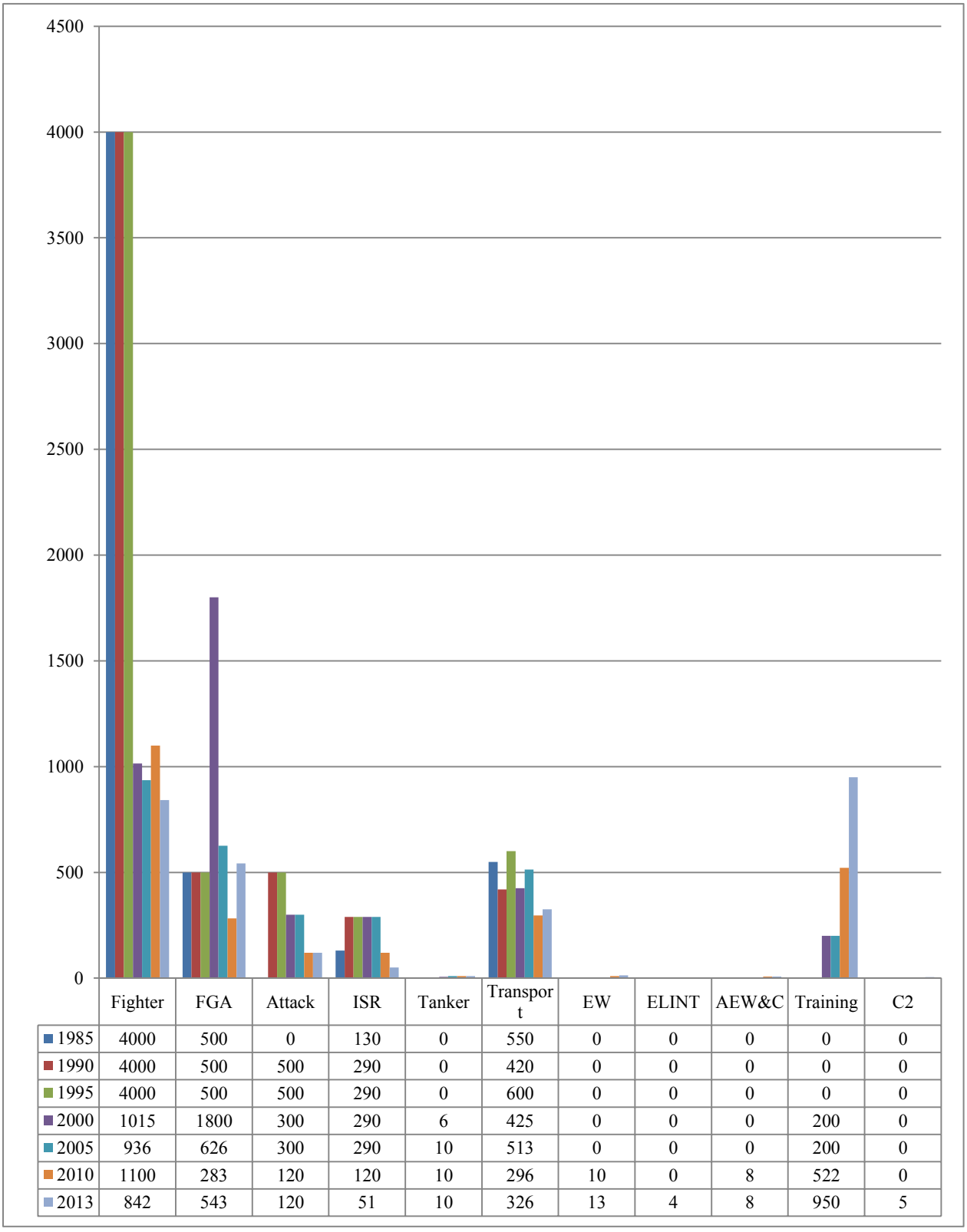
As the figures below show, the dominance of the fighter-interceptor in the PLAAF has eroded and other categories of aircraft are making up larger and larger portions of the PLAAF. This trend indicates a significant change in doctrine and military objectives: more specifically, the changing force structure indicates greater doctrinal emphasis on ground attack, transport, and training missions. All of these are in line with the Local Wars concept.

In addition to the previously-described changes in the numbers of fighter-interceptor, fighter-ground attack, transport, and training aircraft, changes in the other categories also have significance.

The decline and the steady plateau of PLAAF bombers, combined with small numbers of tanker aircraft, indicate that the PLAAF is limiting the majority of its strike missions to targets within the first island chain. The H-6 variants forming the entirety of the PLAAF's bomber force appear to be cruise-missile buses suitable for use against distant targets.[313] However, even if one considers the number of cruise missiles they could potentially carry, the number of bombers is so limited relative to fighter-ground attack aircraft that it appears that the PLAAF has either decided to concentrate its scarce resources within the first island chain, has not identified many targets worth striking outside of the first island chain, or potentially has abdicated medium-range strike to the Second Artillery Force.

Some American experts argue that the small number of tankers, EW, ELINT, AEW&C, and C2 aircraft indicates two things: first, that the PLAAF still does not function as effectively as the Western or Russian air forces, and also that the PLAAF has begun to plant the seeds of its own modernization and force development, and plans to develop similar capabilities as have the Western and Russian air forces.

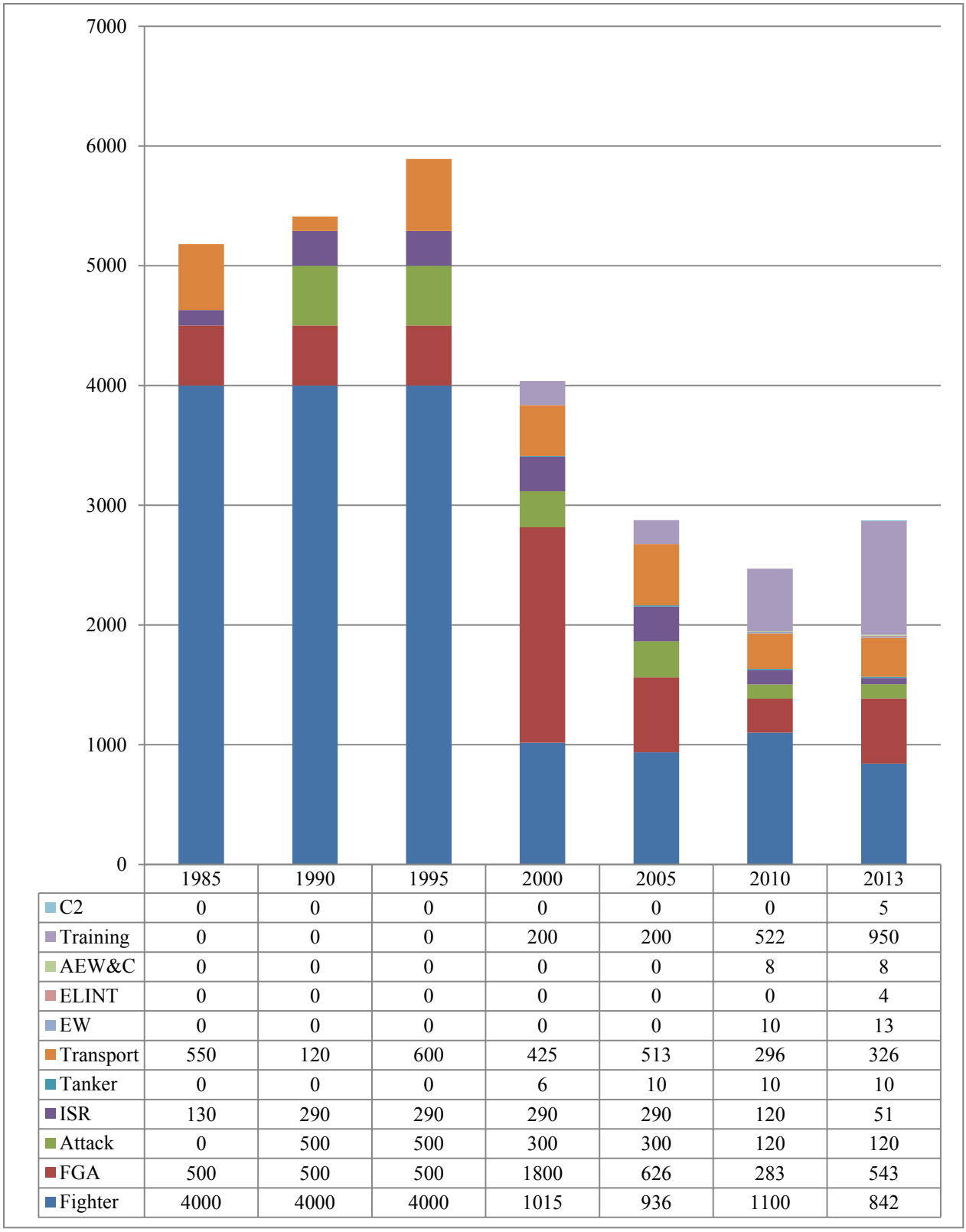
Figure 9.4: Historical PLAAF Force Structure, 1985-2013



	Fighter	FGA	Attack	ISR	Tanker	Transport	EW	ELINT	AEW&C	Training	C2
1985	4000	500	0	130	0	550	0	0	0	0	0
1990	4000	500	500	290	0	420	0	0	0	0	0
1995	4000	500	500	290	0	600	0	0	0	0	0
2000	1015	1800	300	290	6	425	0	0	0	200	0
2005	936	626	300	290	10	513	0	0	0	200	0
2010	1100	283	120	120	10	296	10	0	8	522	0
2013	842	543	120	51	10	326	13	4	8	950	5

Source: IISS, *Military Balance,* 1985-2013.

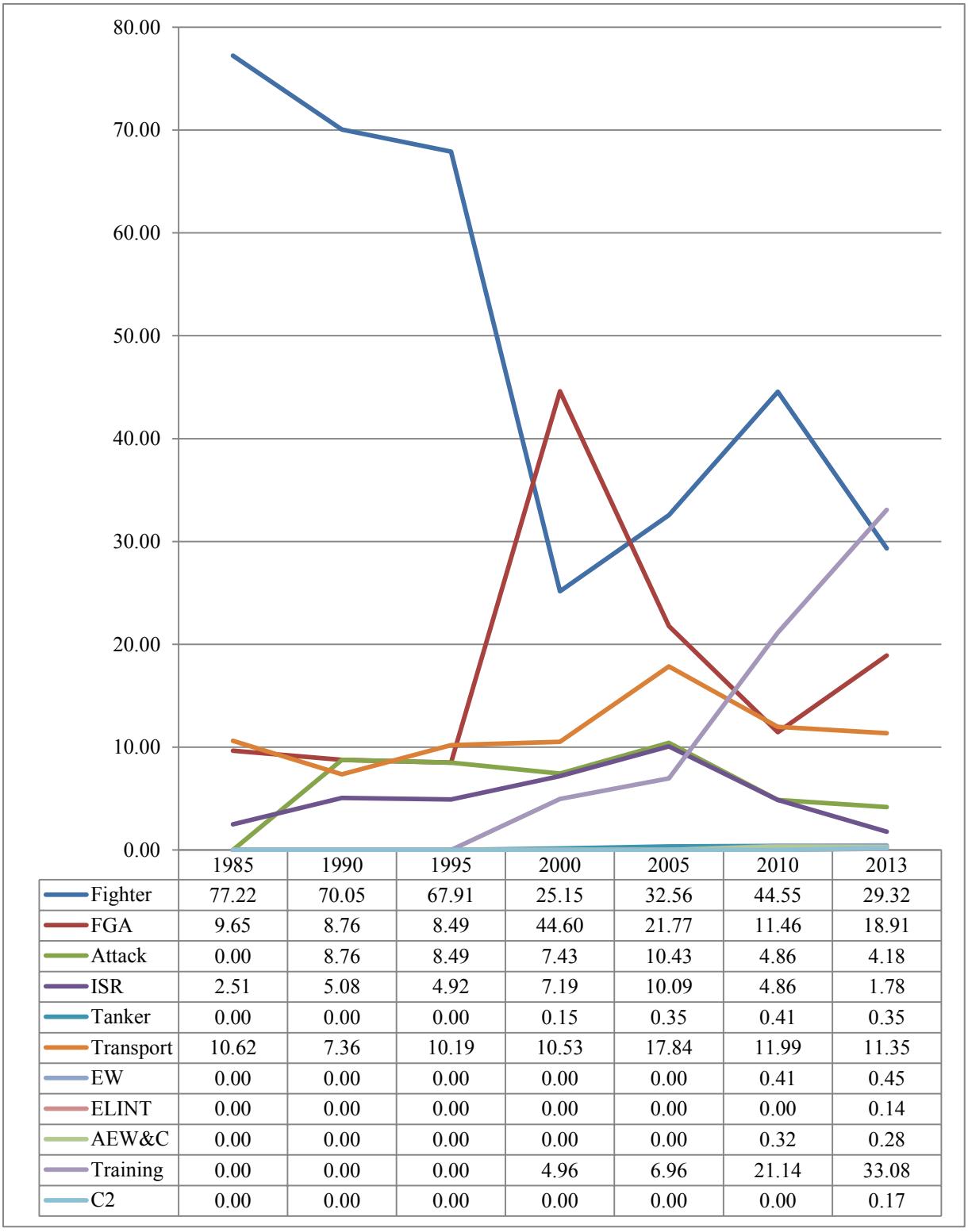
Figure 9.5: Historical PLAAF Numbers and Composition, 1985-2013



	1985	1990	1995	2000	2005	2010	2013
C2	0	0	0	0	0	0	5
Training	0	0	0	200	200	522	950
AEW&C	0	0	0	0	0	8	8
ELINT	0	0	0	0	0	0	4
EW	0	0	0	0	0	10	13
Transport	550	120	600	425	513	296	326
Tanker	0	0	0	6	10	10	10
ISR	130	290	290	290	290	120	51
Attack	0	500	500	300	300	120	120
FGA	500	500	500	1800	626	283	543
Fighter	4000	4000	4000	1015	936	1100	842

Source: IISS, *Military Balance,* 1985-2013.

Figure 9.6: Historical Relative Trends in the PLAAF's Force Structure



	1985	1990	1995	2000	2005	2010	2013
Fighter	77.22	70.05	67.91	25.15	32.56	44.55	29.32
FGA	9.65	8.76	8.49	44.60	21.77	11.46	18.91
Attack	0.00	8.76	8.49	7.43	10.43	4.86	4.18
ISR	2.51	5.08	4.92	7.19	10.09	4.86	1.78
Tanker	0.00	0.00	0.00	0.15	0.35	0.41	0.35
Transport	10.62	7.36	10.19	10.53	17.84	11.99	11.35
EW	0.00	0.00	0.00	0.00	0.00	0.41	0.45
ELINT	0.00	0.00	0.00	0.00	0.00	0.00	0.14
AEW&C	0.00	0.00	0.00	0.00	0.00	0.32	0.28
Training	0.00	0.00	0.00	4.96	6.96	21.14	33.08
C2	0.00	0.00	0.00	0.00	0.00	0.00	0.17

Note: Percentages may not add up to 100 due to rounding.

Source: IISS, *Military Balance,* 1985-2013.

Shifts in Equipment Composition

While the changing force structure of the PLAAF has significant consequences for its combat capabilities, the rapid modernization of the PLAAF's aircraft inventory has also augmented PLAAF combat power; relative to as late as 2000, the PLAAF is now a decisively more modern force and its combat power has improved as a consequence.

Tied to the Local Wars doctrine, the PLAAF requires the capability to conduct precision strikes, air defense, ISR, EW, and strategic airlifts. The nimble, powerful military force envisioned by the Local Wars doctrine calls for an air force that can support the other services along the entire periphery of China despite any potential adversarial exploitation of weaponized information technology.

Key Aspects of Equipment Modernization

The 2013 DoD report on Chinese military power noted that China was focusing on both A2AD capabilities and stealth, as well as on precision strike capabilities and improved air defenses:[314]

> China's future air force A2/AD capabilities will be bolstered by the development of a 5th generation fighter force, which is not likely to be fielded before 2018. Key characteristics of fifth generation fighters include high maneuverability, lack of visibility on radar due to very low observable stealth shaping, and an internal weapons bay. Other key features of these aircraft are modern avionics and sensors that offer more timely situational awareness for operations in network-centric combat environments, radars with advanced targeting capabilities and protection against enemy electronic countermeasures, and integrated electronic warfare systems with advanced communication and GPS navigation functions. These next generation aircraft will improve China's existing fleet of fourth generation aircraft (Russian built Su-27/Su-30 and indigenous J-10 and J-11B fighters) by utilizing low-observable platforms to support regional air superiority and strike operations. Additionally, China's continuing upgrades to its bomber fleet may provide the capability to carry new, longer-range cruise missiles. Similarly, the acquisition and development of longer-range unmanned aerial vehicles (UAV), including the BZK-005, and unmanned combat aerial vehicles (UCAV), will increase China's ability to conduct long-range reconnaissance and strike operations. (p. 35)
>
> …The PLA seeks to develop aircraft with low observable features, advanced avionics, super-cruise engines, and stealth applications, as demonstrated by the January 2011 flight test of the J-20 prototype and recent observations of a second indigenously-produced aircraft with stealth features. China seeks to develop these advanced aircraft to improve its regional airpower projection capabilities and strengthen its ability to strike regional airbases and facilities. China's first fifth generation fighter is not expected to enter service prior to 2018, and China faces numerous challenges to achieving full operational capability, including developing high-performance jet engines. (p. 64)
>
> The PLA Air Force has observed foreign military employment of stealth aircraft and views this technology as a core capability in its transformation from a predominantly territorial air force to one capable of conducting offensive and defensive operations. The PLA Air Force also perceives there is an imbalance between offensive and defensive operations due to advances in stealth aircraft and related technologies with stealth aircraft providing an offensive operational advantage that denies an adversary the time to mobilize and conduct defensive operations. The PLA Air Force also sees the offensive advantage to combining an aircraft's stealthy features with information systems that enhance situational awareness and improve coordination of forces during combat. (p. 64)
>
> The development of stealth aircraft incorporated with advanced fifth generation capabilities, including super-cruise engines and advanced avionics, would make the aircraft capable of supporting a variety of tactical and regional missions. Furthermore, stealth aircraft the size of China's J-20 could be used as a multi-role fighter to strike ground targets within the region in addition to supporting air superiority missions beyond China's borders. Although China's second developmental fifth generation fighter is smaller in size than the J-20, this aircraft (tentatively identified as the J-31) may be designed for multi-role

> missions, providing China with a second stealth platform for regional operations. In addition to manned fighter aircraft, the PLA Air Force also views stealth technology as integral to unmanned aircraft, specifically those with an air-to-ground role, as this technology will improve the system's ability to penetrate heavily protected targets. (p. 64)
>
> China's ground-based air defense A2/AD capabilities will likely be focused on countering long-range airborne strike platforms with increasing numbers of advanced, long-range SAMs. China's current air and air defense A2/AD components include a combination of advanced long-range SAMs – its indigenous HQ-9 and Russian SA-10 and SA-20 PMU1/PMU2, which have the advertised capability to protect against both aircraft and low-flying cruise missiles. China continues to pursue the acquisition of the Russian extremely long-range S-400 SAM system (400 km), and is also expected to continue research and development to extend the range of the domestic HQ-9 SAM to beyond 200km. (p. 35)

Stealth

The Chinese development of stealth capabilities has been particularly striking. It became clear in early 2011 that China was developing its own "stealth" strike fighter, the J-20, although its capabilities and deployment schedule remain unknown.[315] DNI James R. Clapper described the US assessment of this development as follows in his testimony to the US Intelligence Community for the House Permanent Select Committee on Intelligence on February 10, 2011:[316]

> China's ongoing military modernization program began in earnest in the late 1990s, after Beijing observed the threat posed by long-range precision guided warfare in DESERT STORM and the Balkans. China's defense policies—initially aimed at creating credible options to forcibly bring Taiwan under Beijing's authority and developing the corresponding capabilities to prevent US intervention in a cross-Strait conflict—led Beijing to invest heavily in short- and medium-range ballistic missiles, modern naval platforms, improved air and air defense systems, counterspace capabilities, and an Intelligence, Surveillance, and Reconnaissance (ISR) system. For example, the Chinese have recently conducted the first flight test of what we refer to as a fifth-generation fighter, the J-20. We have known about this program for a long time and the flight test was not a surprise. We judge that this event is another indication of China's aspiration to develop a world-class military, and it is a capability we take seriously. But this program, like others in China, will have to overcome a number of hurdles before reaching its full potential.

The J-20 underwent its first test flight in January 2011, while more recently China test flew a second prototype stealth fighter model, the J-31 Falcon Eagle, on October 31, 2012. The J-31 appears to be a smaller version of the J-20. The J-31 looks similar in size and shape to Lockheed Martin's F-35 and F-22 fighters. It has been reported that Chinese hackers stole data on the design, performance, and other characteristics of the F-35 from the British defense firm BAE Systems. Though both Chinese planes display stealth design features, their true capabilities in terms of radar-absorbing coatings, censors, and other stealth attributes remain unknown. It is also unknown when or if either plan will enter production.[317]

According to the IISS,[318]

> In September 2012, China's aerospace ambitions were again confirmed when images emerged of a twin-engine medium fighter manufactured by the Shenyang Aero-space Company, unofficially identified as either the J-21 or J-31. Unlike the Chengdu J-20 heavy fighter, unveiled in January 2011 and gauged by some analysts as of possibly Russian heritage, the J-21 reflects US designs, with echoes of the F-22 and the F-35. This has led to speculation of industrial espionage during its development. As with the J-20, Beijing has yet to comment formally on the nature or specific purpose of the J-21 project. The J-21 airframe has almost all the hallmarks of a low observable design, and is missing the large canards that feature on the J-20. That said, the aft quadrant and engine nozzles do not appear optimised to minimise radar and infrared signatures, although this may reflect its prototype status.
>
> The extent to which the structural materials used are appropriate for a low-observable design remains unclear, as does the degree to which the sensor suite would support stealth operations. It is widely speculated

> that the first aircraft could be fitted with the Russian RD-93 engine, which is being exported to China for Pakistan-bound JF-17 light fighters. The J-21 is smaller than the J-20, and it may be intended to complement the larger aircraft. At the end of 2012, however, it remained unclear which of the services was the project's initial sponsor, or indeed whether the design began as a competitor to the J-20. The Shenyang prototype also features characteristics of a carrier-borne fighter. However, the PLAN already has a carrier-borne multi-role fighter under development, in the Shenyang J-15. The J-15 is based on the locally produced variant of the Su-27, while Chinese industry may also have benefitted from the purchase of a proto-type Su-33 from Ukraine. At least five J-15 prototypes are being tested.

Other Advanced Fighters and Carrier Aircraft

It was also reported in March 2013 that China's second stealth fighter, the J-31, could be developed into an aircraft carrier-borne fighter. It is the smaller of the two, resembles the F-25, and has two wheels on its nose landing gear. Meanwhile, the larger J-20 is likely to be a multi-role fighter designed to attack both ground and air targets, a stealthy interceptor like the USSR's MiG-25 Foxbat able to shoot down incoming fleets of attack plans, or a stealth bomb truck designed to speedily evade enemy radars and attack ships and bases with bombs and cruise missiles.[319]

Chinese manufacturers have unveiled the two next-generation fighter aircraft prototypes, the J-20 and J-31, as well as the J-15 carrier-based fighter and the accelerated modernization of Shenyang J-11 and Chengdu J-10 fleets. The Chinese defense industry has clearly been developing a diverse portfolio of new aircraft designs, including modernizing its traditional fighters and developing indigenous fourth generation – and potentially fifth generation – fighters:[320]

> These important advances owe to the implementation of a multi-pronged strategy across the sector's largest defence-industrial group, Aviation Industry Corporation of China (AVIC) and its five core prime contractors: Chengdu Aircraft Industry Corporation, Shenyang Aircraft Corporation, Hongdu Aviation Industry Group, Xi'an Aircraft Company and Changhe/Hafei Aviation. This strategy has included corporate reforms and organisational restructuring, coupled with sustained investment and expansion. China's aeronautic development strategy has also focused on key projects, such as indigenous platform and critical sub-system programs, and on building research, development and innovation capacity. Finally, this strategy has aimed to integrate civil and military aircraft manufacturing and leverage international commercial partnerships and acquisitions.
>
> As AVIC upgrades its existing third- and fourth-generation fighters, it is also focusing on next-generation stealth fighters (J-31) and strategic transport aircraft (Y-20), designed to complement the PLA's long-term military transformation. These programs are currently in their development stages and have yet to overcome technical hurdles — AVIC is finding it particularly difficult to integrate reliable high-performance power plants. Nevertheless, these programs represent the Chinese defence industry's growing potential for innovation.

China still lacks the sophisticated technology required for highly advanced innovation in military equipment – in particular, advanced capabilities in material selection, process standardization, quality control, and ensuring structural strength. When combined with integration, systems design, and management problems, the result has been cost overruns, extensive testing and delays, and many modifications of the design. Furthermore, the fragmented corporate structure of AVIC makes it difficult for the group to gain compliance from its sub-units.[321]

China is, however, making major progress. Analyst Andrew S. Erikson has assessed China's stealth prototype developments in further depth. In particular, Chengdu Aircraft Corporation's (CAC's) production and design abilities are growing, and the company's Project 718 J-20 could become the PRC's first fifth generation (or, in Chinese terminology, fourth generation) aircraft – meaning it would include high maneuverability, supercruise, helmet-mounted sights, thrust

vectoring, low observability, and sensor fusion characteristics. The J-20 prototype – which resembles the F-22 – is also large and has a significant weapons bay; when combined with China's strategic goals (as discussed in Chapter 1), it is likely that the plane could have several different applications, especially important to attack aircraft and strike fighter missions.[322]

One of these missions could be offensive counterair, meaning that due to its low-detection capabilities, it would be able to strike high-value airborne assets. The J-20 could also be used to destroy key targets in heavily-defended areas inside an air-defense system. This capability could be used against both land-based targets – like air-defense radars – or ship-based assets. However to achieve these potential capabilities, the plane needs to overcome difficulties with avionics, engine design, and systems integration. One PLAAF deputy commander projected 2017-19 as a possible first deployment for the plane.[323]

Shanghai Aircraft Corporation (SAC) is also working on its own stealth aircraft prototype, which has been called the F-60, J-31, and J-21 in various sources. The plane could be exported, as well. A scale model was presented in 2010, and in 2012 photographs and videos – allegedly of the prototype – appeared online, depicting a plane with "31001" painted on it, indicating that J-31 is likely the best name for the plane until something more official is announced. The plane is the second significant fighter aircraft produced by SAC in less than a year. The other is the J-16, a plane that is similar to the Russian Su-30MKK and the US F-15E – a two-seat version of the Chinese J-11B. The J-31 is likely to be a multirole combat aircraft that can be used in both air-to-air and air-to-surface roles requiring modern precision munitions.[324]

Because both the J-20 and the J-31 prototypes were completed at roughly the same time, it seems likely that CAC and SAC have developed a competitive relationship, instead of the previous geographic division of labor. Or, the J-31 could simply be a lighter J-20 (similar to the US F-35 as a complement to the F-22, or the Chinese J-10 as a complement to the J-11B). A key point, however, is that "Beijing has finally decided that it can sustain multiple overlapping advanced programs, with SAC alone currently working on four major fighter aircraft: the J-31 and the aforementioned J-16, as well as the J-16's single-seat parent the J-11B and the carrier-borne J-15, also based on the J-11B."[325]

UAVs, Drones, and More Advanced IS&R

It would appear that China's ability to sustain multiple overlapping advanced programs in its shipbuilding and aviation industries could be an important strategic breakthrough for the Chinese.[326]

China is also working on the development of unmanned aerial vehicles. One Chinese newspaper reported that the *Lijian* weaponized stealth drone, designed jointly by the Hongdu Aviation Industry Group and Shenyang Aviation Corporation, completed taxi tests in December of 2012 and is ready for its maiden flight. The drone is similar to the US X-47B and the European nEUROn. The first picture of the drone in flight was posted on the Internet in early May 2013.[327] The *Lijian* is meant to replace the current slow, low-flying, propeller-driven UAVs that the PLA currently has.[328]

China is developing a wide range of information, ISR, and battle management systems to support all of its services, including its Air Force. The broad goals of this effort are described in Chapter 1, and the space-related efforts have been discussed in Chapter 9. The DoD does note, however,

that they involve a new and much broader Chinese interest in electronic warfare that would affect Chinese tactical operations in any Asian regional contingency:[329]

> An integral component of warfare, the PLA identifies EW as a way to reduce or eliminate U.S. technological advantages. Chinese EW doctrine emphasizes using electromagnetic spectrum weapons to suppress or deceive enemy electronic equipment. PLA EW strategy focuses on radio, radar, optical, infrared, and microwave frequencies, in addition to adversarial computer and information systems.
> Chinese EW strategy stresses that it is a vital fourth dimension to combat and should be considered equally with traditional ground, sea, and air forces. Effective EW is seen as a decisive aid during military operations and consequently the key to determining the outcome of war. The Chinese see EW as an important force multiplier and would likely employ it in support of all combat arms and services during a conflict.
>
> PLA EW units have conducted jamming and anti-jamming operations testing the military's understanding of EW weapons, equipment, and performance, which helped improve their confidence in conducting force-on-force, real-equipment confrontation operations in simulated electronic warfare environments. The advances in research and deployment of electronic warfare weapons are being tested in these exercises and have proven effective. These EW weapons include jamming equipment against multiple communication and radar systems and GPS satellite systems. EW systems are also being deployed with other sea and air-based platforms intended for both offensive and defensive operations.

China's second and third generation fighter, strike, and bomber aircraft are unlikely to survive the high-attrition military conflicts predicted by the Local Wars concept given their lack of advanced radar, BVR-combat capabilities, or reduced radar profiles. The PLAAF has responded to this reality by significantly reducing its holdings of second and third generation aircraft while developing and purchasing fourth generation or near-fourth generation aircraft. Indigenously developed J-10, J-11, and JH-7 fighter and strike aircraft, as well as the continued development of the J-20 and J-31 fifth generation aircraft, improve the survivability and effectiveness of the PLAAF. As of late June 2013, there have been at least two J-20 test jets. Chinese officials have previously said that they expect to have a stealth fighter in service as early as 2017.[330]

The purchase of Su-27 and Su-30 aircraft quickly provided the PLAAF with a fourth generation fighter capability. The production and purchase of these aircraft has and will improve the capability of the PLAAF to an extent greater than can be predicted solely by analyzing force structure or aircraft numbers. Consequently, it is necessary to examine both force structure and force composition in order to measure the PLAAF's progress towards becoming an air force capable of winning Local Wars.

It is important to note that all aircraft with fourth generation or near-fourth generation capabilities are considered modern. In the PLAAF arsenal, this includes J-10, J-11, Su-27, Su-30, and JH-7 aircraft. As they are developed, J-15, J-20, and J-31 aircraft will be added to this list.

Figures 9.7 and 9.8 show the numbers of modern PLAAF aircraft in comparison to overall PLAAF holdings. They indicate both the absolute progress the PLAAF is making in its drive to acquire modern aircraft and also its relative progress in becoming a modern air force. In 2013, with over 500 modern fighters or fighter bombers, the modern portion of the PLAAF outnumbers most air forces in the Asia-Pacific region.

In addition, the import of Su-27 and Su-30 aircraft, along with the manufacture of indigenous fourth generation fighter aircraft such as the J-10 and J-11, suggest that the PLAAF will continue developing into a modern air force which fields a higher proportion of fourth generation systems. Moreover, the J-20 and J-31 stealth fighter prototypes indicate that the PLAAF is seeking a fifth

generation combat capability – though there remain significant technological hurdles to be overcome in this quest.

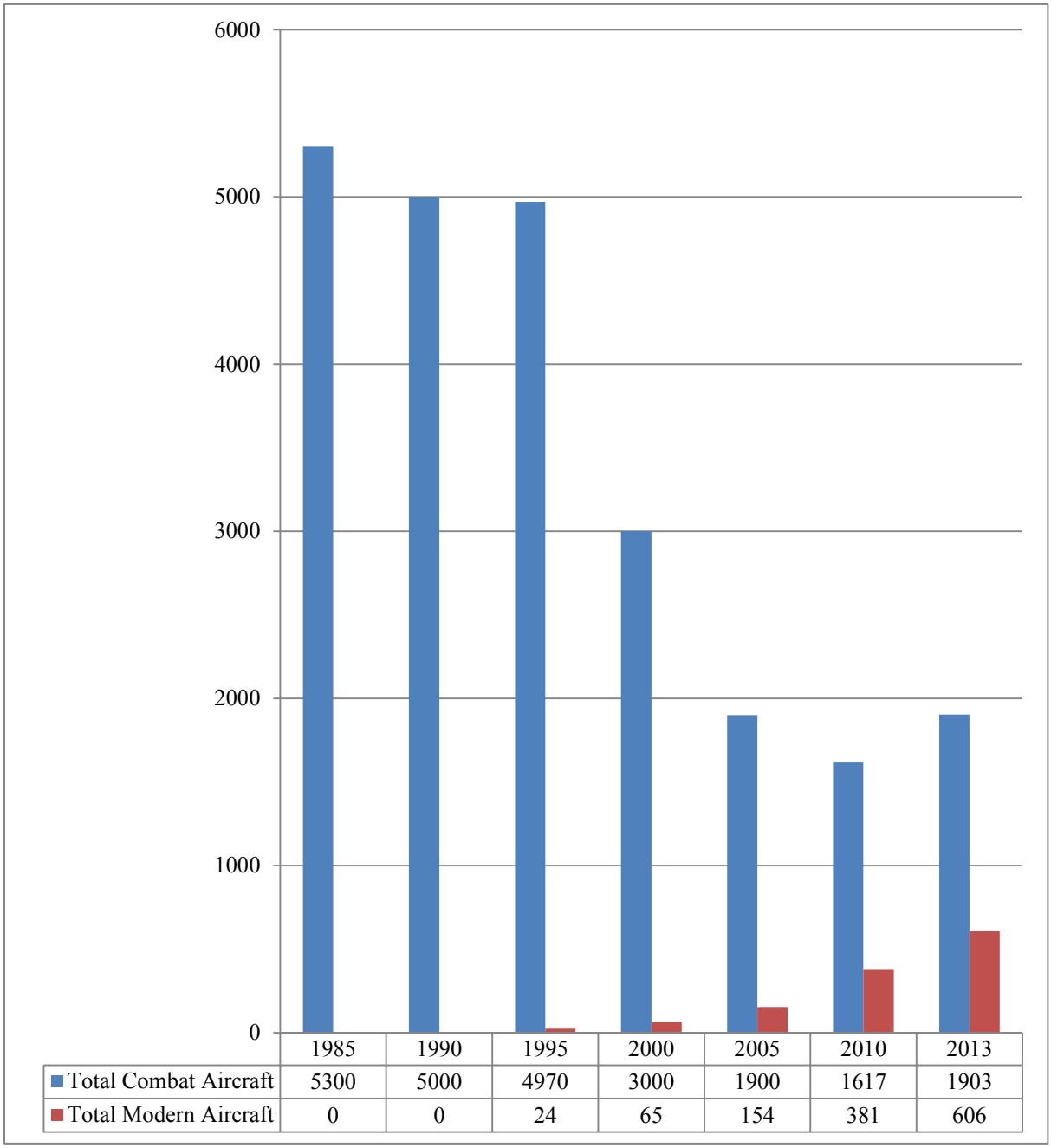
Figure 9.9 tracks the percentage of the PLAAF that is considered modern from 1985 to place these modernization trends into better perspective and help the observer see concurrent changes in force composition and capability. The graph demonstrates the rapid modernization of the PLAAF since the year 2000 and displays the trends that are augmenting the PLAAF's ability to win Local Wars.

Most striking is the level of modernization in the ground attack force: it is currently completely made up of fourth or near-fourth generation aircraft. The rapid modernization of this segment of the PLAAF shows compelling evidence of a wider shift from an air defense focus to a multi-mission, especially strike, focus for the PLAAF.

Compared to the bomber arm which currently has no modern aircraft, it appears that the indications given by the PLAAF's force structure also hold true in its force composition: the modernization of both aircraft categories indicates a PLAAF focus on targets within the first island chain. Such a posture is consistent with the Local Wars doctrine and is one indication that the doctrine is indeed influencing PLAAF modernization.

As the PLAAF's modernization trends continue, China's Air Force is likely to have greater and greater military capabilities, increasing its ability to decisively act in contingencies along its borders. In other words, it will be more capable of fighting and winning Local Wars.

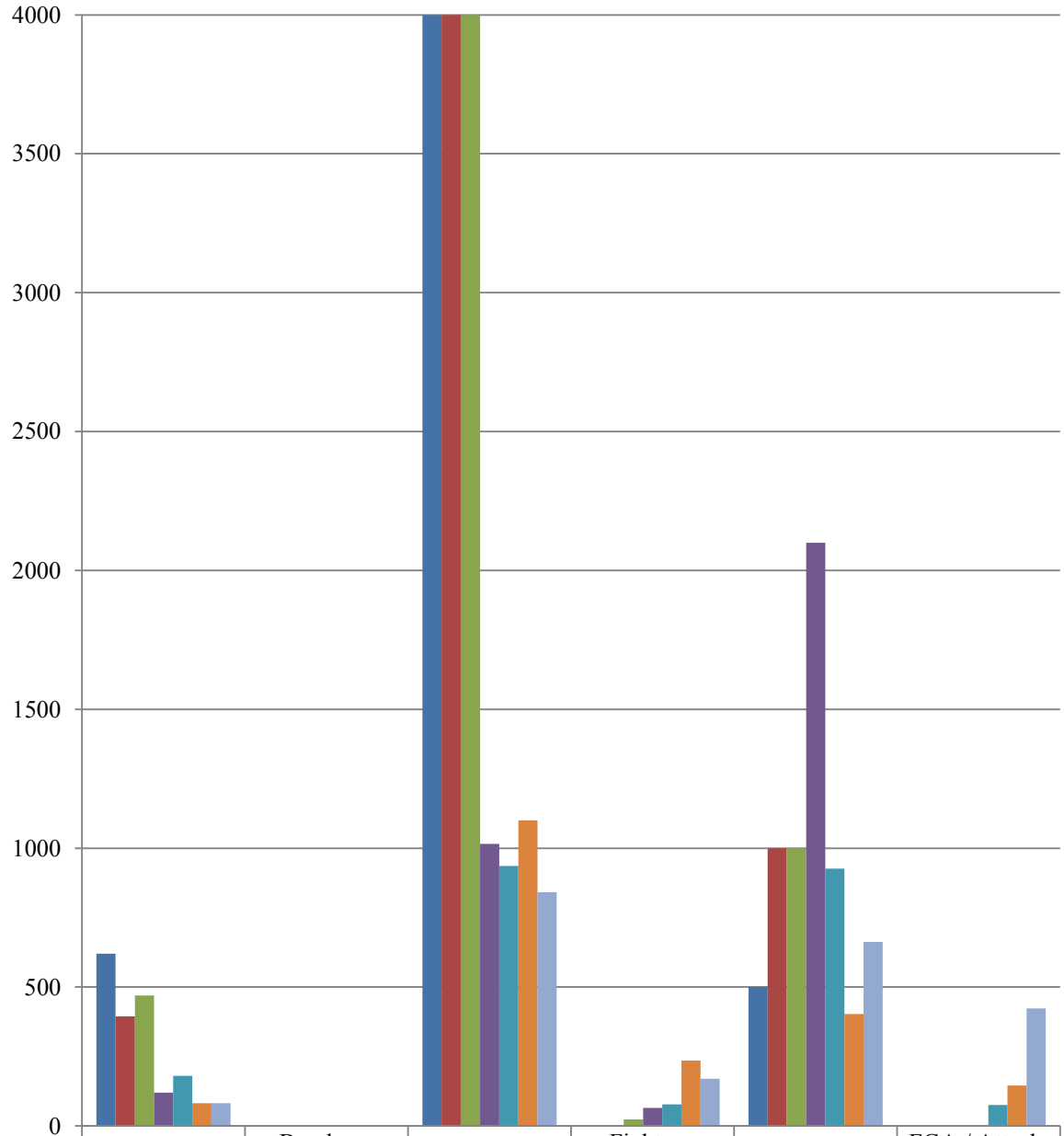
Figure 9.7: Total Versus Modern Aircraft in the PLAAF



	1985	1990	1995	2000	2005	2010	2013
Total Combat Aircraft	5300	5000	4970	3000	1900	1617	1903
Total Modern Aircraft	0	0	24	65	154	381	606

Source: IISS, *Military Balance,* 1985-2013.

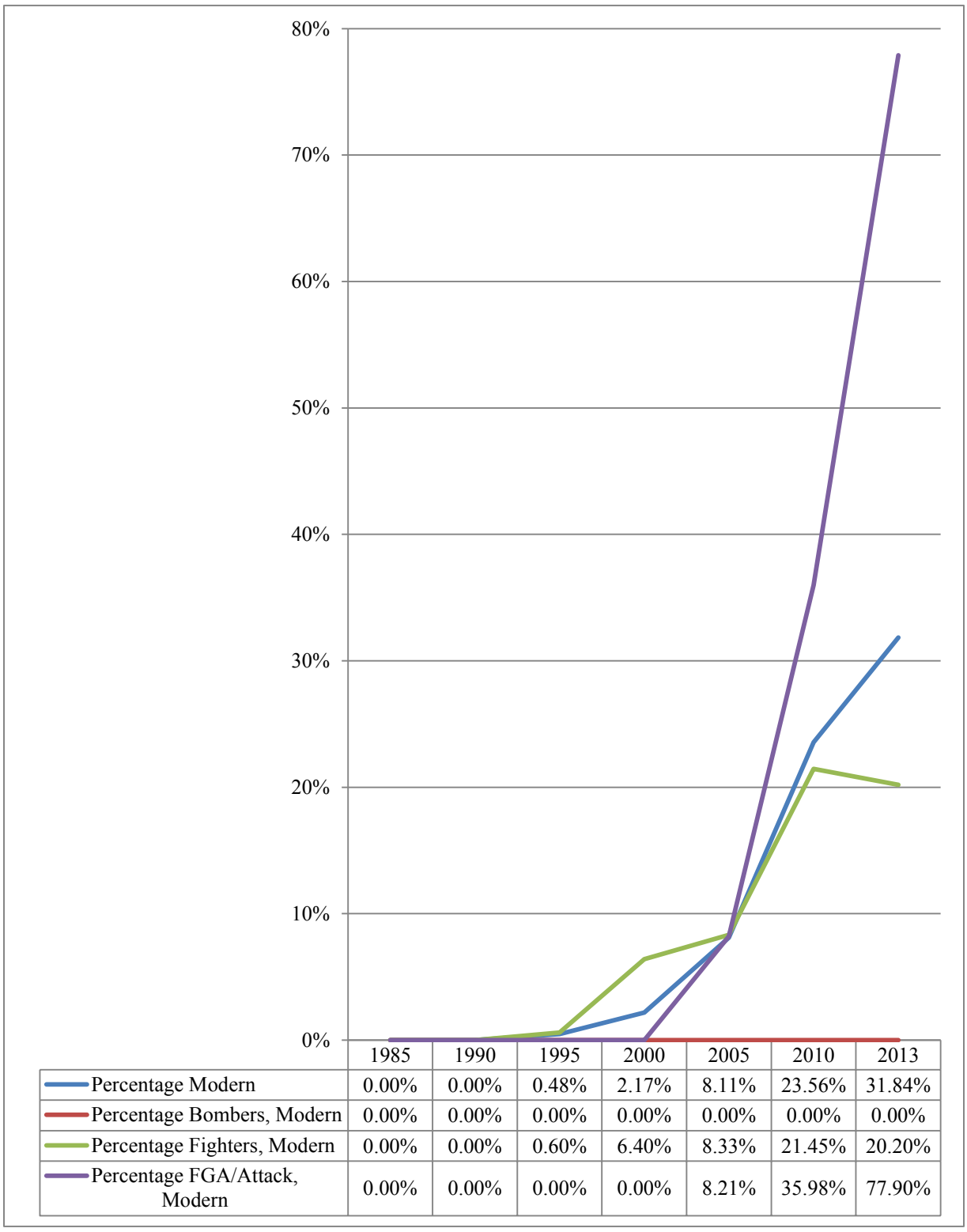
Figure 9.8: Total Versus Modern PLAAF Aircraft by Type



	Bombers	Bombers, Modern	Fighters	Fighters, Modern	FGA / Attack	FGA / Attack, Modern
1985	620	0	4000	0	500	0
1990	395	0	4000	0	1000	0
1995	470	0	4000	24	1000	0
2000	120	0	1015	65	2100	0
2005	180	0	936	78	926	76
2010	82	0	1100	236	403	145
2013	82	0	842	170	663	423

Source: IISS, *Military Balance,* 1985-2013.

Figure 9.9: Percentage of PLAAF Aircraft Modern



	1985	1990	1995	2000	2005	2010	2013
Percentage Modern	0.00%	0.00%	0.48%	2.17%	8.11%	23.56%	31.84%
Percentage Bombers, Modern	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Percentage Fighters, Modern	0.00%	0.00%	0.60%	6.40%	8.33%	21.45%	20.20%
Percentage FGA/Attack, Modern	0.00%	0.00%	0.00%	0.00%	8.21%	35.98%	77.90%

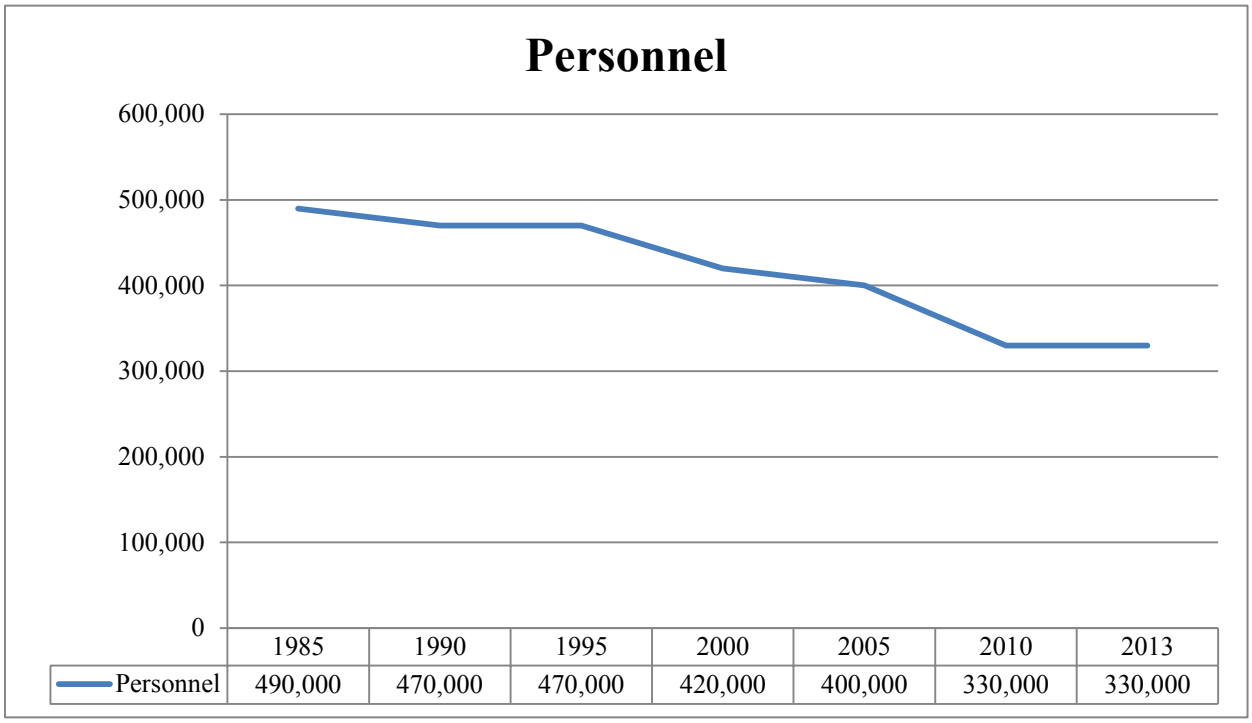
Source: IISS, *Military Balance*, 1985-2013.

Note: "Percentage Modern" assesses only combat capable aircraft.

Shifts in Manpower

The PLAAF's manpower policies have sought to reduce the size of the PLAAF while improving the combat and leadership skills of its personnel. The PLAAF aims to achieve the second goal by increasing the realism of training, offering academic courses to currently serving personnel, and conducting military exercises with other countries. These manpower trends are shown in **Figure 9.10.**

Figure 9.10: Historical PLAAF Manpower Trends



	1985	1990	1995	2000	2005	2010	2013
Personnel	490,000	470,000	470,000	420,000	400,000	330,000	330,000

Source: IISS, *Military Balance,* 1985-2013.

Expansion of Chinese Air Power Projection Capabilities, US Forced Entry, and the Outer Island Chain

As is the case with the PLAN, the PLAAF has emphasized "realistic" combat training that simulates force on force engagements in accordance with the 2009 *Outline of Military Training and Evaluation*. Such training forces the PLAAF's personnel to compete with an opposing force over objectives in a complex electro-magnetic environment. As part of this process, the PLAAF emphasizes the following four "guiding thoughts": "adapt to the revolution in military affairs, prepare for battles to combat Taiwan's independence, integrate advanced equipment into the PLAAF, and counter an excessive focus on safety during training."[331]

Besides realistic training, the PLAAF has sought to develop a grass-roots movement towards self-education and academic achievement within the ranks. In addition to formal military education institutions, which offer high school through doctoral degrees, there exist online, correspondence, and short-term courses in which 60% of enlisted soldiers and officers have

reportedly taken part.[332] These educational efforts are aided by information-technology communications. Also, there are significant numbers of PLAAF officers that enroll in graduate programs at civilian universities.[333]

As is also the case with the PLAN, the PLAAF has been an active participant in joint military exercises. For example, in 2010, the PLAAF conducted bilateral exercises with Turkey that involved PLAAF fighters flying to Turkey and refueling in flight. Furthermore, PLAAF fighters used bases in the PRC to fly over Kazakhstan during PEACE MISSION 2010, a Shanghai Cooperation Organization military exercise.[334] These exercises indicate that the PLAAF is not only practicing necessary combat skills, but also practicing long-distance flight.

The PLAAF and Power Projection

The PLAAF's efforts to alter its force structure, equipment composition, and manpower policies have resulted in a force more suited to fighting Local Wars. The shift from an air-defense to a multi-mission air force enables the PLAAF to support the wider PLA in multiple ways, whether through fire support, air defense, or transport.

Moreover, the planes flown by the PLAAF are steadily becoming more capable, a trend which ensures that the PLAAF is gaining combat power faster than a pure force structure analysis would indicate. The synergy between force restructuring, aircraft modernization, and manpower policies ensures that the PLAAF will consistently become more capable of fighting and winning Local Wars as its modernization program continues.

This progress has made Chinese forces far more competitive with US air and missile power. As was touched upon earlier, this has helped the US to focus on the air-sea battle and the use of land and sea-based air and missile power in projecting power in Asia. It is important to note, however, that only one third of the PLAAF's aircraft are modern, that modern fighter-interceptors only account for ~20% of the fighter arsenal, and that numerous categories such as C2, ELINT, and AEW&C aircraft are just beginning to enter the PLAAF. Despite the PLAAF's improvements, it still requires much more development before it becomes equivalent to the US or Russian air forces.

At the same time, China has put more efforts into ship and land-based missiles. These now include efforts to create a long-range ability to strike carrier-sized targets and the growing mix of SRBMs, MRBMs, and IRBMs, discussed in the next chapter.

Chapter 10: PLA Missile Forces—The Second Artillery Force

Chinese missile forces, which are grouped under the Second Artillery Force (SAF) – also called the Second Artillery Corps (SAC) – have undergone significant transformation over the past 30 years. Since 1985, the SAF has shifted from a nuclear deterrent force based primarily on intermediate- and medium-range missiles to a force of intercontinental- and medium-range nuclear forces combined with a powerful conventional missile arm capable of conducting precision attacks at a medium range.

With the addition of intercontinental nuclear missiles beginning in the mid-1980s, as well as new modernized missile classes, the SAF is now capable of credibly deterring adversaries at intercontinental ranges. Moreover, with the introduction of conventional short-range ballistic missiles (SRBMs), medium-range ballistic missiles (MRBMs), and land attack cruise missiles (LACMs), the SAF is now capable of conventionally holding at risk adversary forces within 1,500 km of China. These significant changes are the result of doctrinal modifications made during the 1980s that fundamentally altered the SAF's overarching mission as well as its position within the wider PLA.

The US Official view

The 2013 DoD report *Military and Security Developments Involving the People's Republic of China* describes the current structure and trends in the SAF. The US summarized Chinese missile and space developments as follows:[335]

> The Second Artillery controls China's nuclear and conventional ballistic missiles. It is developing and testing several new classes and variants of offensive missiles, forming additional missile units, upgrading older missile systems, and developing methods to counter ballistic missile defenses.
>
> By December 2012, the Second Artillery's inventory of short-range ballistic missiles (SRBM) deployed to units opposite Taiwan stood at more than 1,100. 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.
>
> China is fielding a limited but growing number of conventionally armed, medium-range ballistic missiles, including the DF-21D anti-ship ballistic missile (ASBM). The DF-21D is based on a variant of the DF-21 (CSS-5) medium-range ballistic missile (MRBM) and gives the PLA the capability to attack large ships, including aircraft carriers, in the western Pacific Ocean. The DF-21D has a range exceeding 1,500 km and is armed with a maneuverable warhead.
>
> 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 United States. China may also be developing a new road-mobile ICBM, possibly capable of carrying a multiple independently targetable re-entry vehicle (MIRV)….
>
> **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. The Second Artillery continues to field advanced variants with improved ranges and more sophisticated payloads, while gradually replacing earlier generations that do not possess true precision strike capability.

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 far from China's shores out to the first island chain.

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 ASBMs).

Land-Attack Cruise Missiles: The PLA continues to field air- and ground-launched LACMs for stand-off, precision strikes. Air-launched cruise missiles include the YJ-63, KD-88, and the CJ-20.

Ground Attack Munitions: The PLA Air Force has a small number of tactical air-to-surface missiles as well as precision-guided munitions including all-weather, satellite-guided bombs, anti-radiation missiles, and laser-guided bombs.

Anti-Ship Cruise Missiles: The PLA Navy is deploying the domestically-produced, ship-launched YJ-62 ASCM; the Russian SS-N-22/SUNBURN supersonic ASCM, which is fitted on China's SOVREMENNY-class DDGs acquired from Russia; and the Russian SS-N-27B/SIZZLER supersonic ASCM on China's Russian-built KILO SS. It has, or is acquiring, nearly a dozen ASCM variants, ranging from the 1950s-era CSS-N-2 to the modern Russian-made SS-N-22 and SS-N-27B. China is working to develop a domestically-built supersonic cruise missile capability. The pace of ASCM research, development, and production has accelerated over the past decade.

Anti-Radiation Weapons: China is starting to integrate an indigenous version of the Russian Kh-31P (AS-17) known as the YJ-91 into its fighter-bomber force. The PLA imported Israeli-made HARPY UAVs and Russian-made anti-radiation missiles during the 1990s.

Artillery-Delivered High Precision Munitions: The PLA is developing or deploying artillery systems with the range to strike targets within or even across the Taiwan Strait, including the PHL-03 300 mm multiple-rocket launcher (MRL) (100+ km range) and the longer-range AR-3 dual-caliber MRL (out to 220 km).

Second Artillery: …[T]he Second Artillery is expanding its conventional MRBM force and developing IRBMs to extend the distance from which it can threaten other countries with conventional precision or near-precision strikes.

….China has prioritized land-based ballistic and cruise missile programs to extend its strike warfare capabilities further from its borders. It is developing and testing several new classes and variants of offensive missiles, forming additional missile units, upgrading older missile systems, and developing methods to counter ballistic missile defenses. The Second Artillery has deployed more than 1,100 SRBMs to garrisons across from Taiwan and is fielding cruise missiles, including the ground-launched CJ-10 land-attack cruise missile. China continues to field an ASBM based on a variant of the DF-21 (CSS-5) medium-range ballistic missile that it began deploying in 2010. Known as the DF-21D, this missile provides the PLA the capability to attack large ships, including aircraft carriers, in the western Pacific. The DF-21D has a range exceeding 1,500 km and is armed with a maneuverable warhead.

…. China has made efforts to go beyond defense from aircraft and cruise missiles to gain a ballistic missile defense capability in order to provide further protection of China's mainland and strategic assets. China's existing long-range SAM inventory offers limited capability against ballistic missiles. The SA-20 PMU2, the most advanced SAM Russia offers for export, has the advertised capability to engage ballistic missiles with ranges of 1,000km and speeds of 2,800m/s. China's domestic CSA-9 long-range SAM system is expected to have a limited capability to provide point defense against tactical ballistic missiles with ranges up to 500km. China is proceeding with the research and development of a missile defense umbrella consisting of kinetic energy intercept at exo-atmospheric altitudes (>80km), as well as intercepts of ballistic missiles and other aerospace vehicles within the upper atmosphere. In January 2010, and again in January 2013, China successfully intercepted a ballistic missile at mid-course, using a ground-based missile.

…. China has developed a large constellation of imaging and remote sensing satellites under a variety of mission families. These satellites can support military objectives by providing situational awareness of foreign military force deployments, critical infrastructure, and targets of political significance. Since 2006, China has conducted 16 Yaogan remote sensing satellite launches. The Yaogan satellites conduct scientific experiments, carry out surveys on land resources, estimate crop yield, and support natural disaster reduction and prevention. Additionally, China has launched two Tianhui satellites designed to conduct scientific experiments and support land resource surveys and territory mapping with a stereoscopic imaging payload. China has three Huanjing disaster monitoring satellites currently on orbit (the third of which was launched in November 2012). The Ziyuan series of satellites are used for earth resources, cartography, surveying, and monitoring. China also operates the Haiyang ocean monitoring constellation and Fengyun weather satellites in low Earth and geosynchronous orbits. China will continue to increase its on-orbit constellation with the planned launch of 100 satellites through 2015. These launches include imaging, remote sensing, navigation, communication, and scientific satellites, as well as manned spacecraft.

Space: In 2012, China conducted 18 space launches. China also expanded its space-based intelligence, surveillance, reconnaissance, navigation, meteorological, and communications satellite constellations. In parallel, China is developing a multi-dimensional program to improve its capabilities to limit or prevent the use of space-based assets by adversaries during times of crisis or conflict.

During 2012, China launched six Beidou navigation satellites. These six satellites completed the regional network as well as the in-orbit validation phase for the global network, expected to be completed by 2020. China launched 11 new remote sensing satellites in 2012, which can perform both civil and military applications. China also launched three communications satellites, five experimental small satellites, one meteorological satellite, one relay satellite, and a manned space mission.

China continues to develop the Long March 5 (LM-5) rocket, which is intended to lift heavy payloads into space. LM-5 will more than double the size of the Low Earth Orbit (LEO) and Geosynchronous Orbit (GEO) payloads China is capable of placing into orbit. To support these rockets, China began constructing the Wenchang Satellite Launch Center in 2008. Located on Hainan Island, this launch facility is expected to be complete around 2013, with the initial LM-5 launch scheduled for 2014.

Counter-Space. PLA strategists regard the ability to utilize space and deny adversaries access to space as central to enabling modern, informatized warfare. Although PLA doctrine does not appear to address space operations as a unique operational "campaign," space operations form an integral component of other PLA campaigns and would serve a key role in enabling A2/AD operations. Publicly, China attempts to dispel any skepticism over its military intentions for space. In 2009, PLA Air Force Commander General Xu Qiliang publically retracted his earlier assertion that the militarization of space was a "historic inevitability" after President Hu Jintao swiftly contradicted him. General Xu Qiliang is now a Vice Chairman of the Central Military Commission and the second highest-ranking officer in the PLA.

The PLA is acquiring a range of technologies to improve China's space and counter-space capabilities. China demonstrated a direct-ascent kinetic kill anti-satellite capability to low Earth orbit when it destroyed the defunct Chinese FY-1C weather satellite during a test in January 2007. Although Chinese defense academics often publish on counterspace threat technologies, no additional anti-satellite programs have been publicly acknowledged. A PLA analysis of U.S. and coalition military operations reinforced the importance of operations in space to enable "informatized" warfare, claiming that "space is the commanding point for the information battlefield." PLA writings emphasize the necessity of "destroying, damaging, and interfering with the enemy's reconnaissance...and communications satellites," suggesting that such systems, as well as navigation and early warning satellites, could be among the targets of attacks designed to "blind and deafen the enemy." The same PLA analysis of U.S. and coalition military operations also states that "destroying or capturing satellites and other sensors…will deprive an opponent of initiative on the battlefield and [make it difficult] for them to bring their precision guided weapons into full play."

Figure 10.1 shows a DoD estimate of the size of Chinese missile forces in 2012.

Figure 10.1: The Size of the China's Missile Forces in 2012

China's Missile Force			
System	**Missiles**	**Launchers**	**Estimated Range**
ICBM	50-75	50-75	5,500+ km
IRBM	5-20	5-20	3,000-5,500 km
MRBM	75-100	75-100	1,000-3,000 km
SRBM	1,000-1,200	200-250	< 1,000 km
GLCM	200-500	40-55	1,500+ km

Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2012*, May 2012, p. 29.

A more detailed US official assessment of Chinese missile forces took place in May 2013. This assessment was made by the US National Air and Space Intelligence Center with contributions from the Defense Intelligence Agency Missile and Space Intelligence Center and the Office of Naval Intelligence.[336] This assessment summarized Chinese missile developments as follows:[337]

> China has the most active and diverse ballistic missile development program in the world. It is developing and testing offensive missiles, forming additional missile units, qualitatively upgrading missile systems, and developing methods to counter ballistic missile defenses.
>
> …The Chinese ballistic missile force is expanding in both size and types of missiles. China continues to field conventionally armed SRBMs opposite Taiwan, and is developing a number of new mobile, conventionally armed MRBMs. Missiles such as the CSS-5 ASBM are key components of the Chinese military modernization program, specifically designed to prevent adversary military forces' access to regional conflicts.
>
> …China continues to maintain regional nuclear deterrence, and its long-term, comprehensive military modernization is improving the capability of its ballistic missile force to conduct high-intensity, regional military operations, including "anti-access and area denial" (A2/AD) operations. The term A2/AD refers to capabilities designed to deter or counter adversary forces from deploying to or operating within a defined space. Currently, China deploys the nuclear armed CSS-2, CSS-5 Mod 1, and CSS-5 Mod 2 for regional nuclear deterrence. China is also acquiring new conventionally armed CSS-5 MRBMs to conduct precision strikes. These systems are likely intended to hold at-risk or strike logistics nodes, regional military bases including airfields and ports, and naval assets. Notably, China has likely started to deploy the DF-21D, an ASBM based on a variant of the CSS-5.
>
> …China is strengthening its strategic nuclear deterrent force with the development and deployment of new ICBMs.…China currently has a single XIA Class SSBN that is intended to carry 12 CSS-NX-3/JL-1 missiles. In addition, China will deploy the new CSS-NX-14/JL-2 SLBM on new 12-tube JIN Class SSBNs. This missile will, for the first time, allow Chinese SSBNs to target portions of the United States from operating areas located near the Chinese coast…The CJ-10 (DH-10) is the first of the Chinese Changjian series of long-range missiles and LACMs. It made its public debut during a military parade in 2009 and is currently deployed with the Second Artillery Corps.

SAF Strategy

During the 1980s, the CMC ordered the SAF to operate according to the concept of "Dual Deterrence and Dual Operations." This doctrine was developed in response to recent changes in the nature of modern warfare, and the CMC believed that these changes required the SAF to maintain both a conventional strike capability and augmented security for its nuclear deterrent. As the *Science of Second Artillery Campaigns* states,[338]

> In the late 1980s, the Central Military Commission assigned the Second Artillery Force the mission to build and develop a conventional guided missile force. Especially after the Gulf War, the PLA, under the correct leadership of President Jiang Zemin (江泽民), formulated the military strategic guidelines of the new era. To meet the needs of future high tech local wars, the Central Military Commission issued the new task of "dual deterrence and dual operations" and set up a new conventional guided missile force.

The basic logic of dual deterrence and dual operations was that both conventional and nuclear missile capabilities could deter China's adversaries, while both conventional and nuclear operations were necessary in wartime. By nuclear operations, the SAF refers to nuclear counter-attack and nuclear deterrence operations.

The requirements placed on the SAF by the new service strategy had significant implications for force structure, equipment composition, and manpower policies. In the mid-1980s, the SAF was a force comprised mostly of medium- and intermediate-range nuclear and atomic weapons. The SAF had few intercontinental ballistic missiles (ICBMs) and no conventional capabilities. The requirements of the new service strategy created doctrinal and practical challenges. As the *Science of Second Artillery Campaigns* states, several theoretical changes had to occur:[339]

> First is to shift the footing of the theoretical research of Second Artillery Force campaigns from dealing with a nuclear war in the past to participating in a high tech local war under the condition of nuclear deterrence; Second is to shift the focus of the research from using the single nuclear means to accomplish the mission of nuclear counter attack in the past to using two types of means, both nuclear and conventional, namely to a mission of "dual deterrence and dual operations." Third is to change the content of research from focusing on strategizing in the past to focusing on a combined use of strategizing and technical means.

When the PLA adopted the Local Wars concept in 1993, the SAF's dual deterrence and dual operations strategy easily fit into the new construct – the emphasis on developing a conventional strike capability fit in with the Local Wars requirements for long-range precision strikes.

As the following section will show, the SAF has succeeded in facing the theoretical and practical challenges of the CMC's imperatives and is currently in the process of a modernization and force development program designed to enable it to conduct dual deterrence, dual operations, and to fight and win Local Wars.

Shifts in Force Structure, Equipment Composition, and Manpower

The SAF has responded to these twin imperatives by fundamentally altering its force structure, equipment composition, and manpower policies. Force structure changes are illustrated by the proliferation of missile categories and units within the SAF as well as by the dual development of conventional and nuclear weapons systems.

Equipment-wise, the nuclear and conventional objectives necessitate similar capabilities: they both require missile systems that are mobile and survivable. However, the differing requirements of nuclear and conventional missile campaigns mean that the SAF requires both conventional

missiles accurate enough to target mobile or small targets and nuclear missiles capable of evading and surviving enemy nuclear attacks. Neither capability is simple or easy to achieve, and the SAF is still making progress towards both.

As the data below indicate, however, the SAF has made significant progress in all of these capabilities compared to its position in 1985. In the conventional field, the SAF, which had no conventional missiles in 1985, now has the largest conventional missile arsenal in the Asia-Pacific.[340] Since 1985, the SAF has developed conventional systems that are mobile, solid-fueled, and precise or near-precise in accuracy.[341] Moreover, it has also developed indigenous cruise missiles and the resulting precision-strike capability offered by such systems. In addition, these conventional systems now enjoy increased survivability due to the development of a reportedly 5,000 kilometer-long tunnel network[342] and improving PLAAF air defenses.[343]

The nuclear forces have also made significant progress. Since 1985 the SAF has retired much of its liquid-fueled nuclear missile arsenal. In turn, these systems have been replaced by new, solid-fueled, mobile missile systems. Unlike the conventional forces, however, the nuclear forces still retain a number of obsolete, liquid-fueled missiles and lack modern technologies such as multiple independent targetable reentry vehicles (MIRVs) or ballistic missile defenses. Consequently, while the SAF's nuclear delivery modernization continues, it has yet to achieve a fully modern force.

All of these developments have been occurring within the context of the SAF's efforts to create a force capable of winning Local Wars along China's periphery. Consequently, the SAF has developed its strongest capabilities in precision-strike weapon systems that can hit targets within 600 km of China's borders: the DoD has estimated that the SAF has 1,200-1,700 SRBMs and GLCMs.[344] In addition, the SAF has been reported by the DoD to be increasing its numbers of MRBMs, anti-ship ballistic missiles (ASBMs), and long-range GLCMs. Consequently, the SAF enables the PLA to mitigate some of the weaknesses still existent in its other branches. This dynamic, combined with the SAF's proven anti-satellite capability, illustrates the importance of the SAF to the PLA's Local Wars concept.

Trends in Total Missile Forces

The trends in these developments – which have played out over the course of nearly three decades – are illustrated by shifts in the number of missile forces in the SAF order of battle from 1985-2012. The data in **Figures 10.2 to 10.4** are drawn from the IISS and show the historical trends in Second Artillery manpower and missile strength.

- **Figure 10.2** provides detailed quantitative data on the SAF's order of battle since 1985.
- **Figures 10.3 to 10.4** compare both absolute and relative trends – absolute numbers alone do not indicate institutional change; it is necessary to tie changes in absolute numbers to changes in relative force structure. **Figures 10.3 and 10.4** also demonstrate such a change between 1985 and 2013: the SAF's evolving force structure illustrates a shift from a medium-/intermediate-range nuclear force to a bifurcated force dually dedicated to conventional short-medium range missions and a nuclear force capable of medium-range and intercontinental strikes.
- **Figure 10.5** shows the range of China's missiles and how they affect its full range of operations – in Asia and in extending its sea-air extension of operations in the second island chain and in areas affecting the South China Sea.

There are several key indicators of this shift from a medium-/intermediate-range nuclear force to a bifurcated multi-mission force shown in the Figures. The first such indicator is the diminishing

number of missile launchers solely suited to nuclear missions. Even if an observer ignores the DF-21C/D and counts the DF-21 series as a nuclear-only class, the percentage of the SAF's missile launcher strength suited only for nuclear missions drops from 100% in 1985 to slightly over 40% in 2012.

Roughly 60% of the current SAF arsenal can conduct effective conventional missions and thus contribute to victory in non-nuclear Local Wars under Conditions of Informatization. As the Figures show, the reason for this significant change is the introduction of precision or near-precision strike SRBMs and LACMs. When SRBMs first appeared on the graph in 2000, they accounted for 30% of the SAF's missile launchers; by 2013, SRBMs accounted for approximately 50%. This change is complemented by the introduction of cruise missiles: by 2010, LACMs accounted for roughly 11% of SAF strength. These trends occur in contrast to the effective destruction of the SAF's nuclear intermediate-range ballistic missile (IRBM) force. In 1985, the SAF's nuclear IRBMs accounted for over 50% of the force; by 2013, the total was roughly 0.4%.

The second major indicator of a shift in SAF doctrine and capability is the significant growth in the relative size of the ICBM arsenal. Not only does the ICBM force increase in relative size from 5% to 14%, but also much of the growth is due to modern DF-31 and DF-31A ICBMs. This trend may be an indication of a shifting priority from regional and Eurasian deterrence missions to intercontinental deterrence missions. Consequently, not only have the SAF's equipment holdings revealed a shift from nuclear to nuclear and conventional missions, it is possible that the same equipment holdings also indicate a shift in the priority of nuclear deterrence missions.

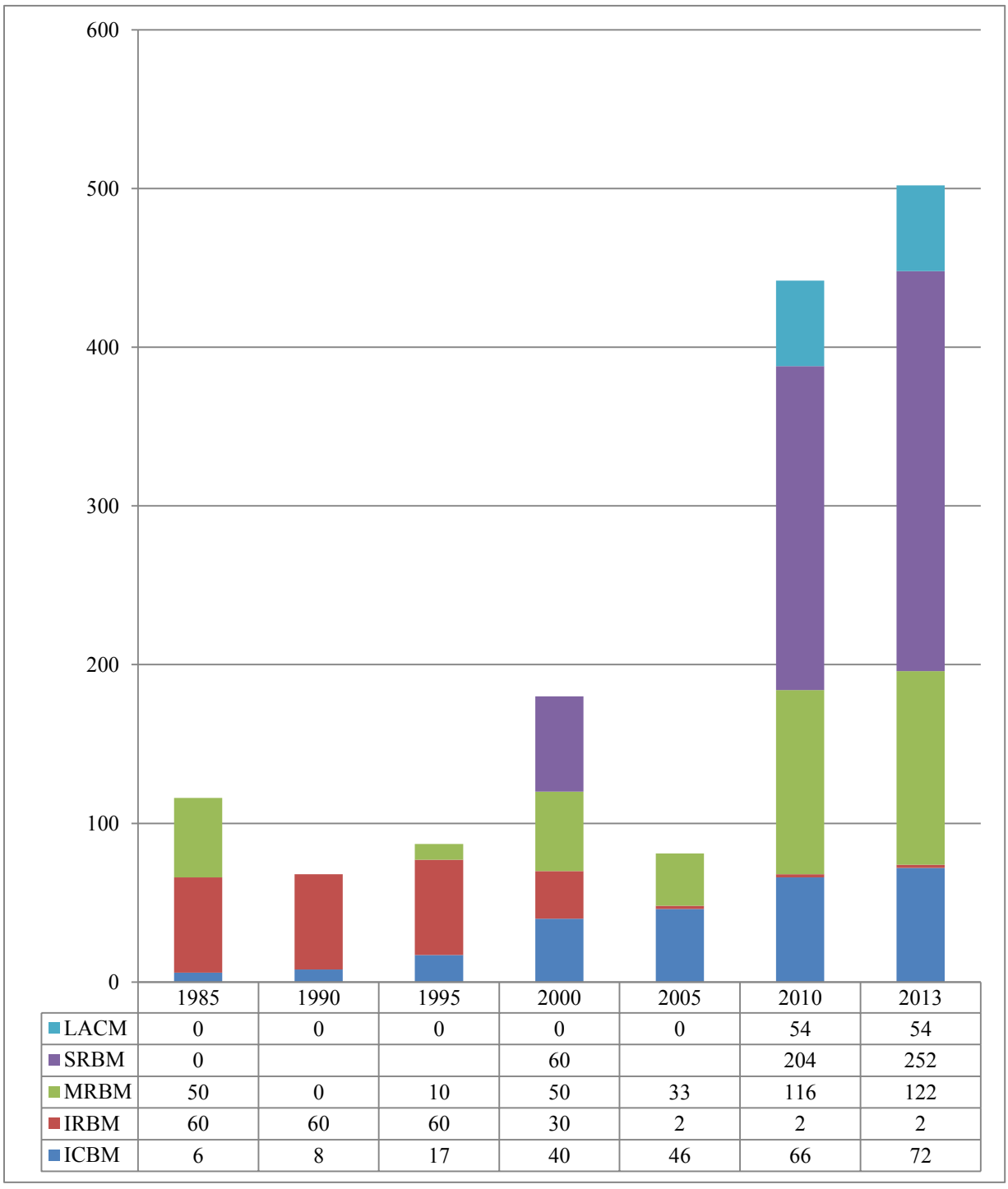
The third indicator is the change in the geographic range of the force. In 1985, 100%[345] of the SAF's missile force could reach the critical US base on Guam, located in the second island chain.[346] In 2012, the composition of the SAF is such that only roughly 15% of the SAF's capabilities can hit the US base on Guam. This change indicates a significant shift in priorities from the second island chain and beyond to China's immediate periphery. Such a shift is fully in line with the Local Wars concept.

Figure 10.2: Historical Quantitative Data on the SAF

	1985	1990	1995	2000	2005	2010	2013
DF-2 (CSS-1)	50	0	0	0	0	0	0
DF-3/A (CSS-2 Mod) [IRBM]	60	60	60+	30+	2	2	2
DF-4 (CSS-3) [ICBM]	4	6	10+	20+	20	10	10
DF-5/A (CSS-4 Mod 2) [ICBM]	2	2	7	20+	20	20	20
DF-21/A (CSS-5 Mod1/2) [MRBM]	0	0	10	50+	33	80	80
DF-21C (CSS-5 Mod 3) [MRBM]	0	0	0	0	0	36	36
DF-21D (CSS-5 Mod 4 – ASBM) [MRBM]	0	0	0	0	0	0	6
DF-15/M9 (CSS-6) [SRBM]	0	some	some	20	some	96	144
DF-11/A/M-11A (CSS-7 Mod 2) [SRBM]	0	some	some	40	some	108	108
DF-31 (CSS-9) [ICBM]	0	0	0	0	6	12	12
DF-31A (CSS-9 Mod 2) [ICBM]	0	0	0	0	0	24	30
DH-10/CJ-10 [LACM]	0	0	0	0	0	54	54

Source: IISS, *Military Balance,* 1985-2013.

Figure 10.3: Historical Size and Composition of the SAF Arsenal

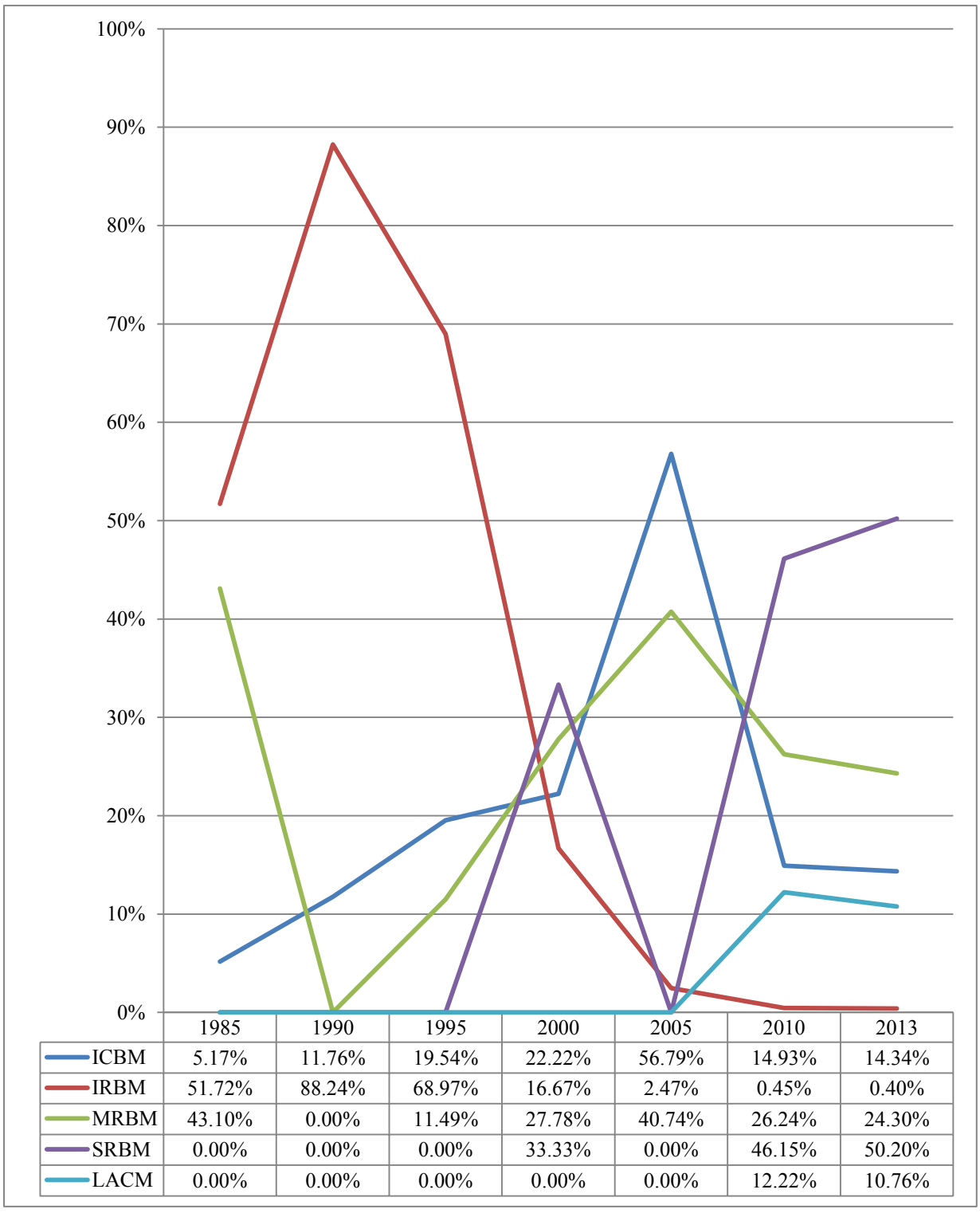


	1985	1990	1995	2000	2005	2010	2013
LACM	0	0	0	0	0	54	54
SRBM	0			60		204	252
MRBM	50	0	10	50	33	116	122
IRBM	60	60	60	30	2	2	2
ICBM	6	8	17	40	46	66	72

Note: IISS lists total SRBM missile numbers, not SRBM missile launchers for 2005. Consequently, while it is possible to estimate the number of launchers, such estimates are very rough given uncertainty regarding missile-to-launcher ratios and the uneven distribution of both types of equipment to missile forces. Consequently, the authors have chosen to leave to leave the field for 2005 SRBM numbers blank, but it should be kept in mind that there was a sustained increase in SRBM launcher numbers between 2000 and 2010.

Source: IISS, *Military Balance,* 1985-2013.

Figure 10.4: The SAF's Changing Force Structure, 1985-2013 (Percent)

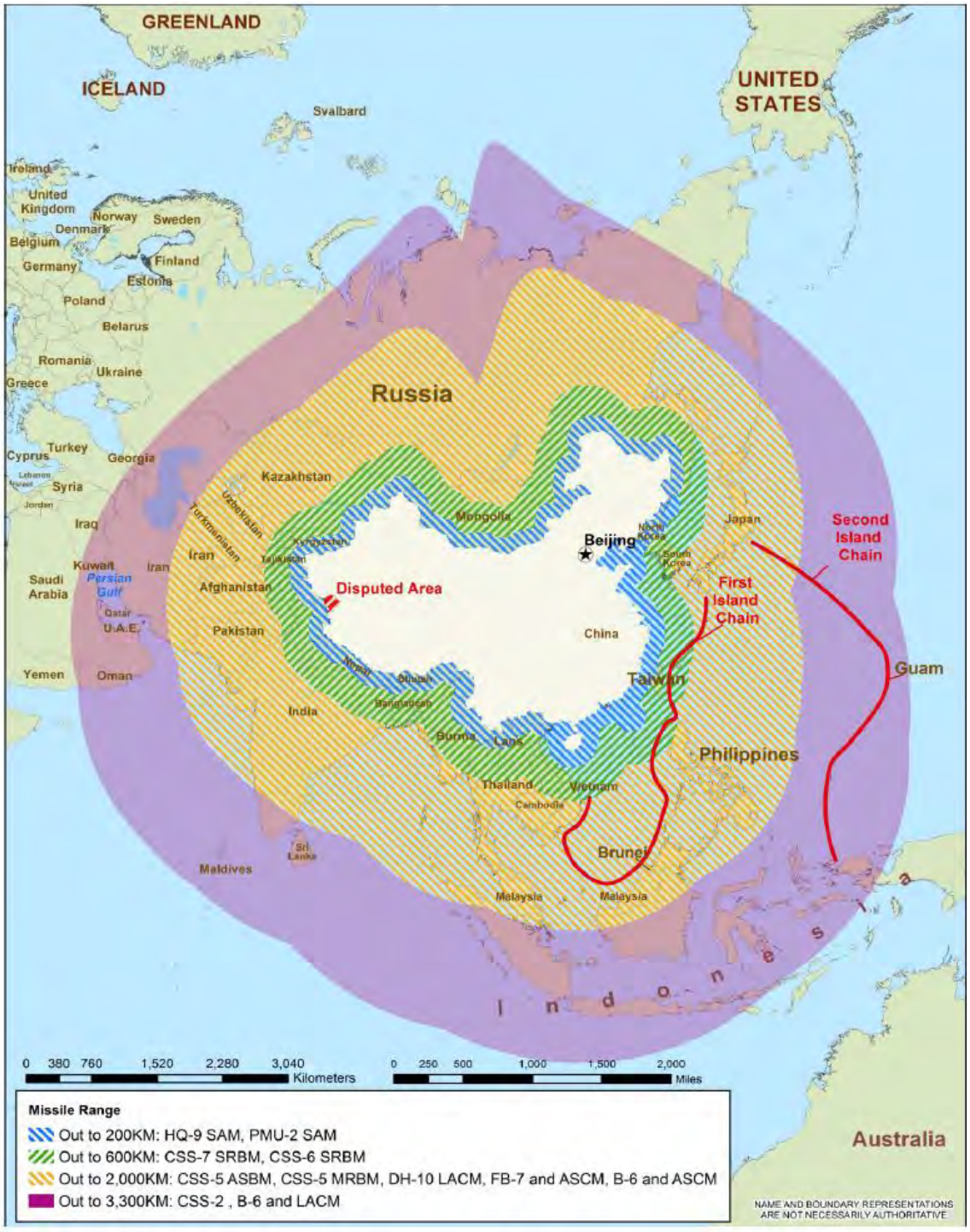


	1985	1990	1995	2000	2005	2010	2013
ICBM	5.17%	11.76%	19.54%	22.22%	56.79%	14.93%	14.34%
IRBM	51.72%	88.24%	68.97%	16.67%	2.47%	0.45%	0.40%
MRBM	43.10%	0.00%	11.49%	27.78%	40.74%	26.24%	24.30%
SRBM	0.00%	0.00%	0.00%	33.33%	0.00%	46.15%	50.20%
LACM	0.00%	0.00%	0.00%	0.00%	0.00%	12.22%	10.76%

Note: Due to rounding, numbers may not add up to 100.

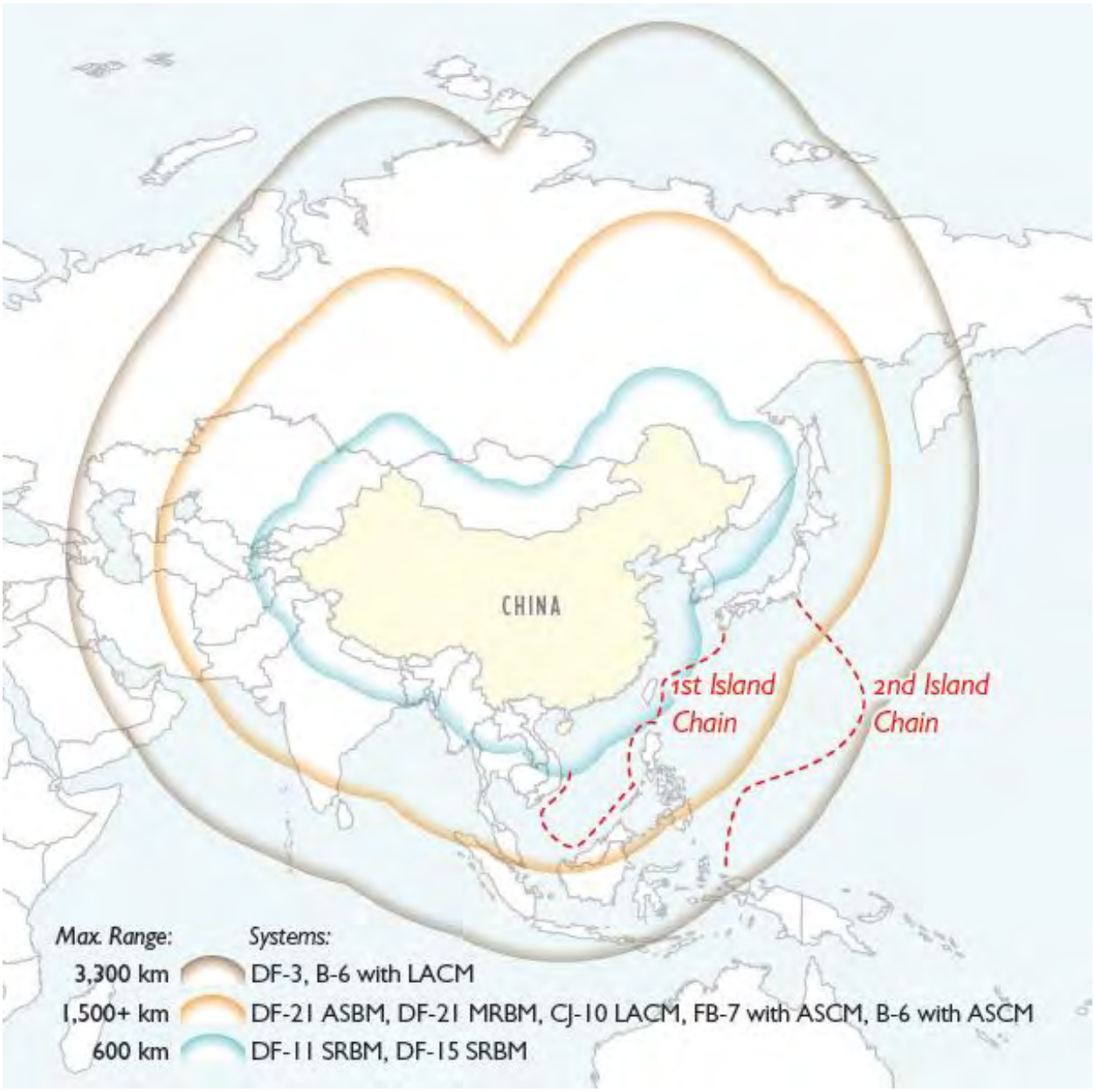
Source: IISS, *Military Balance,* 1985-2013.

Figure 10.5: The Expanding Range of China's Theater Missile Forces – Part One



Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 81.

Figure 10.5: The Expanding Range of China's Theater Missile Forces – Part Two



Note: the PLA's conventional forces are currently capable of striking targets well beyond China's immediate periphery (counter-intervention capability). Not included are ranges for naval surface- and sub-surface-based weapons, whose employment distances from China would be determined by doctrine and the scenario in which they are employed.

Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2012, p. 42.

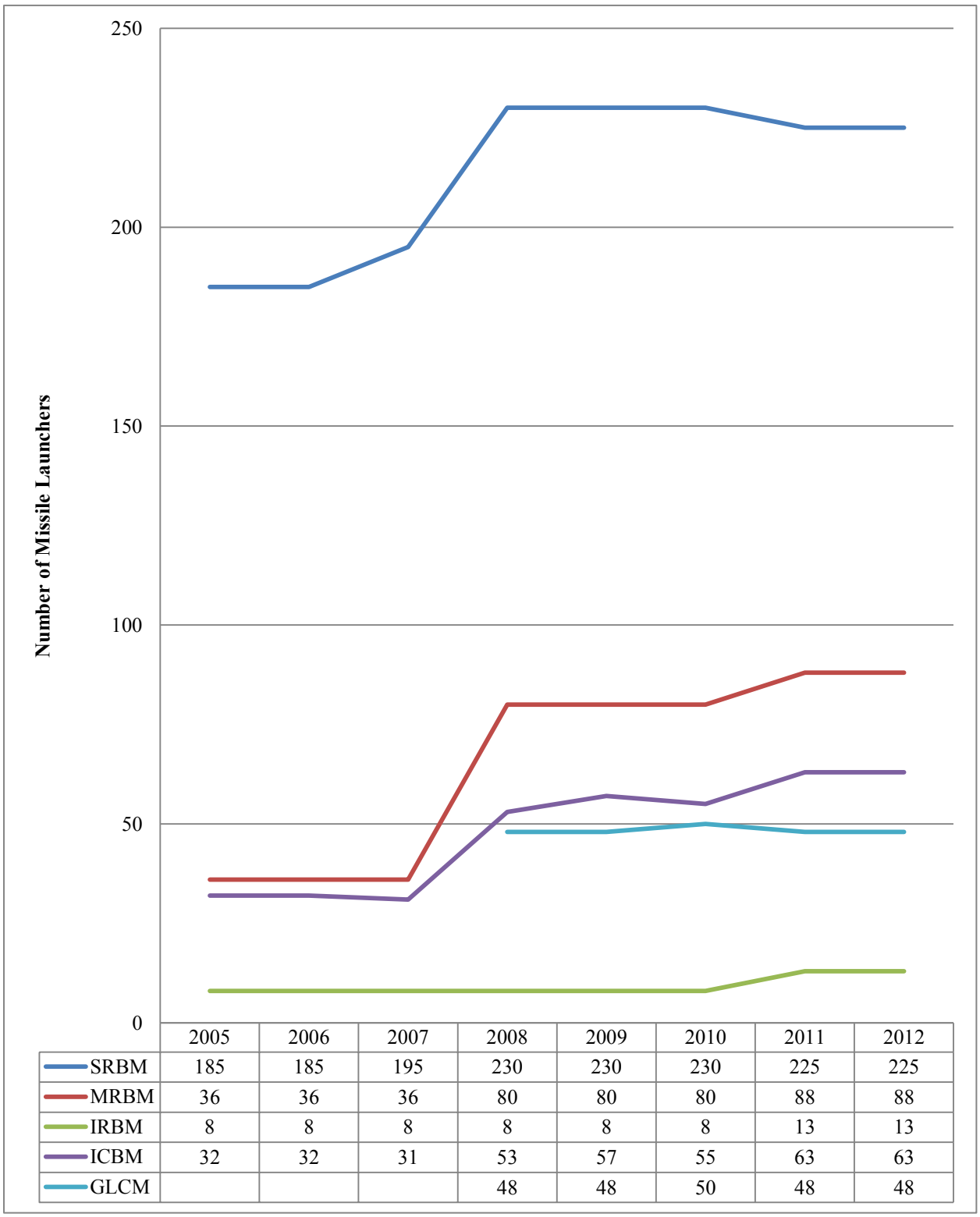
Figures 10.2 to 10.4 relied on missile launcher statistics provided by the IISS. However, the arsenal of actual missiles, not just missile launchers, also has important implications for the SAF's force structure. The number of missiles per missile launcher indicates military planning, operational concepts, and SAF progress towards its stated goals. Using DoD-reported data through 2012 – the 2013 report did not include any updates – it is possible to analyze the SAF's missile holdings.

- **Figure 10.6** shows DoD-reported numbers for year-on-year growth in SAF missile launchers.
- **Figure 10.7** shows DoD-reported SAF missile strength from 2002 onwards, on a year-on-year basis.

Figures 10.6 and 10.7 have significant implications. They show that, unlike every other missile category, the SRBM and LACM launchers are assigned a relatively large number of missiles per launcher. Moreover, trend lines indicate growing gaps between missile and missile launcher numbers leading to larger and larger reserve stockpiles of SRBMs and LACMs. This may indicate that the SAF plans to fire repeated salvos of SRBMs and LACMs during hypothetical contingencies.

Unlike the SAF's inventory of medium- and longer-range missiles, potential adversaries could face multiple salvos per SRBM or GLCM launcher, possibly in a counter-air role as has been proposed by RAND.[347] Such a capability falls perfectly in line with the conventional requirements of Local Warfare under Conditions of Informatization and, when supplemented by an increasingly secure nuclear second-strike capacity, provide the PLA with critical capabilities necessary for fighting and winning Local Wars while deterring further escalation.

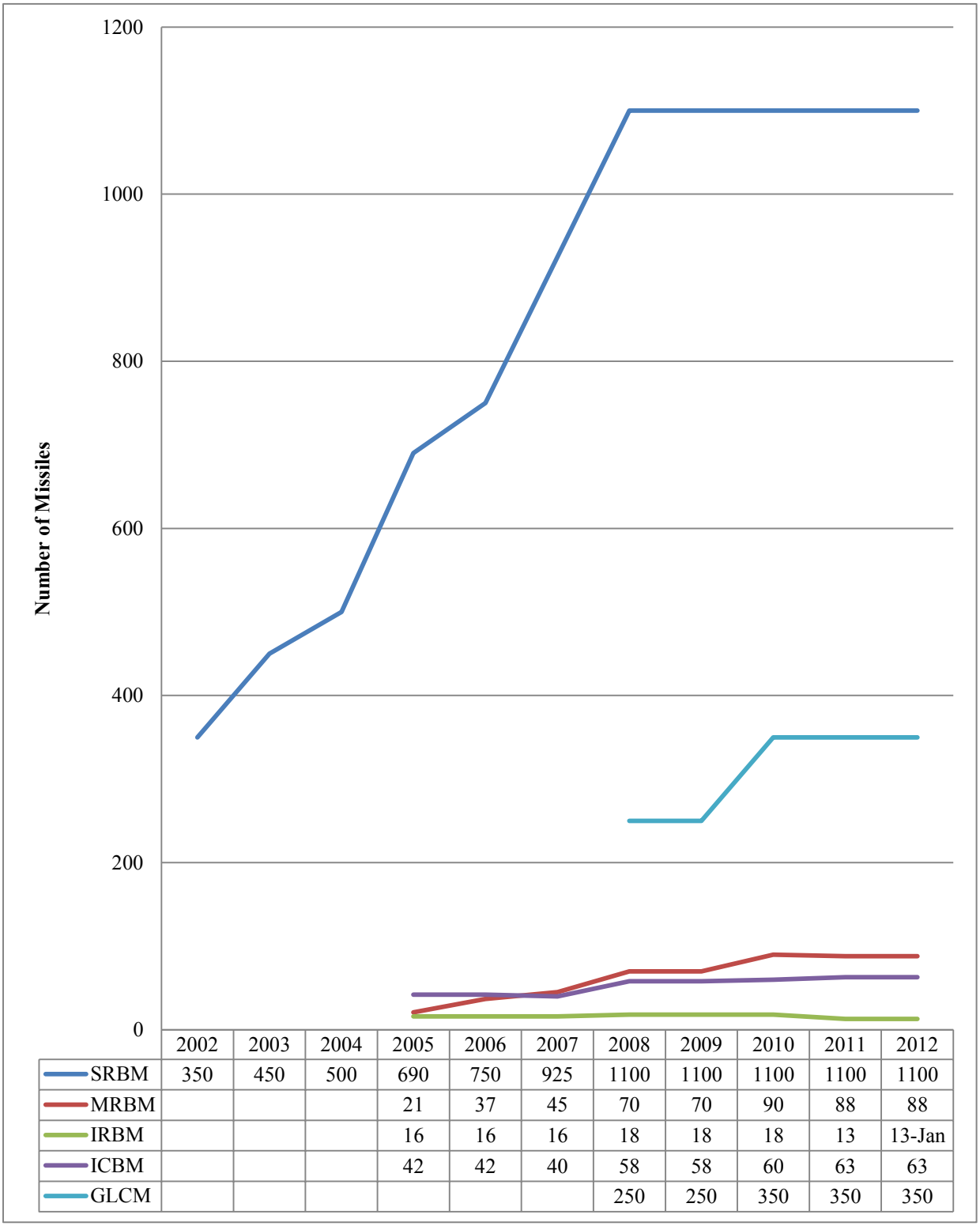
Figure 10.6: Year-on-Year Missile Launcher Strength, 2005-2012



	2005	2006	2007	2008	2009	2010	2011	2012
SRBM	185	185	195	230	230	230	225	225
MRBM	36	36	36	80	80	80	88	88
IRBM	8	8	8	8	8	8	13	13
ICBM	32	32	31	53	57	55	63	63
GLCM				48	48	50	48	48

Source: DOD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2012.

Figure 10.7: Year-on-Year Missile Inventory, 2005-2012



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SRBM	350	450	500	690	750	925	1100	1100	1100	1100	1100
MRBM				21	37	45	70	70	90	88	88
IRBM				16	16	16	18	18	18	13	13-Jan
ICBM				42	42	40	58	58	60	63	63
GLCM							250	250	350	350	350

Source: DOD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2012.

Shifts in Equipment Composition

As noted earlier, the trends in **Figure 10.2** reflected several important trends in the modernization of the SAF. Since 1985, in line with the PLA concept of winning Local Wars under Conditions of Informatization, the SAF has reduced its relative holdings of non-mobile, liquid-fueled missiles with nuclear warheads and shifted to a force structure heavily comprised of mobile, solid-fueled conventional missile systems.

SRBMs

It is important to note that China is scarcely the only power deploying SRBMs. A US National Air and Space Intelligence Center estimate of regional balance in short-range ballistic missile forces is shown in **Figure 10.8**. It shows that many other powers have such systems, and these figures do not include US capability to launch cruise missiles and South Korea's decision to acquire SRBMs. The NASIC summarizes key regional trends as follows:[348]

> Several countries are now producing and/or developing SRBM systems, while many other countries have purchased missiles or missile technologies from one or more of the missile producers.
>
> The Russian SS-1c Mod 1, also called the SCUD B, has been exported to more countries than any other type of guided ballistic missile, and has proven to be a versatile and adaptable weapon.
>
> For example, … North Korea has produced its own version of the SCUD B and the SCUD C, which is an extended-range version of the SCUD B. Although the SCUD was originally designed as a tactical battlefield support weapon, many countries view it and other SRBM systems as strategic weapons to be used against urban areas.
>
> … Other countries could modify SCUD missiles to significantly improve their accuracy and use them against high-value military targets and cities.
>
> New SRBM systems are in development in several countries. China has deployed a very large force of modern solid-propellant SRBMs in the vicinity of Taiwan, and according to Taiwanese government officials, China has recently started to deploy a new SRBM known as the Dong Feng 16 (DF-16/CSS-11 Mod 1).

Since 1985, the SAF has steadily increased the number of Short-Range Ballistic Missiles (SRBMs) in its arsenal. All are mobile and solid-fueled, enabling the SAF to conduct rapid strikes against regional threats while limiting the risk of preemption. Moreover, in line with the Local Wars concept, the SAF has increased the range of its SRBMs to improve their regional utility, created numerous variants for different purposes, and improved their accuracy.

On this last point, the 2011 DoD report stated, "the PLA continues to field advanced variants with improved ranges and more sophisticated payloads that are gradually replacing earlier generations that do not possess true precision strike capability."[349] The 2013 DoD on Chinese military power report noted that, "the PLA is also introducing new SRBM variants with improved ranges, accuracies, and payloads."[350]

Figures 10.8 and 10.9 showed the rise in SRBM strength as well as a plateau and later a slight decrease in SRBM missile launcher numbers. However, this drop in force numbers does not necessarily indicate a drop in SRBM combat power. As the 2011 DoD Report stated:[351]

> The Second Artillery had more than 1,100 SRBMs at the end of 2012, a modest increase over the past year. The Second Artillery continues to field advanced variants with improved ranges and more sophisticated payloads, while gradually replacing earlier generations that do not possess true precision strike capability.

The DoD has since confirmed what has been reported throughout the decade in open-source literature: the SAF is creating new variants of both its DF-11 and DF-15 SRBMs that have improved range and, most importantly, significantly improved circular error probability (CEP). Consequently, a reduction in overall force numbers, if the result of a reduction in older SRBMs that are concurrently being replaced with fewer – but newer – models, will most likely result in an overall increase in SAF SRBM combat power.

A RAND report released in 2009 illustrates this point effectively. Comparing open-source information on various SAF SRBM classes and their variants, the report estimated the number of SRBMs needed to completely, albeit temporarily, neutralize the Republic of China (ROC or Taiwanese) Air Force. The report drew two conclusions: first, older, less accurate SRBMs had very little conventional utility in precision-strike operations. Second, newer SRBMs with significantly improved CEPs are capable of achieving ambitious operational objectives with a much smaller quantity of SRBMs than earlier variants of the same class. **Figure 10.10** illustrates these developments.

- **Figure 10.10** uses open-source data collected by RAND estimating the parameters of the SAF's SRBM capability to compute the number of SRBMs necessary to achieve a given probability of neutralizing a single runway.

As these Figures show, the replacement of newer SRBMs with precision strike capabilities has a significant impact on the combat utility of each individual SRBM. For example, the replacement of a DF-15 with a DF-15A, according to the RAND data, would augment the SAF's combat power by 500% – in other words, it would take 5 DF-15s to achieve the same kill probability as a single DF-15A. Consequently, replacing older SRBMs with newer ones, even if not on a one-to-one basis, will significantly augment the SAF's SRBM-based combat power. Thus, while the growth in SRBM numbers indicates growth in the SAF's SRBM capacity, the converse is not automatically true – a reduction in SRBM numbers may simply reflect the impact of missile modernization and represent an increase in overall capability.

Figure 10.8: NAISC Estimate of the Regional Balance of Short-range Ballistic Missiles (SRBMs)

MISSILE	PROPELLANT	DEPLOYMENT MODE	MAXIMUM RANGE (km)	Number of Launchers (By Country)*
RUSSIA				Fewer than 200
SCUD B (SS-1c Mod 1)	Liquid	Road-mobile	300	
SS-1c Mod 2	Liquid	Road-mobile	240+	
SS-21 Mod 2	Solid	Road-mobile	70	
SS-21 Mod 3	Solid	Road-mobile	120	
SS-26	Solid	Road-mobile	300	
Iskander-E	Solid	Road-mobile	280	
CHINA				More than 200
CSS-11 Mod 1	Solid	Road-mobile	800+	
CSS-6 Mod 1	Solid	Road-mobile	600	
CSS-6 Mod 2	Solid	Road-mobile	850+	
CSS-6 Mod 3	Solid	Road-mobile	725+	
CSS-7 Mod 1	Solid	Road-mobile	300	
CSS-7 Mod 2	Solid	Road-mobile	600	
CSS-8	Solid/Liquid	Road-mobile	150	
CSS-9 Mod 1	Solid	Road-mobile	150	
CSS-9 Mod-X-2	Solid	Road-mobile	260	
CSS-14 Mod-X-1	Solid	Road-mobile	150	
CSS-14 Mod-X-2	Solid	Road-mobile	280	
CSS-X-16	Solid	Road-mobile	200	
CSS-X-15	Solid	Road-mobile	280	
NORTH KOREA				Fewer than100
SCUD B	Liquid	Road-mobile	300	
SCUD C	Liquid	Road-mobile	500	
Toksa	Solid	Road-mobile	120	
ER SCUD	Liquid	Road-mobile	700-995	
INDIA				Fewer than 75
Prithvi I	Liquid	Road-mobile	150	
Prithvi II	Liquid	Road-mobile	250	
Dhanush	Liquid	Ship-based	400	
Agni I	Solid	Road-mobile	700	
PAKISTAN				Fewer than 50
Hatf-9	Solid	Road-mobile	60	
Hatf-1	Solid	Road-mobile	50	
Shaheen I	Solid	Road-mobile	750	
Ghaznavi	Solid	Road-mobile	250	
IRAN				Fewer than100
Fateh-110	Solid	Road-mobile	200-300	
Shahab 1	Liquid	Road-mobile	300	
Shahab 2	Liquid	Road-mobile	500	
CSS-8 (M-7)	Solid/Liquid	Road-mobile	150	
Qiam -1	Liquid	Road-mobile	unknown	
SYRIA				Fewer than100
SCUD D	Liquid	Road-mobile	700	

Note: All ranges are approximate.
* The missile inventory may be larger than the number of launchers; launchers can be reused to fire additional missiles

Source: US National Air and Space Intelligence Center, Defense Intelligence Agency Missile and Space Intelligence Center and Office of Naval Intelligence, *Ballistic & Cruise Missile Threat*, NASIC, May 2013, p. 11-13.

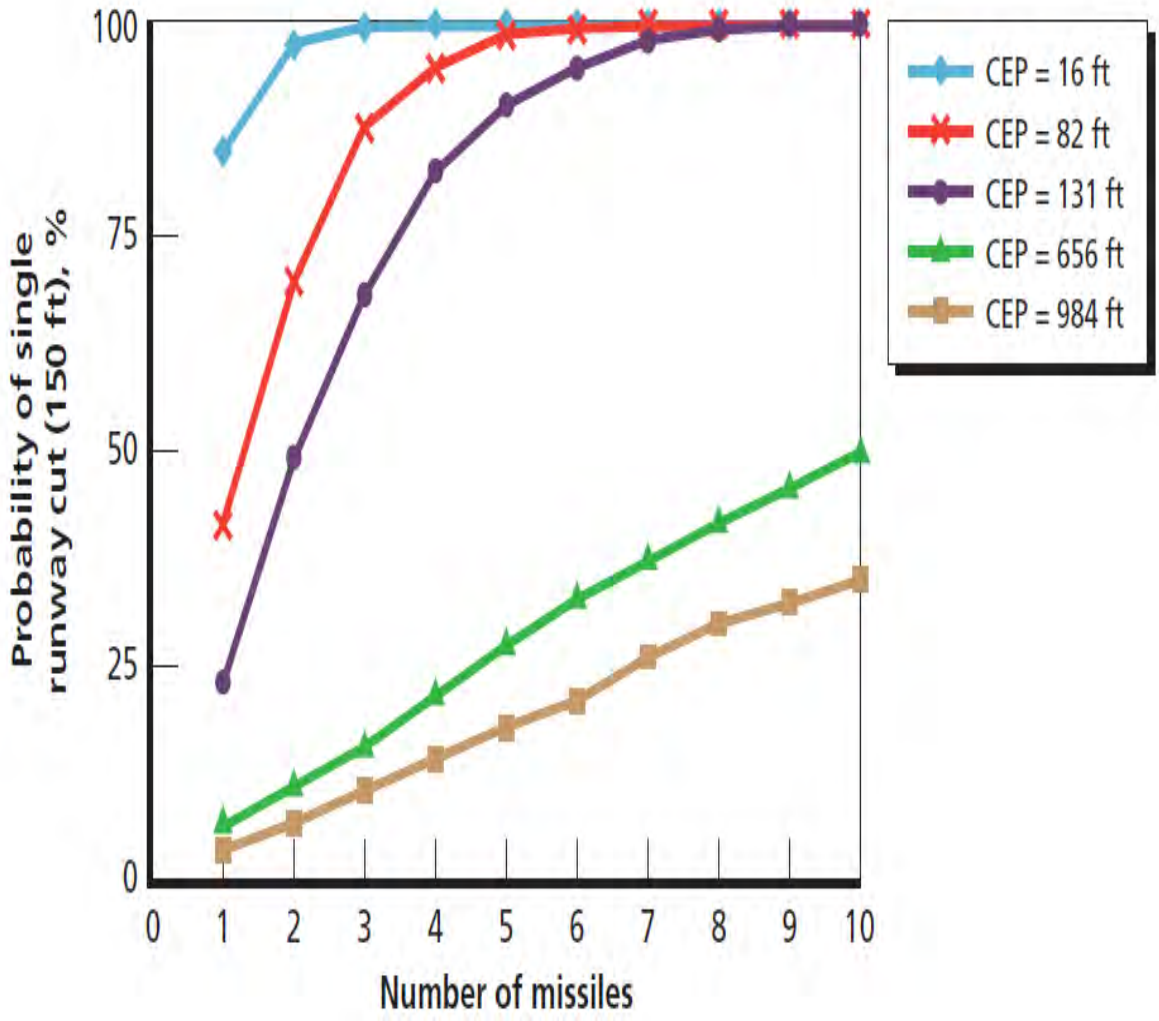
Figure 10.9: RAND Data on PRC SRBMs and the "Notional SRBM" Model (2009)

Characteristics of CSS-7, CSS-6, and Notional SRBM

	CSS-7		CSS-6			Notional
Characteristic	DF-11	DF-11A	DF-15	DF-15A	DF-15B	SRBM
Range (km)	280–350	350–530	600	600	600	>280
Warhead (kg)	800	500	500	600	600	500
CEP (m)	600	20–30; 600 for oldest version	300	30–45	5	5, 25, 40, 200, 300
Number of missiles	675–715		315–355			900
Number of launchers	120–140		90–110			200

Source: David A. Shlapak et al, *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*, RAND, 2009, p. 34. http://www.rand.org/pubs/monographs/MG888.html.

Figure 10.10: SRBMs Needed to Obtain Given Probabilities of Neutralizing a Single Runway



Source: Shlapak et al, *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*, RAND, 2009, p. 41. http://www.rand.org/pubs/monographs/MG888.html.

Cruise Missiles

Cruise missiles often do not receive the same attention as ballistic missiles but they serve as both a method of delivering nuclear weapons and can provide precision strikes with conventional weapons. As such, they are as important – if not more important in terms of probable use and the ability to conduct lethal attacks – than most SRBMs and MRBMs without high-yield nuclear weapons.

The US National Air and Space Intelligence Center estimate of the regional balance in short-range ballistic missile forces is shown in **Figure 10.11**. *It should be stressed that this assessment does not include sea-launched or air-launched cruise missiles, which sharply understate the capabilities of US forces and the potential threat perceived by China.*

The NASIC summarizes key regional trends as follows:[352]

> Unlike ballistic missiles, cruise missiles are usually categorized by intended mission and launch mode (instead of maximum range). The two broadest categories are LACMs and antiship cruise missiles. Each type can be launched from an aircraft, ship, submarine, or ground-based launcher.
>
> A LACM is an unmanned, armed aerial vehicle designed to attack a fixed or mobile ground-based target. It spends the majority of its mission in level flight, as it follows a preprogrammed path to a predetermined target. Propulsion is usually provided by a small jet engine.
>
> Because of highly accurate guidance systems that can place the missile within a few feet of the intended target, the most advanced LACMs can be used effectively against very small targets, even when armed with conventional warheads. LACM guidance usually occurs in three phases: launch, midcourse, and terminal.
>
> During the launch phase, a missile is guided using only the inertial navigation system. In the midcourse phase, a missile is guided by the inertial navigation system updated by one or more of the following systems: a radar-based terrain contour matching system, a radar or optical scene matching system, and/or a satellite navigation system such as the US Global Positioning System or the Russian Global Navigation Satellite System. The terminal guidance phase begins when a missile enters the target area and uses either more accurate scene matching or a terminal seeker (usually an optical or radar-based sensor).
>
> Defending against LACMs will stress air defense systems. Cruise missiles can fly at low altitudes to stay below enemy radar and, in some cases, hide behind terrain features. Newer missiles are incorporating stealth features to make them even less visible to radars and infrared detectors. Modern cruise missiles also can be programmed to approach and attack a target in the most efficient manner. For example, multiple missiles can attack a target simultaneously from different directions, overwhelming air defenses at their weakest points. Furthermore, LACMs may fly circuitous routes to get to the target, thereby avoiding radar and air defense installations.
>
> Some developmental systems may incorporate chaff or decoys as an added layer of protection, though concealment will remain a cruise missile's main defense. The cruise missile threat to US forces will increase over the next decade. At least nine foreign countries will be involved in LACM production during the next decade, and several LACM producers will make their missiles available for export.
>
> The success of US Tomahawk cruise missiles has heightened interest in cruise missile acquisition in many countries. Many cruise missiles available for purchase will have the potential to perform precision-strike missions. Many of these missiles will have similar features: a modular design, allowing them to be manufactured with a choice of navigational suites and conventional warhead options; the incorporation of stealth technology; the ability to be launched from fighter-size aircraft; and the capability to fly high-subsonic, low-altitude, terrain-following flight profiles.
>
> The cruise missile threat to US forces will continue to increase. At least nine foreign countries will be involved in LACM production during the next decade, and several of the LACM producers will make their missiles available for export.

> The CJ-10 (DH-10) is the first of the Chinese Changjian series of long-range missiles and LACMs. It made its public debut during a military parade in 2009 and is currently deployed with the Second Artillery Corps.
>
> Iran recently announced the development of the 2,000-km range Meshkat cruise missile, with plans to deploy the system on air-, land-, and sea-based platforms.
>
> The Club-K cruise missile "container launcher" weapons system, produced and marketed by a Russian firm, looks like a standard shipping container. The company claims the system can launch cruise missiles from cargo ships, trains, or commercial trucks.
>
> The first flight test of the Brahmos, jointly developed by India and Russia, took place in June 2001. India plans to install Brahmos on a number of platforms, including destroyers, frigates, submarines, maritime patrol aircraft, and fighters. Russia and India are also working on a followup missile, the Brahmos 2, which was flight-tested in 2012. Pakistan continues to develop the Babur (Hatf-VII) and the air-launched Ra'ad (Hatf-VIII). Each missile was flight tested in 2012.

The Japanese 2013 defense white paper made only a short statement regarding Chinese SRBMs:[353]

> Concerning SRBMs, China possesses a large number of solid-propellant DF-15 and DF-11, and they are believed to be deployed against Taiwan…covering also a part of the Southwestern Islands including the Senkaku Islands, which are inherent territories of Japan.

While Chinese and other cruise missiles achieve considerable attention in non–governmental reporting, their importance is badly understated in the official reporting – which is the focus of this report. There also is no matching literature on the balance in air- and sea-launched cruise missiles. Cruise missiles need far more attention in official reports, dialogue, and arms control negotiations, and cannot meaningfully be separated from the balance of ballistic missiles.

Figure 10.11: NASIC Estimate of the Regional Balance of Land Attack Cruise Missiles

MISSILE	LAUNCH MODE	WARHEAD TYPE	RANGE (km)	IOC
CHINA				
YJ-63	Air	Conventional	Undetermined	Undetermined
DH-10	Undetermined	Conventional or nuclear	Undetermined	Undetermined
FRANCE				
APACHE-AP	Air	Submunitions	100+	2002
SCALP-EG	Air and ship	Penetrator	250+	2003
Naval SCALP	Sub and surface ship	Penetrator	250+	2013+
UAE				
BLACK SHAHEEN*	Air	Penetrator	250+	2006
GERMANY, SWEDEN, SPAIN				
KEPD-350	Air	Penetrator	350+	2004
INDIA, RUSSIA				
Brahmos 1	Air, ground, ship, and sub	Conventional	less than 300	2010+
Brahmos 2	Air, ground, ship, and sub	Conventional	less than 300	2013+
ISRAEL				
Popeye Turbo	Air	Conventional	300+	2002
PAKISTAN				
RA'AD	Air	Conventional or nuclear	350	Undetermined
Babur	Ground	Conventional or nuclear	350	Undetermined
RUSSIA				
AS-4	Air	Conventional or nuclear	300+	Operational
AS-15	Air	Nuclear	2,800+	Operational
SS-N-21		Nuclear	12,800+	Operational
Kh-555	Air	Conventional	Undetermined	Undetermined
Kh-101	Air	Conventional	Undetermined	2013
3M-14E	Ground, ship, and sub	Conventional	275	Undetermined
SOUTH AFRICA				
MUPSOW	Air and ground	Conventional	150	2002
Torgos	Air and ground	Conventional	300	Undetermined
TAIWAN				
Wan Chien	Air	Conventional	250+	2006
HF-2E	Ground	Conventional	Undetermined	Undetermined
UNITED KINGDOM				
Storm Shadow	Air	Penetrator	250+	2003
IRAN				
Meshkat	Air, ground, and ship	Conventional	Undetermined	Undetermined

Note: All ranges are approximate and represent the range of the missile only. The effective system range may be greatly increased by the range of the launch platform.

*The BLACK SHAHEEN is an export version of the SCALP-EG.

Source: US National Air and Space Intelligence Center, Defense Intelligence Agency Missile and Space Intelligence Center and Office of Naval Intelligence, *Ballistic & Cruise Missile Threat*, NASIC, May 2013, p. 11-13.

MRBMs

A US National Air and Space Intelligence Center estimate of the regional balance in MRBMs and IRBMs is shown in **Figure 10.12**. It again illustrates a broad set of trends in the regional balance that both affects and is affected by China, and once again, these figures do not include US capability to launch cruise missiles. The NASIC summarizes key regional trends as follows:[354]

> New MRBM and/or IRBM systems are in development in China, North Korea, Iran, India, and Pakistan. These are strategic systems, and many will be armed with nonconventional warheads. All of these countries… have tested nuclear weapons. Neither Russia nor the United States produce or retain any MRBM or IRBM systems because they are banned by the Intermediate-Range Nuclear Forces Treaty, which entered into force in 1988.
>
> China continues to maintain regional nuclear deterrence, and its long-term, comprehensive military modernization is improving the capability of its ballistic missile force to conduct high-intensity, regional military operations, including "anti-access and area denial" (A2/AD) operations.
>
> The term A2/AD refers to capabilities designed to deter or counter adversary forces from deploying to or operating within a defined space. Currently, China deploys the nuclear armed CSS-2, CSS-5 Mod 1, and CSS-5 Mod 2 for regional nuclear deterrence. China is also acquiring new conventionally armed CSS-5 MRBMs to conduct precision strikes. These systems are likely intended to hold at-risk or strike logistics nodes, regional military bases including airfields and ports, and naval assets.
>
> Notably, China has likely started to deploy the DF-21D, an ASBM based on a variant of the CSS-5. North Korea has an ambitious ballistic missile development program and has exported missiles and missile technology to other countries, including Iran and Pakistan. North Korea has also admitted its possession of nuclear weapons. It has displayed new IRBMs and older No Dong MRBMs in recent military parades.
>
> … India continues to develop and improve its ballistic missiles. All of India's long-range missiles use solid propellants. Indian officials have stated that the Agni II MRBM is deployed. The Agni III IRBM has been flight tested four times since 2006, and has been pronounced ready for deployment. The Agni IV IRBM has been flight tested twice since 2010, with the 2011 launch successful.
>
> Pakistan continues to improve the readiness and capabilities of its Army Strategic Force Command and individual strategic missile groups through training exercises that include live missile firings. Pakistan has tested its solid-propellant Shaheen 2 MRBM six times since 2004, and this missile system probably will soon be deployed.

The 2013 Japanese defense white paper summarizes these developments as follows:[355]

> As for the IRBM/MRBM covering the Asia-Pacific region including Japan, China has deployed the solid-propellant DF-21, which can be transported and operated on a TEL, in addition to the liquid-propellant DF-3 missiles. These missiles are capable of carrying nuclear warheads. It is believed that China possesses conventional ballistic missiles with high targeting accuracy based on the DF-21, and it has been pointed out that China has deployed conventional anti-ship ballistic missiles (ASBM), which could be used to attack ships at sea including aircraft carriers…
>
> In addition to IRBM/MRBM, China also possesses the DH-10 (CJ-10), a cruise missile with a range of 1,500 km or longer, as well as the H-6 (Tu-16), medium-range bombers that are capable of carrying nuclear warheads and cruise missiles. These missiles might complement ballistic missile forces, covering the Asia-Pacific region including Japan.
>
> …China announced that it had conducted tests on midcourse missile interception technology in January 2010 and 2013. Attention will be paid to China's future trends in ballistic missile defense.

Chinese development of mobile, solid-fueled Medium-Range Ballistic Missiles (MRBMs) provides a further indication of a larger institutional shift towards missile forces, as "the PLA is acquiring and fielding conventional 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."[356] The 2013 DoD report reiterated this point, assessing, "China is fielding a limited but growing number of conventionally armed, medium-range ballistic missiles."[357] This trend is evident in the development of the more precise DF-21C and DF-21D missile systems.

The SAF's nuclear forces underwent a similar modernization experience. The need to deter nuclear attacks on the mainland and, according to the *Science of Second Artillery Campaigns*, to reduce the scope of conventional warfare,[358] forced the SAF to increase the survivability of its nuclear counter-attack forces. In turn, this requirement necessitated mobility, rapid deployment, and quick firing of the missile system.

The SAF replaced the aging, liquid-fueled DF-2 MRBM with the solid-fueled mobile DF-21A/B MRBM. Between 1985 and 2000, the SAF not only entirely retired the DF-2 but also completely replaced it with nuclear-tipped DF-21s, missile for missile. Such a change in MRBM holdings illustrates several important elements of the SAF nuclear modernization: a shift from liquid to solid fuel, a shift from transportable to mobile systems, and a shift to more accurate missiles.

These trends are fully detailed in **Figure 10.13**, which provides a visual representation of the data and trends described above. Important elements to notice are: the rapid expansion in SRBM numbers, the brief dip in MRBM numbers (the DF-2 to DF-21 series transition), the drawdown of IRBMs (China has yet to develop a mobile solid-fueled IRBM), the growth in ICBMs as the SAF seeks an invulnerable second-strike capability, and the sudden appearance of cruise missile units.

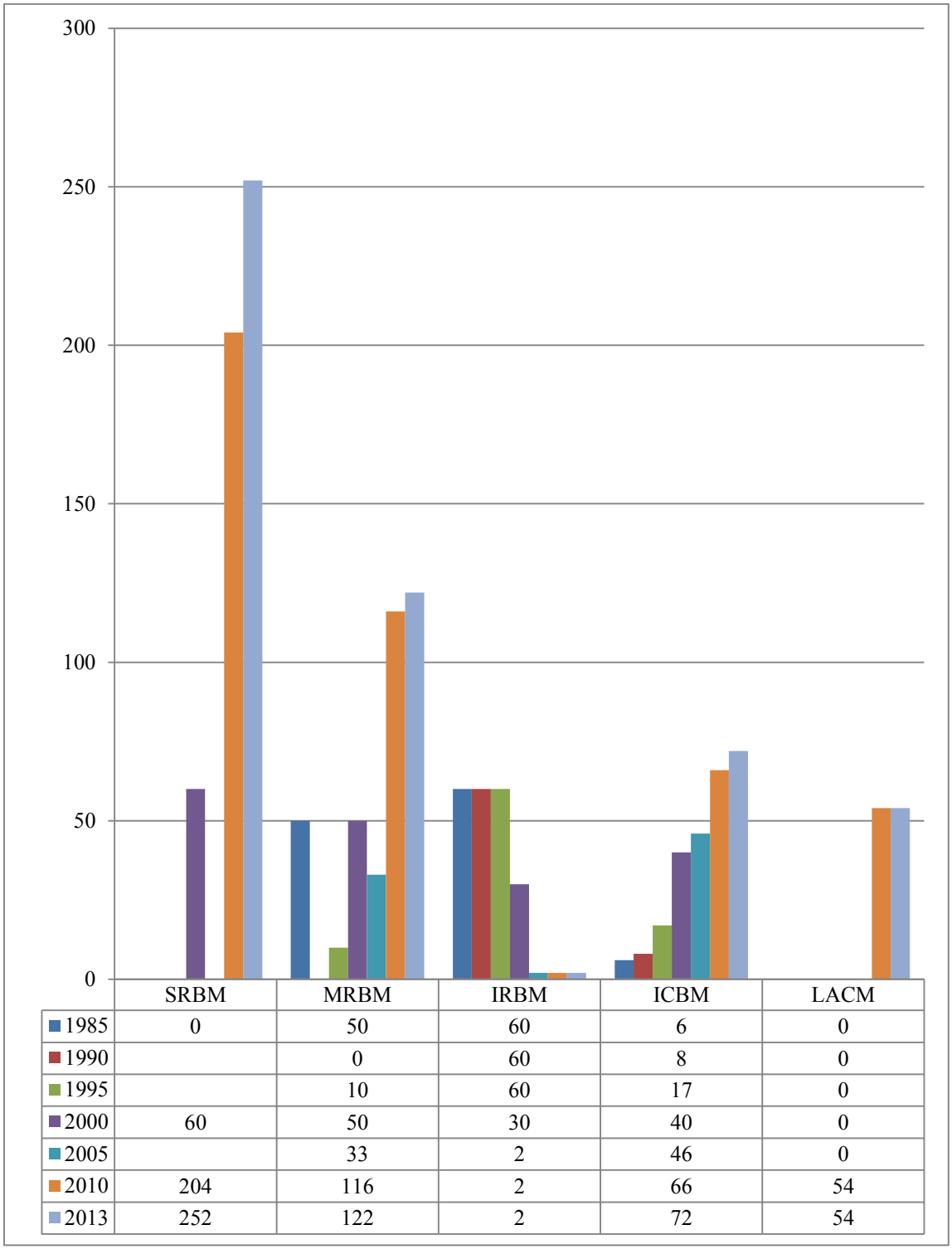
Figure 10.12: NASIC Estimate of the Regional Balance of MRBMs and IRBMs

MISSILE	NUMBER OF STAGES	PROPELLANT	DEPLOYMENT MODE	MAXIMUM RANGE (km)	NUMBER OF LAUNCHERS*
China					
CSS-2	1	Liquid	Transportable	3,000	5 to 10 (Limited Mobility)
CSS-5 Mod 1	2	Solid	Road-mobile	1,750+	Fewer than 50
CSS-5 Mod 2	2	Solid	Road-mobile	1,750+	Fewer than 50
CSS-5 Conventional	2	Solid	Mobile	1,750+	Fewer than 30
CSS-5 ASBM	2	Solid	Mobile	1,500+	Unknown
Saudi Arabia (Chinese-produced)					
CSS-2 (conventional)	1	Liquid	Transportable	3,000	Fewer than 50 (Limited Mobility)
North Korea					
No Dong	1	Liquid	Road-mobile	1,250	Fewer than 50
IRBM	1	Liquid	Road-mobile	3,000+	Fewer than 50
India					
Agni II	2	Solid	Rail-mobile	2,000+	Fewer than 10
Agni III	2	Solid	Rail-mobile	3,200+	Not yet deployed
Agni IV	2	Solid	Rail-mobile	3,500+	Not yet deployed
Pakistan					
Ghauri	1	Liquid	Road-mobile	1,250	Fewer than 50
Shaheen 2	2	Solid	Road-mobile	2,000	Unknown
Iran					
Shahab 3	1	Liquid	Silo & road-mobile	2,000	Fewer than 50
Sejjil	2	Solid	Road-mobile	2,000	Unknown
IRBM/ICBM	Undetermined	Undetermined	Undetermined	Undetermined	Undetermined

Note: All ranges are approximate.
* The missile inventory may be larger than the number of launchers; launchers can be reused to fire additonal missiles

Source: US National Air and Space Intelligence Center, Defense Intelligence Agency Missile and Space Intelligence Center and Office of Naval Intelligence, *Ballistic & Cruise Missile Threat*, NASIC, May 2013, p. 16.

Figure 10.13: Development of Ballistic and Cruise Missile Launchers, 1985-2013



	SRBM	MRBM	IRBM	ICBM	LACM
1985	0	50	60	6	0
1990		0	60	8	0
1995		10	60	17	0
2000	60	50	30	40	0
2005		33	2	46	0
2010	204	116	2	66	54
2013	252	122	2	72	54

Source: IISS, *Military Balance,* 1985-2013.

ICBMs and SLBMs

A US National Air and Space Intelligence Center estimate of regional balance of ICBMs and SLBMs is shown in **Figure 10.14**. This Figure again illustrates a broad set of trends in the regional balance – a balance that that both affects and is affected by China. The NASIC summarizes key regional trends as follows:[359]

ICBMs

Russia retains about 1,200 nuclear warheads on ICBMs. Most of these missiles are maintained on alert, capable of being launched within minutes of receiving a launch order. Although the size of the Russian ICBM force will continue to decrease because of arms control agreements, aging missiles, and resource constraints, Russia probably will retain the largest ICBM force outside the United States. Efforts to maintain and modernize the force are underway. Russia successfully tested a new type of mobile ICBM in 2012 according to Russian press reports. The Russian SS-27 Mod 1 ICBM, a missile designed with countermeasures to ballistic missile defense systems, is now deployed in silos in six regiments. Russia began deployment of the road-mobile version of the SS- 27 Mod 1 in 2006. A MIRV version of the SS-27, the SS-27 Mod-2 (RS-24), was deployed in 2010.

In addition, Russian officials claim a new class of hypersonic vehicle is being developed to allow Russian strategic missiles to penetrate missile defense systems, and the Russian press has indicated deployment of a new rail-mobile ICBM is being considered. Furthermore, Russia has stated that a new heavy liquid-propellant ICBM is under development to replace the aging SS-18. Russia's goal is to begin its deployment in the 2018-2020 timeframe.

In 2011, the New Strategic Arms Reduction Treaty, which limits the United States and Russia to no more than 1,550 warheads each (including those on ICBMs, SLBMs, and heavy bombers), entered into force.

China is strengthening its strategic nuclear deterrent force with the development and deployment of new ICBMs. China retains a relatively small number of nuclear armed, liquid-propellant CSS-3 limited range ICBMs and CSS-4 ICBMs capable of reaching the United States. It is also modernizing solid-propellant CSS-10 Mod 1 and the longer range CSS-10 Mod 2 ICBMs have been deployed to units within the Second Artillery Corps. The CSS-10 Mod 1 is capable of reaching targets throughout Europe, Asia, and parts of Canada and the northwestern United States. The longer range CSS-10 Mod 2 will allow targeting of most of the continental United States. China may also be developing a new road-mobile ICBM capable of carrying a MIRV payload, and the number of warheads on Chinese ICBMs capable of threatening the United States is expected to grow to well over 100 in the next 15 years.

North Korea continues development of the TD-2 ICBM/SLV, which could reach the United States if developed as an ICBM. Launches in July 2006, April 2009, and April 2012 ended in failure, but a December 2012 launch successfully placed a satellite in orbit. In an April 2012 military parade, North Korea unveiled the new Hwasong-13 road-mobile ICBM. This missile has not yet been flight tested. Either of these systems could be exported to other countries in the future. Continued efforts to develop the TD-2 and the newly unveiled ICBM show the determination of North Korea to achieve long-range ballistic missile and space launch capabilities.

Since 2008, Iran has conducted multiple successful launches of the two-stage Safir SLV. In early 2010, Iran unveiled the larger Simorgh SLV. Iran will likely continue to pursue longer range ballistic missiles and more capable SLVs, which could lead to the development of an ICBM system. Iran could develop and test an ICBM capable of reaching the United States by 2015.

India conducted the first flight test of the Agni V ICBM in April 2012. An even longer range Agni VIIs reportedly in the design phase.

SLBMs

Russia maintains a substantial force of nuclear powered ballistic missile submarines (SSBNs) with intercontinental-range missiles. Russia is developing new and improved SLBM weapon systems to replace its current inventory of Cold War vintage systems. Upgraded SS-N-23s are intended to replace older SS-N-23s on DELTA IV Class SSBNs. The SS-NX-32/Bulava is a new solid-propellant SLBM that is primarily

> intended for deployment on new DOLGORUKIY class SSBNs. Russian SLBMs are capable of launch from surfaced and submerged SSBNs from a variety of launch locations.
>
> China currently has a single XIA Class SSBN that is intended to carry 12 CSS-NX-3/JL-1 missiles. In addition, China will deploy the new CSS-NX-14/JL-2 SLBM on new 12-tube JIN Class SSBNs. This missile will, for the first time, allow Chinese SSBNs to target portions of the United States from operating areas located near the Chinese coast.
>
> India is developing a new ballistic missile-capable submarine, the INS Arihant. The K-15 is reportedly ready for induction when the Arihant is deemed ready.

Japan provides a somewhat similar summary in its 2013 defense white paper:[360]

> China has made independent efforts to develop nuclear capabilities and ballistic missile forces since the middle of the 1950s, seemingly with a view to ensuring deterrence, supplementing its conventional forces, and maintaining its voice in the international community. With regard to the nuclear strategy, it is recognized that China employs a strategy where it can deter a nuclear attack on its land by maintaining nuclear force structure able to conduct retaliatory nuclear attacks on a small number of targets such as cities in the enemy country….
>
> China possesses various types and ranges of ballistic missiles: intercontinental ballistic missiles (ICBM), submarine-launched ballistic missiles (SLBM), intermediate-range ballistic missiles/medium-range ballistic missiles (IRBM/MRBM), and short-range ballistic missiles (SRBM).
>
> Update of China's ballistic missile forces from a liquid propellant system to a solid propellant system is improving their survivability and readiness. Moreover, it is also believed that China is working to increase performance by extending ranges, improving accuracy, introducing MIRV, and other means.
>
> China has deployed the DF-31, which is a mobile type ICBM with a solid propellant system mounted onto a Transporter Erector Launcher (TEL), and the DF-31A, a model of the DF-31 with extended range. It is pointed out that China has already deployed the DF-31A and will increase the number.
>
> Regarding SLBM, China currently appears to be developing the JL-2, a new SLBM whose range is believed to be approximately 8,000 km, and constructing Jin-class nuclear-powered ballistic missile submarines (SSBN) to carry the missiles. Once the JL-2 reaches a level of practical use, it is believed that China's strategic nuclear capabilities will improve by a great margin.

The numbers of Chinese ICBMs shown earlier in **Figure 10.6 and Figure 10.7** have shown a steady increase in the ICBM force, but one that understates the actual rise in Chinese capabilities because obsolete ICBMs have been retired as more modern versions were produced. During this time period, the SAF reduced its holdings of its relatively vulnerable, liquid-fueled, and non-mobile DF-4s while it deployed DF-31 and DF-31A ICBM systems.

As a result, it is necessary to combine the analysis of absolute ICBM numbers with an analysis of the relative modernization of the ICBM arsenal. Such a combined analysis is not necessary for the other missile classes because the ICBM category is the only one in which the deployment of modern systems occurred at the same time as obsolete missiles were discarded; the culling of obsolete MRBMs happened before modern versions were produced, no modern IRBMs have been developed, and the SAF never had obsolete SRBMs or LACMs.

Figure 10.15 shows that the introduction of the DF-31 and DF-31A significantly increased the percentage of the ICBM force that is modern, and **Figure 10.16** shows the expanding range of China's conventional weapons, ICBMs, and MRBMs. This figure shows that China can now reach any target in the world, including the US.

As a result, the growth in ICBM numbers during the 2005-2013 period understates the growth in the SAF's intercontinental deterrence capability and its increasing survivability. Paired with improved PLAAF AD and the development of the SAF's tunnel network, the modernization of

the SAF's ICBM arsenal has positive implications for the SAF's ICBM survivability, and thus for one of the SAF's two core missions.

Moreover, China's newer missiles could eventually be equipped with MIRV warheads. In December 2012, China successfully conducted a second test of its DF-31A missile, allowing it to reach any city in the US. The missile is believed to have three warheads per missile and a range of approximately 7,000 miles. While the Chinese CSS-4 has similar capabilities, the CSS-4 requires a stationary launch pad and contains only one nuclear warhead. In contrast, the DF-31A is portable and can be launched from the back of a truck, train, or tank.[361] China appears to have supplied missiles to Saudi Arabia, Iran, Iraq, Libya, Pakistan, Syria, and North Korea.[362]

The US assessment of China's military capabilities has long focused on China's growing nuclear and missile forces and increasing capability to target the US and Japan in ways that directly affect the regional balance of power and the potential risk of US involvement any regional crisis or conflict. The 2011 DoD report on *Military and Security Developments Affecting the People's Republic of China* stated that,[363]

> China has prioritized land-based ballistic and cruise missile programs. It is developing and testing several new classes and variants of offensive missiles, forming additional missile units, upgrading older missile systems, and developing methods to counter ballistic missile defenses.
>
> The PLA is acquiring large numbers of highly accurate cruise missiles, many of which have ranges in excess of 185 km. This includes the domestically-produced, ground-launched DH-10 land-attack cruise missile (LACM); the domestically produced ground- and ship-launched YJ-62 anti-ship cruise missile (ASCM); the Russian SS-N-22/SUNBURN supersonic ASCM, which is fitted on China's SOVREMENNY-class DDGs acquired from Russia; and, the Russian SS-N-27B/SIZZLER supersonic ASCM on China's Russian-built, KILO-class diesel-electric attack submarines.
>
> By December 2010, the PLA had deployed between 1,000 and 1,200 short-range ballistic missiles (SRBM) to units opposite Taiwan. To improve the lethality of this force, the PLA is introducing variants of missiles with improved ranges, accuracies, and payloads.
>
> China is developing an anti-ship ballistic missile (ASBM) based on a variant of the CSS-5 medium-range ballistic missile (MRBM). Known as the DF-21D, this missile is intended to provide the PLA the capability to attack large ships, including aircraft carriers, in the western Pacific Ocean. The DF-21D has a range exceeding 1,500 km and is armed with a maneuverable warhead.
>
> China is modernizing its nuclear forces by adding more survivable 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 (ICBMs) have entered service. The CSS-10 Mod 2, with a range in excess of 11,200 km, can reach most locations within the continental United States.
>
> China may also be developing a new road-mobile ICBM, possibly capable of carrying a multiple independently targetable re-entry vehicle (MIRV).
>
> …. China's nuclear arsenal currently consists of approximately 55-65 intercontinental ballistic missiles (ICBMs), including the silo-based CSS-4 (DF-5); the solid-fueled, road-mobile CSS-10 Mods 1 and 2 (DF-31 and DF-31A); and the more limited range CSS-3 (DF-3). This force is complemented by liquid-fueled CSS-2 intermediate-range ballistic missiles and road-mobile, solid-fueled CSS-5 (DF-21D) MRBMs for regional deterrence missions. The operational status of China's single XIA-class ballistic missile submarine (SSBN) and medium-range JL-1 submarine-launched ballistic missiles (SLBM) remain questionable.
>
> By 2015, China's nuclear forces will include additional CSS-10 Mod 2s and enhanced CSS-4s. The first of the new JIN-class (Type 094) SSBN appears ready, but the associated JL-2 SLBM has faced a number of problems and will likely continue flight tests. The date when the JIN-class SSBN/JL-2 SLBM combination will be fully operational is uncertain. China is also currently working on a range of technologies to attempt to counter U.S. and other countries' ballistic missile defense systems, including maneuvering re-entry vehicles, MIRVs, decoys, chaff, jamming, thermal shielding, and anti-satellite (ASAT) weapons. PRC

official media also cites numerous Second Artillery Corps 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.

The introduction of more mobile systems will create new command and control challenges for China's leadership, which now confronts a different set of variables related to deployment and release authorities. For example, the PLA has only a limited capacity to communicate with submarines at sea, and the PLA Navy has no experience in managing a SSBN fleet that performs strategic patrols with live nuclear warheads mated to missiles. Land-based mobile missiles may face similar command and control challenges in wartime, although probably not as extreme as with submarines.

Beijing's official policy towards the role of nuclear weapons continues to focus on maintaining a nuclear force structure able to survive an attack, and respond with sufficient strength to inflict unacceptable damage on the enemy. The new generation of mobile missiles, maneuvering and MIRV warheads, and penetration aids are intended to ensure the viability of China's strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic intelligence, surveillance, and reconnaissance; precision strike; and missile defense capabilities.

Beijing has consistently asserted that it adheres to a "no first use" (NFU) policy, stating it would use nuclear forces only in response to a nuclear strike against China. China's NFU pledge consists of two stated commitments: China will never use nuclear weapons first against any nuclear-weapon state, and China will never use or threaten to use nuclear weapons against any non-nuclear-weapon state or nuclear-weapon-free zone. However, there is some ambiguity over the conditions under which China's NFU policy would apply, including whether strikes on what China considers its own territory, demonstration strikes, or high altitude bursts would constitute a first use.

Moreover, some PLA officers have written publicly of the need to spell out conditions under which China might need to use nuclear weapons first; for example, if an enemy's conventional attack threatened the survival of China's nuclear force, or of the regime itself. However, there has been no indication that national leaders are willing to attach such nuances and caveats to China's "no first use" doctrine.

Beijing will likely continue to invest considerable resources to maintain a limited nuclear force, also referred to by some PRC writers as "sufficient and effective" to ensure the PLA can deliver a damaging retaliatory nuclear strike.

The DoD provided updates in the 2013 edition of *Military and Security Developments Affecting the People's Republic of China*, describing China's latest nuclear-armed missile developments as follows:[364]

The Second Artillery controls China's nuclear and conventional ballistic missiles. It is developing and testing several new classes and variants of offensive missiles, forming additional missile units, upgrading older missile systems, and developing methods to counter ballistic missile defenses. (p. 5-6)

By December 2012, the Second Artillery's inventory of short-range ballistic missiles (SRBM) deployed to units opposite Taiwan stood at more than 1,100. 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.

China is fielding a limited but growing number of conventionally armed, medium-range ballistic missiles, including the DF-21D anti-ship ballistic missile (ASBM).[365] The DF-21D is based on a variant of the DF-21 (CSS-5) medium-range ballistic missile (MRBM) and gives the PLA the capability to attack large ships, including aircraft carriers, in the western Pacific Ocean. The DF-21D has a range exceeding 1,500 km and is armed with a maneuverable warhead. (p. 5-6)

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 United States. China may also be developing a new road-mobile ICBM, possibly capable of carrying a multiple independently targetable re-entry vehicle (MIRV). (p. 5-6)
>
> **Land-Based Platforms.** China's nuclear arsenal currently consists of approximately 50-75 ICBMs, including the silo-based CSS-4 (DF-5); the solid-fueled, road-mobile CSS-10 Mods 1 and 2 (DF-31 and DF-31A); and the more limited range CSS-3 (DF-4). This force is complemented by liquid-fueled CSS-2 intermediate-range ballistic missiles and road-mobile, solid-fueled CSS-5 (DF-21) MRBMs for regional deterrence missions. By 2015, China's nuclear forces will include additional CSS-10 Mod 2 and enhanced CSS-4 ICBMs. (p. 31)
>
> **Sea-Based Platforms.** China continues to produce the JIN-class SSBN, with three already delivered and as many as two more in various stages of construction. The JIN-class SSBNs will eventually carry the JL-2 submarine-launched ballistic missile with an estimated range of 7,400 km. The JIN-class and the JL-2 will give the PLA Navy its first long-range, sea-based nuclear capability. After a round of successful testing in 2012, the JL-2 appears ready to reach initial operational capability in 2013. JIN-class SSBNs based at Hainan Island in the South China Sea would then be able to conduct nuclear deterrence patrols. (p. 31-32)
>
> **…Future Efforts.** China is working on a range of technologies to attempt to counter U.S. and other countries' 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 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 SSBN deterrence patrols will force 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. (p. 32)

Outside sources provide further insights into these developments. As the IISS reported in 2013,[366]

> In July 2012, unnamed US officials reportedly said that China had test-fired a DF-41 intercontinental ballistic missile, although little information was provided. The DF-41 would, if deployed, be the first land-based missile able to reach the entire continental United States. The July test was reported to include a multiple independently targetable re-entry vehicle (MIRV), though it is unclear whether MIRVed warheads have yet been deployed on China's current longest-range ICBM, the DF-31A. This continues to be produced, with satellite imagery from 2011 suggesting that the 809 Brigade in Datong was receiving DF-31s in place of DF-21s. Taiwan's 2010 report on Chinese military power claimed that the Second Artillery had also deployed a few new DF-16 MRBMs.
>
> Within a month, China also conducted a successful test of the JL-2 ballistic missile. The JL-2 is the submarine-launched version of the DF-31 road-mobile ICBM, to be deployed on the Type-094 nuclear-ballistic-missile submarine. Successful development and deployment of the hitherto troubled JL-2 would give China a more secure second-strike deterrent, as the four Type-094 submarines currently in the water would then be able to provide continuous at-sea deterrence.

Figure 10.14: NASIC Estimate of the Regional Balance of ICBMs and SLBMs

ICBMs

MISSILE	NUMBER OF STAGES	WARHEADS PER MISSILE	PROPELLANT	DEPLOYMENT MODE	MAXIMUM RANGE (km)	NUMBER OF LAUNCHERS*
Russia						
SS-18 Mod 5	2 + PBV	10	Liquid	Silo	10,000+	About 50
SS-19 Mod 3	2 + PBV	6	Liquid	Silo	9,000+	About 50
SS-25	3 + PBV	1	Solid	Road-mobile	11,000	More than 150
SS-27 Mod 1	3 + PBV	1	Solid	Silo & road-mobile	11,000	About 80
SS-27 Mod-2	3 + PBV	Multiple	Solid	Silo & road-mobile	11,000	About 20
New ICBM	At least 2	Undetermined	Solid	Road-mobile	5,500+	Not yet deployed
China						
CSS-3	2	1	Liquid	Transportable	5,5000+	10 to 15
CSS-4 Mod 1	2	1	Liquid	Silo	12,000+	About 20
CSS-10 Mod 1	3	1	Solid	Road-mobile	7,000+	5 to 10
CSS-10 Mod 2	3	1	Solid	Road-mobile	11,000+	More than 15
North Korea						
Taepo Dong-2	2 or 3	1	Liquid	Fixed	5,500+	Unknown**
Hwasong-13	Undetermined	Undetermined	Undetermined	Road-mobile	5,500+	Unknown
India						
Agni V	3	1	Solid	Undetermined	5,000+	Not yet deployed

SLBMs

MISSILE	NUMBER OF STAGES	WARHEADS PER MISSILE	PROPELLANT	SUBMARINE CLASS	MAXIMUM RANGE (km)	NUMBER OF LAUNCHERS
RUSSIA						
SS-N-18	2 + PBV	3	Liquid	DELTA III	5,500+	96
SS-N-23	3 + PBV	4	Liquid	DELTA IV	8,000+	96
SS-NX-32 Bulava	3 + PBV	6	Solid	DOLGORUKIY (BOREY)	8,000+	16; Not yet deployed
				TYPHOON		20; Not yet deployed
CHINA						
CSS-NX-3/JL-1	2	1	Solid	XIA	1,700+	12; Not yet deployed
CSS-NX-14/JL-2	3	1	Solid	JIN	7,000+	12; Not yet deployed
INDIA						
K-15	2	1	Solid	ARIHART	700	12; Not yet deployed

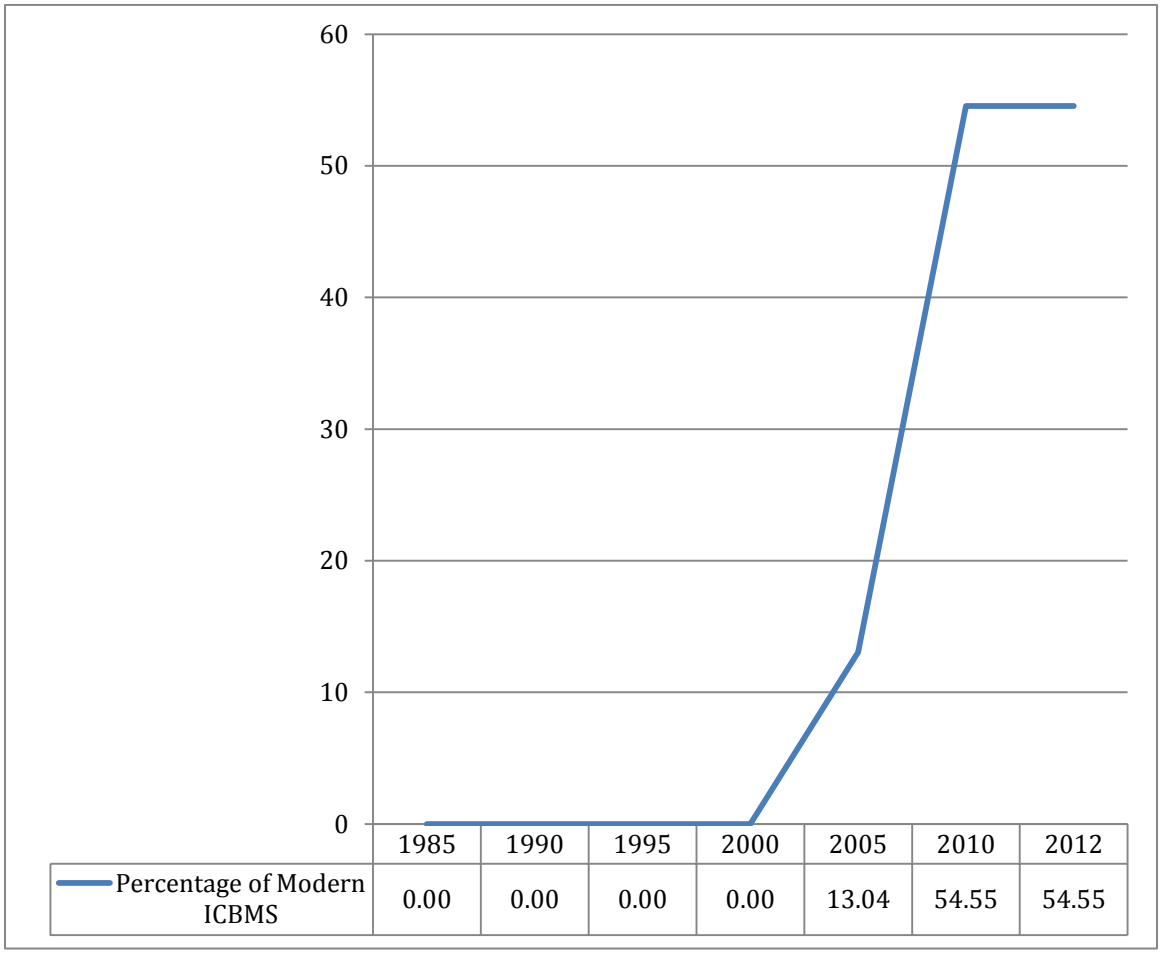
Note: All ranges are approximate.

* The missile inventory may be much larger than the number of launchers; launchers can be reused to fire additional missiles.

** Launches of the TD-2 space vehicle have been observed from both east and west coast facilities.

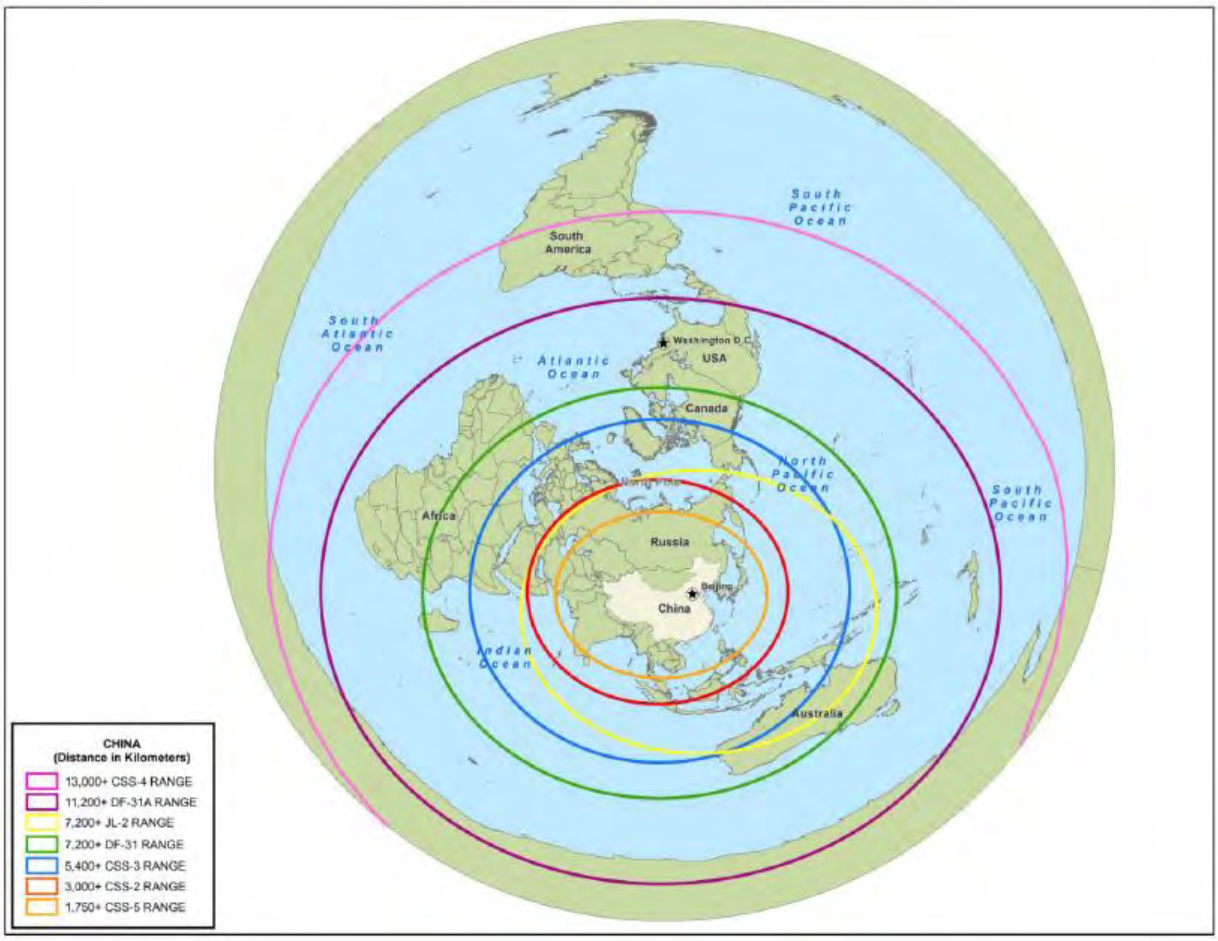
Source: adapted from US National Air and Space Intelligence Center, Defense Intelligence Agency Missile and Space Intelligence Center and Office of Naval Intelligence, *Ballistic & Cruise Missile Threat*, NASIC, May 2013, p. 21.

Figure 10.15: Percentage of Modern ICBMs in the SAF's Arsenal, 1985-2012



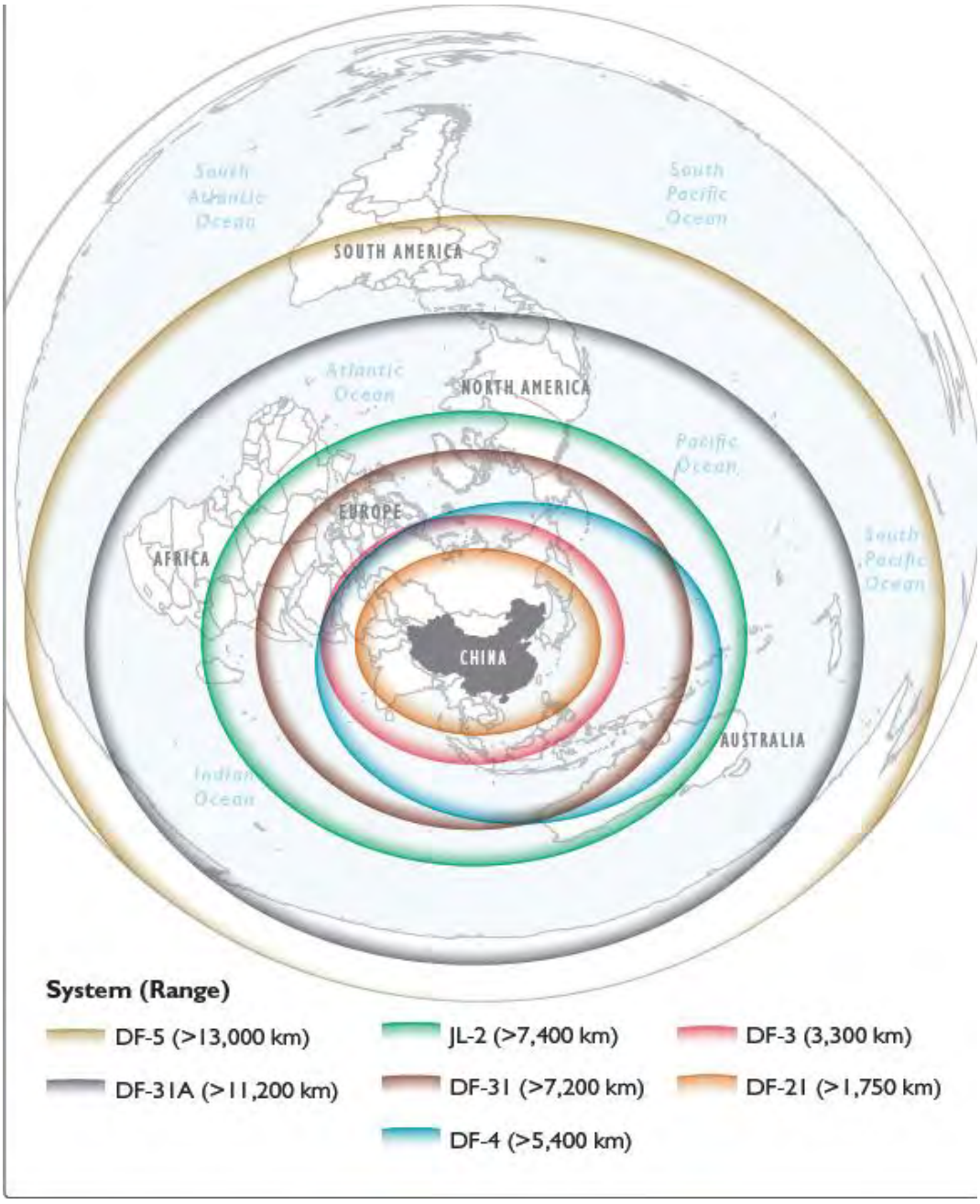
Source: *Military Power of the People's Republic of China* 2005-2009; *Military and Security Developments Involving the People's Republic of China* 2009-2012.

Figure 10.16: The Expanding Range of China's ICBM and Longer-Range Forces – Part One



Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 82.

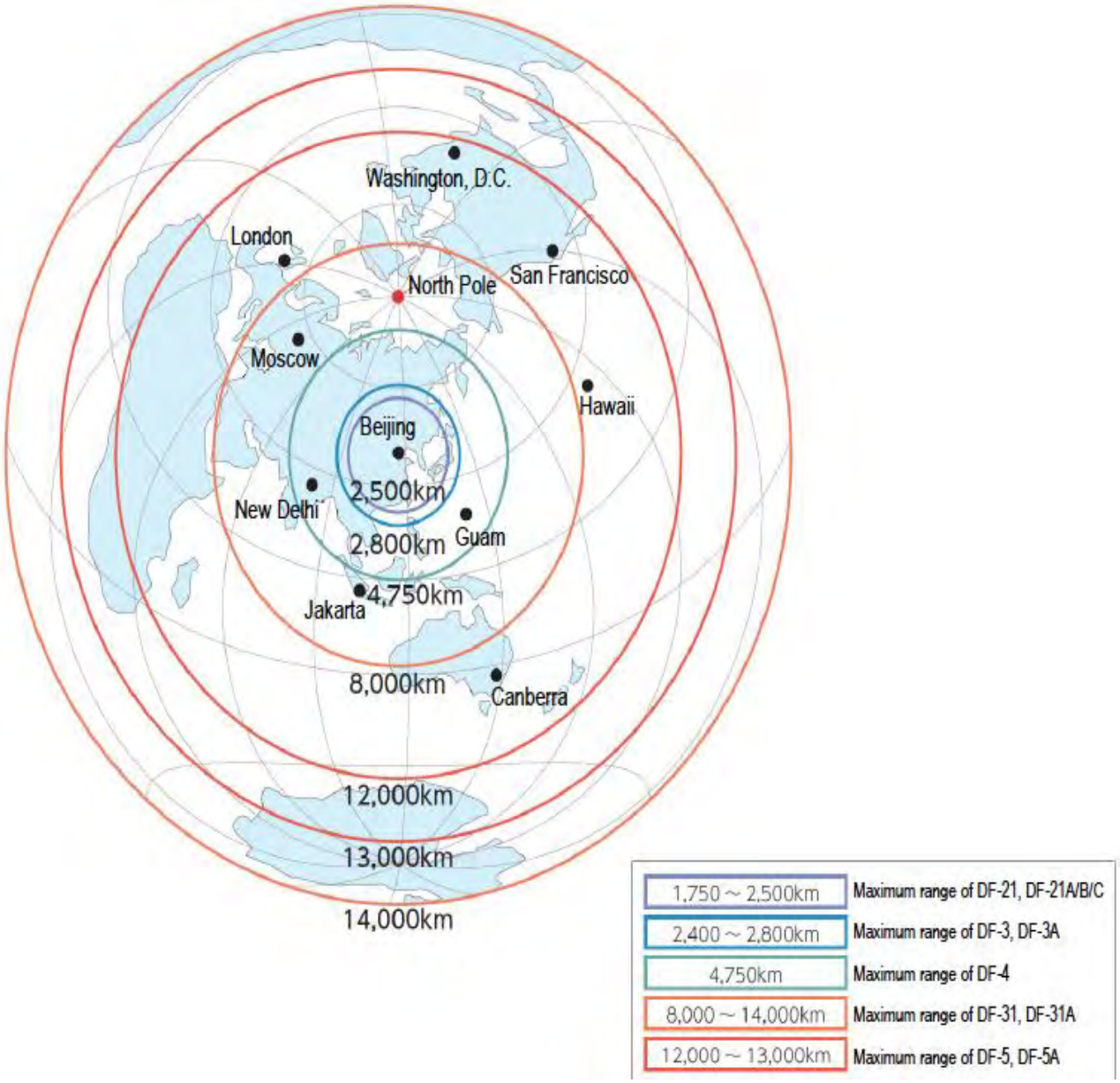
Figure 10.16: The Expanding Range of China's ICBM and Longer-Range Forces – Part Two



Note: Medium and Intercontinental Range Ballistic Missiles. China is capable of targeting its nuclear forces throughout the region and most of the world, including the continental United States. Newer systems such as the DF-31, DF-31A, and JL-2 will give China a more survivable nuclear force.

Source: DoD, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2012*, p. 43.

Figure 10.16: The Expanding Range of China's ICBM and Longer-Range Forces – Part Three



Source: Japanese Ministry of Defense, *Defense of Japan 2013,* Figure I-1-3-2.

Chinese Missile Defense Capabilities

There are other important aspects of China's missile and space programs. The 2010 Chinese defense white paper argued against international missile defense programs. The paper also included sections on the desire to prohibit biological and chemical weapons, prevent an arms race in outer space, promote military expenditure transparency, and work towards conventional arms control. In the section on non-proliferation, the PRC wrote,[367]

> China maintains that the global missile defense program will be detrimental to international strategic balance and stability, will undermine international and regional security, and will have a negative impact on the process of nuclear disarmament. China holds that no state should deploy overseas missile defense systems that have strategic missile defense capabilities or potential, or engage in any such international collaboration.

The 2013 white paper mentioned missile defense but did not address the issue in much depth. In contrast, the 2013 DoD report on *Military and Security Developments Involving the People's Republic of China* noted that,[368]

> China has made efforts to go beyond defense from aircraft and cruise missiles to gain a ballistic missile defense capability in order to provide further protection of China's mainland and strategic assets. China's existing long-range SAM inventory offers limited capability against ballistic missiles. The SA-20 PMU2, the most advanced SAM Russia offers for export, has the advertised capability to engage ballistic missiles with ranges of 1,000km and speeds of 2,800m/s. China's domestic CSA-9 long-range SAM system is expected to have a limited capability to provide point defense against tactical ballistic missiles with ranges up to 500km. China is proceeding with the research and development of a missile defense umbrella consisting of kinetic energy intercept at exo-atmospheric altitudes (>80km), as well as intercepts of ballistic missiles and other aerospace vehicles within the upper atmosphere. In January 2010, and again in January 2013, China successfully intercepted a ballistic missile at mid-course, using a ground-based missile.

China tested an advanced missile defense system on January 11, 2010. The test, entitled the *Test of the Land-based Mid-course Phase Anti-ballistic Missile Interception Technology,* targeted a missile during the mid-course phase when it was exoatmospheric. According to press reports, the US DoD stated, "We detected two geographically separated missile launch events with an exoatmospheric collision also being observed by space-based sensors."[369]

Reportedly, China carried out a second land-based mid-course missile interception test on January 27, 2013 in the Xinjiang Uyghur Autonomous Region. Although no other information was given, the Chinese Defense Ministry remarked that the test was "defensive in nature" and appeared to be successful. In all likelihood, the system is a reconfigured DF-21C or DF-25 (KS/SC-19), both of which are two-stage medium-range (1500-1700 km) ballistic missiles capable of carrying a 600 kg payload – in this case, an exoatmospheric kill vehicle. However, China likely remains far from an operational anti-missile shield.[370]

China is also working to increase its tactical ballistic missile defense capabilities – which add another level of deterrence and defense capabilities. China is beginning to produce its own variant of the S300 and may be able to deploy significantly more advanced theater missile defense systems in the mid-term.

Chinese Counterspace Capabilities

China is developing counterspace capabilities that affect the country's entire spectrum of warfighting capacities, from the tactical to the strategic levels. Both China and Russia "continue developing systems and technologies that can interfere with or disable vital U.S. space-based navigation, communication, and intelligence collection satellites."[371] China has tested anti-

satellite weapons that could also have a massive impact on US battle management and ISR systems, and may have some capability to use EMP weapons.

The DoD's 2013 report on *Military and Security Developments Involving the People's Republic of China* notes that,[372]

> PLA strategists regard the ability to utilize space and deny adversaries access to space as central to enabling modern, informatized warfare. Although PLA doctrine does not appear to address space operations as a unique operational "campaign," space operations form an integral component of other PLA campaigns and would serve a key role in enabling A2/AD operations. Publicly, China attempts to dispel any skepticism over its military intentions for space.
>
> In 2009, PLA Air Force Commander General Xu Qiliang publically retracted his earlier assertion that the militarization of space was a "historic inevitability" after President Hu Jintao swiftly contradicted him. General Xu Qiliang is now a Vice Chairman of the Central Military Commission and the second highest-ranking officer in the PLA.
>
> The PLA is acquiring a range of technologies to improve China's space and counter-space capabilities. China demonstrated a direct-ascent kinetic kill anti-satellite capability to low Earth orbit when it destroyed the defunct Chinese FY-1C weather satellite during a test in January 2007. Although Chinese defense academics often publish on counterspace threat technologies, no additional anti-satellite programs have been publicly acknowledged. A PLA analysis of U.S. and coalition military operations reinforced the importance of operations in space to enable "informatized" warfare, claiming that "space is the commanding point for the information battlefield."
>
> PLA writings emphasize the necessity of "destroying, damaging, and interfering with the enemy's reconnaissance...and communications satellites," suggesting that such systems, as well as navigation and early warning satellites, could be among the targets of attacks designed to "blind and deafen the enemy." The same PLA analysis of U.S. and coalition military operations also states that "destroying or capturing satellites and other sensors…will deprive an opponent of initiative on the battlefield and [make it difficult] for them to bring their precision guided weapons into full play."

Space

China is expanding its own space-based systems in ways that will enhance its deterrent, missile, and other military capabilities. The new Party leadership has emphasized such activities as long-range missiles and other aerospace programs in its military modernization push. Chinese companies are also looking at increasing domestic development and production through the acquisition of parts manufacturers, leasing businesses, cargo airlines, materials producers, and airport operators. However, many of these Chinese companies that are pursuing joint ventures and technical cooperation agreements alongside acquisitions have deep ties to the military, raising issues for American regulators:[373]

> The main contractor for the country's air force, the state-owned China Aviation Industry Corporation, known as Avic, has set up a private equity fund to purchase companies with so-called dual-use technology that has civilian and military applications, with the goal of investing as much as $3 billion. In 2010, Avic acquired the overseas licensing rights for small aircraft made by Epic Aircraft of Bend, Ore., using lightweight yet strong carbon-fiber composites — the same material used for high-performance fighter jets.
>
> Provincial and local government agencies in Shaanxi Province, a hub of Chinese military aircraft testing and production, have set up another fund of similar size for acquisitions. Last month, a consortium of Chinese investors, including the Shaanxi fund, struck a $4.23 billion deal with the American International Group to buy 80 percent of the International Lease Finance Corporation, which owns the world's second-largest passenger jet fleet.

In 2010, China conducted 15 space launches while expanding its space-based surveillance, reconnaissance, intelligence, meteorological, navigation, and communications satellites. At the

same time, China is developing a multi-dimensional program in order to improve its ability to prevent or limit adversaries' use of space-based assets.[374]

The 2013 DoD report on China cited earlier remarks that,[375]

> In 2012, China conducted 18 space launches. China also expanded its space-based intelligence, surveillance, reconnaissance, navigation, meteorological, and communications satellite constellations. In parallel, China is developing a multi-dimensional program to improve its capabilities to limit or prevent the use of space-based assets by adversaries during times of crisis or conflict. (p. 9)
>
> During 2012, China launched six Beidou navigation satellites. These six satellites completed the regional network as well as the in-orbit validation phase for the global network, expected to be completed by 2020. China launched 11 new remote sensing satellites in 2012, which can perform both civil and military applications. China also launched three communications satellites, five experimental small satellites, one meteorological satellite, one relay satellite, and a manned space mission. (p. 9)
>
> China continues to develop the Long March 5 (LM-5) rocket, which is intended to lift heavy payloads into space. LM-5 will more than double the size of the Low Earth Orbit (LEO) and Geosynchronous Orbit (GEO) payloads China is capable of placing into orbit. To support these rockets, China began constructing the Wenchang Satellite Launch Center in 2008. Located on Hainan Island, this launch facility is expected to be complete around 2013, with the initial LM-5 launch scheduled for 2014. (p. 9-10)

China is the third country to develop an independent human spaceflight program, and early in 2012 the PRC achieved its first manned space docking at an orbital laboratory. The country has a stated goal of building a 60-ton space station for future missions. China has traditionally been relying on its manned Shenzhou spacecraft, capsule-based vehicles. It would also appear that China is in the test-flight stages of a new Shenlong space plane, a drone that is similar to, though less capable than, the US' X-37B.[376]

China's growing space capabilities translate into military capabilities that affect all aspects of conventional and nuclear targeting, ground-air-sea operations, precision conventional strike capacities, and missile defense. China is also using its intelligence collection efforts to improve technological capacity. In his 2012 Senate testimony, DIA Director Ronald L. Burgess, Jr. remarked,[377]

> China is beginning to develop and test technologies to enable ballistic missile defense. The space program, including ostensible civil projects, supports China's growing ability to deny or degrade the space assets of potential adversaries and enhances China's conventional military capabilities. China operates satellites for communications, navigation, earth resources, weather, and intelligence, surveillance, and reconnaissance, in addition to manned space and space exploration missions. China successfully tested a direct ascent anti-satellite weapon (ASAT) missile and is developing jammers and directed-energy weapons for ASAT missions. A prerequisite for ASAT attacks, China's ability to track and identify satellites is enhanced by technologies from China's manned and lunar programs as well as technologies and methods developed to detect and track space debris. Beijing rarely acknowledges direct military applications of its space program and refers to nearly all satellite launches as scientific or civil in nature.
>
> China has used its intelligence services to gather information via a significant network of agents and contacts utilizing a variety of methods to obtain U.S. military technology to advance their defense industries, global command and control, and strategic warfighting capabilities. The Chinese continue to improve their technical capabilities, increasing the collection threat against the U.S. The Chinese also utilize their intelligence collection to improve their economic standing and to influence foreign policy. In recent years, multiple cases of economic espionage and theft of dual-use and military technology have uncovered pervasive Chinese collection efforts.

One example of Chinese space technologies is the Beidou satellite position, navigation, and timing system, which has been in development and regional use since 2000. The second generation version has been operational in the region since 2012 and is planned to be available

globally by 2020. The system will "enable subscribers outside of China to purchase receivers and services that give civilian and military applications greater redundancy and independence in a conflict scenario that employs space assets."[378]

China conducted anti-satellite (ASAT) weapons tests in January 2007 and 2010. Over the next several years, China plans to put more than 20 new navigational satellites in medium-earth orbit to improve the functionality of its Beidou system. An editorial in the state-run Global Times stated, "it is necessary for China to have the ability to strike US satellites. This deterrent can provide strategic protection to Chinese satellites and the whole country's national security."[379]

Anti-Access/Area Denial Sea-based Space Programs

China's A2AD programs rely on a mix of space-based systems. China is relying on land and sea launch capabilities as well as sea-based systems that utilize "Long View" space support ships to perform tasks like monitoring and tracking space vehicles – such as spacecraft, missiles, and rockets – while also coordinating and communicating with ground-based assets. This system can increase space operations and situational awareness while also providing potential military applications.

In a conflict, ship-based C4ISR capabilities could have advantages over ground-based installations. Again, Andrew S. Erikson provides a history and more in-depth description of the program, which began in 1965 with Premier Zhou Enlai and was further developed in the 1970s under Project 718. In order to support Chinese ICBM sea tests, the Yuanwang program was initiated, though it was soon delayed by subsequent political events. It was jointly designed and developed by the Seventh Academy of the Sixth Ministry of Machine Building, the Seventh Ministry of Machine Building, and the Commission of Science and Technology for National Defense's concept-study team.[380]

Design and development of the Yuanwang started in 1974, with construction from 1975 and the first ships ready for trials in the late 1970s. Though six were originally built, only three are in operation today. It appears that the Yuanwang-class ship was first used in 1980 to retrieve the instrument package from China's first successful DF-5/CSS-4 ICBM test – showing that the ships were able to successfully track missiles from the sea. The ships were further deployed in support of civilian and military space launches and tracking of space operations, including communications satellites, ballistic missile tests, and manned spacecraft (the Shenzhou). The fleet complements the PRC's two Tianlian data-relay satellites and many ground stations, facilitating communication between satellites and these stations.[381]

The Yuanwang fleet was technologically upgraded starting in the 1980s; for example, the ships were initially able to track almost 25,000 miles above Earth, later increasing to almost 250,000 miles. Better radars improved the communication and tracking systems; most of the ships in the fleet have C- and S-band monopulse tracking radar, velocimetry systems, cinetheodolite laser ranging and tracking systems, computers, and navigation and positioning approaches. A variety of communications systems can secure data transfer, and the ships can operate in any maritime environment except polar areas. The ships could be used to detect and track foreign satellites and provide support to any PRC attempt to threaten them.[382]

While a ship-based tracking system has advantages such as flexibility, there are also disadvantages – it is expensive to operate and maintain, and during longer missions the lack of necessary engineers and equipment could make repairs difficult. Deploying such critical systems

overseas makes them vulnerable targets, and any signals interference – or PRC supporting vessels – could affect their operation. Their sea-based nature also makes advanced communications connectivity difficult, especially during bad weather. There are still technological issues, such as calibration and stabilization, that frustrate the ships' operations.[383]

As of mid-2008, the fleet had "completed 68 maritime space-tracking missions, sailed more than 1.4 million nautical miles safely, and performed more than 7,600 days of operations at sea…. During 2011-12, Yuanwang ships 3, 5, and 6 completed a cumulative 120,000-nautical-mile, 539-day trip to provide space-tracking and control support for the docking of the Tiangong-1 space-lab module and Shenzhou-8 spacecraft." There have also been reports that a seventh ship was under construction; in 2006 the chief engineer of Yuanwang 6 noted that another boat was in the pre-research stages and could potentially be used in deep-space exploration missions. There has also been significant research on ship-based multi-target simulators to track and control satellite launches or missiles, which the PLA sees as a key capability. The Yuanwang could also provide support to PRC development of ground-based laser and kinetic anti-satellite capabilities. Overall, Andrew S. Erikson notes,[384]

> In reapplying indispensable positioning information and controlling space assets overseas, the *Yuanwang* fleet represents a vital node in China's aerospace infrastructure. The construction and proliferation of these ships over the past four decades underscores their importance and utility to the country's space and military operations. Space-tracking vessels have successfully participated in full-range ICBM tests, submarine-to-shore guided-missile underwater-launch tests, communications-satellite launches, manned and unmanned space-vehicle launches, and an Antarctic visit. They have played a significant role in the development and testing of technologies and weapons…. Chinese research literature also points to a larger role for space TT&C ships as the nation's space operations continue to expand.

Anti-Access/Area Denial Land-based Space Programs

China also has a broad range of land-based stations that enhance its space warfare capabilities in ways that can threaten or attack US power projection capabilities:[385]

> China has three satellite launch centers and stations: Jiuquan (also known as Base 20 and Dongfeng Space City), Xichang (Base 27), and Taiyuan (Base 25). The country is currently constructing a station in Wenchang (also known as Wenchang Space City and Wenchang Satellite Launch Center), which should be operational in 2013. Additionally, it has two control facilities: an Aerospace Command and Control Center in Xi'an (also known as Base 26). The Aerospace Telemetry Oceanic Ship Base is a crucial ground station, as it tracks *Yuanwang* data on both commercial satellites and spacecraft. Established in 1978 in Jiangyin, Jiangsu Province, the base sends the ships it operates primarily to the Pacific and Indian Oceans. China operates three integrated land-based space-monitoring and control network stations in Kashi, Jiamusi, and Sanya….
>
> China has overseas tracking stations in Karachi, Pakistan; Malindi, Kenya; and Swakopmund, Namibia. The Malindi station, in an Indian Ocean coastal town, became operational in July 2005 to support the *Shenzhou* 6 mission. In Swakopmund, the station works in conjunction with *Yuanwang* 3 to provide telemetry, tracking and command (TT&C) support during *Shenzhou* spacecraft landings. China also had a ground station in Tarawa, Kiribati; but it was dismantled in 2003 after Kiribati recognized Taiwan. Beijing plans to construct three ground-control stations in South America by 2016 for deep-space network support. Additionally, China reportedly shares space-tracking facilities with France, Sweden, and Australia.

Improved Manpower

The doctrinal, operational, tactical, and technical requirements generated by the SAF's modernization and development program have required a SAF comprised of technically proficient officers and men with higher levels of human capital and academic achievement. This

necessity has led to a shift in manpower policies toward greater formal military education of officers and men, greater recruitment of university graduates, and more intensive and realistic military training.

The 2010 Chinese defense white paper asserted that one of the main drivers of greater military spending is greater investments in training and education. If accurate, such spending has led to specialized military education institutions such as the Non-Commissioned Officer (NCO) School of the Second Artillery Force, which has been reported by Chinese media to have trained several thousand NCOs in the last several years.[386] Officers have also enjoyed the benefits of improving military education, as Chinese media has reported that officer's colleges have begun developing warfighting simulators and other training and education equipment based on information-technology.[387]

The recruitment of qualified personnel with undergraduate or graduate academic degrees has become a major SAF imperative. PLA media frequently cite some percentage of personnel in a given unit as undergraduate degree holders, emphasizing a self-reported increase in undergraduate degree holders. In one specific instance, it was claimed that a certain SAF brigade's officers were 85% undergraduate degree holders.[388]

The 2009 revision of the PLA's *Outline of Military Training and Evaluation* emphasized joint training, training in "complex electromagnetic environments," and the use of opposition forces to increase training realism;[389] the SAF seeks to develop these training techniques so as to better conduct integrated joint operations under conditions of informatization. It is impossible to discern if these new training regulations have had a significant effect on SAF forces, but Chinese media reports corroborate the new emphasis on "realistic training."[390] These reports frequently describe training exercises along the lines of the 2009 Outline of Military Training and Education, discussed previously – one story in *Jiefangjun Huabao* described joint training at the brigade level.[391] Such efforts, if carried out on a sustained and well-resourced basis, form a significant means of augmenting SAF combat skills.

Progress in Power Projection

China's missile programs cannot be separated from the nuclear capabilities discussed in the next chapter, but they do have a major impact on its power projection capabilities and interact with the ongoing improvements in its naval and air forces discussed earlier. The SAF's force development and modernization efforts indicate that China has sought to obtain both the conventional and nuclear capabilities necessary for fighting and winning Local Wars under Conditions of Informatization in the 21st century. However, the SAF's modernization and force development is an ongoing process, one that will likely continue into the near future.

The SAF's equipment procurement policies are fully in line with the Local Wars concept. The SAF has modernized its missile systems and built a conventional arsenal comprised entirely of modern missiles that utilize solid fuel and are road-mobile. Moreover, the SAF's conventional missile systems are increasing in accuracy, thus augmenting the potency of a hypothetical SAF long-range precision strike. In addition, the nuclear element of the SAF's dual mission is enjoying similar progress, although the nuclear deterrent is lagging behind the conventional force in its development of a solid-fueled, mobile forces – China's nuclear deterrent posture still partially relies on fixed, liquid-fueled missiles.

The SAF's modernization and force development is not merely an issue of developing new missiles. The SAF has also fundamentally changed its force structure over the last twenty years, shifting from a medium-/intermediate-range nuclear force to a bifurcated force armed with an array of missile categories, classes, and variants. The SAF is now capable of and required to carry out a variety of missions. Capabilities such as regional conventional precision strike, which did not exist in 1995, now make up more than half of the SAF's missile launcher arsenal.

At the operational level, the SAF is preparing to conventionally fight Local Wars. It has built a 5,000-kilometer-long tunnel network to provide protection for its mobile missile systems, thus reducing the risk of preemption and complicating targeting by any potential adversary. Moreover, the forces with the greatest precision, the SRBM and LACM forces, have large numbers of reserve missiles per missile launcher, thus ensuring the possibility of sustained combat operations and repeated salvo fire. This combination of enhanced mobility, survivability, and large supplies of ammunition ensures that, in the case of any potential conflict, adversary forces in the region must operate in an environment in which there would be no sanctuaries within hundreds of kilometers of China.

These important developments come together to form a larger picture of a SAF in transition. It is currently modernizing its forces and developing a new force composition in accordance with the Local Wars theory. It is within this context that new weapons systems such as the DF-21D ASBM, Anti-Satellite missiles, and conventional DF-21Cs are developed, deployed, and used.

Appendix to Chapter 10: NASIC Data on the PLA's Missile Classes

Second Artillery Force SRBMs

MISSILE	PROPELLANT	DEPLOYMENT MODE	MAXIMUM RANGE (MILES)
CHINA			
CSS-6 Mod 1	Solid	Road-mobile	370
CSS-6 Mod 2	Solid	Road-mobile	550+
CSS-6 Mod 3	Solid	Road-mobile	450+
CSS-7 Mod 1	Solid	Road-mobile	185
CSS-7 Mod 2	Solid	Road-mobile	370
CSS-8	1st stage: solid 2nd stage: liquid	Road-mobile	93
B611	Solid	Road-mobile	93

Second Artillery Force MRBM/IRBMs

MISSILE	NUMBER OF STAGES	PROPELLANT	DEPLOYMENT MODE	MAXIMUM RANGE (MILES)	NUMBER OF LAUNCHERS*
China					
CSS-2	1	Liquid	Transportable (Limited Mobility)	1,900	5 to 10
CSS-5 Mod 1	2	Solid	Road-mobile	1,100+	Fewer than 50
CSS-5 Mod 2	2	Solid	Road-mobile	1,100+	Fewer than 50
CSS-5 Conventional	2	Solid	Mobile	1,100	Fewer than 30
CSS-5 ASBM	2	Solid	Mobile	900+	Not Yet Deployed

Second Artillery Force ICBMs

Missile	Number of Stages	Warheads per Missile	Propellant	Deployment Mode	Maximum Range* (miles)	Number of Launchers
China						
CSS-3	2	1	Liquid	Silo & transportable	3,400+	10 to 15
CSS-4 Mod 2	2	1	Liquid	Silo	8,000+	About 20
CSS-10 Mod 1	3	1	Solid	Road-mobile	4,500+	Fewer than 15
CSS-10 Mod 2	3	1	Solid	Road-mobile	7,000+	Fewer than 15

Source: National Air and Space Intelligence Center (NASIC), Ballistic and Cruise Missile Threat, Wright-Patterson Air Force Base, April 2009. http://www.fas.org/programs/ssp/nukes/NASIC2009.pdf.

Chapter 11: China's Nuclear Forces and Weapons of Mass Destruction

There is no way to assess the exact probability that the US or China will ever make threats to use nuclear weapons in a regional conflict or ever escalate to their actual use, but the probability they would even make explicit threats seems extremely low.

Each side's nuclear weapons have a deterrent impact in restraining the other's behavior without such threats, and even raising the possibility of an actual nuclear exchange would threaten the stability of Asia, the global economy, and the US and Chinese economies in ways in which the end result could not be calculated. Both sides seem likely to calculate that moving beyond the tacit threat posed by the existence of the other's nuclear forces and would almost certainly be so destructive as to be more costly than any strategic or military gains in a limited war could ever be worth.

At the same time, history is a grim warning that deterrence sometimes fails. Moreover, China must take the fact that North Korea, Russia, India and Pakistan have nuclear weapons into account in calculating the size and nature of its forces, as well as the possibility that the ROK or Japan might eventually develop nuclear weapons.

The Strategic Nuclear Balance

Unclassified estimates of the present structure of US, Chinese, and other outside nuclear forces are shown in the following figures:

- **Figure 11.1** compares the overall strength of US and major Northeast Asian nuclear powers.
- **Figure 11.2** provides an estimate of the global holdings of nuclear weapons**.**

These nuclear balances include Russia, and it is important to note that most US thinking about the nuclear balance still focuses on Russia, North Korea, and the risk of Iran acquiring nuclear weapons – not on China. The forces on each side are also anything but static. The US is pursuing a reduction in nuclear forces. China is increasing its forces and their capabilities, although there is little credible unclassified data on Chinese plans and activities.

It is also unclear that weapons numbers shown in these figures will affect future contingencies unless events forced both sides into a major nuclear engagement. The fact the US will have much larger weapons numbers for the foreseeable future might mean the US could theoretically "win" in terms of inflicting the most strikes and damage, but such a victory would be as pyrrhic a "victory" as a feared Cold War-era exchange between the US and Russia. Nevertheless, the US and China are major nuclear powers with boosted and thermonuclear weapons. While neither is likely to use these weapons, they have the capability and – at a minimum – their possession of nuclear weapons plays a major role in the balance of deterrence and in shaping the risks of asymmetric escalation.

Figure 11.1: Chinese, US and Russian Nuclear Forces

China

Quantity	Role/Type
	Strategic Missiles (figures are estimates)
	ICBM
12	DF-31 (CSS-9)
30	DF31A (CSS-9 Mod 2)
10	DF-4 (CSS-3)
20	DF-5A (CSS-4 Mod 2)
	MRBM
80	DF-21/21A (CSS-5 Mod 1/2)
36	DF21C (CSS-5 Mod 3)
6	DF-21D (CSS-5 Mod 4 – ASBM)
Some	DF-16
	IRBM
2	DF-3A (CSS-2 Mod)
	SRBM
108	DF-11A/M-11A (CSS-7 Mod 2)
144	DF-15/M-9 (CSS-6)
	LACM
54	CJ-10 (DH-10)
Navy	
1	Xia *With 12 JL-1(CSS-N-3) strategic SLBM*
3	Jin *With up to 12 JL-2 (CSS-NX-4) strategic SLBM (3rd and 4th vessels under construction)*

United States

Quantity	Role/Type
	Navy
14	Ohio SSBN 730 *Each with up to 24 UGM-133A Trident D-5 strategic SLBM*
	Air Force
6	SQN with 71 B-52H Stratofortress *Each with up to 20 AGM-86B nuclear ALCM and/or AGM-129A nuclear ACM*
2	SQN with 19 B-2A Spirit *Each with up to 16 free-fall bombs (or 80 when fitted with Small Diameter Bombs)*
9	SQN with 450 LGM-30G Minuteman III *Each with a capacity of 1-3 MIRV Mk12/Mk12A per missile*

Russia

Quantity	Role/Type
	Navy
3	Kalmar (Delta III) *Each with 16 RSM-50 (SS-N-18 Stingray) strategic SLBM*
6	Delfin (Delta IV) *Each with 16 R-29RMU Sineva (SS-N-23Skiff) strategic SLBM (1 vessel in repair, 2014 expected return to service)*
1	Akula (Typhoon) *Each with 20 RSM-52 Sturgeon strategic SLBM*
	Strategic Rocket Force Armies
3	Strategic Rocket Forces is a separate branch of the Russian Armed Forces, directly subordinate to the General Staff. The Strategic Rocket Forces were demoted to this status from that of a separate service of the Armed Forces by a presidential decree of March 24, 2001.Strategic Rocket Forces include three missile armies: the 27th Guards Missile Army (HQ in Vladimir), the 31st Missile Army (Orenburg), the 33rd Guards Missile Army (Omsk). The 53rd Missile Army (Chita) was disbanded in 2002. It appears that the 31st Missile Army (Orenburg) will be liquidated by 2016. As of 2012, the missile armies included 11 missile divisions with operational ICBMs.*

	As of March 2012, the Strategic Rocket Forces were estimated to have 332 operational missile systems of five different types. Intercontinental ballistic missiles of these systems could carry 1092 warheads.*
Strategic Missiles	
54	RS-20 (SS-18) Satan (mostly mod 5, 10 MIRV per msl)
120	RS-12M (SS-25) Sickle
40	RS-18 (SS-19) Stiletto (mostly mod 3, 6 MIRV per msl)
60	RS-12M2 Topol-M (SS-27M1), silo based
18	RS-12M2 Topol-M (SS-27M1), road mobile
21	RS-24 (SS-27M2) Yars (estimated 3 MIRV per msl)
Long-Range Aviation Command	
1	Sqn Tu-160 Blackjack *16 Tu-160 each with up to 12 Kh-55SM (AS-15A/B Kent) nuclear ALCM*
3	Sqn Tu-95MS Bear *32 Tu-95MS6 (Bear H-6) each with up to 6 Kh-55 (AS-15A/B Kent) nuclear ALCM* *31 Tu-95MS16 (Bear H-16) each with up to 16 Kh-55 nuclear ALCM*

Source: Based primarily on material in IISS, *The Military Balance 2013*. Figures do not include equipment used for training purposes. Some equipment and personnel figures are estimates. All equipment figures represent equipment in active service.

* Based on "Strategic Nuclear Forces" section of Russian Forces Project, http://russianforces.org/missiles/.

Figure 11.2: Comparative Estimate of Global Holdings of Nuclear Weapons

Country	Russia		US		China		DPRK	
Information Source	**FAS[392]**	**CAC[393]**	**FAS**	**CAC**	**FAS**	**CAC**	**FAS**	**CAC**
Operational: Strategic	1,740	1,740	1,950	1,950	0	n/a	0	n/a
Operational: Non-strategic	0	0	200	200	?	n/a	n/a	n/a
Non-deployed/ Reserve	2,700	2,700 (+ 4,000 awaiting dismantlement)	2,500	2,650 (+ 3,000 awaiting dismantlement	180	240-300	<10	<10
Total Inventory	8,500	8,500	7,700	7,700	240	300	<10	<10
Growth Trend	Decrease		Decrease		Growing		Growing	

Country	UK		Israel		Pakistan		India		France	
Information Source	**FAS**	**CAC**	**FAS**	**CAC**	**FAS**	**CAC**	**FAS**	**CAC**	**FAS**	**CAC**
Operational: Strategic	160	<160	0	n/a	0	n/a	0	n/a	290	<300
Operational: Non-strategic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	50
Non-deployed/Reserve	65	65	80	80	90-110	90-110	80-100	80-100	?	n/a
Total Inventory	225	225	80	80 (200)	90-110	90-110	80-100	80-100	300	298-300
Growth Trend	Decrease		Growing		Steady		Steady		Slight decrease	

Note: FAS – Federation of American Scientists; CAC – Center for Arms Control and Non-Proliferation
Source: FAS, Status of World Nuclear forces, December 18, 2012. http://www.fas.org/programs/ssp/nukes/nuclearweapons/nukestatus.html; Prepared by Lesley McNiesh, Updated by Justin Bresolin; *Fact Sheet: Global Nuclear Weapons Inventories in 2013*, Center for Arms Control and Non-Proliferation March 2013. http://armscontrolcenter.org/issues/nuclearweapons/articles/fact_sheet_global_nuclear_weapons_inventories_in_2012/.

The Regional Nuclear Balance

As noted earlier, North Korea's growing missile forces and nuclear programs, create an unstable wild card that might trigger US threats to use nuclear weapons or even the development of a nuclear weapons capability by Japan and South Korea, leading to further regional nuclear instability. North Korea now, at most, has very limited numbers of nuclear weapons and no nuclear armed missiles; but if North Korea can create larger and more effective nuclear weapons, both China and the US would confront the risk of North Korean use of such weapons – or even a serious threat to use such weapons – which could force the US to respond and ultimately confront China with a nuclear crisis on its borders.

China

The US has not provided detailed data on Chinese nuclear forces, nor has the US made them a focus of its arms control efforts. Conversely, the US only gives them passing mention in its recent unclassified reporting on US doctrine for sizing and employing US nuclear forces. A number of leading sources on nuclear forces and arms control do, however, provide considerable detail. The data involved are sometime contradictory, but generally provide a common picture of Chinese nuclear weapons stockpiles and designs.

The Nuclear Threat Initiative (NTI) Estimate

The Nuclear Threat Initiative (NTI) describes China's nuclear forces as follows:[394]

> China's nuclear weapons program began in 1955 and culminated in a successful nuclear test in 1964…China has conducted 45 nuclear tests, including tests of thermonuclear weapons and a neutron bomb. The series of nuclear tests in 1995-96 prior to China's signature of the Comprehensive Nuclear Test Ban Treaty (CTBT) resulted in a smaller and lighter warhead design for a new generation of intercontinental ballistic missiles (ICBMs).
>
> China closely guards information about its nuclear arsenal, making estimates unusually difficult. However, the U.S. Department of Defense asserts that China has approximately 130-195 deployed nuclear-capable ballistic missiles, and while China's XIA- and JIN-class ballistic missile submarines appear set, their associated JL-1 and JL-2 systems do not seem ready yet…
>
> Although not announced officially, China is reported to have placed a moratorium on fissile material production.[..The International Panel on Fissile Materials estimates that China produced 20 ± 4 metric tons of Highly Enriched Uranium (HEU), and still holds 16 ± 4 metric tons. In terms of plutonium, it estimates China produced approximately 2 ± 0.5 tons of plutonium, with 1.8 ± 0.5 tons remaining…
>
> China joined the International Atomic Energy Agency (IAEA) in 1984, but supplied nuclear technology and reactors to several countries of proliferation concern in the 1980s and early 1990s. Most notably, the Chinese are widely understood to have supplied design information (including warhead design), and fissile material to the development of Pakistan's nuclear weapons program that were later transferred to Libya for its program…
>
> China acceded to the Treaty on the Non-Proliferation of Nuclear Weapons in 1992 as a nuclear weapon state and has since improved its export controls, including the promulgation of regulations on nuclear materials and nuclear dual-use exports, and has pledged to halt exports of nuclear technology to un-safeguarded facilities. In 2002 China ratified the IAEA Additional Protocol, the first nuclear weapon state to do so. In 2004, China joined the Nuclear Suppliers Group (NSG). China is the first nuclear weapon state to adopt a nuclear "no first use" policy and an official pledge not to use nuclear weapons against non-nuclear weapons states. There has been some controversy following the release of China's 2013 Defense White Paper, which did not explicitly use the phrase "no first-use," as it did in the 2010 Defense White Paper, and previous white papers…China's current nuclear posture focuses on survivability and maintaining a second-strike capability…

The NTI's report on recent Chinese weapons developments is as follows:[395]

> …On 16 October 1964 China exploded its first nuclear device… Although the exact size of China's nuclear stockpile has not been publicly disclosed, reports indicate that as of 2011 China has produced a total of 200 to 300 nuclear warheads… In 2011, Robert S. Norris and Hans M. Kristensen estimated the size of China's current nuclear stockpile to be approximately 240 warheads, with 178 deployed.
>
> …China's nuclear tests in the late-1980s and 1990s were geared toward further modernizing its nuclear forces. Although China officially declared in 1994 that these tests were for improving safety features on existing warheads, they were also likely intended for the development of new, smaller warheads for China's next-generation solid-fueled ICBMs (e.g., DF-31 and DF-31A), and possibly to develop a multiple warhead (MRV or MIRV) capability as well.[28] China's last test was on 29 July 1996, and less than two months later on 24 September 1996 Beijing signed the Comprehensive Nuclear Test Ban Treaty (CTBT)…In order to sign the treaty China overcame several of its initial concerns, including allowing an exemption for Peaceful Nuclear Explosions and the use of national technical means and on-site inspections for verification. The National People's Congress, however, has yet to ratify the treaty.
>
> Since the inception of its nuclear weapons program, China has relied on a mixture of foreign and indigenous inputs to steadily develop and modernize its nuclear arsenal from its first implosion device to the development of tactical nuclear weapons in the 1980s[…As a result, the Federation of American Scientists assesses China to have at least six different types of nuclear payload assemblies: a 15-40 kiloton (kt) fission bomb; a 20 kt missile warhead; a 3 megaton (mt) thermonuclear missile warhead; a 3 mt thermonuclear gravity bomb; a 4-5 mt missile warhead; and a 200-300 kt missile warhead. China is thought to possess a total of some 150 tactical nuclear warheads on its short-range ballistic, and possibly cruise missiles…

Only limited data are available on Chinese military nuclear facilities as well. The NTI reports that,[396]

> Soviet assistance was critical in the early stages of China's nuclear facility construction. Between 1955 and 1958 the two nations signed six accords on the development of China's nuclear science, industry, and weapons program. In these accords, Soviet assistance included the supply of a nuclear reactor, cyclotron, aid in building China's nuclear industries and research facilities, and a prototype atomic bomb. The Sino-Soviet Split prevented the transfer of a prototype weapon, and the Chinese had to independently finish the construction of the gaseous diffusion plant at Lanzhou, Jiuquan's plutonium-producing reactor and plutonium-processing plant, and the Baotou Nuclear Fuel Component Plant.
>
> …China duplicated these facilities in its Third Line Policy with the construction of the Heping Uranium Enrichment Plant, Guangyuan facility (Plant 821), and the Yibin Nuclear Fuel Factory. Highly enriched uranium (HEU) production was based primarily in the Lanzhou and Heping gaseous diffusion plants. Both facilities stopped HEU production in 1979 and 1987 respectively. China's current inventory of HEU for weapons is estimated to total 16 ± 4 tons….China has produced plutonium for weapons at two sites, the Jiuquan Atomic Energy Complex and Guangyuan plutonium production complex. China's current inventory of weapon-grade plutonium is estimated to total 1.8 ± 0.5 tons.[19] Many HEU research reactors in China are being converted to low enriched uranium (LEU) or shut down.
>
> In 2007 the Nuclear Power Institute of China converted its high flux engineering test reactor (HFETR) as well as the HFETR Critical Assembly from HEU to LEU. China shut down the MNSR-SH at the Shanghai Testing and Research Institute in March 2007, and confirmed the shutdown of the MNSR-Shandong reactor in December 2010…
>
> Independently China is investing in the development of Generation IV technologies, such as the pebble-bed high temperature gas-cooled reactor (HTGR)….China is exploring options for reprocessing spent nuclear fuel to close the fuel cycle, in particular at the 404 Reprocessing Plant in Gansu Province. On 3 January 2011, state media hailed a "breakthrough" of mastering reprocessing technology.[23] The process poses proliferation concerns of plutonium being extracted, and cost and feasibility problems may hinder the commercialization of reprocessing technology…

The Union of Concerned Scientists (UCS) Estimate

The Union of Concerned Scientists (UCS) provides another good unclassified summary of China's nuclear weapons programs:[397]

> U.S. governmental and non-governmental assessments[1] indicate China currently possesses a small nuclear arsenal, with an estimated 155 nuclear warheads ready to be deployed on six different types of land-based missiles. Approximately 50 of those missiles can reach the continental United States.
>
> …Warheads: Estimates of the current number of Chinese nuclear warheads vary, but China is believed to have manufactured a total of between 200 and 300 warheads, roughly 50 of which have been used for nuclear tests. Currently, approximately 155 of those are believed to be prepared for deployment.
>
> China's stocks of military plutonium limit how much it could expand its arsenal without restarting plutonium production. Estimates of the size of China's existing plutonium stocks…are uncertain, but imply that the number of new warheads China could produce from existing stocks ranges from very few to possibly several hundred.
>
> China has halted production of military plutonium but has not declared an official moratorium. Its dedicated military plutonium production facilities have been decommissioned. However, China recently began operating a pilot plant for reprocessing spent fuel from its commercial reactors and is discussing plans for a larger commercial reprocessing facility. These facilities extract plutonium that is created in the reactor from the spent fuel. China also operates an experimental fast breeder reactor, which is optimized to produce plutonium that would be used as fuel, and is considering purchasing two additional fast breeder reactors from Russia. If necessary, China could divert plutonium extracted from these experimental and commercial facilities for military use.
>
> Satellite observations of the production facilities suggest they are not producing plutonium but they are well maintained. China officially supports negotiation of a Fissile Material Cut-off Treaty (FMCT) that would ban all future production for military use. This would cap China's capability to produce new warheads and place an upper bound on the size of its nuclear arsenal.
>
> …China has conducted 45 nuclear tests. This relatively small number of tests (the United States conducted 1,054 and the Soviet Union/Russia conducted 715) suggests there are a limited number of tested Chinese warhead designs certified for deployment. China accelerated the pace of its nuclear testing during the three years it took to negotiate the Comprehensive Test Ban Treaty (CTBT) in the mid-1990s in order to complete a series of tests on a smaller warhead design…U.S. analyses of that final test series suggest this smaller warhead is still too large for China to place multiple warheads on the long-range mobile missile designed deliver it, the DF-31…
>
> … Unlike other nuclear weapons states, China keeps all of its warheads in storage. China's nuclear warheads and nuclear-capable missiles are kept separate and the warheads are not mated to the missiles until they are prepared for launch. Interestingly, for this reason under the counting rule for New START the number of Chinese weapons would be counted as zero…
>
> … Estimates of the number, ranges, and payloads of Chinese nuclear-capable missiles vary. The estimates indicate China deploys approximately 150 land- based missiles that can carry nuclear payloads, fewer than 50 of which are long-range and can reach the United States….China is not believed to currently place multiple warheads on its missiles. However, some sources say DF-4 and DF- 5 missile tests have included testing of multiple re-entry vehicles…These tests may allow China to replace the older, larger single warheads on these two liquid-fueled missiles with smaller warheads and penetration aids. Chinese reports indicate that these may be tests of dummy warheads and penetration aids designed to defeat missile defenses…
>
> China is experimenting with submarine-launched ballistic missiles but the one nominally operational nuclear-armed ballistic missile submarine it currently possesses does not patrol and Chinese experts describe it as a failure…China built two new ballistic missile submarines and is rumored to be building more, but the nuclear-capable missile designed for deployment on those submarines failed initial flight tests…

… U.S. governmental and non- governmental reports indicate China possesses a stockpile of air-deliverable nuclear weapons but they have no "primary mission," according to U.S. assessments. Chinese cruise missiles can be armed with nuclear payloads but U.S. assessments state they are not. U.S. observations of China's military facilities, equipment, and training suggest China does not maintain a stockpile of tactical nuclear weapons…

…Chinese nuclear experts believe the risk that a nuclear- armed adversary would threaten to use nuclear weapons in an attempt to coerce China in some way is greatly reduced if this adversary doubts its ability to launch a strike that could eliminate China's ability to retaliate. China therefore values secrecy over transparency, since China believes transparency undermines its confidence in the survivability of its nuclear arsenal. Moreover, this confidence waxes and wanes in response to perceived trends in technological development. Technological improvements by a potential adversary that may increase its willingness to risk an attack against China with nuclear weapons, or an attack against China's nuclear weapons with conventional weapons, decreases Chinese confidence in its ability to retaliate. This precipitates requests by China's leadership to adjust or improve its arsenal.

Because of this sensitivity to technological change, China's defense scientists and engineers play a decisive role in determining China's nuclear posture. The open source literature published by this technically oriented community over the past several decades suggests it sees improvements in space and missile defense technology as the most significant and likely challenges to the credibility of China's ability to retaliate with nuclear weapons. For example, China is concerned that improvements in satellite reconnaissance may reveal the location of Chinese weapons and command and control facilities, and may increase the ability of adversaries to track and target mobile weapons. Or that missile defenses may increase the willingness of foreign adversaries to threaten a strike against China's nuclear arsenal, thus exposing Chinese leaders to the "nuclear blackmail" their arsenal is designed to prevent.

…A comparative look at China's arsenal relative to the arsenals of its principal rivals reveals that the evolution of China's nuclear weapon systems has occurred more slowly and on a smaller scale than that of the United States and the Soviet Union/Russia… China's modernization efforts are focused on developing solid-fueled missiles that can be deployed on mobile platforms, to reduce the likelihood its missiles could be destroyed in a first strike, compared to its original liquid- fueled missiles at fixed launch sites. In the past few years it

…The small size and limited capabilities of China's nuclear arsenal make the threat of a first use of nuclear weapons against the United States or Russia highly unlikely and not at all credible, since it would invite massive nuclear retaliation as well as international condemnation. None of the improvements to China's arsenal that are currently underway would present Chinese decision-makers with a more credible ability to threaten the first use of nuclear weapons against the United States or Russia. Therefore, it is reasonable to assume that the improvements being made to the Chinese nuclear arsenal are limited to maintaining a credible threat to retaliate.

…Because of the lack of nuclear testing, China is not modernizing or improving the design or nuclear components of its warheads. If China needs to manufacture warheads for the new nuclear-capable missiles it is deploying, these warheads would be manufactured according to existing, tested warhead designs certified for deployment before it stopped testing in 1996. As noted above, the size of China's existing stocks of military plutonium will place a limit on how many additional warheads it could build without producing more plutonium.

…China is also deploying a 1,700-km range nuclear missile, the DF-21, which is mobile and uses solid fuel. As with China's other missiles, the nuclear-capable DF-21 has been produced in small batches and progressively modified to accommodate different conventional military objectives, such as to launch the anti-satellite interceptor China tested in 2007 and the anti-ship

.. Chinese efforts to develop a submarine-launched nuclear missile, despite decades of effort, have yet to produce a deployable capability. This may be in part because it is not a high priority. Based on the history of Soviet submarines, if these first-generation submarines are eventually deployed they are expected to be noisy enough to be easily detectable at sea, which would restrict them to patrolling in shallow areas around the Chinese coast inside its territorial waters and beyond interference from U.S. forces.

Moreover, should China eventually begin to deploy submarine-launched missiles, deployment would

require placing both the warheads and missiles on the submarine, giving the commander greater responsibility and independence under conditions in which continuous secure and reliable communications with the political leadership are more difficult to maintain than with China's land-based missiles. This would be a major change, and could be seen as weakening the Chinese leadership's tight control over its development and testing of penetration aids. The development of these aids may be responsible for the increase in Chinese missile testing observed by U.S. satellites during the past decade.

The Global Security Estimate

In terms of China's historical development of nuclear weapons and potential future steps, Global Security reports that,[398]

> By 1953 the Chinese, under the guise of peaceful uses of nuclear energy, had initiated research leading to the development of nuclear weapons. The decision to develop an independent strategic nuclear force was made no later than early 1956 and was to be implemented within the Twelve-Year Science Plan presented in September 1956 to the Eighth Congress of the CCP. The decision to enter into a development program designed to produce nuclear weapons and ballistic missile delivery systems was, in large part, a function of the 1953 technology transfer agreements initiated with the USSR.
>
> In 1951 Peking signed a secret agreement with Moscow through which China provided uranium ores in exchange for Soviet assistance in the nuclear field. In mid-October 1957 the Chinese and Soviets signed an agreement on new technology for national defense that included provision for additional Soviet nuclear assistance as well as the furnishing of some surface-to-surface and surface-to-air missiles. The USSR also agreed to supply a sample atomic bomb and to provide technical assistance in the manufacture of nuclear weapons. The Soviets provided the Chinese with assistance in building a major gaseous diffusion facility for production of enriched uranium. Subsequently the Chinese accused Moscow of having abrogated this agreement in 1959, and having "refused to supply a simple atomic bomb and technical data concerning its manufacture."
>
> China began developing nuclear weapons in the late 1950s with substantial Soviet assistance. Before 1960 direct Soviet military assistance had included the provision of advisors and a vast variety of equipment. Of the assistance provided, most significant to China's future strategic nuclear capability were an experimental nuclear reactor, facilities for processing uranium, a cyclotron, and some equipment for a gaseous diffusions plant.
>
> When Sino-Soviet relations cooled in the late 1950s and early 1960s, the Soviet Union withheld plans and data for an atomic bomb, abrogated the agreement on transferring defense technology, and began the withdrawal of Soviet advisers in 1960. Despite the termination of Soviet assistance, China committed itself to continue nuclear weapons development to break "the superpowers' monopoly on nuclear weapons," to ensure Chinese security against the Soviet and United States threats, and to increase Chinese prestige and power internationally.
>
> When China decided in 1955 to develop atomic bombs it faced a number of technological choices as to the most appropriate route to follow. At that time China could only work on one path, and had to choose between producing Pu239 from a reactor, or developing the method of producing U235 through isotope separation. The uranium path offered two alternatives, either system, either chemical separation or physical separation. Chemical separation of Pu235 from the mixed system of U235 and U238 would have been easier than physical separation, but the separation of plutonium and uranium was difficult due to the high radioactivity of the Pu-U system, and the severe toxicity of plutonium. Therefore, the chosen path was the physical separation of U235 and U238 isotopes. The implosion method of detonating an atomic bomb was considered more technically advanced, though there were questions as to whether China was capable of producing a uranium bomb detonated by the implosion method.
>
> China made remarkable progress in the 1960s in developing nuclear weapons. In a thirty-two-month period, China successfully exploded its first atomic bomb (October 16, 1964), launched its first nuclear missile (October 25, 1966), and detonated its first hydrogen bomb (June 14, 1967.
>
> The first Chinese nuclear test was conducted at Lop Nor on 16 October 1964 (CHIC 1). It was a tower shot involving a fission device with a yield of 25 kilotons. Uranium 235 was used as the nuclear fuel, which

indicates Beijing's choice of the path of creating high-yield nuclear weapons right away. Of the ten test shots that followed by 29 September 1969, six are believed to have been related to thermonuclear development. The others had as their goals the adaptation of CHIC 1 for bomber delivery and test of a missile warhead (CHIC 4). The third nuclear test was conducted on 9 September 1966 using a Tu-16 bomber. In addition to uranium 235, this nuclear device, with a yield around 100 KT, this time contained lithium 6, which attested to China's readiness to test a thermonuclear explosion. CHIC 6, an airdrop test on 17 June 1967, was the first full-yield, two-stage thermonuclear test.

… The successes achieved in nuclear research and experimental design work permitted China to begin series production of nuclear (since 1968) and thermonuclear (since 1974) warheads…Subsequent nuclear tests (CHIC 12, CHIC 13) were suggestive of a new phase of the PRC test programs. Both were low yield weapons. It appeared possible that CHIC 13 was delivered by an F-9 fighter aircraft and may have been a proof test of a weapon.

The PRC's nuclear weapons intelligence collection efforts began after the end of the Cultural Revolution in 1976, when the PRC assessed its weaknesses in physics and the deteriorating status of its nuclear weapons programs. The PRC's warhead designs of the late 1970s were large, multi-megaton thermonuclear weapons that could only be carried on large ballistic missiles and aircraft. The PRC's warheads were roughly equivalent to US warheads designed in the 1950s. The PRC may have decided as early as that time to pursue more advanced thermonuclear warheads for its new generation of ballistic missiles.

In addition to the development of a sea-based nuclear force, China began considering the development of tactical nuclear weapons. PLA exercises featured the simulated use of tactical nuclear weapons in offensive and defensive situations beginning in 1982. Reports of Chinese possession of tactical nuclear weapons remained unconfirmed in 1987. In 1988 Chinese specialists tested a 1-5 KT nuclear device with an enhanced radiation yield, advancing the country's development of a very low yield neutron weapon and laying the foundation for the creation of nuclear artillery.

… During the l990s, the PRC was working to complete testing of its modern thermonuclear weapons before it signed the Comprehensive Test Ban Treaty in 1996. The PRC conducted a series of nuclear tests from 1992 to 1996. Based on what is known about PRC nuclear testing practices, combined with data on PRC warhead yield and on PRC missile development, it is clear that the purpose of the 1992 to 1996 test series was to develop small, light warheads for the PRC's new nuclear forces.

One of the objectives of the final series of Chinese nuclear tests was to miniaturize China's nuclear warheads, dropping their weight from 2200 kgs to 700 kgs in order to accommodate the next generation of solid-fueled missile systems. This series of PRC nuclear weapons test explosions from 1992 to 1996 began a debate in the US Government about whether the PRC's designs for its new generation of nuclear warheads were in fact based on stolen U.S. classified information. The apparent purpose of these PRC tests was to develop smaller, lighter thermonuclear warheads, with an increased yield-to-weight ratio.

The United States did not become fully aware of the magnitude of the counterintelligence problem at Department of Energy national weapons laboratories until 1995. In 1995, a "walk-in" approached the Central Intelligence Agency outside the PRC and provided an official PRC document classified "Secret" that contained specific design information on the W-88 Trident D-5, and technical information on other thermonuclear warheads. The CIA later determined that the "walk-in" was directed by the PRC intelligence services. Nonetheless, CIA and other Intelligence Community analysts that reviewed the document concluded that it contained US warhead design information.

Completing the development of its next-generation warhead poses challenges for the PRC. The PRC may not currently be able to match precisely the exact explosive power and other features of U.S. weapons. Nonetheless, the PRC may be working toward this goal, and the difficulties it faces are surmountable. Work-arounds exist, using processes similar to those developed or available in a modern aerospace or precision-guided munitions industry. The PRC possesses these capabilities already.

Assessing the extent to which design information losses accelerated the PRC's nuclear weapons development is complicated because so much is unknown. The full extent of U.S. information that the PRC acquired and the sophistication of the PRC's indigenous design capabilities are unclear. Moreover, there is the possibility of third country assistance to the PRC's nuclear weapons program, which could also assist the PRC's exploitation of the stolen U.S. nuclear weapons information.

There is considerable uncertainly in published estimates of the size of the Chinese nuclear weapons stockpile. In the late 1980s it was generally held that China was the world's third-largest nuclear power, possessing a small but credible nuclear deterrent force of 225 to 300 nuclear weapons. Other estimates of the country's production capacities suggested that by the end of 1970 China had fabricated around 200 nuclear weapons, a number which could have increased to 875 by 1980. With an average annual production of 75 nuclear weapons during the 1980s, some estimates suggest that by the mid-1990s the Chinese nuclear industry had produced around 2,000 nuclear weapons for ballistic missiles, bombers, artillery projectiles and landmines.

… China is seeking to increase the credibility of its nuclear retaliatory capability by dispersing and concealing its nuclear forces in difficult terrain, improving their mobility, and hardening its missile silos.

The Federation of American Scientists (FAS) Estimate

The Federation of American Scientists (FAS) provides additional detail on Chinese tests and weapons developments:[399]

When China decided in 1955 to develop atomic bombs it faced a number of technological choices as to the most appropriate route to follow. At that time China could only work on one path, and had to choose between producing Pu239 from a reactor, or developing the method of producing U235 through isotope separation. The uranium path offered two alternatives, either system, either chemical separation or physical separation. Chemical separation of Pu235 from the mixed system of U235 and U238 would have been easier than physical separation, but the separation of plutonium and uranium was difficult due to the high radioactivity of the Pu-U system, and the severe toxicity of plutonium. Therefore, the chosen path was the physical separation of U235 and U238 isotopes. The implosion method of detonating an atomic bomb was considered more technically advanced, though there were questions as to whether China was capable of producing a uranium bomb detonated by the implosion method.

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Although the Cultural Revolution disrupted the strategic weapons program less than other scientific and educational sectors in China, there was a slowdown in succeeding years. The successes achieved in nuclear research and experimental design work permitted China to begin series production of nuclear (since 1968) and thermonuclear (since 1974) warheads.

Subsequent nuclear tests (CHIC 12, CHIC 13) were suggestive of a new phase of the PRC test programs. Both were low yield weapons. It appeared possible that CHIC 13 was delivered by an F-9 fighter aircraft and may have been a proof test of a weapon. One of the objectives of the final series of Chinese nuclear tests was to miniaturize China's nuclear warheads, dropping their weight from 2200 kgs to 700 kgs in order to accommodate the next generation of solid-fueled missile systems.

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While these analyses differ in detail, they still track broadly with what several experts in the US government felt could be said about Chinese nuclear weapons on an unclassified basis. There are other US experts, however, who believe that China may be concealing a much large nuclear effort, have much larger stockpiles – including theater and smaller tactical weapons – and be moving more aggressively towards MIRVing and improving its strategic nuclear warhead numbers.

The United States

Since the end of the Cold War, the US has been removing its deployed nuclear weapons from Europe and Asia. In 2008, the US informed Japan it would be retiring its sea-based nuclear warhead Tomahawk cruise missiles from the region.[400]

The US had over 1,700 deployed strategic warheads as of March 2013. It had an additional 200 active theater nuclear weapons. The FAS reported that the US had an estimated 2,200 strategic and 300 non-strategic warheads in central storage. Some 260 nonstrategic W80-0 warheads for the Tomahawk land-attack cruise missile (TLAM/N) have been retired. Another 3,000 retired warheads were "awaiting dismantlement." In addition, more than 15,000 plutonium cores (pits) and some 5,000 Canned Assemblies (secondaries) from dismantled warheads are in storage at the Pantex Plant in Texas and Y-12 plant in Tennessee.[401]

The US summarized its strategy in dealing with deterrence and nuclear forces as follows in its FY2014 defense budget overview:[402]

> The United States will maintain a safe, secure, and effective nuclear arsenal. We will field nuclear forces that can operate effectively under all conditions to deny a potential adversary their war aims, and confront them with the prospect of unacceptable damage. This posture is essential for deterring potential adversaries and assuring U.S. allies and other security partners that they can count on America's security commitments. DoD will maintain effective nuclear forces even as it seeks to reduce the role and number of nuclear weapons and as it proceeds with New START implementation. Key enhancements and protected capabilities associated with this mission area include developing a new penetrating bomber and a next-generation ballistic missile submarine.
>
> … DoD conducts a range of activities in partnership with other elements of the U.S. Government and international allies and partners aimed at preventing the proliferation and use of nuclear, biological, and chemical weapons. These activities include strengthening non-proliferation regimes, building partner capacity to counter WMD, Cooperative Threat Reduction (CTR) initiatives, and planning and operations to locate, monitor, track, intercept, interdict, secure, and dispose of WMD and WMD-related components and the means to make them. They also include participation in an active whole- of-government effort to frustrate the ambitions of nations and non-state actors bent on possessing WMD. DoD will continue to invest in capabilities to predict, detect, protect against, and respond to WMD proliferation and use, should preventive measures fail. Key enhancements associated with this mission area include: maintaining the Chemical Biological Incident Response Force (CBIRF); continuing efforts to expand the geographic reach of the CTR program; and providing additional funds for ground-based prompt nuclear forensics diagnostics systems.

Theater nuclear weapons present another set of complex issues because US policy has changed and the current status of such forces in contingencies outside Europe remains somewhat ambiguous. A report by Amy Woolf of the US Congressional Research Service notes that,[403]

> In 1991, the United States and Soviet Union both withdrew from deployment most and eliminated from their arsenals many of their nonstrategic nuclear weapons. The United States now has approximately 760 nonstrategic nuclear weapons, with around 200 deployed with aircraft in Europe and the remaining stored in the United States. Estimates vary, but experts believe Russia still has between 1,000 and 6,000 warheads for nonstrategic nuclear weapons in its arsenal. The Bush Administration quietly redeployed and removed some of the nuclear weapons deployed in Europe. Russia, however seems to have increased its reliance on nuclear weapons in its national security concept. Some analysts argue that Russia has backed away from its commitments from 1991 and may develop and deploy new types of nonstrategic nuclear weapons.
>
> Recent discussions about the U.S. nuclear weapons policy have placed a renewed emphasis on the role of U.S. nonstrategic nuclear weapons in extended deterrence and assurance. Extended deterrence refers to the U.S. threat to use nuclear weapons in response to attacks, from Russia or other adversaries, against allies in NATO and some allies in Asia. Assurance refers to the U.S. promise, made to those same allies, to come to their defense and assistance if they are threatened or attacked. The weapons deployed in Europe are a visible reminder of that commitment; the sea-based nonstrategic nuclear weapons in storage that could be deployed in the Pacific in a crisis served a similar purpose for U.S. allies in Asia. Recent debates, however, have focused on the question of whether a credible U.S. extended deterrent requires that the United States maintain weapons deployed in Europe, and the ability to deploy them in the Pacific, or whether other U.S. military capabilities, including strategic nuclear weapons and conventional forces, may be sufficient….
>
> In the 2010 Nuclear Posture Review, the Obama Administration stated that the United States "will continue to assure our allies and partners of our commitment to their security and to demonstrate this commitment not only through words, but also through deeds." The NPR indicated that a wide range of U.S. military capabilities would support this goal, but also indicated that U.S. commitments would "retain a nuclear dimension as long as nuclear threats to U.S. allies and partners remain." The Administration did not, however, specify that the nuclear dimension would be met with nonstrategic nuclear weapons; the full range of U.S. capabilities would likely be available to support and defend U.S. allies. In addition, the Administration announced that the United States would retire the nuclear-armed sea-launched cruise missiles that had helped provide assurances to U.S. allies in Asia. In essence, the Administration concluded that the United States could reassure U.S. allies in Asia, and deter threats to their security, without deploying sea-based cruise missiles to the region in a crisis.
>
> Moreover, the possible use of nuclear weapons, and extended nuclear deterrence, were a part of a broader concept that the Administration referred to as "regional security architectures." The NPR indicated that regional security architectures were a key part of "the U.S. strategy for strengthening regional deterrence while reducing the role and numbers of nuclear weapons." As a result, these architectures would "include effective missile defense, counter-WMD capabilities, conventional power-projection capabilities, and integrated command and control—all underwritten by strong political commitments." In other words, although the United States would continue to extend deterrence to its allies and seek to assure them of the U.S. commitment to their security, it would draw on a political commitments and a range of military capabilities to achieve these goals.
>
> …In the past, U.S. discussions about nonstrategic nuclear weapons have also addressed questions about the role they might play in deterring or responding to regional contingencies that involved threats from nations that may not be armed with their own nuclear weapons. For example, former Secretary of Defense Perry stated that, "maintaining U.S. nuclear commitments with NATO, and *retaining the ability to deploy nuclear capabilities to meet various regional contingencies*, continues to be an important means for deterring aggression, protecting and promoting U.S. interests, reassuring allies and friends, and preventing proliferation (emphasis added)."
>
> … Specifically, both during the Cold War and after the demise of the Soviet Union, the United States maintained the option to use nuclear weapons in response to attacks with conventional, chemical, or biological weapons. For example, in 1999, Assistant Secretary of Defense Edward Warner testified that "the U.S. capability to deliver an overwhelming, rapid, and devastating military response with the full

range of military capabilities will remain the cornerstone of our strategy for deterring rogue nation ballistic missile and WMD proliferation threats. The very existence of U.S. strategic and theater nuclear forces, backed by highly capable conventional forces, should certainly give pause to any rogue leader contemplating the use of WMD against the United States…"

The George W. Bush Administration also emphasized the possible use of nuclear weapons in regional contingencies in its 2001 Nuclear Posture Review. The Bush Administration appeared to shift towards a somewhat more explicit approach when acknowledging that the United States might use nuclear weapons in response to attacks by nations armed with chemical, biological, and conventional weapons, stating that the United States would develop and deploy those nuclear capabilities that it would need to defeat the capabilities of *any* potential adversary whether or not it possessed nuclear weapons. This does not, by itself, indicate that the United States would plan to use nonstrategic nuclear weapons. However, many analysts concluded from these and other comments by Bush Administration officials that the United States was planning for the tactical, first use of nuclear weapons. The Bush Administration never confirmed this view, and, instead, indicated that it would not use nuclear weapons in anything other than the most grave circumstances.

The Obama Administration, on the other hand, seemed to foreclose the option of using nuclear weapons in some regional contingencies. Specifically, it stated, in the 2010 NPR, that, "the United States will not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the Nuclear Non-Proliferation Treaty (NPT) and in compliance with their nuclear nonproliferation obligations." Specifically, if such a nation were to attack the United States with conventional, chemical, or biological weapons, the United States would respond with overwhelming conventional force, but it would not threaten to use nuclear weapons if the attacking nation was in compliance with its nuclear nonproliferation obligations and it did not have nuclear weapons of its own...At the same time, though, the NPR stated that any state that used chemical or biological weapons "against the United States or its allies and partners would face the prospect of a devastating conventional military response—and that any individuals responsible for the attack, whether national leaders or military commanders, would be held fully accountable."…

…Through the late 1990s and early in George W. Bush Administration, the United States maintained approximately 1,100 nonstrategic nuclear weapons in its active stockpile. Unclassified reports indicate that, of this number, around 500 were air-delivered bombs deployed at bases in Europe. The remainder, including some additional air-delivered bombs and around 320 nuclear-armed sea-launched cruise missiles, were held in storage areas in the United States…

After the Clinton Administration's 1994 Nuclear Posture Review, the United States eliminated its ability to return nuclear weapons to U.S. surface ships (it had retained this ability after removing the weapons under the 1991 PNI). It retained, however, its ability to restore cruise missiles to attack submarines, and it did not recommend any changes in the number of air-delivered weapons deployed in Europe. During this time, the United States also consolidated its weapons storage sites for nonstrategic nuclear weapons. It reportedly reduced the number of these facilities "by, over 75%" between 1988 and 1994. It eliminated two of its four storage sites for sea-launched cruise missiles, retaining only one facility on each coast of the United States. It also reduced the number of bases in Europe that store nuclear weapons from over 125 bases in the mid-1980s to 10 bases, in seven countries, by 2000…

The Bush Administration did not recommend any changes for U.S. nonstrategic nuclear weapons after completing its Nuclear Posture Review in 2001. Reports indicate that it decided to retain the capability to restore cruise missiles to attack submarines because of their ability to deploy, in secret, anywhere on the globe in time of crisis. The NPR also did not recommend any changes to the deployment of nonstrategic nuclear weapons in Europe, leaving decisions about their status to the members of the NATO alliance.

Nevertheless, according to unclassified reports, the United States did reduce the number of nuclear weapons deployed in Europe and the number of facilities that house those weapons during the George W. Bush Administration. Some reports indicate that the weapons were withdrawn from Greece and Ramstein Air Base in Germany between 2001 and 2005. In addition reports indicate that the United States also withdrew its nuclear weapons from the RAF Lakenheath air base in the United Kingdom in 2006.5…According to a recent unclassified report, the United States now deploys 160-200 bombs at six bases in Belgium, Germany, Italy, the Netherlands, and Turkey. Some of these weapons are stored at U.S.

> bases and would be delivered by U.S. aircraft. Others are stored at bases operated by the "host nation" and would be delivered by that nation's aircraft if NATO decided to employ nuclear weapons.
>
> The Obama Administration has not announced any further reductions to U.S. nuclear weapons in Europe and has indicated that the United States would "consult with our allies regarding the future basing of nuclear weapons in Europe." In the months prior to the completion of NATO's new Strategic Concept, some politicians in some European nations did propose that the United States withdraw these weapons. For example, Guido Westerwelle, Germany's foreign minister, stated that he supported the withdrawal of U.S. nuclear weapons from Germany. Some reports indicate that Belgium and the Netherlands also supported this goal…. As was noted above, NATO did not call for the removal of these weapons in its new Strategic Concept, but did indicate that it would be open to reducing them as a result of arms control negotiations with Russia.
>
> Moreover, in the 2010 NPR, the Obama Administration indicated that it would take the steps necessary to maintain the capability to deploy U.S. nuclear weapons in Europe. It indicated that the U.S. Air Force would retain the capability to deliver both nuclear and conventional weapons as it replaced aging F-16 aircraft with the new F-35 Joint Strike Fighter. The NPR also indicated that the United States would conduct a "full scope" life extension program for the B61 bomb, the weapon that is currently deployed in Europe, "to ensure its functionality with the F-35." This life extension program will consolidate four versions of the B61 bomb, including the B61-3 and B61-4 that are currently deployed in Europe, into one version, the B61-12. Reports indicate that this new version will reuse the nuclear components of the older bombs, but will include enhanced safety and security features and a new "tail kit" that will increase the accuracy of the weapon….
>
> On the other hand, the NPR indicated that the U.S. Navy would retire its nuclear-armed, sea-launched cruise missiles (TLAM-N). It indicated that "this system serves a redundant purpose in the U.S. nuclear stockpile" because it is one of several weapons the United States could deploy forward. The NPR also noted that, "U.S. ICBMs and SLBMs are capable of striking any potential adversary." As a result, because "the deterrence and assurance roles of TLAM-N can be adequately substituted by these other means," the United States could continue to extend deterrence and provide assurance to its allies in Asia without maintaining the capability to redeploy TLAM-N missiles….

The US remains committed to civil nuclear programs as well. It has 104 nuclear power reactors producing approximately 20% of US energy needs and is considering the construction of 28 further reactors.[404]

The documents submitted with the US proposed FY2014 budget describe several other current US plans for strategic forces, deterrence, and defense. It is not clear how they will affect the future US stockpile of nuclear weapons, but they do reflect both budget cutbacks and ongoing improvements in other areas:[405]

> The Department will maintain a strong nuclear deterrence posture in the face of all potential threats, including developments in North Korea and risks from Iran. We are also committed to providing effective missile defense and maintaining a safe, secure, and effective nuclear arsenal. Despite budget pressures, DoD has ensured robust funding for these mission areas, making investments and taking actions to ensure the U.S. remains ahead of threat developments, including:
>
> - Refocusing technologically advanced systems unlikely to be fielded quickly towards tech development activities to reduce risk and cost but that will field later (SM-3 IIB)
> - Cancelling expensive surveillance systems and reinvesting in achievable, near-term upgrades to ground based radars (PTSS)
> - Adding to national hedge against ballistic missile attack from rogue states (GBIs)
>
> Partnering with the National Nuclear Security Agency (NNSA) to assess the true requirements of the nuclear stockpile and associated infrastructure.

SM-3 IIB.

The SM-3 IIB missile defense interceptor was previously planned to be based in Europe and provide an additional capability to defend the U.S. from ballistic missile attack. Given the advancing threat posed by North Korea in particular, the DoD assessed that the SM-3 IIB would be late to need and therefore restructured the program by reinvesting the funds into advanced interceptor technology development to include a common kill vehicle, and other enabling programs. The restructuring also funds the increased number of Ground Based Interceptors (GBIs), from 30 to 44. The SM-3 IIB program would have provided an expensive niche capability while homeland defense gaps widen. Changing the investment strategy to advanced technology development and additional deployment of GBIs will better address current and future threat challenges.

Precision Tracking Space Sensor.

PTSS was intended to be a constellation of satellites to track medium and intermediate range ballistic missiles as well as intercontinental ballistic missiles. A review of the program found significant cost growth, schedule concurrency, technical risk, and utility concerns. Therefore, DoD terminated the PTSS program and reinvested some of the savings in evolutionary upgrades to existing systems. Reinvesting PTSS funds addresses key sensor gaps, including discrimination, raid size, and coverage. These investments provide upgrades to existing radars and strengthen operational support of missile defense systems.

Ground Based Interceptors. GBIs are missile interceptors based in Alaska and California, intended to defend the U.S. from limited ballistic missile attack. Restructure of the SM-3 IIB program allowed for additional buys of 14 GBIs and corresponding refurbishment of the Alaskan missile field at Fort Greely. This restructure decision was driven by increased concerns and intelligence regarding the current threat environment. The increase in GBIs closes the near-term gap between our defense capabilities and threat intelligence projections.

Partnering with the Department of Energy.

In addition to missile defense, DoD partnered with the Department of Energy's National Nuclear Security Agency to assess nuclear stockpile and infrastructure requirements. As an outcome, the DoD and DoE better postured the nation to ensure an executable, safe nuclear weapons program for years to come by:

- Funding maintenance, upgrades, and replacements for aging nuclear infrastructure.
- Finding cost-effective approaches to extending the life of our nuclear arsenal without compromising safety, security, or effectiveness.
- Robustly funding a broad array of non-proliferation projects to reduce global nuclear dangers.
- Restructuring efforts for disposition of excess plutonium on a path to ensure efforts are both effective and fiscally responsible.
- Initiating efforts to gain numerous efficiencies across the enterprise.

However, as regards its nuclear forces, the US has long focused on Russia, paying little attention to Chinese nuclear forces. The US has also begun to promote significant nuclear weapons reductions. President Obama declared in April 2009 that the US was committed to the long-term goal of zero nuclear weapons, and there has been a unilateral Congressional moratorium on nuclear tests since 1992. Although the 2001 Nuclear Posture Review suggested that the US might develop new types of nuclear weapons, the 2010 Nuclear Posture Review reversed course. The new posture is that nuclear weapons research will only involve components based on previous designs, not new capabilities or missions.

After the 2010 Review and the ratification of the new START Treaty, President Obama directed the Departments of State, Energy, Defense, and the intelligence community to analyze US nuclear deterrence requirements and policy in the current security environment. A White House

fact sheet released on June 19, 2013 described Obama's new guidance on nuclear employment planning, force structure, and posture decisions, which:[406]

- affirms that the United States will maintain a credible deterrent, capable of convincing any potential adversary that the adverse consequences of attacking the United States or our allies and partners far outweigh any potential benefit they may seek to gain through an attack.
- directs DOD to align U.S. defense guidance and military plans with the policies of the NPR, including that the United States will only consider the use of nuclear weapons in extreme circumstances to defend the vital interests of the United States or its allies and partners. The guidance narrows U.S. nuclear strategy to focus on only those objectives and missions that are necessary for deterrence in the 21st century. In so doing, the guidance takes further steps toward reducing the role of nuclear weapons in our security strategy.
- directs DOD to strengthen non-nuclear capabilities and reduce the role of nuclear weapons in deterring non-nuclear attacks.
- directs DOD to examine and reduce the role of launch under attack in contingency planning, recognizing that the potential for a surprise, disarming nuclear attack is exceedingly remote. While the United States will retain a launch under attack capability, DOD will focus planning on the more likely 21st century contingencies.
- codifies an alternative approach to hedging against technical or geopolitical risk, which will lead to more effective management of the nuclear weapons stockpile.
- reaffirms that as long as nuclear weapons exist, the United States will maintain a safe, secure and effective arsenal that guarantees the defense of the U.S. and our allies and partners. The President has supported significant investments to modernize the nuclear enterprise and maintain a safe, secure, and effective arsenal. The administration will continue seeking congressional funding support for the enterprise.

The DoD's June 12, 2013 *Report on Nuclear Employment Strategy of the United States Specified in Section 491 of 10 U.S.C.* referenced China directly, making clear that the US will continue to seek maintenance of strategic stability with China and Russia:[407]

> While addressing the increasingly urgent threats of nuclear terrorism and proliferation, the United states must continue to address the more familiar challenge of ensuring strategic stability with Russia and China….
>
> The United States is concerned about many aspects of China's conventional military modernization efforts and is watching closely the modernization and growth of China's nuclear arsenal. The lack of transparency surrounding its nuclear programs, specifically their pace and scope, as well as the strategy and doctrine that guides them, raises questions about China's long-term intentions.
>
> The United States remains committed to maintaining strategic stability in U.S.-China relations and supports initiation of a dialogue on nuclear affairs aimed at fostering a more stable, resilient, and transparent security relationship with China.
>
> …. The new guidance states that the United States will maintain a nuclear Triad, consisting of intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and nuclear-capable heavy bombers. Retaining all three triad legs will best maintain strategic stability at reasonable cost, while hedging against potential technical problems or vulnerabilities. These forces should be operated on a day-to-day basis in a manner that maintains strategic stability with Russia and China, deters potential regional adversaries, and assures U.S. Allies and partners….

Russian President Putin and President Obama discussed non-proliferation at the June 2013 G8 summit, and Obama gave a public speech on the issue on a June 19 visit to Germany, calling for reductions in strategic nuclear weapons stockpiles of one-third.[408] While concentrating on Russia and the European theatre, it seems that China was not mentioned once.

North and South Korea

The official view of the US intelligence community is that North Korea has not yet been successful in obtaining high yields from its fission devices. Its initial tests produced only very low yields. The third test on February 12, 2013 seems to have produced a yield of only "several kilotons" to 6-7 kilotons, versus 12-20 kilotons for the first US weapons.[409] This would present serious problems for the regime in terms of targeting anything but city-sized targets, especially any capacity to hit targets at long missile ranges, given the combined uncertainties surrounding the reliability of both the warhead and North Korean missiles, as well as the reliability and accuracy of North Korean systems overall.

North Korea may not have the ability to build small warheads and bombs – although this seems to be a subject of dispute within the US intelligence community and outside exports; for instance, ISIS estimates that, "it should not come as a surprise to the international community that North Korea may now have the capability to explode a miniaturized nuclear device."[410]

ISIS (and key members of the US intelligence community) have assessed for some time that North Korea likely has the capability to miniaturize a nuclear weapon for its 800-mile range *Nodong* missile, although more information is needed to make a sound assessment. ISIS has also argued that North Korea still lacks the ability to deploy a warhead on an ICBM, though it shows progress at this effort. North Korea would need to conduct missile flight tests with a re-entry vehicle and mock warhead, increase the explosive yield of the warhead, possibly requiring its further miniaturization, and improve the operational reliability of the warhead and missile."[411]

It seems clear that North Korea does not have boosted or thermonuclear weapons production capabilities, but there is no way to predict when or if it might acquire these. Again, ISIS estimates that, "North Korea does not appear to have detonated a more sophisticated nuclear device, such as a thermonuclear device. Before the test, concern was expressed by some analysts that North Korea could test a more advanced nuclear weapon. The data from this test so far indicate that this is not the case. One important question is whether the nuclear test used only plutonium or involved highly enriched uranium either alone or in combination with plutonium."[412]

There is no clear way to estimate North Korea's stocks of plutonium. ISIS has estimated that, "North Korea had produced a total plutonium stockpile of between 46 and 64 kilograms, of which 28-50 kilograms could be in separated form and usable in nuclear weapons." This estimate was made in 2007, after the North's first nuclear test. There have since been two other tests, illustrating the difficulty in making such estimates.[413] Current estimates may or may not take account North Korea's third test, but give estimates of enough plutonium to make up to six weapons.[414, 415]

North Korea has publically stated that it is refueling its 5 MWe reactor at Yongbyon and is building a new 50-100 MWe there as well as a 200 MWe reactor at Taechon.[416] It displayed a large centrifuge facility at Yongbyon in 2010 that could give it uranium fissile material for its weapons as well as fuel its reactors to make more plutonium. However, experts indicate the capacity of this facility is still limited: "…North Korea announced on April 2 that it would restart its nuclear facilities, including its 5-megawatt nuclear reactor in Yongbyon, north of the capital, which had been disabled and mothballed since an agreement in October 2007.… North Korea's nuclear arsenal is severely limited by a lack of fissile materials – plutonium or highly enriched uranium (HEU) – to fuel its bombs. Despite its recent threats, North Korea does not yet have

much of a nuclear arsenal because it lacks fissile materials and has limited nuclear testing experience."[417]

In the long term, it is important that North Korea does not produce more fissile materials and does not conduct more nuclear tests; otherwise it would pose a much more serious threat. The Kim Jong-un regime has already threatened to conduct more tests, this announcement indicates that they are going to make more bomb fuel, which they also need to conduct more nuclear tests.[418]

North Korea has deployed its own version of the *Scud* B with a nominal range of 186 miles and *Scud* C with a range of 310 miles. It has four longer-range systems in development that include the *Nodong* (620 miles?), *Taepodong*-1 (900+ miles), *Musudan* (1,680-2,100 miles), and *Taepodong*-2 (2,500-3,700 miles).[419]

A recent CRS analysis notes that,[420]

> A DNI report to Congress says that 'North Korea has short and medium range missiles that could be fitted with nuclear weapons, but we do not know whether it has in fact done so.' North Korea has several hundred short-range Scud-class and medium-range No-Dong-class ballistic missiles, and is developing an intermediate range ballistic missile. The Taepo-Dong-2 that was tested unsuccessfully in July 2006 would be able to reach the continental United States if it becomes operational. DNI assessed in 2008 that the Taepo-Dong-2 has the potential capability to deliver a nuclear-weapon-sized payload to the United States, but that absent successful testing the likelihood of this is low. A launch of a Taepo-Dong-2 missile as part of a failed satellite launch in April 2009 traveled further than earlier unsuccessful launches but still did not achieve a complete test. An April 2012 launch of a Taepo-Dong-2 (called the Unha-3 by North Korea) also failed in the first stage. The December 2012 launch of a Taepo-Dong-2 (Unha-3) was North Korea's first successful launch of a satellite into space. However, putting a satellite into orbit, while moving North Korea technically to its goal, does not translate into a reliable missile. Further testing would be required.

North Korea has already threatened nuclear strikes on the US even though it lacks a credible capability to launch them and makes no secret of the nuclear threat it poses to its neighbors. North Korea also seems set on a course in which it will steadily deploy nuclear-armed missiles and aircraft with progressively longer ranges, higher yields, and more accuracy and reliability over time. It will exploit any failure to match these forces, and there is no clear way to estimate how a mature and survivable nuclear force would affect North Korean uses of force at lower levels or its perceptions of risk.

There is no way China or the US can calculate North Korea's willingness to take nuclear risks, though the fact its threats and strategic rhetoric are extreme does not mean its actions will be. However, that it remains the only power that openly threatens nuclear war and whose strategic leadership is openly uncertain enough to raise serious questions about its judgment and restraint.

US options are limited by the fact that North Korea has a powerful – if cautious and sometimes restraining – protector in China. It is far harder for the US to talk about preventive strikes after the fact and in the face of Chinese desire to keep a buffer state between it and the US. In addition, US options are affected by the fact that any deployment of US nuclear forces or extended deterrence that focuses on North Korea will be seen by China as a potential threat.

At the same time, the US faces the reality that the risks of a growing North Korean nuclear force – coupled with a large stock of chemically-armed bombs and missiles and possible biological weapons – mean it cannot simply let a key ally like South Korea bear a one-sided threat or leave Japan in the position where it, too, has no balancing force. While arms control options are not impossible, it is also all too clear that that they offer only a limited chance of success.

Accordingly, North Korea seems to be a nuclear wildcard that both the US and China will have to live with indefinitely into the future, though recently China has announced, along with both the US and South Korea, on separate occasions, itself in favor of a denuclearized North Korea and a resumption of disarmament negotiations.

India and Pakistan

North Korea is not the only regional nuclear power that can be a wild card in China's military development and that needs to be considered in any US and Chinese dialogue or negotiations on nuclear weapons. South Korea, Japan, and Iran are all potential nuclear forces. More importantly China faces current potential nuclear threats from India and must consider the risk Pakistan might lose control of some of its nuclear weapons.

At present, both countries continue to build up their nuclear-armed missile forces and stockpiles of nuclear weapons. While unclassified estimates are very uncertain and differ greatly in detail, an Open Briefing report on Indian nuclear forces drawing on material published in the Bulletin of the Atomic Scientists noted that India continued to improve the nuclear strike capabilities of its combat aircraft and develop sea-based ballistic and cruise missiles, and that its nuclear weapons stocks and missiles could be summarized as follows:[421]

> India is estimated to have produced approximately 520 kilograms of weapons-grade plutonium (IPFM, 2011), sufficient for 100–130 nuclear warheads; however, not all of the material has been converted into warheads. Based on available information about its nuclear-capable delivery vehicles, we estimate that India has produced 80–100 nuclear warheads. It will need more warheads to arm the new missiles it is currently developing. In addition to the Dhruva plutonium production reactor near Mumbai, India plans to construct a second reactor near Visakhapatnam, on the east coast. India is building an unsafeguarded prototype fast-breeder reactor at the Indira Gandhi Centre for Atomic Research near Kalpakkam (about 1,000 kilometers or 620 miles south of Visakhapatnam), which will significantly increase India's plutonium production capacity once it becomes operational.
>
> … India has three types of land-based missiles that may be operational: the short-range Prithvi I, the short-range Agni I, and the medium-range Agni II. The Prithvi I has been deployed for almost 15 years, but the Agni I and II, despite being declared operational, both have reliability issues that have delayed their full operational service.
>
> India has been busy growing its missile program, with four more Agni versions in progress: an Agni II+ was test-launched in 2010 but failed; the longer-range Agni III, after at least four flight-tests, remains under development; and the Agni IV may be a technology bridge to the newest type, the long-range Agni V, which had its first test-launch in April. Some of these Agni programs may serve as technology-development platforms for longer-range versions.
>
> The bulk of the Indian ballistic missile force is comprised of three versions of Prithvi missiles, but only one of these versions, the army's Prithvi I, has a nuclear role. Given its small size (9 meters long and 1 meter in diameter), the Prithvi I is difficult to spot on satellite images, and therefore little is known about its deployment locations. The Prithvi I is a short-range missile (up to 150 kilometers or 93 miles) and is the mainstay of the Strategic Forces Command, India's designated nuclear weapons service.
>
> In December 2011, India successfully test-launched its two-stage Agni I missile, which has a range of 700 kilometers (435 miles), for the eighth time—suggesting that the missile might finally have become fully operational. But a ninth test-launch scheduled for early May 2012 was postponed due to a technical glitch.
>
> The road- or rail-launched Agni II, an improvement on the Agni I, can fly up to 2,000 kilometers (1,243 miles) and can carry a 1,000-kilogram payload, and it takes just 15 minutes for the missile to be readied for firing. The missile has been test-fired eight times with several failures, but more recent test-flights, on May 19, 2010 and September 30, 2011, were successful, demonstrating some progress toward making the Agni II fully operational. A 2010 test-launch of an extended-range Agni II, known as the Agni II+, failed.

> Still under development is India's rail-mobile Agni III, a two-stage, solid-fuel missile with a range of more than 3,000 kilometers (1,864 miles)…. India took a significant step forward with the successful test-launch of the Agni V ballistic missile on April 19, 2012. With a range reportedly greater than 5,000 kilometers (3,107 miles), the Agni V can reach any target in China; however, the missile needs more testing and is still several years away from operational deployment.

A slightly more dated article in the Bulletin of Atomic Scientists describes Pakistan's nuclear program as including its F-16 fighters and the following nuclear and missile capabilities:[422]

> Pakistan is building two new plutonium production reactors and a new reprocessing facility with which it will be able to fabricate more nuclear weapons fuel. It is also developing new delivery systems. Enhancements to Pakistan's nuclear forces include a new nuclear-capable medium-range ballistic missile (MRBM), the development of two new nuclear-capable short-range ballistic missiles, and the development of two new nuclear-capable cruise missiles.
>
> We estimate that Pakistan has a nuclear weapons stockpile of 90–110 nuclear warheads, an increase from the estimated 70–90 warheads in 2009 (Norris and Kristensen, 2009). The US Defense Intelligence Agency projected in 1999 that by 2020 Pakistan would have 60–80 warheads (Defense Intelligence Agency, 1999); Pakistan appears to have reached that level in 2006 or 2007 (Norris and Kristensen, 2007), more than a decade ahead of predictions. In January 2011, our estimate (DeYoung, 2011) of Pakistan's stockpile was confirmed in the New York Times by "officials and outsiders familiar with the American assessment," who said that the official US estimate for "deployed weapons" ranged from the mid-90s to more than 110 (Sanger and Schmitt, 2011).1 With four new delivery systems and two plutonium production reactors under development, however, the rate of Pakistan's stockpile growth may even increase over the next 10 years.
>
> The Pakistani government has not defined the number and type of nuclear weapons that its minimum deterrent requires. But Pakistan's pace of nuclear modernization—and its development of several short-range delivery systems—indicates that its nuclear posture has entered an important new phase and that a public explanation is overdue.
>
> …Pakistan has three operational nuclear-capable ballistic missiles: the short-range Ghaznavi (Hatf-3) and Shaheen-1 (Hatf-4) and the medium-range Ghauri (Hatf-5). It has at least three other nuclear-capable ballistic missiles under development: the medium-range Shaheen-2 (Hatf-6), which may soon be operational, and the short-range Abdali (Haft-2) and Nasr (Haft-9) systems.
>
> … Pakistan is developing two new cruise missiles, the Babur (Hatf-7) and Ra'ad (Hatf-8), and it uses similar language to describe both missiles. According to the ISPR, the Babur and Ra'ad both have "stealth capabilities" and "pinpoint accuracy," and each is described as "a low-altitude, terrain-hugging missile with high maneuverability"
>
> One has to assume that there should be a high level of rational restraint and deterrence, but both states have a history of overreaction, nationalism, and failure to demonstrate stability and restraint in arms control. More broadly, historical precedent, particularly over the 20th century, does not make a strong case for behavior based on rational bargaining.

Finally, it is important to note that North Korea also has extensive stocks of chemical weapons and that many powers in the region can now develop and produce advanced nerve agents and biological weapons.

So far, China has shown only limited overt concern about the risks posed by regional nuclear weapons and proliferation, but almost certainly sees these risks as all too real and thus sizes and deploys its forces accordingly.

China's Evolving Nuclear Forces

China is one of the five nuclear weapons states acknowledged in the Nuclear Non-Proliferation Treaty (NPT). China's first nuclear test occurred in 1964. Since then, China has conducted 45 nuclear tests, including thermonuclear weapons and a neutron bomb.[423] It has also become a

party to the Comprehensive Test Ban Treaty, the Biological and Toxin Weapons Convention, and the Chemical Weapons Convention.

Until at least 2010, China maintained a no-first-use policy. China's 2008 Defense White Paper stated that,[424]

> The Second Artillery Force is a strategic force under the direct command and control of the CMC, and the core force of China for strategic deterrence. It is mainly responsible for deterring other countries from using nuclear weapons against China, and for conducting nuclear counterattacks and precision strikes with conventional missiles.
>
> The Second Artillery Force sticks to China's policy of no first use of nuclear weapons, implements a self-defensive nuclear strategy, strictly follows the orders of the CMC, and takes it as its fundamental mission the protection of China from any nuclear attack. In peacetime the nuclear missile weapons of the Second Artillery Force are not aimed at any country. But if China comes under a nuclear threat, the nuclear missile force of the Second Artillery Force will go into a state of alert, and get ready for a nuclear counterattack to deter the enemy from using nuclear weapons against China.
>
> If China comes under a nuclear attack, the nuclear missile force of the Second Artillery Force will use nuclear missiles to launch a resolute counterattack against the enemy either independently or together with the nuclear forces of other services. The conventional missile force of the Second Artillery Force is charged mainly with the task of conducting medium- and long-range precision strikes against key strategic and operational targets of the enemy.

Similarly, China's 2010 White Paper argued that,[425]

> China has never evaded its obligations in nuclear disarmament and pursues an open, transparent and responsible nuclear policy. It has adhered to the policy of no-first-use of nuclear weapons at any time and in any circumstances, and made the unequivocal commitment that under no circumstances will it use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones. China has never deployed nuclear weapons in foreign territory and has always exercised the utmost restraint in the development of nuclear weapons, and has never participated in any form of nuclear arms race, nor will it ever do so. It will limit its nuclear capabilities to the minimum level required for national security

China's 2013 Defense White Paper did not address these issues. China is, however, in the process of a major modernization of its nuclear-armed missile forces and is developing a "stealth" strike aircraft – the J-20. It is also now MIRVing its nuclear systems. As a result, the US DoD report on Chinese military power for 2013 provided the following analysis of how these developments interact with China's no first use policy.[426]

> China's official policy on nuclear weapons continues to focus on maintaining a nuclear force structure able to survive an attack and respond with sufficient strength to inflict unacceptable damage on an enemy. The new generation of mobile missiles, with warheads consisting of MIRVs and penetration aids, are intended to ensure the viability of China's strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic intelligence, surveillance, and reconnaissance (ISR), precision strike, and missile defense capabilities. The PLA has deployed new command, control, and communications capabilities to its nuclear forces. These capabilities improve the Second Artillery's ability to command and control multiple units in the field. Through the use of improved communications links, the ICBM units now have better access to battlefield information, uninterrupted communications connecting all command echelons, and the unit commanders are able to issue orders to multiple subordinates at once, instead of serially via voice commands.
>
> China has consistently asserted that it adheres to a "no first use" (NFU) policy, stating it would use nuclear forces only in response to a nuclear strike against China. China's NFU pledge consists of two stated commitments: China will never use nuclear weapons first against any nuclear-weapon state, and China will never use or threaten to use nuclear weapons against any non-nuclear-weapon state or nuclear-weapon-free zone. However, there is some ambiguity over the conditions under which China's NFU policy would apply, including whether strikes on what China considers its own territory, demonstration strikes, or high-altitude

> bursts would constitute a first use. Moreover, some PLA officers have written publicly of the need to spell out conditions under which China might need to use nuclear weapons first; for example, if an enemy's conventional attack threatened the survival of China's nuclear force or of the regime itself. However, there has been no indication that national leaders are willing to attach such nuances and caveats to China's NFU doctrine.
>
> China will likely continue to invest considerable resources to maintain a limited, but survivable, nuclear force (sometimes described as "sufficient and effective"), to ensure the PLA can deliver a damaging retaliatory nuclear strike.
>
> …China's official policy on nuclear weapons continues to focus on maintaining a nuclear force structure able to survive an attack and respond with sufficient strength to inflict unacceptable damage on an enemy. The new generation of mobile missiles, with warheads consisting of MIRVs and penetration aids, are intended to ensure the viability of China's strategic deterrent in the face of continued advances in U.S. and, to a lesser extent, Russian strategic intelligence, surveillance, and reconnaissance (ISR), precision strike, and missile defense capabilities. The PLA has deployed new command, control, and communications capabilities to its nuclear forces. These capabilities improve the Second Artillery's ability to command and control multiple units in the field. Through the use of improved communications links, the ICBM units now have better access to battlefield information, uninterrupted communications connecting all command echelons, and the unit commanders are able to issue orders to multiple subordinates at once, instead of serially via voice commands.
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>
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Estimates of Chinese nuclear forces differ by source, as has been seen in **Figure 11.2**. An estimate by the Nuclear Threat Initiative (NTI) estimated that China has approximately 130-195 deployed nuclear-capable ballistic missiles. It also appears that their XIA- and JIN-class ballistic missile submarines are able to be deployed, while the associated JL-1 and JL-2 systems are not yet ready.[427] The NTI describes the Chinese nuclear-armed forces as follows:[428]

> In its… (2011) Annual Report to Congress on the Military and Security Developments of the People's Republic of China, the U.S. Department of Defense noted that "China is both qualitatively and quantitatively improving its strategic missile forces."…The report stated that China's nuclear capable missile arsenal consists of a total of 55-65 intercontinental ballistic missiles (ICBMs), including: silo-based, liquid-fueled DF-5 (CSS-4) ICBMs; solid-fueled, road-mobile DF-31 (CSS 10 Mod-1) and DF-31A (CSS-10 Mod 2) ICBMs; limited-range CSS-3 ICBMs; and liquid-fueled CSS-2 intermediate-range ballistic missiles; DF- 21 (CSS-5) road-mobile, solid-fueled MRBMs; and JL-1 submarine-launched ballistic missiles (SLBM) for China's single XIA-class SSBN.
>
> China also possesses DF-15 (CSS-6) and 700-750 DF-11 (CSS-7) short-range ballistic missiles (SRBMs), though China maintains significantly fewer launchers, and 200-500 DH-10 (a cruise missile thought to be able to support a nuclear payload). The Department of Defense assesses that all Chinese SRBMs are deployed near Taiwan. Most recently, China has developed the long-range DF-31 and DF-31A ICBMs. The 2011 report assessed that while the JIN-class submarine appeared ready, its accompanying JL-2 SLBM

system had failed several flight tests and remained in the development stage. It is currently uncertain when the JIN/JL-2 combination will become fully operational….

There is an ongoing effort to shift from liquid-fueled missiles to solid-fueled ones which, among other advantages, can be launched more rapidly…China has also continued to develop new missile launch sites and underground storage facilities in remote inland regions, including the Gobi Desert and the Tibetan highlands. As there is no evidence of long-range missiles being deployed to these new locations, the launch sites appear to be intended primarily as forward bases for potential launches against Russia and India.

Even as it continues to develop its arsenal, however, China has also slowly moved towards increased openness in its willingness to share a limited amount of deployment information and strategy. For example, the 2010 China Defense White Paper details Beijing's no-first-use policy and roughly outlines several stages of nuclear alert. The paper states that "nuclear-weapon states should negotiate and conclude a treaty on no-first-use of nuclear weapons against each other." The White Paper also states China's "unequivocal commitment that under no circumstances will it use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones."…

…China's 1996 signing of the CTBT was the latest in a series of policy shifts on nuclear nonproliferation issues. In fact, it was during the 1980s that China's position on nuclear proliferation first started to change. Since the 1960s, Beijing had criticized the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) as imbalanced and discriminatory, but by the 1980s the country had also indicated that it accepted in principle the norm of nuclear nonproliferation …

In August 1991, shortly after France acceded to the NPT, China also declared its intention to join, though it again expressed its reservations about the treaty's discriminatory nature…China formally acceded to the NPT in March 1992, as a nuclear weapon state. In its statement of accession, the Chinese government called on all nuclear weapon states to issue unconditional no-first-use pledges, to provide negative and positive security assurances to non-nuclear weapon states, to support the development of nuclear weapon-free zones, to withdraw all nuclear weapons deployed outside of their national territories, and to halt the arms race in outer space. Since its accession, China has praised the NPT's role in preventing the proliferation of nuclear weapons, and also supported the decision to indefinitely extend the NPT at the 1995 Review and Extension Conference…

However, China has continued to state that it views nonproliferation not as an end in itself, but rather as a means to the ultimate objective of the complete prohibition and thorough destruction of nuclear weapons. Despite this, China was embroiled in nuclear proliferation scandals throughout the late 1980's and early 1990's, particularly with respect to its sale of ring magnets to Pakistan in 1995.. China provided Pakistan with a nuclear bomb design (used in China's October 1966 nuclear test). These designs were later passed to Libya by the A.Q. Khan network, and discovered by IAEA inspectors in 2004 after then President Muammar Qadhafi renounced his nuclear weapons program and allowed inspectors to examine related facilities.

The plans contained portions of Chinese text with explicit instructions for the manufacture of an implosion device….In the late 1990s, the U.S. Congress formed the Select Committee on U.S. National Security and Military-Commercial Concerns with China (also known as the Cox Committee). According to the Cox Committee Report, China engaged in an active espionage program and stole several nuclear bomb designs as early as the late 1970s. Designs compromised include the United States' then-most advanced W-88 warhead and a design for an enhanced radiation weapon (neutron bomb). However, the Cox Report has been severely criticized by both experts and officials in the United States and China as a political document that has several technical inaccuracies…

…There is much speculation that China's nuclear modernization program may be geared toward developing the capacity to move from a strategy of minimum deterrence to one of limited deterrence. Under a "limited deterrence" doctrine, China would need to target nuclear forces in addition to cities, which would require expanded deployments. However, such a limited deterrence capability may still be a long way off. According to Alastair Johnston, "…is fairly safe to say that Chinese capabilities come nowhere near the level required by the concept of limited deterrence."…

Meanwhile, tensions between China and Taiwan have declined, and in the wake of Japan's 2011 nuclear crisis, China and Taiwan are taking concrete measures to cooperate on nuclear safety issues. Such cross-

> strait cooperation includes establishing a formal nuclear safety agreement and an official contact mechanism between the two sides, which will be used to facilitate information exchanges and emergency responses in case of an accident…
>
> While China's decreased threat perception may not slow its nuclear modernization efforts, which are seen simply as representing the replacement of obsolete equipment, it does have the potential to slow acquisitions in key areas — for example, the buildup of short-range missiles. If sustained, the shift may also make both sides more amenable to nonproliferation efforts such as ratification of the Comprehensive Nuclear Test Ban Treaty.

Chinese Biological and Chemical Weapons

While China is a party to many of the international agreements regulating biological weapons, past US government reports have alleged that China maintains a small offensive weapons program and has engaged in proliferation of related items to countries such as Iran. There have also historically been concerns in the US about Chinese will to enforce export controls on dual use items, but the State Department concluded in 2011 that there were no compliance issues raised between the two.

In ratifying the Chemical Weapons Convention in 1997, China declared three former production facilities. While the US has doubted that China was fully declaring its previous and current activities in this area, the US reported most of its concerns resolved in 2011.[429]

Role of Chinese Tunnel Facilities

The PLA has also been building underground tunnels to protect and conceal its key assets since the early 1950s; the underground tunnel network reportedly stretches for over 5,000 km.[430] Experts like Phillip Karber note their value in terms of both missile deployments and the potential ability to stockpile much larger numbers of nuclear weapons than are normally estimated to be in China's forces.[431]

The US DoD, however, sees these efforts as largely defensive: [432]

> … China maintains a technologically advanced underground facility (UGF) program protecting all aspects of its military forces, including C2, logistics, missile, and naval forces. Given China's NFU nuclear policy, China has assumed it may need to absorb an initial nuclear blow while ensuring leadership and strategic assets survive.
>
> China determined it needed to update and expand its military UGF program in the mid to late 1980s. This modernization effort took on a renewed urgency following China's observation of U.S. and NATO air operations in Operation Allied Force and of U.S. military capabilities during the 1991 Gulf War. A new emphasis on "winning hi-tech battles" in the future precipitated research into advanced tunneling and construction methods. These military campaigns convinced China it needed to build more survivable, deeply-buried facilities, resulting in the widespread UGF construction effort detected throughout China for the last decade.

Chapter 12: Chinese Military Modernization and the Taiwan Strait Military Balance

Three major flashpoints exist within the Asia-Pacific which many analysts consider especially capable of generating conflict and potentially war: the Korean Peninsula, the Pacific and the South China Sea, and the Taiwan Strait. Due to the many intricacies of the issues involved, this report does not attempt to address all of these flashpoints or their impact on US and Chinese strategic relations.

The Korean military balance in the Northeast Asian strategic environment – including a detailed analysis of Chinese forces and modernization – has already been analyzed in a separate three-volume Burke Chair report.[433] The issues affecting the South China Sea have been summarized in this report's examination of the PLAN.

There does not seem to be any imminent risk of s US and Chinese military confrontation over the Taiwan Strait. Even so, it is an area of constant tension between the US and China, and it provides a key case study for examining the effects of Chinese military modernization on an existing and continuous military balance.

The US Perspective

Figure 12.1 shows a DoD estimate of the balance of forces in 2013. The *Military and Security Developments Involving the People's Republic of China* report stresses that the PRC and Taiwan are improving their relations and that neither side has shown it is seeking a conflict. At the same time, it describes the current balance as follows:[434]

> Dealing with a potential contingency in the Taiwan Strait remains the PLA's primary mission despite decreasing tensions there - a trend which continued following the re-election of Taiwan President Ma Ying-jeou in January 2012. In this context, should deterrence fail, the PLA could be called upon to compel Taiwan to abandon independence or to re-unify with the mainland by force of arms while defeating any third-party intervention on Taiwan's behalf.
>
> **Cross-Strait Stability**. China and Taiwan have reached 18 agreements for cross-Strait cooperation on economic, cultural, and functional issues, but Taiwan authorities and the broader Taiwan public do not support negotiation on issues directly related to sovereignty.
>
> China and Taiwan have also undertaken some combined security and police operations, and held a combined maritime rescue exercise in August 2012 featuring two helicopters, 14 vessels, and 300 personnel, with both sides equally represented. Also in August, Chinese and Taiwan police apprehended 30 suspects in a human-trafficking and prostitution ring – a first collaborative effort to combat human trafficking.
>
> During a mid-October 2011 speech, President Ma stated that a cross-Strait peace agreement with China might be attainable in 10 years, but backed down immediately in the face of widespread negative public reaction and Ma specified the conditions under which he would pursue such an agreement. Despite occasional signs of impatience, China appears content to respect Taiwan's current approach to cross-Strait relations. In November 2012, Xi Jinping, China's newly selected general secretary of the CCP Central Committee sent a message to President Ma (in the latter's capacity as chairman of the ruling Kuomintang Party), emphasizing the need to continue promoting the peaceful development of cross-Strait relations. This early message suggests that China under Xi Jinping may be willing to follow President Hu Jintao's multi-pronged strategy for developing cross-Strait relations rather than compelling unification through the use of force. President Hu in his report to the 18th Party Congress in November 2012 used language that

promoted peaceful reunification and called for both sides to explore political relations and make reasonable arrangements to discuss the creation of a military confidence-building mechanism.

…. Security in the Taiwan Strait is largely a function of dynamic interactions between and among mainland China, Taiwan, and the United States. China's strategy toward Taiwan continues to be influenced by what it sees as positive developments in Taiwan's political situation and approach to engagement with Beijing. However, China's overall strategy continues to incorporate elements of persuasion and coercion to deter or repress the development of political attitudes in Taiwan favoring independence. The two sides made progress in expanding cross-Strait trade/economic links and people-to-people contacts; China addressed in limited terms Taiwan's expressed desire for greater international space through its decision not to oppose Taiwan's meaningful participation in the World Health Assembly.

Alongside positive public statements about the Taiwan Strait situation from top leaders in China following the re-election of Taiwan President Ma Ying-jeou in 2012, however, there have been no signs that China's military disposition opposite Taiwan has changed significantly. The PLA has developed and deployed military capabilities to coerce Taiwan or to attempt an invasion, if necessary. These improvements pose major challenges to Taiwan's security, which has been based historically upon the PLA's inability to project power across the 100 nm Taiwan Strait, natural geographic advantages of island defense, Taiwan's armed forces' technological superiority, and the possibility of U.S. intervention.

CHINA'S STRATEGY IN THE TAIWAN STRAIT

China appears prepared to defer the use of force, as long as it believes that unification over the long-term remains possible and the costs of conflict outweigh the benefits. China argues that the credible threat to use force is essential to maintain the conditions for political progress, and to prevent Taiwan from making moves toward de jure independence. China has refused for decades to renounce the use of force to resolve the Taiwan issue, despite simultaneously professing its desire for peaceful unification under the principle of "one country, two systems."

The circumstances under which the mainland has historically warned it would use force have evolved over time in response to the island's declarations of political status, changes in PLA capabilities, and China's view of Taiwan's relations with other countries. These circumstances, or "red lines," have included:

- Formal declaration of Taiwan independence;
- Undefined moves toward Taiwan independence;
- Internal unrest on Taiwan;
- Taiwan's acquisition of nuclear weapons;
- Indefinite delays in the resumption of cross-Strait dialogue on unification;
- Foreign intervention in Taiwan's internal affairs; and
- Foreign troops stationed on Taiwan.

Article 8 of the March 2005 "Anti-Secession Law" states that China may use "non-peaceful means" if "secessionist forces … cause the fact of Taiwan's secession from China;" if "major incidents entailing Taiwan's secession" occur; or, if "possibilities for peaceful reunification" are exhausted. The ambiguity of these "redlines" preserves China's flexibility.

CHINA'S COURSES OF ACTION AGAINST TAIWAN

The PLA is capable of increasingly sophisticated military action against Taiwan. It is possible China would first pursue a measured approach characterized by signaling its readiness to use force, followed by a deliberate buildup of force to optimize the speed of engagement over strategic deception. Another option is that China would sacrifice overt, large-scale preparations in favor of surprise to force rapid military and/or political resolution before other countries could respond. If a quick resolution is not possible, China would seek to:

- Deter potential U.S. intervention;

- Failing that, delay intervention and seek victory in an asymmetric, limited, quick war; and,
- Fight to a standstill and pursue a political settlement after a protracted conflict.

Maritime Quarantine or Blockade. In addition to direct military engagement, PLA writings describe potential alternative solutions—air blockades, missile attacks, and mining to force capitulation. China could declare that ships en route to Taiwan must stop in mainland ports for inspection and/or transshipment prior to transiting to Taiwan ports. China could also attempt the equivalent of a blockade by declaring exercise or missile closure areas in approaches to ports, in effect closing port access and diverting merchant traffic. The PLA employed this method during the 1995-96 missile firings and live-fire exercises. There is a risk, however, that China would underestimate the degree to which any attempt to limit maritime traffic to and from Taiwan would trigger countervailing international pressure and military escalation. China today probably could not enforce a full military blockade, particularly if a major naval power intervened. However, its ability to do so will improve significantly over the next five to ten years.

Limited Force or Coercive Options. China might use a variety of disruptive, punitive, or lethal military actions in a limited campaign against Taiwan, likely in conjunction with overt and clandestine economic and political activities. Such a campaign could include computer network or limited kinetic attacks against Taiwan's political, military, and economic infrastructure to induce fear in Taiwan and degrade the populace's confidence in the Taiwan leadership. Similarly, PLA special operations forces could infiltrate Taiwan and conduct attacks against infrastructure or leadership targets.

Air and Missile Campaign. Limited SRBM attacks and precision strikes against air defense systems, including air bases, radar sites, missiles, space assets, and communications facilities, could be conducted in an attempt to degrade Taiwan's defenses, neutralize Taiwan's leadership, or break the Taiwan people's will to fight.

Amphibious Invasion. Publicly available Chinese writings describe different operational concepts for amphibious invasion. The most prominent of these, the Joint Island Landing Campaign, envisions a complex operation relying on coordinated, interlocking campaigns for logistics, air and naval support, and EW. The objective would be to break through or circumvent shore defenses, establish and build a beachhead, transport personnel and materiel to designated landing sites in the north or south of Taiwan's western coastline, and launch attacks to seize and occupy key targets and/or the entire island.

The PLA is capable of accomplishing various amphibious operations short of a full-scale invasion of Taiwan. With few overt military preparations beyond routine training, China could launch an invasion of small Taiwan-held islands in the South China Sea such as Pratas or Itu Aba. A PLA invasion of a medium-sized, better defended offshore island such as Matsu or Jinmen is within China's capabilities. Such an invasion would demonstrate military capability and political resolve while achieving tangible territorial gain and simultaneously showing some measure of restraint. However, this kind of operation includes significant, if not prohibitive, political risk because it could galvanize pro-independence sentiment on Taiwan and generate international opposition.

Large-scale amphibious invasion is one of the most complicated and difficult military operations. Success depends upon air and sea superiority, rapid buildup and sustainment of supplies on shore, and uninterrupted support. An attempt to invade Taiwan would strain China's armed forces and invite international intervention. These stresses, combined with China's combat force attrition and the complexity of urban warfare and counterinsurgency (assuming a successful landing and breakout), make amphibious invasion of Taiwan a significant political and military risk. Taiwan's investments to harden infrastructure and strengthen defensive capabilities could also decrease China's ability to achieve its objectives. Moreover, China does not appear to be building the conventional amphibious lift required to support such a campaign.

THE PLA'S CURRENT POSTURE FOR A TAIWAN CONFLICT

Preparation for a Taiwan conflict with the possibility of U.S. intervention has largely dominated China's military modernization program. Despite decreased cross-strait tensions since 2008, Taiwan remains a primary military focus.

Missile Forces. The Second Artillery is prepared to conduct SRBM attacks and precision strikes against Taiwan's air defense systems, air bases, radar sites, missiles, space assets, C2 and communications

facilities, in an attempt to degrade Taiwan's defenses, neutralize Taiwan's leadership, or break the public's will to fight.

Air Forces. The PLA Air Force has maintained a force posture that provides it with a variety of capabilities to leverage against Taiwan in a contingency. First, it has stationed a large number of advanced aircraft within an unrefueled range of Taiwan, providing them with a significant capability to conduct air superiority and ground attack operations against Taiwan. Second, a number of long-range air defense systems provide a strong layer of defense of China's mainland against a counterattack. Third, China's development of support aircraft provide it improved ISR to support PLA Air Force operations in a contingency.

Navy Forces. The PLA Navy is improving anti-air and anti-surface warfare capabilities, developing a credible at-sea nuclear deterrent, and introducing new platforms that are positioned to strike Taiwan in a cross-Strait conflict. The additional attack submarines, multi-mission surface combatants, and fourth-generation naval aircraft entering the force are designed to achieve sea superiority within the first island chain and counter any potential third party intervention in a Taiwan conflict. The PLA Navy currently lacks the massive amphibious lift capacity that a large-scale invasion of Taiwan would require.

Ground Forces. Increasingly armed with more modern systems such as armed attack helicopters, the PLA ground forces are conducting joint training exercises that will prepare them for a Taiwan invasion scenario. Training, including amphibious landing training, is often conducted under realistic conditions, including all-weather and at night. Improved networks provide real-time data transmissions within and between units, enabling better command and control during operations. Additionally, the PLA Army's ongoing fielding of advanced air defense equipment is significantly enhancing the self defense of key command and control elements and other critical assets assessed as likely tasked for potential use against Taiwan. As the number of these new systems grows in the PLA ground forces, the ability of an amphibious invasion force to successfully defend cross-Strait amphibious lodgments against counterattacks by both legacy and advanced weaponry will inevitably increase.

TAIWAN'S DEFENSIVE CAPABILITIES

Taiwan has historically relied upon multiple military variables to deter PLA aggression: the PLA's inability to project sufficient power across the 100 mile Taiwan Strait, the Taiwan military's technological superiority, and the inherent geographic advantages of island defense. China's increasingly modern weapons and platforms (more than 1,100 ballistic missiles, an anti-ship ballistic missile program, ships and submarines, combat aircraft, and improved C4ISR capabilities) have largely negated many of these factors.

Taiwan has taken important steps to build its war reserve stocks, grow its defense industrial base, improve joint operations and crisis response capabilities, and increase its officer and noncommissioned officer (NCO) corps. These improvements partially address Taiwan's eroding defensive advantages. Taiwan is following through with its transition to a volunteer military and reducing its active military end-strength from 275,000 to 215,000 personnel to create a "small but smart and strong force." Under this plan, which is slated for completion by December 2014, the cost savings from a smaller force will free up resources to increase volunteer salaries and benefits, although these savings are not sufficient to cover the costs of volunteers. However, the transition has led to additional personnel costs needed to attract and retain personnel under the volunteer system, diverting funds from foreign and indigenous acquisition programs, as well as near-term training and readiness. The actual number of active-duty service members is approximately 235,000 – well below the 275,000 currently authorized. In addition, Taiwan military spending has dropped to approximately 2 percent of GDP – well below President Ma's pledge of 3 percent. China's official defense budget is about 10 times that of Taiwan. Realizing that Taiwan cannot match China's military spending, Taiwan is working to integrate innovative and asymmetric measures into its defense planning in order to counter-balance China's growing capabilities.

U.S. policy toward Taiwan derives from its One-China Policy, based on the three Joint Communiqués and the Taiwan Relations Act (TRA). U.S. policy opposes any unilateral changes to the status quo in the Taiwan Strait by either side. The United States continues to support peaceful resolution of cross-Strait differences in a manner acceptable to the people on both sides.

Consistent with the TRA, the United States has helped to maintain peace, security, and stability in the Taiwan Strait by providing defense articles and services to enable Taiwan to maintain a sufficient self

defense capability. To this end, the United States has announced more than $12 billion in arms sales to Taiwan since 2010. This includes, most recently, in September 2011, the U.S. announcement of its intent to sell to Taiwan $5.85 billion worth of defensive arms and equipment, including an advanced retrofit program for Taiwan's F-16 A/B fighter jets, training, and spare parts for Taiwan's air force.

Taiwanese and Japanese Perspectives

There are many different ways to count and portray the balance of forces in the region. The governments of both the Republic of China (ROC or Taiwan) and Japan have issued their own assessments. **Figure 12.2** shows the Taiwanese view of the balance as described in its 2011 defense white paper. **Figure 12.3** shows a Japanese estimate of the PRC-ROC balance, issued in 2013, which covers a wider range of data, but with numbers that track broadly with the data in the DoD and IISS estimates that follow.

The unclassified narratives in the discussions of these issues in the Japanese and South Korean white papers are limited and broadly correspond with the assessments made by the US and the IISS. As might be expected, Taiwanese military assessments go into more detail. Taiwan is careful to note the improvements in PRC-ROC relations, but its analyses still present a more urgent threat in what is the most serious area of potential US-Chinese military confrontation in the near-to-mid term.

This makes the ROC's view of Chinese strategy, military modernization, and warfighting capabilities important to a US-Chinese security dialogue and an understanding of some of the key trends in Chinese military modernization and strategy. Taiwan's *National Defense Report – 100th Anniversary*, issued in July 2011, provides a good, unclassified picture of the ROC's thinking and perception of the PRC's strategy and capabilities. It should be stressed that the following excerpts are a small portion of a much longer document and focus on the Taiwanese threat assessment but not the overall assessment of strategic risk – which does emphasize the improvement in Chinese and Taiwanese relations:[435]

> The PRC views the beginning of the 21st century to 2020 as an important "strategic opportunity period," and is gradually shifting towards technological force developments with an emphasis on winning limited wars under conditions of informatization. Furthermore, the PRC has stepped up its defense and military modernization, and is gradually establishing "external" military developments. Although cross-strait relations have somewhat relaxed, the PRC has not slowed its military preparations against Taiwan, and even stressed that Taiwan was its "core interest" in 2010. The PRC has not abandoned military options against Taiwan; therefore, the risk of cross-strait military conflicts still exists.
>
> … Even though cross-strait relations have somewhat relaxed, the PRC has not slowed its military preparations against Taiwan. The PRC issued a white paper titled "China's National Defense in 2010" on March 31st, 2011. The white paper indicated that China's military preparations are aimed at large scale operations at its southeast coasts to "oppose the independence of Taiwan and advance the unity of China."
>
> Although the PRC claims that it will continue to promote peaceful developments across the Taiwan Strait, it remains concerned of U.S. arms sales to Taiwan, and expressed its dissatisfaction with the ROC and U.S. deepening military exchanges, believing that it will endanger future U.S.-PRC relations. This shows that even though cross strait relations have relaxed, the PRC has not ceased its military preparations against Taiwan.
>
> Furthermore, the PRC's continuous expansion of its military force, frequent military activities in the Asia-Pacific in recent years, and tough attitude over territorial sovereignty has raised suspicion and alert in surrounding countries, forming the strategic situation of the U.S. and PRC both competing and cooperating in regional security issues, showing that the PRC has adjusted its military strategy in response to the growth of its national strength.

… The PRC's military strategies are founded on "active defense," and after Hu Jintao assumed office in 2002, the PRC's strategic objectives and concepts have been adjusted in response to the growth of its national strength. Following the increasing importance of information technologies in warfare, the PLA adopted "win limited wars under conditions of informatization" as its strategic objective and "stopping wars and winning wars" as its strategic concept. Since 2008, the PLA adjusted its military strategic concept to "preventing crises and stopping wars," and enhanced the capabilities of its military for completing multifaceted military missions.

In addition, the PRC stressed that its "active defense" insists on the principle of "defend, self defense and strike only after the enemy has struck." Although it appears that the PRC will not actively provoke war, it is in fact prepared, and will be able to overcome the enemy and control the war situation once the enemy strikes; however, in essence this is a strategy to "take the initiative." … The PLA is actively implementing military modernization developments to adapt to requirements of new situations. After the strategic objective of defense and military modernization was proposed in 1997, the PRC clearly indicated in 2009 that "future efforts will be to achieve development objectives of the 'Three Step' strategy, and step up defense and military modernization."

In addition, in order to fundamentally achieve mechanization and achieve greater developments for information infrastructure before 2020, the PRC insists on using mechanization as a foundation and informatization as its orientation for extensively applying information technology results, driving mechanization and informatization developments and integration in hopes of modernizing its defense and military, and gradually expanding to areas outside the Asia-Pacific.

…To develop into an informatized armed force, the PLA proposed talent cultivation objectives and military knowledge requirements for the next two decades, planning to enhance the competencies of military personnel, as well as equip cadres with leadership skills that will enable them to meet future joint operations requirements before 2020. The "Outline of Military Training and Evaluation," which the PLA announced in 2008, clearly states that the focus of cadre cultivation has gradually changed from the conventional "armed service" to "joint operations, joint education and joint training," aiming to create a good talent cultivation environment to substantially improve the quality of military strategy talents, which are required for future joint operations, and also foster their joint operations command skills; this outline aims to enhance the PLA's ability to cultivate new cadres for the future.

… Based on the PLA's preparedness for taking military action against Taiwan and developments of the situation in the Taiwan Strait, high level officers of the PLA upgraded the military strategy against Taiwan at the end of 2008 from "using military force to oppose Taiwan independence" to "opposing Taiwan independence and advancing the unity of China." At the end of 2009, the PLA was required to enhance preparation results for contingency response operations, in hopes of gaining the ability to launch large scale operations against Taiwan and prevent interference from foreign forces before 2020. It is obvious that although the possibility of military conflict has decreased after cross-strait relations relaxed, and dealing with the "Taiwan issue" might even be delayed, the PRC's objective to unify Taiwan has not changed. As the military strength of the two sides of the Taiwan Strait becomes even more imbalanced, we are bound face growingly severe military threats.

.. The PLA has continued to actively enhance its capabilities in recent years according to its original plans. However, in view of its diplomatic policy "to become a good neighbor and a good partner," its exercises are based on "contingency operations against Taiwan" and target tactics and techniques of the ROC Armed Forces. In which its joint landing exercises still mainly target Taiwan, and apply enhanced capabilities of area-denial, accumulating large scale operations capabilities.

… The PLA's Ground Force development focuses on "mechanization" and "informatization" according to its force restructuring plans. The PLA is actively building a ground force with Chinese characteristics, and continues to refine its organizational structure and improve training results, so as to strengthen combat and contingency response capabilities. Over the past year, guided by the transformation from "regional defense" to "global mobility," the PLA has concentrated on equipping the Nanjing and Guangzhou military regions with new amphibious assault vehicles and new MLRS, and expanding armored outfits and electronic countermeasure outfits in the Tibet and Xinjiang Autonomous Regions, implementing "mechanization" and "informatization" to enhance its capabilities of operations across the Taiwan Strait and defense operations on its western frontier.

… The PRC Navy's developments focus on enhancing its strategic intimidation and counter attack capabilities, gradually developing open water management and cooperation and unconventional threat response capabilities (e.g. counter-terrorism operations, right-safeguard cruise and disaster relief). The PLA Navy has sent battleships in batches to execute commercial ship convoy missions in the Gulf of Aden since 2008, besides verifying the performance and combat capabilities of new equipment, these missions serve to intensify joint operations training for multiple armed services, as well as live exercises. This shows that its strategic concept has gradually shifted from "offshore defense" to "open water defense," as it is actively building battleships and deploying long-range anti-ship missiles on its coasts, and gradually expanding the depth of maritime operations and anti-access capabilities.

The PLA's Air Force developments focus on enhancing reconnaissance, early warning, air strike, air-defense, anti-missile and strategic delivery capabilities. In recent years, the PLA Air Force has been actively acquiring new precision strike weapons and informatized command and control equipment, and has been participating in joint exercises and training, which have significantly strengthened its long-range precision strike and strategic delivery capabilities. Furthermore, it is actively improving its air force bases and battlefield protection facilities, and strengthening its logistics protection system, thereby elevating its comprehensive protection capabilities for combat equipment. In addition, guided by the change in strategy from "homeland air defense" to "balanced offense and defense," the PLA Air Force continues to upgrade its equipment to third generation fighters and new air defense missiles to strengthen its overall air defense capabilities.

…Developments of the PLA's Second Artillery seek a balance between nuclear and conventional and use both solid and liquid. The Second Artillery has continued to improve the precision and effectiveness of its missiles; develop middle range ballistic missiles for targeting ships and independently targetable intercontinental range ballistic missiles; strengthen the penetration, precision and nuclear intimidation capabilities of its missiles; and, established a new ballistic missiles brigade outfitted with middle range ballistic missiles, so as to strengthen its overall missile strike effectiveness. The Second Artillery already has some capability of attacking aircraft carriers. Furthermore, the current quantity, accuracy and effectiveness of the Second Artillery's missiles, combined with forces of the Air Force and Navy, are already capable of launching large scale joint fire support strikes and sea and air blockades.

… Military satellites currently in orbit are capable of supporting operation command and control of PLA forces west of the first island chain, daytime and nighttime surveillance and reconnaissance, and intelligence transmission. Furthermore, after the "Beidou" navigation satellite system consisting of 35 satellites is completed in 2020, the PRC will no longer be dependent on the U.S. GPS, and will effectively enhance the precision of its long-range precision weapons.

The PLA stresses that gaining an electromagnetic advantage early in battle is a key task to ensuring the success of operations, and has thus been strengthening its "integrated network and electronic warfare" capabilities in recent years. Using electronic warfare and computer network warfare as a means, coupled with the application of hardware kills, the PLA will adopt "integrated network and electronic warfare" as a basic form of joint operations, so as to gain control over electromagnetic spectrums. If the PRC engages in a military conflict with its surrounding countries, this will help it seize "electromagnetic control" over the battlefield early in battle.

… To this day the PLA's force deployment against Taiwan has not changed, only that its military build-up and exercises targeting Taiwan have been more "subtle," shifting to either the north or south. In terms of the security situation in the Taiwan Strait, evaluations show gradual improvement in cross-strait relations, and the PRC deleted its statement "Taiwan authorities taking a radical Taiwan independence route threatens regional peace." Nevertheless, the PRC continues to stress that the "Taiwan independence" separatist force is a threat to its territorial sovereignty and security, and objected that the U.S. continuing arms sales to Taiwan was a violation of the "Three Joint Communiqués."

In recent years, the PLA has continued to outfit its Fukien and Guangdong military regions with amphibious assault vehicles, long range MLRS, battleships, long-range anti-ship missiles, third generation fighters, air defense missiles and middle range ballistic missiles with an emphasis on the enhancement of long-range delivery capabilities. Up to now the PRC has not showed military good will towards Taiwan, making it evident that its thoughts of intimidation and unification have not changed.

… At the beginning of the 21st century, the PLA established "winning limited wars under conditions of informatization" as a basis for its military preparations, and focused on developing its Navy, Air Force and Second Artillery. In which the Air Force's new generation fighters were dispatched to southeast coastal bases to take part

in defense affairs, and were outfitted with long-range air defense missiles; the Navy deployed long-range anti-ship missiles and new missile boats on the coasts of Fukien and Guangdong; the Ground Force prioritized the Nanjing and Guangzhou military regions for outfitting new long-range MLRS and amphibious assault vehicles. These actions enhance the PLA's firepower for suppressing our offshore islands and its amphibious landing capabilities.

Furthermore, the PLA uses garrison training and exercises to verify the performance of its new equipment and capabilities of its forces. In summary, the PLA has continued to follow through with its military readiness against Taiwan, and is stepping up the development of armed services (forces) under the guidance of its strategic goals for overall national security and defense and military modernization. At present, the PLA is already capable of blockading Taiwan and seizing our offshore islands.

In order to successfully execute multifaceted military missions, the PRC's military diplomacy has changed towards "practicality." Utilizing the diplomatic strategies of large states, the PRC used its dissatisfaction of U.S. arms sales to Taiwan for the high-profiled reestablishment of strategic cooperation with Russia, and went into the vicinities of the U.S. in search of energy, while cozying up with anti-U.S. forces. The PRC's "earthquake diplomacy" served as a catalyst for the establishment of a multinational joint disaster relief mechanism, and it initiated its MND press release system to improve the PLA's image.

Furthermore, the PRC held joint counterterrorism exercises with numerous countries, and bilateral joint search and rescue exercises in its surrounding sea areas in the Asia-Pacific, in hopes of effectively increasing its influence on international affairs. The PRC emphasized that "military operations other than war is an important way of using national military strength," and thus stepped up its counter-terrorism, stability safeguard, contingency response, disaster relief and international peacekeeping operations, enhancing its international influence by demonstrating that the PLA is capable of responding multiple security threats and completing multifaceted military missions.

… The PLA gained a profound understanding of the importance of modernized warfare from the Gulf War and Kosovo War, and is actively learning from battlefield experiences and operational concepts of the U.S. Army. Furthermore, the PRC in 2010 for the first time sent Air Force fighters to Turkey's "Anatolia" air force base to participate in the "Anatolian Eagle" joint exercise, hoping to use the opportunity of joint training of different fighters with the Turkey Air Force and gain related experience. The PLA Air Force was invited to Pakistan in March 2011 to take part in the joint air force exercise held for the 60th anniversary of the PRC and Pakistan establishing diplomatic relations. Due to the fact that Pakistan has the same F-16 and Mirage fighters as us, besides deepening military exchanges with Pakistan, the PLA also used to opportunity to become familiar with characteristics of western fighters and verify its counter measures, absorbing operational concepts of foreign armed forces to enhance the combat capabilities of its own forces.

In response to the future trend of increasing war protection difficulty, the PLA is actively strengthening and making overall plans for military-civilian joint protection, and is devoted to the integration of force, local and defense mobilization protection capabilities. The PLA has thus carried out joint logistics exercises and training involving military transportation, maritime hygiene and air delivery, thereby gaining military-civilian contingency response capabilities.

Furthermore, the PLA established large regional comprehensive protection bases, and signed joint protection agreements with private enterprises for equipment, fuel and supplies. The PLA also implemented social protection works and utilized the advantages of integrating military and civilian for logistics protection. In addition, the PLA evaluates the professional competencies of logistics protection personnel, and provides integrated combat and protection training, so as to verify the protection performance of new logistics equipment.

… The PLA began actively waging non-military "three warfares" (public opinion warfare, psychological warfare and legal warfare) against Taiwan in December 2003, and formally included them in the "Regulations for the CPLA on Political Work." Since 2008 the two sides of the Taiwan Strait have engaged

in economic and cultural exchanges, and although the tense atmosphere has somewhat relaxed, the PRC is still actively using its military for intimidation and making preparations for invasion. Besides incorporating the "three warfares" as a part of military school education and force exercises, the PRC has also mobilized local governments and scientific research institutions to engage in the three warfares as well. The PRC attempts to disunite the ROC with talks of "peace," to intimidate and pressure the ROC with talks of "war," hoping to achieve "wage small wars and win big victories" and "win without fighting."

At the present stage the PLA emphasizes intangible combat capability as an important means for utilizing its soft power; therefore, the "three warfares" is a means for bringing the PLA's military soft power into full play. In recent years, besides strengthening infrastructure for the "three warfares," the PLA is also actively building a psychological trial force, establishing training research institutes, and training dedicated psychological warfare officers; the PRC also established a Ministry of Defense news spokesperson mechanism, which will serve to breakdown psychological defenses and affect public opinion when infiltrating the enemy. In addition, seeing that the "three warfares" are among main operations of local wars, the PRC is gradually strengthening "three warfares" capabilities at each stage for future military confrontations. The PRC's current attitude towards Taiwan still stresses that "non-peaceful measures will be adopted to resolve the Taiwan issue when Taiwan's separation inclination is apparent," showing that its strategic concept is still "to be softer when the enemy is soft and to be tougher when the enemy is tough."

… Over the past year the PLA's exercises and training continues to be directed against Taiwan; combat preparations are required to be completed according to its timetable, and then verified of its effectiveness in offensive operations against Taiwan. Determining based on the PLA's current capabilities, training and exercise conditions and military action plans targeting Taiwan, the PLA now has emergency mobilization and combat capabilities against Taiwan, in addition to its large scale joint fire support strike capabilities. Moreover, the continuous rise of the PLA's capabilities in both quality and quantity will enable it to elevate the intensity of its military operations and mobility for making adjustments to force deployment, showing that the PRC's determination to use military force against Taiwan and its military threat has not changed.

In terms of the PRC's military capabilities, its current primary threats against Taiwan are still military intimidation and partial blockades. However, in terms of "military modernization, strategic ideology, force structure and deployment, and weapons research and development," the PRC now possesses "diverse air-and-ground reconnaissance and surveillance methods, versatile fire support opposite Taiwan, and multiple intimidation options against Taiwan," which can be summarized as follows:

…Besides accelerating the establishment of infrastructure for various armed forces, the PLA is also actively incorporating military, civilian and international cooperation to gradually establish various intelligence, surveillance and reconnaissance platforms. With regard to the PRC's overall reconnaissance and surveillance force buildup and deployment, its diverse reconnaissance and surveillance methods allow it to cover air and ground throughout the entire eastern Asia. This capability enables the PRC to use military means to resolve the Taiwan Strait issue and territorial disputes over the South China Sea, posing a threat to regional security and stability, and thus increasing the difficulty for our defense preparations and readiness missions to be executed undetected.

… The PLA's existing land attack weapons include various models of tactical ballistic missiles, cruise missiles, air-to-ground precision missiles, and guided bombs. In particular, PRC tactical ballistic missiles can now carry warheads that can attack multiple targets. There are also air launched antiradiation missiles and unmanned attack vehicles capable of attacking command, control, and radar systems on the ground within the PRC's arsenal of air-launched precision missiles. The PRC possesses firepower variety, large area coverage, and tactical versatility, all of which adds difficulty to Taiwan's defensive operations.

The PLA's recent exercises and training still aim to strengthen its readiness against Taiwan. The PLA formally added "Armed Police" to its array of forces for operations against Taiwan in 2007; the Armed Police can rapidly be converted into backup for contingency operations during wartime. Determining based on training and exercise conditions and related military preparations, the PLA now has multiple intimidation options against Taiwan. Moreover, the continuous rise of the PLA's capabilities will enable it to elevate the intensity of its military operations and mobility for making adjustments to force deployment.

Based on the PLA's timetable for military readiness against Taiwan, at the current stage the PLA has large scale joint fire support strike and key sea area and air space blockade capabilities, which could develop into

joint military intimidation, joint blockade operations, joint fire support strike, joint landing operations and area-denial capabilities. The scope of joint blockade operations extends to the sea area west of the first island chain; joint landing operations include seizing Penghu and limited operations on Taiwan. Possible options are summarized below:

1. Joint Military Intimidation

The PRC may employ psychological warfare against ROC Armed Forces, which may involve intensifying military activities, adjusting force

deployment and using the media to publicize military risks in the Taiwan Strait, attempting to cause panic in Taiwan and lower the morale of our military and civilians.

2. Joint Blockade Operations

The PLA may use its Air Force and Navy to set up partial blockades targeting important ports in Taiwan and offshore islands, as well as external transportation routes, so as to weaken the morale of our military and civilians, sever our economic lifeline, deteriorate our living environment, and force us to seek peace agreements.

3. Joint Fire Support Strike

The PLA may use its Second Artillery and air-launched land attack missiles to attack our command system, political and economic centers and symbolic targets. The PLA will then gradually escalate the situation by crippling our air defense, sea control and counter strike systems, and seizing and maintaining electromagnetic control, air control and sea control, thus shattering our will to fight, forcing us to surrender, or creating a foundation for subsequent strategic operations.

4. Joint Landing Operations

The PLA may combine its ground forces, navy, air force and second artillery to launch a triphibian invasion of Taiwan in the sequence, preliminary engagement, electromagnetic control operations, air superiority operations, sea control operations and landing. The PRC will aim for a short battle and quick victory before foreign forces can intervene, thus establishing a political reality that will prevent further intervention.

5. Area-Denial

The scope of area-denial has been expanded to partial sea areas and air space west of Guam, and is directed towards the U.S. and Japan.

At present, the PRC is not yet fully equipped to launch a full scale invasion of Taiwan as it still has insufficient amphibious transport equipment. Therefore, it is more likely that the PRC will adopt military intimidation, partial blockade (including seizing our offshore islands) and firepower strike as measures for achieving its military readiness objectives for the current stage. In the future, once the PLA is capable of invading Taiwan, or when the need arises, it considers the direct invasion of Taiwan an option for achieving its ultimate political goal.

The PLA's three armed services (including the Second Artillery) has a total force of some 2.3 million personnel; the ROC's three armed services (no second artillery) has a total force of some 270 thousand personnel; the PLA has roughly 10 times the number of troops as the ROC Armed Forces. The PLA has an absolute advantage in terms of ballistic missiles and submarines. Furthermore, superiority in ground forces, navy and air force is also gradually tipping towards the PLA.

Using the 2010 defense budget of both sides for comparison, the PRC's defense budget was roughly U.S.$78 billion, while the ROC's defense budget was roughly U.S.$9 billion, which appears to be a difference of over 8-fold. Yet, the PRC's actual military funding is somewhere between 2 to 3 times the figure it has disclosed. Therefore, the actual difference in defense budgets on the two sides may reach up to 21-fold.

The gap in terms of weapons and equipment is even wider, and should be followed with great concern Although the risk of military conflict has subsided in recent years as cross-strait relations improved, this

development has benefitted the PRC's defense and military modernization and strengthened its military, which increases the threat to our national security and impacts regional military balance; this is truly a risk to regional and our national security. Provided that at the current stage the PLA has not renounced the use of military force against Taiwan, the risk of cross-strait military conflicts still exists.

Moreover, the PLA has deployed over one thousand missiles along its southeast coasts opposite Taiwan, established a network of air defense and anti-ship bases, and continued to outfit long-range precision strike fighters and missile boats with stealth capabilities. Furthermore, the PLA is sending navy ships to the western Pacific for long-term voyage training, hoping to gradually improve the effectiveness of its joint fire support strikes and strengthen its force delivery capabilities, using military force to support its plans to overpower Taiwan.

In recent years, the PRC has boasted its contributions to the international society to shape its image as a peacekeeper. From a strategic point of view, the PRC has switch from a passive strategy of responding to matters of concern of the international society, to actively manipulating international military control, disarmament and proliferation prevention issues, attempting to play the role as a leader of the third world and arbitrator of regional affairs.

Furthermore, although the PRC agrees that cross-strait relations have been improved, it remains discontent with developments of U.S. arms sales to Taiwan, and has continued to strengthen its military readiness against Taiwan, this includes strengthening precision strike capabilities of the Second Artillery, improving long distance target guidance and strike capabilities of the Navy and Air Force, and refining exercises of the Ground Force for (controlling) seizing nearby islands. It is apparent that the PRC's concepts of "opposing Taiwan independence and advancing the unity of China" and "using military force to advance the unity of China" have not changed. In the light of this, we must continue to solidify our force development and defense readiness, so as to meet the PRC's military challenge.

…typhoons and landslides. Based on the concept of "active disaster relief," the ROC Armed Forces has adopted the approach of "preparing for disasters in advance, deploying troops with an eye to disaster preparedness, and ensuring readiness for rescue operations" for responding to the threat of major natural disasters to national security. In view of the strong earthquake that occurred in Japan on March 11th, 2011, which became a "complex" disaster as it caused a tsunami that resulted in a nuclear disaster, the ROC Armed Forces is strengthening its contingency response capabilities to meet new challenges. Our nation is engaged in frequent international exchanges, and is thus at risk of foreign infectious diseases causing an epidemic in our borders. In the light of this, the ROC Armed Forces assists with epidemic prevention in coordination with the government's health policy and medical system, so as to prevent epidemic situations from further escalating.

In addition, the ROC is a nation highly dependent on imports for energy and food.

Therefore, food and energy security is a matter of the nation's overall development. With global raw material prices trending upwards, we must continue to place emphasis on the source, transportation, import and storage of energy and food; this will allow us to prevent inadequate supply for people's livelihood and economic development from becoming a threat to our national security. Furthermore, the gradual decrease in draft age men as a result of the rapid outflow of talents and trend of aging population is also a matter of national security, and also a secret worry of our national defense.

The above describes challenges to our national security. The ROC Armed Forces must implement defense transformation and build a solid defense force under the policy to "prevent war" and to "prepare for war but not provoke war," so that it may back cross-strait peaceful and positive interaction.

At the same time, the Armed Forces must serve as a "guardian of national security" and remain aware that "to bring peace it must first be capable of war," establishing innovative and asymmetrical military deterrence capabilities, reinforcing disaster relief mechanisms, and actively handling major threats in our exclusive economic zone, including ground, air, marine, submarine, electromagnetic spectrum and network. The Armed Forces will thus become a contributor to peace and stability of the western Pacific, ensuring the stability of the Asia-Pacific and the continued prosperous development of the global economy.

Figure 12.1: The Balance in the Taiwan Straits in 2013 – Part One

Taiwan Strait Military Balance, Ground Forces			
	China		Taiwan
	Total	Taiwan Strait Area	Total
Personnel (Active)	1.25 million	400,000	130,000
Group Armies	18	8	3
Infantry Divisions	15	5	0
Infantry Brigades	16	6	8
Mechanized Infantry Divisions	6	2	0
Mechanized Infantry Brigades	17	7	3
Armor Divisions	1	0	0
Armor Brigades	16	7	4
Artillery Divisions	2	2	0
Artillery Brigades	17	6	5
Airborne Divisions	3	3	0
Amphibious Divisions	2	2	0
Amphibious Brigades	3	3	3
Tanks	7,000	3,000	1,100
Artillery Pieces	8,000	3,000	1,600

Taiwan Strait Military Balance, Air Forces			
	China		Taiwan
Aircraft	Total	Within range of Taiwan	Total
Fighters	1,700	330	388
Bombers/Attack	600	160	22
Transport	475	40	21

Figure 12.1: The Balance in the Taiwan Straits in 2013 – Part Two

Taiwan Strait Military Balance, Naval Forces			
	China		Taiwan
	Total	East and South Sea Fleets	Total
Aircraft Carriers	1	0	0
Destroyers	23	16	4
Frigates	52	44	22
Tank Landing Ships/ Amphibious Transport Dock	29	27	12
Medium Landing Ships	26	24	4
Diesel Attack Submarines	49	33	4
Nuclear Attack Submarines	5	2	0
Coastal Patrol (Missile)	85	67	45

Notes:

PLA active ground forces are organized into group armies. Infantry, armor, and artillery units are organized into a combination of divisions and brigades deployed throughout the PLA's seven military regions (MRs). A significant portion of these assets are deployed in the Taiwan Strait area, specifically the Nanjing, Guangzhou, and Jinan MRs. Taiwan has seven defense commands, three of which have field armies. Each army contains an artillery command roughly equivalent to a brigade plus.

The PLA Navy has the largest force of principal combatants, submarines, and amphibious warfare ships in Asia. In the event of a major Taiwan conflict, the East and South Sea Fleets would be expected to participate in direct action against the Taiwan Navy. The North Sea Fleet would be responsible primarily for protecting Beijing and the northern coast, but could provide mission-critical assets to support other fleets.

The PLA Air Force and the PLA Navy have approximately 2,300 operational combat aircraft. These consist of air defense and multi-role fighters, ground attack aircraft, fighter-bombers, and bombers. An additional 1,450 older fighters, bombers and trainers are employed for training, research, and development. The two air arms also possess approximately 475 transports and more than 100 surveillance and reconnaissance aircraft with intelligence, surface search, and airborne early warning capabilities. The majority of PLA Air Force and PLA Navy aircraft are based in the eastern half of the country. Currently, 490 aircraft could conduct combat operations against Taiwan without refueling, but this number could be significantly increased through any combination of aircraft forward deployment, decreased ordnance loads, or altered mission profiles.

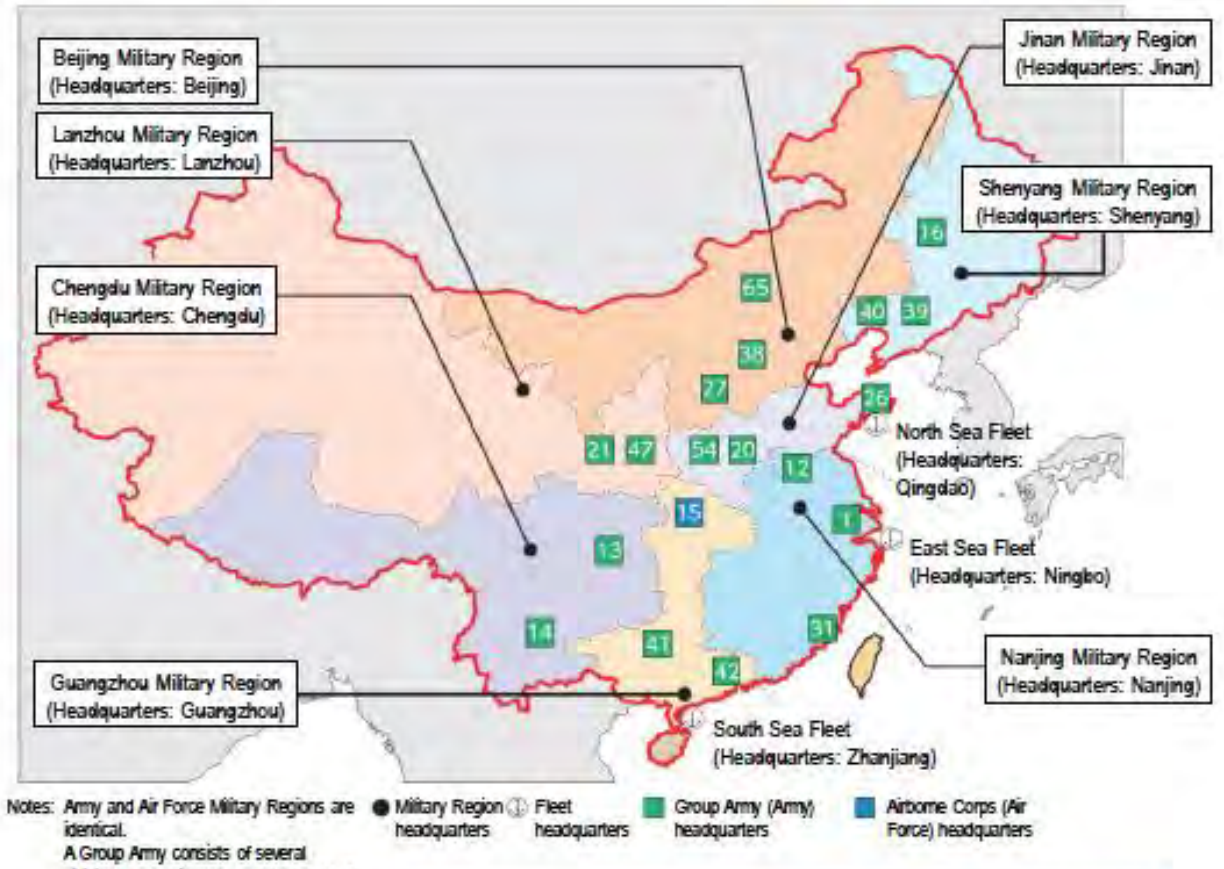
Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 75-76.

Figure 12.2: Taiwanese (ROC) Ministry of Defense Summary of the PRC-ROC Military Balance

	ROC Armed Forces	Category	People's Liberation Army
Total Force	Over 270,000		Over 2,300,000
Ground Forces	180,000 (including central, joint logistics, military police and reserve forces) Tanks and armored vehicles: Over 1,200 Helicopters: Over 200 Heavy artillery: Over 1,000	Force Combat Equipment	1,264,000 Tanks and armored vehicles: Over 7,000 Helicopters: Over 400 Heavy artillery: Over 8,000
Navy	39,000 Over 190 Large battleships: Over 30 Amphibious ships: Over 10 Submarines: 4 Over 10,000	Force Battleships Principal Combatants Marines	264,000 Over 930 Large battleships: Over 70 Amphibious ships: Over 40 Submarines: Over 60 Over 8,000
Air Forces	37,000 Over 420 Bombers: 0 Fighters: Over 390 (F-16, M-2000, IDF and F-5E) Attack aircrafts: 0 UAV: 0 Air defense missile systems: about 30	Force Fighters Principal Combatants	394,000 Over 3,400 (including navy aviation) Bombers: Over 300 Fighters: Over 1,860 (J-7, J-8, J-10, Su-27, Su-30) Attack aircrafts: Over 300 UAV:Over 280 Air defense missile systems: about 1,000
Second Artillery	N/A N/A N/A N/A	Force Strategic Missiles Tactical Missiles Nuclear Warheads	146,000 Over 180 Over 1,400 (including cruise missiles) 450-500

Source: Republic of China (Taiwan*), National Defense Report – 100th Anniversary*, July 2011, p. 82; Also see Republic of China, *National Defense Report*, 2011 http://2011mndreport.mnd.gov.tw/en/foreword.html

Figure 12.3: Japanese Ministry of Defense Summary of the PRC-ROC Military Balance



		China	Taiwan (Reference)
Total military forces		Approx. 2.3 million troops	Approx. 290,000 troops
Ground forces	Group troops	Approx. 1.6 million troops	Approx. 200,000 troops
	Tanks	Type-98A/99, Type-96/A, Type-88A/B and others Approx. 8,200 vehicles	M-60, M-48A/H and others Approx. 1,420 vehicles
Maritime forces	Warships	Approx. 970 vessels/ 1.469 million tons	Approx. 360 vessels/ 217,000 tons
	Destroyers & frigates	Approx. 80 vessels	Approx. 30 vessels
	Submarines	Approx. 60 vessels	4 vessels
	Marines	Approx. 10,000 troops	Approx. 15,000 troops
Air forces	Combat aircraft	Approx. 2,580 aircraft	Approx. 510 aircraft
	Modern fighters aircraft	J-10×268 Su-27/J-11×308 Su-30×97 (Fourth-generation fighters×673)	Mirage 2000×57 F-16×146 F-CK-1 (IDF) ×128 (Fourth-generation fighters×331)
Reference	Population	Approx. 1.347 billion	Approx. 23 million
	Term of service	2 years	1 year

Source: Japanese Ministry of Defense, *Defense of Japan*, 2013, Figure I-1-3-3.

Historical Trends in the Taiwan Strait Military Balance

The US DoD has issued a wide range of unclassified reporting on the security situation in the Taiwan Strait and the US view of the changing balance in the Strait over the last decade. By nature, military balances are relative, and therefore they must exist between two or more countries. While numerous countries have an interest in cross-strait relations, this study focuses on the PRC-ROC military balance in the Taiwan Strait.

Figures 12.4 to 12.6 depict DoD-reported data on the military forces of the PRC and ROC as well as a comparison of forces in the immediate vicinity of the Strait.[436] It is important to state that force numbers do not tell the whole story – differences in equipment quality, military doctrine, and personnel proficiency also influence the Taiwan Strait military balance. However, as the 2013 DoD report on China stated,[437]

> Taiwan has historically relied upon multiple military variables to deter PLA aggression: the PLA's inability to project sufficient power across the 100 mile Taiwan Strait, the Taiwan military's technological superiority, and the inherent geographic advantages of island defense. China's increasingly modern weapons and platforms (more than 1,100 ballistic missiles, an anti-ship ballistic missile program, ships and submarines, combat aircraft, and improved C4ISR capabilities) have largely negated many of these factors.

The Japanese 2013 defense white paper took a somewhat different perspective:[438]

> In China's military modernization, backed by its stable relations with Russia and other neighboring states that share land borders with China, it is believed that China is giving the top priority to handling of the Taiwan issue, more specifically, to improvement of its capabilities to hinder the independence of Taiwan and foreign military support for the independence of Taiwan. Furthermore, in recent years, China is actively trying to acquire capabilities for missions other than the Taiwan issue.
>
> … China holds the principle that Taiwan is a part of China, and that the Taiwan issue is therefore a domestic issue. The country maintains that the "one-China" principle is the underlying premise and foundation for discussions between China and Taiwan. China also claims that it would never abandon its efforts for peaceful unification, and expresses that it will take up policies and measures to solve issues of Taiwanese people's interest and to protect their due authority, while it has repeatedly stated that it has not renounced the use of force from the standpoint of strong opposition to any intervention in the unification of China by foreign powers as well as any move toward independence of Taiwan.
>
> The Anti-Secession Law, enacted in March 2005, clearly lays out the non-renunciation of the use of military force by China. Ma Ying-jeou, who was re-elected in the presidential election in January 2012, continues to advocate a policy of pursuing Taiwanese economic development through expanding economic exchanges with China and the status quo rather than independence in his second term. As exemplified by the coming into force of the Economic Cooperation Framework Agreement (ECFA), relations between the two sides are moving forward mainly around the realm of economy. On the security front, while China made appeals for China and Taiwan to make contact and hold exchanges over military issues at an appropriate time in order to explore the creation of mechanisms for building mutual trust over military security.
>
> Taiwan has shown a cautious stance stating that the conditions are not yet met. Regarding the Senkaku Islands, China and Taiwan have made their own assertion but Taiwan has expressed a negative attitude toward cooperation with China. Attention will be paid to trends in the future relations between China and Taiwan including trends of political dialogues including military affairs.
>
> …Taiwan, under the guidance of building the "hard rock" defense advocated by President Ma Jeou Ying, identifies prevention of war, homeland defense, response to contingencies, deterrence of conflict, and regional stability as the strategic objectives, and takes the military strategy of "resolute defense and credible deterrence."

> Taiwan, for improved expertise of its military personnel and other purposes, aims to transform its armed forces currently consisting of drafted personnel and volunteers into all-volunteer forces, while reducing the total forces from 275,000 to 215,000 personnel by the end of 2014.
>
> At the same time, the Taiwanese armed forces attribute importance to the introduction of advanced technologies and improvement of joint operational capabilities. Additionally, in light of the serious damage that occurred from the typhoon in August 2009, the Taiwanese armed forces identified disaster prevention and relief as one of their major missions.
>
> With regard to Taiwan's military power at present, ground forces include 39 Army brigades and three Navy Marine Corps brigades with a total of approximately 215,000 personnel. In addition, it is believed that the total of approximately 1.65 million reserve personnel of the air, naval, and ground forces would be available in case of war. Regarding naval capabilities, in addition to Kidd-class destroyers which were imported from the United States, Taiwan possesses relatively modern frigates and other vessels. Regarding air capabilities, Taiwan possesses F-16 A/B fighters, Mirage 2000 fighters, Jing Guo fighters, etc.
>
> In view of the fact that the PLA is enhancing its missile, naval, and air forces, the Taiwanese military believes it still needs to modernize its equipment. The U.S. Department of Defense has notified Congress of possible arms sales to Taiwan based on the Taiwan Relations Act, but Taiwan also wishes to purchase the F-16C/D fighter aircraft and other arms from the United States. The issue is to be observed.
>
> Taiwan is also promoting the independent development of military equipment. The Tien Kung II surface-to-air missiles and Hsiung Feng II anti-ship missiles are deployed and it is believed that the Hsiung Feng IIE cruise missiles are being developed in order to acquire long-range attack capabilities, while the Tien Kung III surface-to-air missiles are being developed in order to ensure the capabilities to deal with ballistic missiles.
>
> The military capabilities of China and Taiwan are generally characterized as follows:
>
> > 1) Regarding ground forces, China possesses an overwhelming number of troops; however, their capability of landing on and invading the island of Taiwan is limited. Nevertheless, China is making efforts to improve its landing and invasion capabilities in recent years, such as building large landing ships.
> >
> > 2) Regarding naval and air forces, China, which overwhelms Taiwan in terms of quantity, has also been steadily modernizing its naval and air forces in recent years in terms of quality, where Taiwan had superiority over China.
> >
> > 3) Regarding missile attack capabilities, China possesses numerous short-range ballistic missiles with a range that covers Taiwan, and Taiwan seems to have few effective countermeasures.
>
> In addition to the sizes of forces and performance and quantity of military equipment, a comparison of military capabilities should take into account various factors such as the objectives and characteristic of envisioned military operations, the operational posture, proficiency in military personnel, and logistics.
>
> Nevertheless, as China is rapidly modernizing its military power, the overall military balance between China and Taiwan is shifting in favor of China. Attention should be paid to the modernization of both the Chinese and Taiwanese military capabilities and U.S. weapon sales to Taiwan.

China's ongoing military modernization, combined with the previously-discussed improvements in human capital, training, and military exercises, are eroding the effectiveness of the ROC's prior reliance on intangible factors. Thus, as intangible differences between the two forces are slowly decreasing, tangible factors such as force numbers are becoming more important indicators of the Taiwan Strait military balance.

As has been emphasized throughout this report, a military balance is inherently a dynamic and uncertain construct. While it is impossible to perfectly determine the magnitude of intangible variables and how they interact with the changes in force numbers, it is possible to determine the direction of the changing Taiwan Strait military balance. Given the changes in numbers,

equipment, and training on both sides, it is possible to determine that the balance is shifting in the PRC's favor.

It is important to again point out that a military balance is a relative construct. To say that trends are shifting in the PRC's favor does not indicate that the PRC could win a war with the ROC, that the PRC's combat power is greater than the ROC's, or that the ROC's weapons systems are qualitatively inferior to PRC weapons systems. What it does mean is that, regardless of the military balance in the past, the military balance between the two sides is currently becoming *relatively* more favorable to one side. Thus, a *relative* shift in the favor of one side could still occur in a situation in which that side is at a crushing disadvantage. It is important to remember this important distinction when examining the *relative* trends depicted in the following pages.

- **Figure 12.4** illustrates a brief summary of trends in force structure and strength of the PLA.
- **Figure 12.5** displays trends in PLA forces in the immediate vicinity of the Taiwan Strait.
- **Figure 12.6** shows trends in the force structure of the ROC armed forces.

It should also be remembered that additional PRC forces beyond the vicinity of the Strait could be committed to a potential Taiwan contingency.

Figure 12.4: A Summary of Trends in the PLA

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Personnel (Active)	1,600,000	1,400,000	1,400,000	1,250,000	1,250,0 0	1,250,000	1,250,000	1,250,000	1,250,000
Group Armies	18	18	18	18	18	18	18	18	18
Infantry Divisions	20	25	25	19	19	19	17	-	15
Infantry Brigades	20	33	33	24	24	25	22	-	16
Mot. Infantry Divisions	-	-	-	-	-	-	-	18	-
Mot. Infantry Brigades	-	-	-	-	-	-	-	22	-
Mech. Infantry Divisions	5	-	-	4	4	4	6	8	6
Mech. Infantry Brigades	5	-	-	5	5	5	6	6	17
Armor Divisions	10	9	9	9	9	9	9	9	1
Armor Brigades	10	11	11	8	8	8	8	9	16
Artillery Divisions	5	3	3	2	2	2	2	2	2
Artillery Brigades	15	15	15	17	17	17	17	17	17
Airborne Divisions	*	3	3	3	3	3	3	3	3
Amphibious Divisions	-	-	-	2	2	2	2	-	2
Amphibious/ Marine Brigades	2	2	2	3	3	3	3	2	3
Tanks	6,500	7,000	7,000	6,700	6,700	7,000	7,000	7,000	7,000
Artillery Pieces	11,000	11,000	11,000	7,400	7,400	8,000	8,000	8,000	8,000
Naval forces									
Aircraft Carriers	0	0	0	0	0	0	0	0	1
Destroyers	21	25	25	29	25	25	26	26	23
Frigates	43	45	47	45	48	49	53	53	52
Tank Landing Ship/Amphibious Transport Dock	20	25	25	26	27	27	27	28	29
Medium landing Ships	23	25	25	28	28	28	28	23	26

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Diesel Attack Submarines	51	50	53	54	54	54	49	48	49
Nuclear Attack Submarines	6	5	5	5	6	6	5	5	5
Coastal patrol (Missile)	51	45	41	45	70	85	86	86	85
Fighters	1,500	1,525	1,550	1,630	1,655	1,680	1,680	1,570	1,700
Bombers/Attack	780	775	775	620	645	620	620	550	600
Transport	500	450	450	450	450	450	450	300	475

*Included in figures for Infantry Division

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.5: Trends in PLA Forces Deployed in the Vicinity of the Taiwan Strait

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Personnel (Active)	375,000	400,000	400,000	440,000	400,000	400,000	400,000	400,000	400,000
Group Armies	9	8	8	8	8	8	8	8	8
Infantry Divisions	9	9	9	8	8	6	5	-	5
Infantry Brigades	11	12	12	11	11	11	9	-	6
Mot. Infantry Divisions	-	-	-	-	-	-	-	5	-
Mot. Infantry Brigades	-	-	-	-	-	-	-	11	-
Mech. Infantry Divisions	3	-	-	1	1	1	2	4	2
Mech. Infantry Brigades	1	-	-	1	1	1	1	1	7
Armor Divisions	4	4	4	4	4	4	4	4	0
Armor Brigades	4	4	4	3	3	3	3	4	7
Artillery Divisions	3	3	3	2	2	2	2	2	2
Artillery Brigades	5	5	5	6	6	6	6	6	6
Airborne Divisions	*	3	3	3	3	3	3	3	3
Amphibious Divisions	-	-	-	2	2	2	2	-	2
Amphibious/Marine Brigades	2	2	2	3	3	3	3	2	3
Tanks	2,500	2,700	2,700	2,800	2,800	3,100	3,100	3,100	3,000
Artillery Pieces	5,500	3,200	3,200	2,900	2,900	3,400	3,400	3,400	3,000
Aircraft Carriers	0	0	0	0	0	0	0	0	0
Destroyers	13	16	16	17	17	15	16	16	16
Frigates	34	40	40	36	39	40	44	44	44
Tank Landing Ships	20	22	22	24	25	25	25	26	27
Medium landing Ships	15	20	20	23	23	23	21	18	24
Diesel Attack Submarines	29	28	28	32	32	32	33	30	33
Nuclear Attack Submarines	-	-	-	1	1	2	2	2	2
Coastal patrol (Missile)	34	34	34	35	55	65	68	67	67
Fighters	425	425	425	330	330	330	330	310	330
Bombers/Attack	280	275	275	160	160	160	160	180	160
Transport	50	75	75	40	40	40	40	40	40

*Included in figures for Infantry Division

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.6: Trends in the ROC Armed Forces

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Personnel (Active)	200,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000
Group Armies		3	3	3	3	3	3	3	3
Infantry Divisions	-	-	-	-	-	-	-	-	0
Infantry Brigades	25	13	13	8	8	8	8	-	8
Mot. Infantry Divisions	-	-	-	-	-	-	-	-	-
Mot. Infantry Brigades	-	-	-	-	-	-	-	8	-
Mech. Infantry Divisions	-	-	-	-	-	-	-	-	0
Mech. Infantry Brigades	3	-	-	3	3	3	3	3	3
Armor Divisions	-	-	-	-	-	-	-	-	0
Armor Brigades	5	5	5	5	5	4	4	4	4
Artillery Divisions	-	-	-	-	-	-	-	-	0
Artillery Brigades	-	3+	3+	5	5	5	5	5	5
Airborne Divisions	-	-	-	-	-	-	-	-	0
Amphibious Divisions	1	-	-	-	-	-	-	-	0
Amphibious /Marine Brigades	3	2	2	3	3	3	3	2	3
Tanks	1,900	1,800	1,800	1,100	1,100	1,100	1,100	1,100	1,100
Artillery Pieces	4,400	3,200	3,200	1,600	1,600	1,600	1,600	1,600	1,600
Aircraft Carriers	0	0	0	0	0	0	0	0	0
Destroyers	6	2	4	4	4	4	4	4	4
Frigates	21	22	22	22	22	22	22	22	22
Tank Landing Ship/ Amphibious Transport Dock	12	12	12	12	12	12	12	12	12
Medium landing Ships	4	4	4	4	4	4	4	4	4
Diesel Attack Submarines	4	4	4	4	4	4	4	4	4
Nuclear Attack Submarines	-	-	-	-	-	-	-	-	0
Coastal patrol (Missile)	50	50	50	51	59	61	61	61	45
Fighters	420	330	330	390	390	388	388	388	388
Bombers/Attack	-	-	-	-	-	22	22	22	22
Transport	40	40	40	40	40	21	21	21	21

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

The Naval Balance

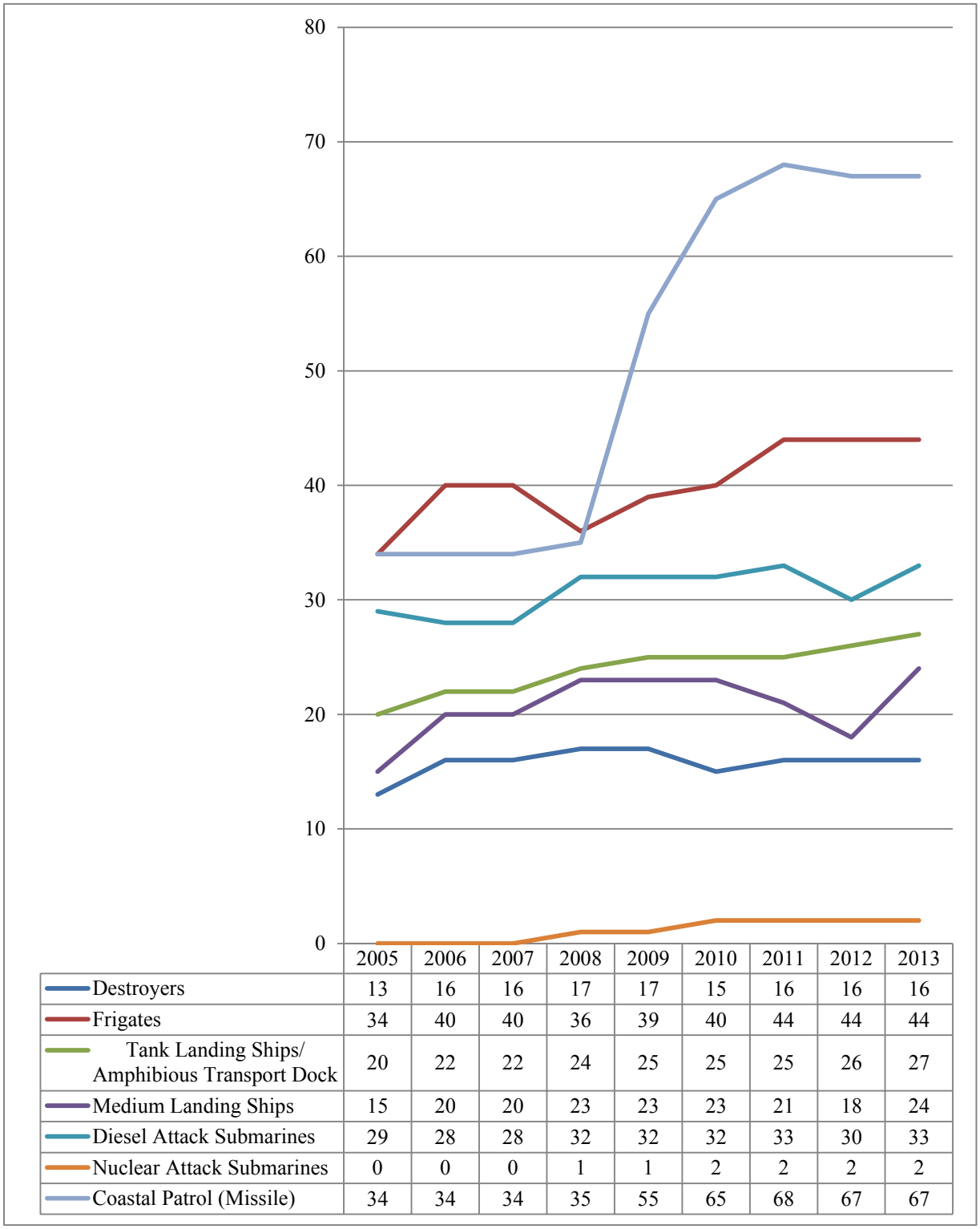
The numerical indicators presented in **Figures 12.1 to 12.6** have shown that the naval balance in the Taiwan Strait is shifting in favor of the PRC. The Figures for the years 2005-2013 indicate that, while Taiwan has kept its naval force numbers at a relatively stable level (with the exception of patrol craft), the PRC has engaged in a constant, if moderate, increase in the number of naval forces allocated to the Taiwan Strait.

Figures 12.7 and 12.8 illustrate the numerical changes in naval forces on both sides over time; these data show that the PLAN has allocated significantly larger numbers of patrol craft, frigates, and tank landing ships to the East and South Sea Fleets. In addition, there were moderate increases in the number of destroyers and medium landing ships. Perhaps most significantly, the PLAN allocated two nuclear attack submarines (one in 2008 and another in 2010), when historically all of the PLAN's SSNs have been concentrated in the North Sea Fleet.

In contrast, the ROC Navy deployed significantly more patrol craft but saw few increases in any other ship category. One additional frigate was deployed in the fleet, but two destroyers were decommissioned in turn. Furthermore, the 2013 balance shows a significant ROC reduction in coastal patrol boats. While the ROC has historically relied on quality, rather than quantity, to militarily balance the PRC, the increasing numerical advantage of the PLAN as well as the ongoing PLAN modernization program, which has resulted in advanced combatants such as the Luyang II DDG, indicate that the naval balance in the Strait is shifting in the favor of the PLAN.

It is important to note that the comparisons presented here have significant drawbacks. Both sides operate land-based anti-ship cruise missiles, maritime strike aircraft, land-based artillery, and electronic and cyberwarfare forces. Moreover, the PRC has a reportedly operational anti-ship ballistic missile. Successes or failures by either side in the air, space, land, and cyber domains, as well as the electro-magnetic spectrum, will have significant implications for any potential naval combat. In addition, both the PRC and the ROC are attempting to realize joint operations among their services. All of these variables will influence naval combat. However, the lack of reliable data on many of these variables and the intangible nature of others preclude effective comparison. Consequently, this study presents naval force numbers in the Strait in order to provide a quantitative analysis of one portion of the military balance.

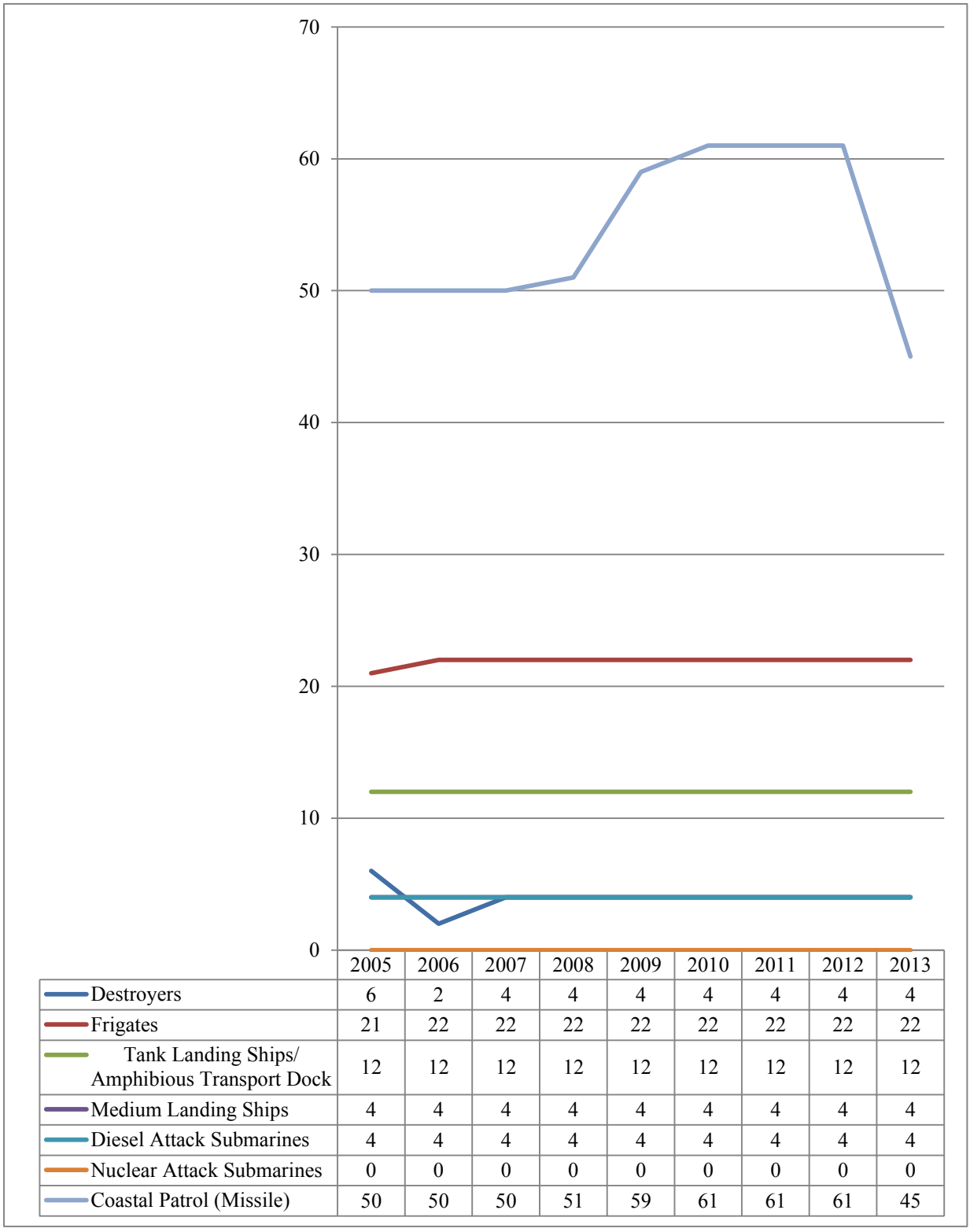
Figure 12.7: Absolute Trends in PLAN Deployments to the East and South Sea Fleets



	2005	2006	2007	2008	2009	2010	2011	2012	2013
Destroyers	13	16	16	17	17	15	16	16	16
Frigates	34	40	40	36	39	40	44	44	44
Tank Landing Ships/ Amphibious Transport Dock	20	22	22	24	25	25	25	26	27
Medium Landing Ships	15	20	20	23	23	23	21	18	24
Diesel Attack Submarines	29	28	28	32	32	32	33	30	33
Nuclear Attack Submarines	0	0	0	1	1	2	2	2	2
Coastal Patrol (Missile)	34	34	34	35	55	65	68	67	67

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.8: Absolute Trends in ROC Naval Forces



	2005	2006	2007	2008	2009	2010	2011	2012	2013
Destroyers	6	2	4	4	4	4	4	4	4
Frigates	21	22	22	22	22	22	22	22	22
Tank Landing Ships/ Amphibious Transport Dock	12	12	12	12	12	12	12	12	12
Medium Landing Ships	4	4	4	4	4	4	4	4	4
Diesel Attack Submarines	4	4	4	4	4	4	4	4	4
Nuclear Attack Submarines	0	0	0	0	0	0	0	0	0
Coastal Patrol (Missile)	50	50	50	51	59	61	61	61	45

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figures 12.7 and 12.8 indicate that, while the ROC's forces have been largely numerically stagnant or, in the case of coastal patrol boats, decreasing, the PLAN's deployments to the Taiwan Strait have been moderately – and in some cases, significantly – increasing.

However, the PRC and ROC are not engaging in a symmetric competition. The ROC has mostly based its defense strategy on assumptions of numerical inferiority, qualitative superiority, and asymmetric strategic imperatives. Consequently, a more meaningful assessment compares *relative* changes in the Taiwan Strait balance to compare the changing balance of forces. Thus, regardless of strategic assumptions, a changing relative balance indicates a meaningfully changing military balance and thus changing effects on bilateral relations.

Figures 12.9 and 12.10 illustrate this changing relative balance by using 2005 as a baseline and charting relative increases in force numbers on both sides. **Figure 12.9** demonstrates the changing relative force strength of PLAN deployments to the Taiwan Strait while **Figure 12.10** shows the changing relative force strength of ROC naval deployments. Even assuming a ROC strategic posture based on operating against numerically larger forces, such a comparison enables an observer to identify a military balance in flux in the PRC's favor. As the data in both Figures show, the ROC's naval forces are being forced to deter or defeat larger numbers of the PRC's forces *per individual ROC combatant.*

This outcome is the result of numerous trends within both navies. On the PLAN side, nearly every ship category has seen more than a 20% increase in force numbers since 2005. Importantly, nuclear submarines have been newly introduced into the region and so do not appear in the Figures below, because the PLAN's nuclear submarine force strength has increased by an infinite percentage. Also impressive, the PLAN's patrol craft force has increased by nearly 100% over the 2005 figure.

In contrast, the ROC's naval forces have experienced stagnant growth in naval force structure, with the 30% decrease in destroyers and the recent cuts to coastal patrol craft holdings being especially significant. These decreases have only been answered by a 5% increase in frigates and stagnant growth in other ship categories.

As a result, the Taiwan Strait naval balance shifted significantly in the favor of the PRC by 2012. Of course, this trend does not mean that the ROC cannot or will not engage in creative and asymmetric means of maintaining cross-strait deterrence in order to compensate for adversary trends in the Strait. However, these trends indicate that such asymmetric approaches are becoming necessary for the ROC: symmetric deterrence and war-fighting is becoming less and less feasible for Taiwan's armed forces.

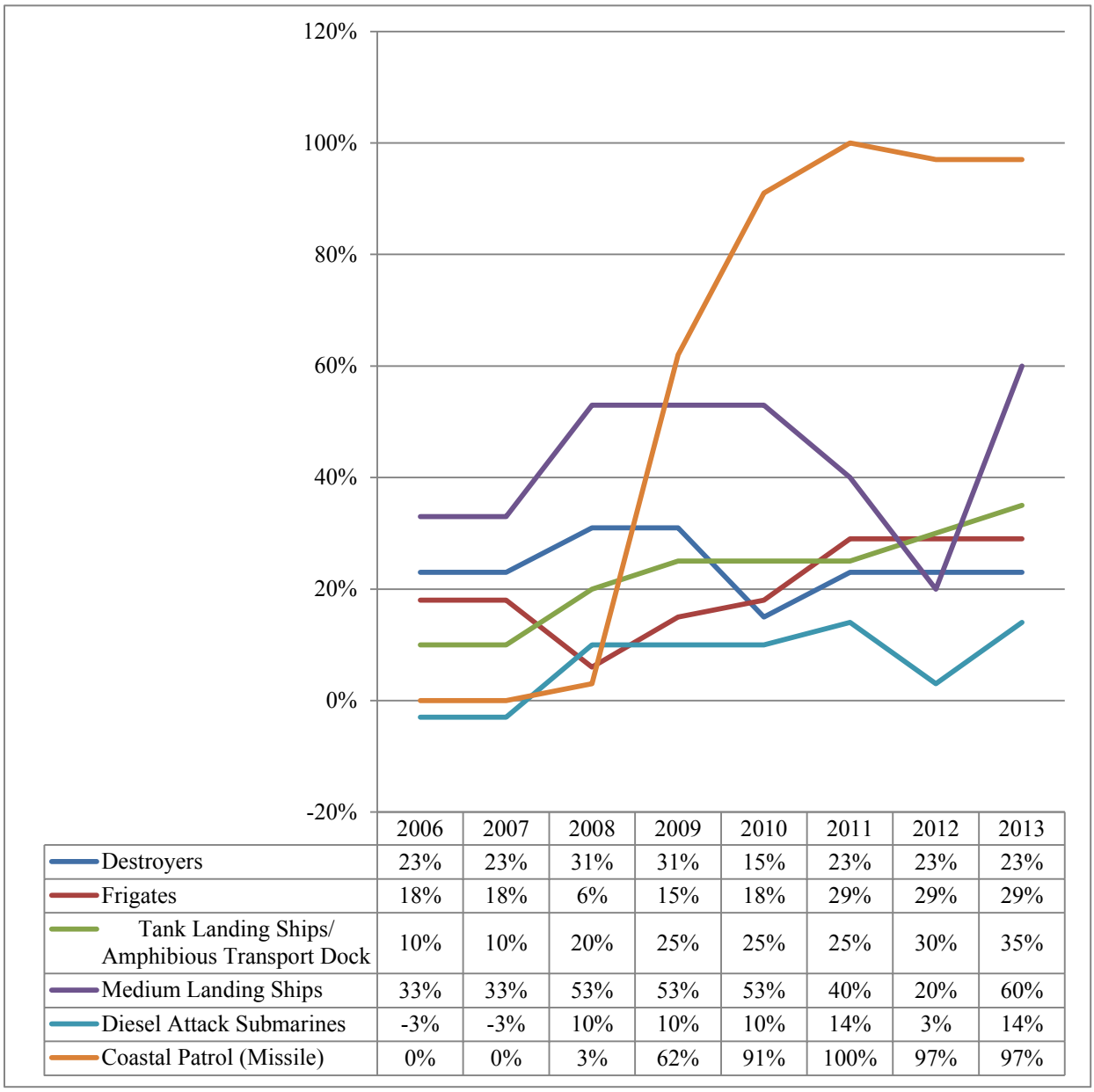
It is necessary to reiterate that these trends do not account for the myriad factors that would influence a PRC-ROC naval contest. Both sides operate numerous systems and forces not shown in the quantitative data below that would influence the naval contest. However, numbers do play a role in determining the outcome of combat.

In is interesting in this regard that the DoD report on *Military and Security Developments Involving the People's Republic of China for 2013* highlights the following largely naval scenario:[439]

> In addition to direct military engagement, PLA writings describe potential alternative solutions—air blockades, missile attacks, and mining to force capitulation. China could declare that ships en route to Taiwan must stop in mainland ports for inspection and/or transshipment prior to transiting to Taiwan ports. China could also attempt the equivalent of a blockade by declaring exercise or missile closure areas in

approaches to ports, in effect closing port access and diverting merchant traffic. The PLA employed this method during the 1995-96 missile firings and live-fire exercises. There is a risk, however, that China would underestimate the degree to which any attempt to limit maritime traffic to and from Taiwan would trigger countervailing international pressure and military escalation. China today probably could not enforce a full military blockade, particularly if a major naval power intervened. However, its ability to do so will improve significantly over the next five to ten years.

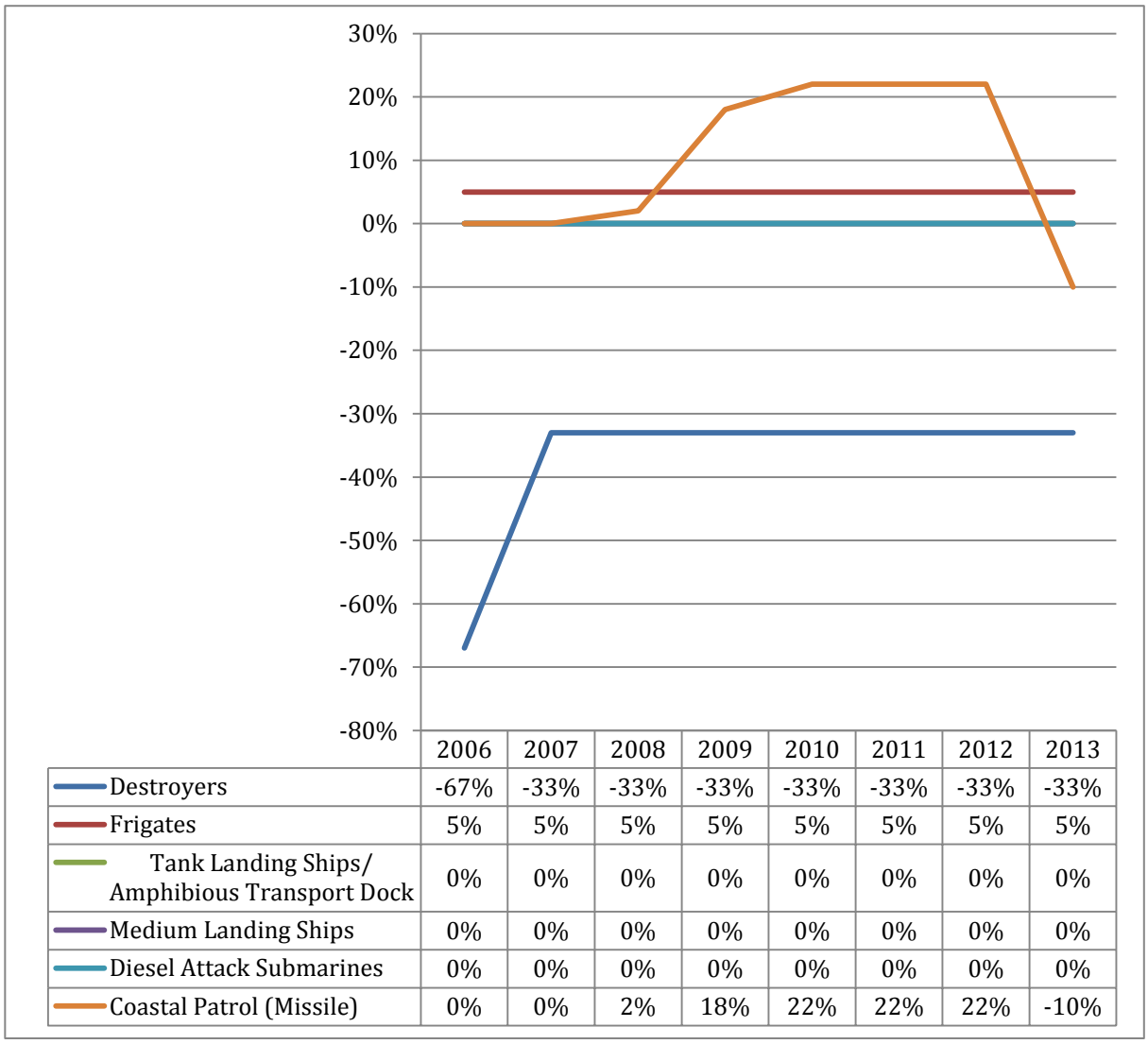
Figure 12.9: Relative Increases in PLAN Deployments to the East and South Sea Fleets since 2005 (percentage increase)



	2006	2007	2008	2009	2010	2011	2012	2013
Destroyers	23%	23%	31%	31%	15%	23%	23%	23%
Frigates	18%	18%	6%	15%	18%	29%	29%	29%
Tank Landing Ships/ Amphibious Transport Dock	10%	10%	20%	25%	25%	25%	30%	35%
Medium Landing Ships	33%	33%	53%	53%	53%	40%	20%	60%
Diesel Attack Submarines	-3%	-3%	10%	10%	10%	14%	3%	14%
Coastal Patrol (Missile)	0%	0%	3%	62%	91%	100%	97%	97%

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.10: Increases in ROC Naval Deployments since 2005 (percentage increase)



	2006	2007	2008	2009	2010	2011	2012	2013
Destroyers	-67%	-33%	-33%	-33%	-33%	-33%	-33%	-33%
Frigates	5%	5%	5%	5%	5%	5%	5%	5%
Tank Landing Ships/ Amphibious Transport Dock	0%	0%	0%	0%	0%	0%	0%	0%
Medium Landing Ships	0%	0%	0%	0%	0%	0%	0%	0%
Diesel Attack Submarines	0%	0%	0%	0%	0%	0%	0%	0%
Coastal Patrol (Missile)	0%	0%	2%	18%	22%	22%	22%	-10%

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

The Air and Missile Balance

The air and missile balance in the Taiwan Strait is changing in more complex ways than the naval balance. Rather than a clear shift in the favor of one country or another, the numbers of aircraft alone cannot indicate a shift in the military balance. Although the ROC Air Force (ROCAF) has introduced bomber aircraft as well as reduced its fighter holdings at roughly one-third the rate the PLAAF has, the PLAAF reductions coincide with the previously-discussed introduction of modern aircraft into the PLAAF fleet.

Moreover, there exist numerous components of the aerial balance that lie outside a symmetric comparison of aircraft: long-range SAMs, SRBMs, naval forces, and long-range artillery all have

the potential to influence any aerial combat over the Taiwan Strait. Consequently, based the DoD-supplied numbers alone, it is difficult to state definitively whether the military balance is shifting in one direction or another in this area. Such a determination would require an analysis of changes over time in numerous equipment categories as well as qualitative trends in training, skill, and leadership.

Considering this reality, the air and missile balance has a synergistic effect on the sea and land military balances that make up the Taiwan Strait balance. Changes in the aerial balance especially affect the naval balance, and vice versa. The deployment of ASCM-capable fighters and bombers in Taiwan, as well as the relative increase in Taiwanese fighters compared to the PLAAF's holdings, may compensate for the shifting trends in the naval balance.

Concurrently, the deployment of more DDGs and guided missile frigates (FFGs) with more capable SAMs by the PLAN may also have a significant effect on the aerial balance. Moreover, the air forces involved have missions in addition to air superiority and close air support; for example, the PLAAF transport aircraft near the Strait indicate that tactical and operational airlift is an important mission for the PLAAF's Taiwan Strait forces. Thus, one aspect of the aerial balance could be the PLAAF's ability to land and supply ground forces on Taiwan and the ROCAF's ability to prevent such actions.

Most significantly, the DoD has reported that the SAF has between 1,000 and 1,200 SRBMs deployed opposite Taiwan:[440] these forces are capable of fulfilling a counter-air role, and the 2009 RAND report mentioned above documents how effectively a SRBM force of such a size and sophistication could significantly impede ROCAF air operations. To quote the RAND report:[441]

> …if the entire first wave of missiles is devoted to air base attack, a greater than 90 percent chance of cutting all [ROCAF] runways could be achieved with 40m CEP missiles.

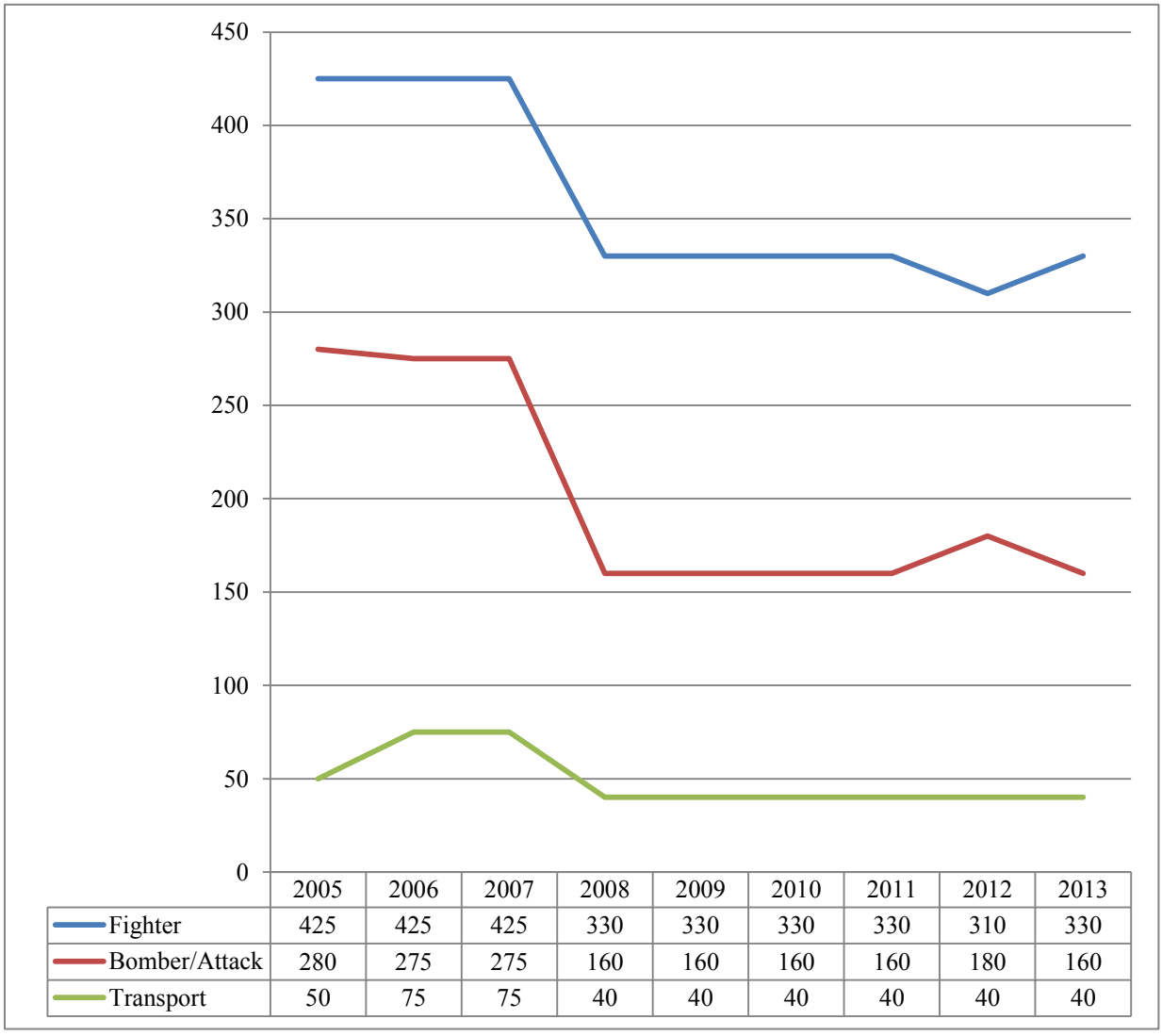
Complementing these SRBMs are PLAA MRLs that have ranges of up to 200 km.

With these caveats in mind, **Figures 12.11 and 12.12** show the changing absolute trends in the PLAAF and ROC Taiwan Strait aerial balance affecting deployments in the Taiwan Strain area. These Figures show that both air forces have decreased the absolute number of fighter and transport aircraft in the Taiwan Strait. However, the ROCAF's fighter strength has made a significant rebound since 2007. The ROC has made a moderate increase in bomber/attack aircraft from a baseline of zero, while the PLAAF made significant reductions in its bomber fleet. However, the PLAAF still holds roughly eight times as many bombers as the ROCAF in the Taiwan Strait area.

As the DoD noted in its 2013 report, [442]

> Limited SRBM attacks and precision strikes against air defense systems, including air bases, radar sites, missiles, space assets, and communications facilities, could be conducted in an attempt to degrade Taiwan's defenses, neutralize Taiwan's leadership, or break the Taiwan people's will to fight.

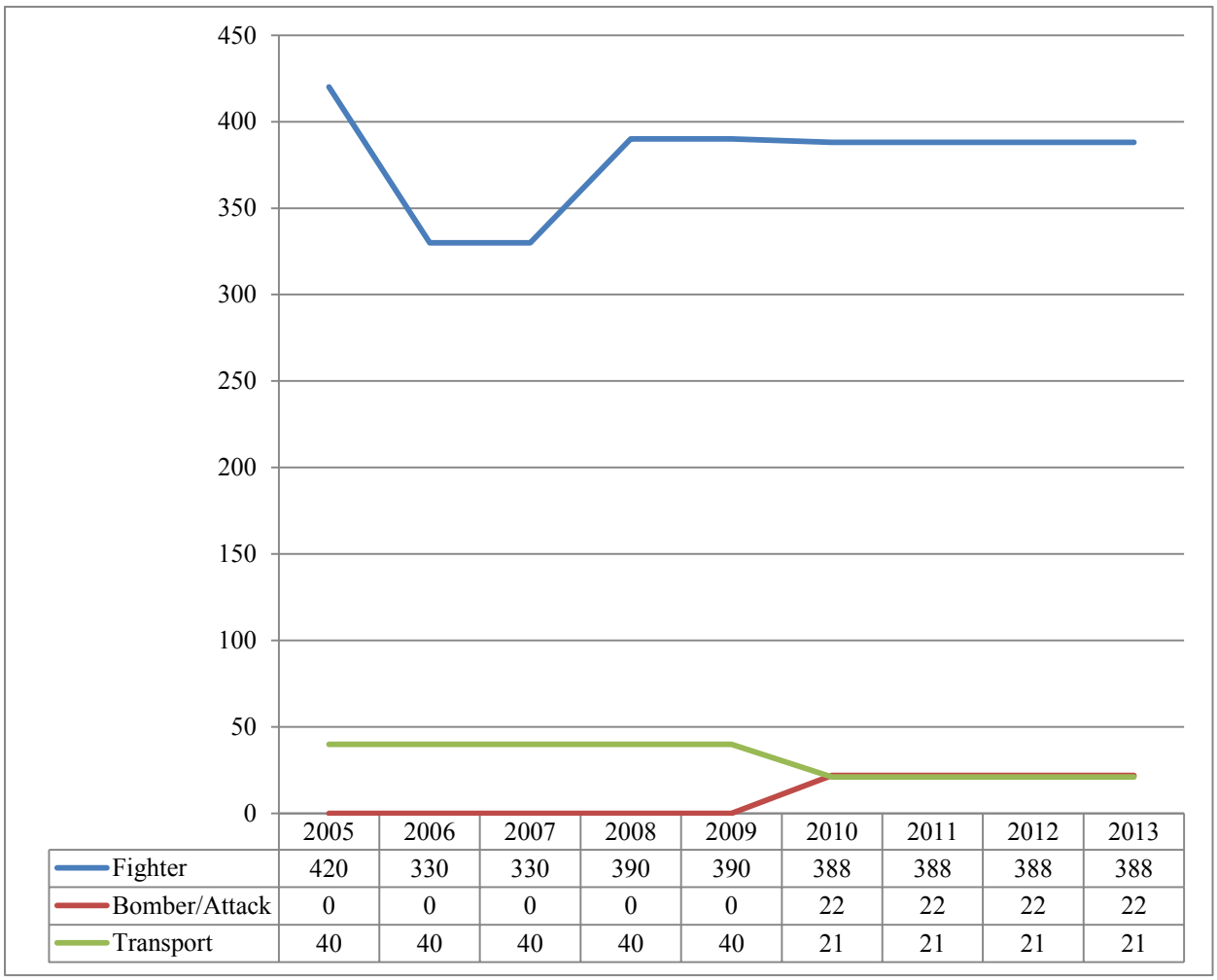
Figure 12.11: Absolute Trends in PLAAF Forces Deployed Near the Taiwan Strait



	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fighter	425	425	425	330	330	330	330	310	330
Bomber/Attack	280	275	275	160	160	160	160	180	160
Transport	50	75	75	40	40	40	40	40	40

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.12: Absolute Trends in the ROCAF Aircraft Inventory



	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fighter	420	330	330	390	390	388	388	388	388
Bomber/Attack	0	0	0	0	0	22	22	22	22
Transport	40	40	40	40	40	21	21	21	21

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

It is difficult to judge the significance of the individual national trends shown in **Figures 12.11 and 12.12** without also looking at the relative trends that result from these numbers. As stated previously, the ROC armed forces operate on the assumption of numerical inferiority, so it is difficult to determine whether the reductions on both sides actually alter the military balance.

In order to provide context for these numbers, as well as to better enable an estimation of the changes occurring in the Taiwan Strait military balance, **Figures 12.13 and 12.14** show the relative trends in the force numbers of both the PLAAF and ROCAF. **Figure 12.15** shows a Japanese Ministry of Defense comparison of the trend in modern fighters.

These Figures indicate that both air forces have engaged in significant numerical reductions in their respective force strengths. As mentioned earlier, these numbers must be placed in the context of dual modernization programs that augment the capabilities of each individual aircraft on both sides. Consequently, a smaller force may counter-intuitively be more capable than a larger one.

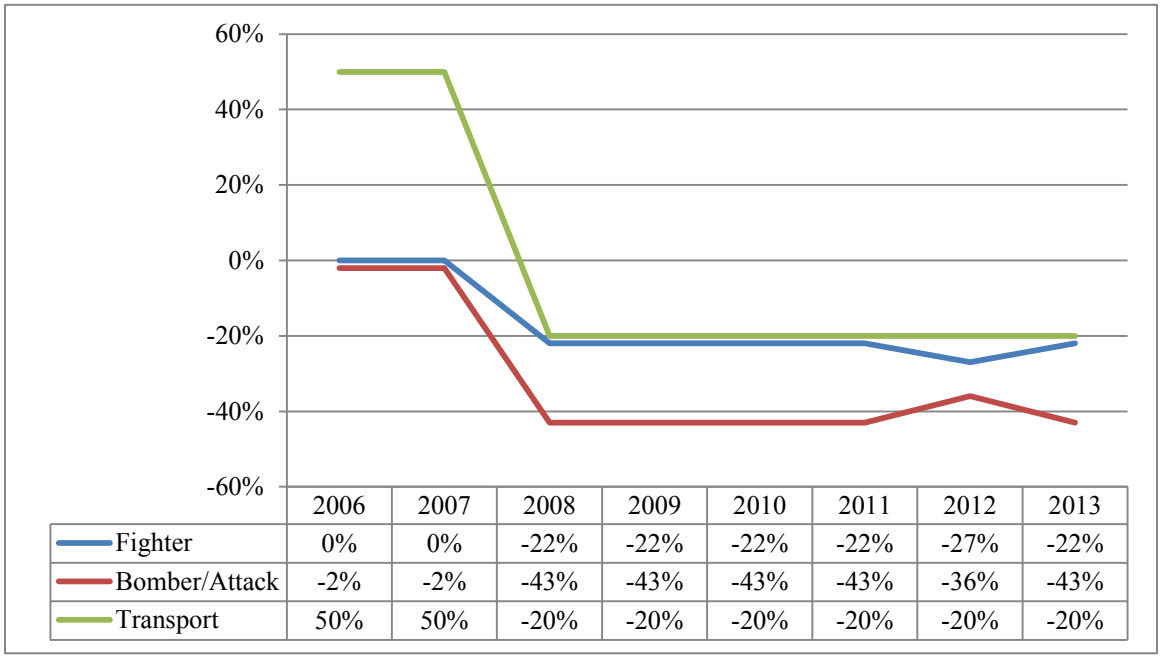
With that caveat, the relative numbers indicate that the PLAAF has reduced combat aircraft at a relatively higher pace than the ROCAF. Between 2005 and 2013, the ROCAF fighter arm decreased in number at approximately one-third the pace of the PLAAF's fighter strength deployed to the Taiwan Strait area. Moreover, as the ROC's fighter forces have grown slightly in strength since 2008, the 2005-2007 reduction may indicate the culling of obsolete aircraft and their replacement with more advanced systems. In addition, as the ROCAF has introduced bombers while the PLAAF has reduced its bomber holdings, the ROCAF bomber force has increased relative to the PLAAF's bomber force. These relative numbers indicate a shift in the aerial balance in the favor of the ROCAF.

Of course, a comparison of aircraft numbers alone only tells part of the story. How the ROCAF's relatively improving fighter and bomber force would perform against improving PLAA and PLAAF long-range SAMs as well as sea-based PLAN SAMs is a standing question.

As **Figure 12.16** illustrates, much would depend upon whether the ROC's air defense systems would provide the ROCAF with a relatively greater advantage than the PLA's air defense systems would provide the PLAAF. The air balance would also be shaped – perhaps critically – by the use of PLA SAF's SRBMs and the ROC's cruise missile forces, as well as by both sides' electronic warfare and cyberwarfare forces.

It is clear, however, that the quantitative trends indicate that the ROCAF is gaining ground at the expense of the PLAAF. As far as relative numbers determine the outcome of deterrence and combat, the ROCAF has seen a relative shift in its favor.

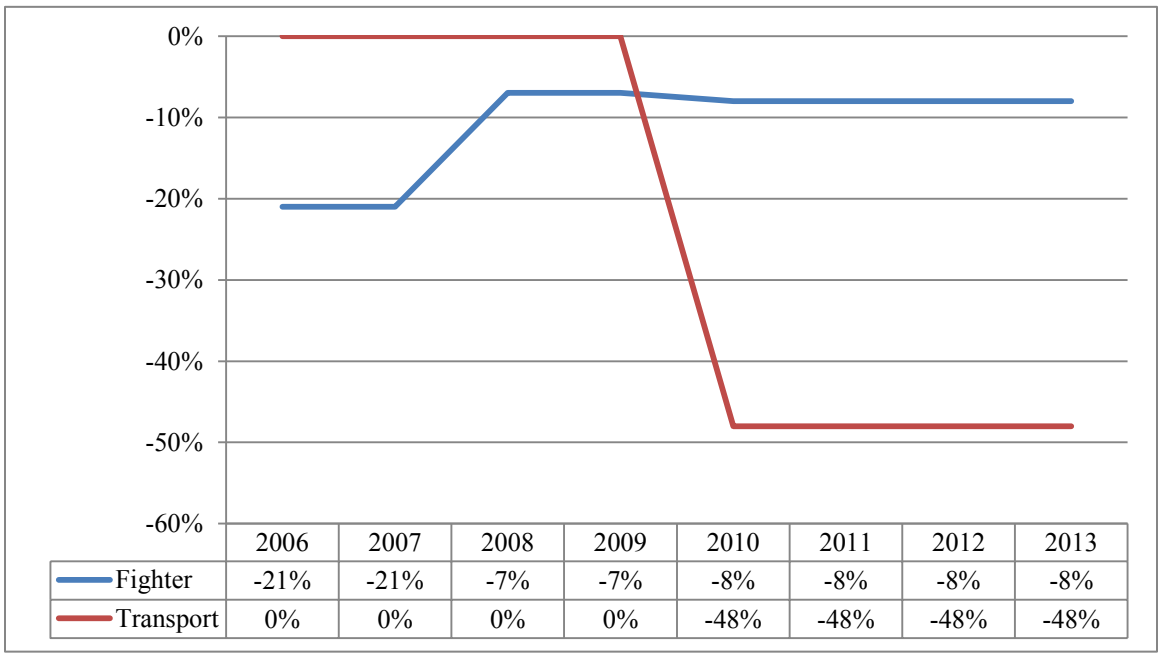
Figure 12.13: Relative Changes in PLAAF Force Deployments to the Taiwan Strait, since 2005 (percentage increase)



	2006	2007	2008	2009	2010	2011	2012	2013
Fighter	0%	0%	-22%	-22%	-22%	-22%	-27%	-22%
Bomber/Attack	-2%	-2%	-43%	-43%	-43%	-43%	-36%	-43%
Transport	50%	50%	-20%	-20%	-20%	-20%	-20%	-20%

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

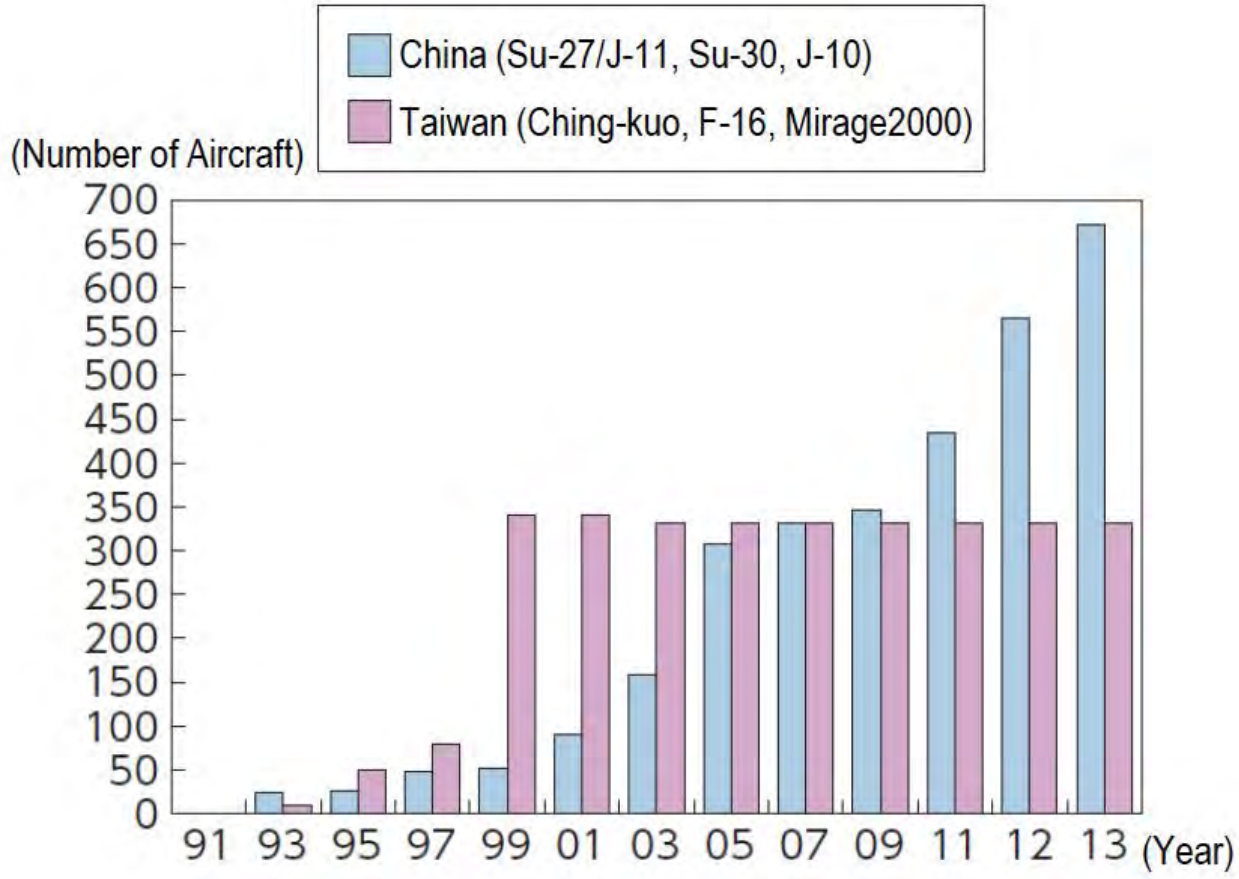
Figure 12.14: Changes in ROCAF Force Numbers, since 2005 (percentage increase)



	2006	2007	2008	2009	2010	2011	2012	2013
Fighter	-21%	-21%	-7%	-7%	-8%	-8%	-8%	-8%
Transport	0%	0%	0%	0%	-48%	-48%	-48%	-48%

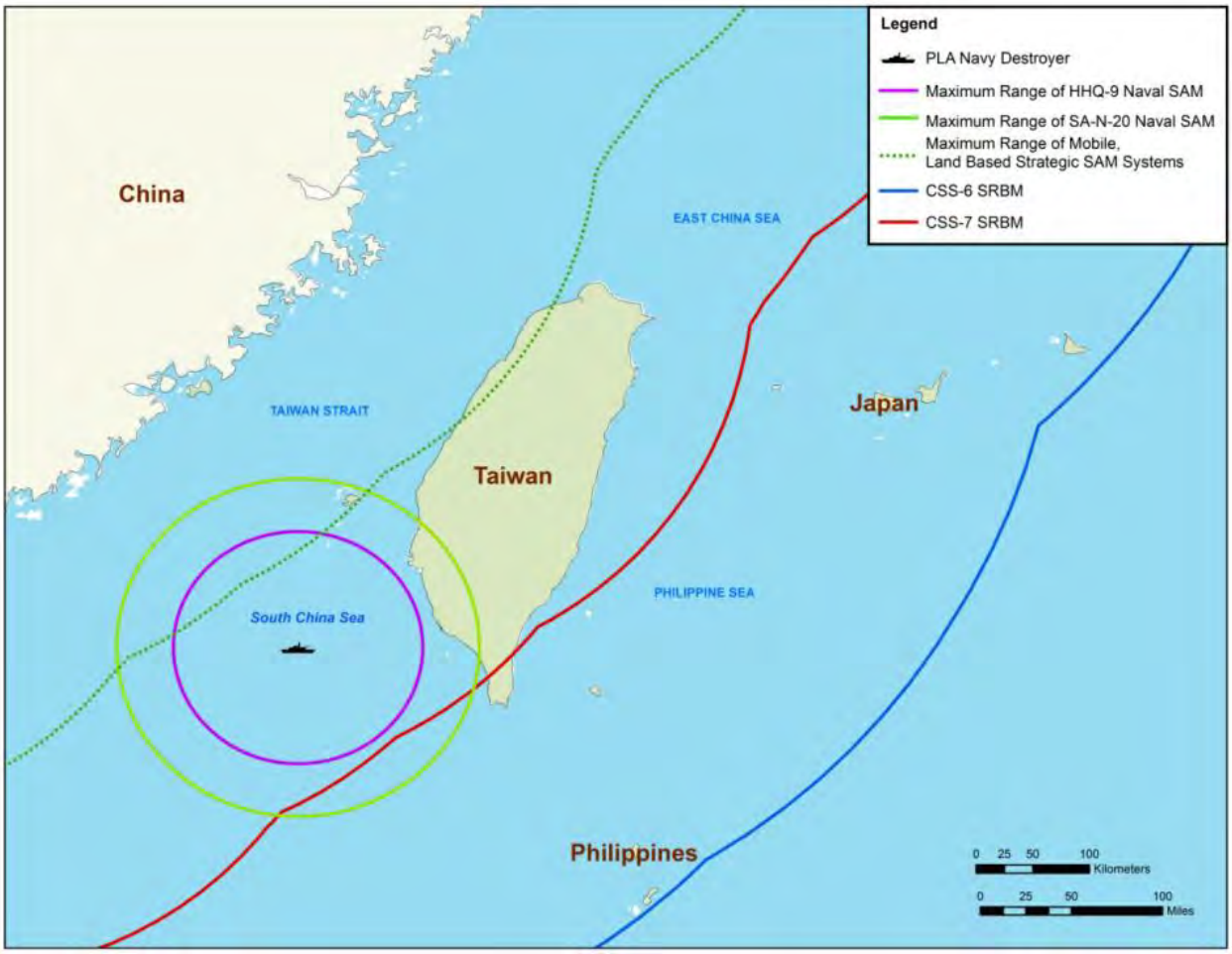
Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.15: Japanese Ministry of Defense Summary of the Trends in the Balance of Modern PRC-ROC Fighter Aircraft



Source: Japanese Ministry of Defense, *Defense of Japan*, 2013, Figure I-1-3-6.

Figure 12.16: Department of Defense Estimate of PLA SAM and SRBM Coverage



Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p. 83.

The Ground Force Balance

Figures 12.17 and 12.18 provide comparative data on the manpower and equipment strengths on both sides of the Taiwan Strait. As **Figure 12.17** indicates, the PLAA has moderately increased its manpower levels in the Taiwan Strait area while the ROC has decreased the size of its army by over one-third. The ROC's manpower reduction is likely a symptom of its transition to an all-volunteer, more modern force. The PLA is also making similar changes, so an increase in manpower levels indicates that the PLA is increasing the relative resources dedicated to the Taiwan Theater. However, the moderate size of the increase, combined with discrepancies in year-on-year accounting in the DoD's annual reports to Congress, mean that the increase may merely represent different DoD accounting practices.

The ground force balance is difficult to extrapolate from force numbers, however, because Taiwan's island geography, as well as the necessity of amphibious operations for either side to

conduct large-scale offensive operations, leads to extraordinary asymmetry in land operations. The attacking side must cross 185 km of sea in the face of air and sea defenses, forcibly enter terrain in the face of reinforced defenses while vulnerable, establish a beachhead, and continuously supply a very large military force across the ocean despite adversary actions. In this context, the effect of numbers is highly scenario-dependent, and full numbers can only be brought to bear once the most difficult elements of amphibious operations have already succeeded.

In addition, combat in all other domains will influence the conduct and success of land operations. Furthermore, these effects will be persistent: the necessity of logistics means that an amphibious operation is *always* vulnerable to logistics interdiction in *all* domains, regardless of the progress made by land forces on the offensive.

As previously noted, the US DoD makes this clear in its 2013 report,[443]

> Publicly available Chinese writings describe different operational concepts for amphibious invasion. The most prominent of these, the Joint Island Landing Campaign, envisions a complex operation relying on coordinated, interlocking campaigns for logistics, air and naval support, and EW. The objective would be to break through or circumvent shore defenses, establish and build a beachhead, transport personnel and materiel to designated landing sites in the north or south of Taiwan's western coastline, and launch attacks to seize and occupy key targets and/or the entire island.
>
> The PLA is capable of accomplishing various amphibious operations short of a full-scale invasion of Taiwan. With few overt military preparations beyond routine training, China could launch an invasion of small Taiwan-held islands in the South China Sea such as Pratas or Itu Aba. A PLA invasion of a medium-sized, better defended offshore island such as Matsu or Jinmen is within China's capabilities. Such an invasion would demonstrate military capability and political resolve while achieving tangible territorial gain and simultaneously showing some measure of restraint. However, this kind of operation includes significant, if not prohibitive, political risk because it could galvanize pro-independence sentiment on Taiwan and generate international opposition.
>
> Large-scale amphibious invasion is one of the most complicated and difficult military operations. Success depends upon air and sea superiority, rapid buildup and sustainment of supplies on shore, and uninterrupted support. An attempt to invade Taiwan would strain China's armed forces and invite international intervention. These stresses, combined with China's combat force attrition and the complexity of urban warfare and counterinsurgency (assuming a successful landing and breakout), make amphibious invasion of Taiwan a significant political and military risk. Taiwan's investments to harden infrastructure and strengthen defensive capabilities could also decrease China's ability to achieve its objectives. Moreover, China does not appear to be building the conventional amphibious lift required to support such a campaign.

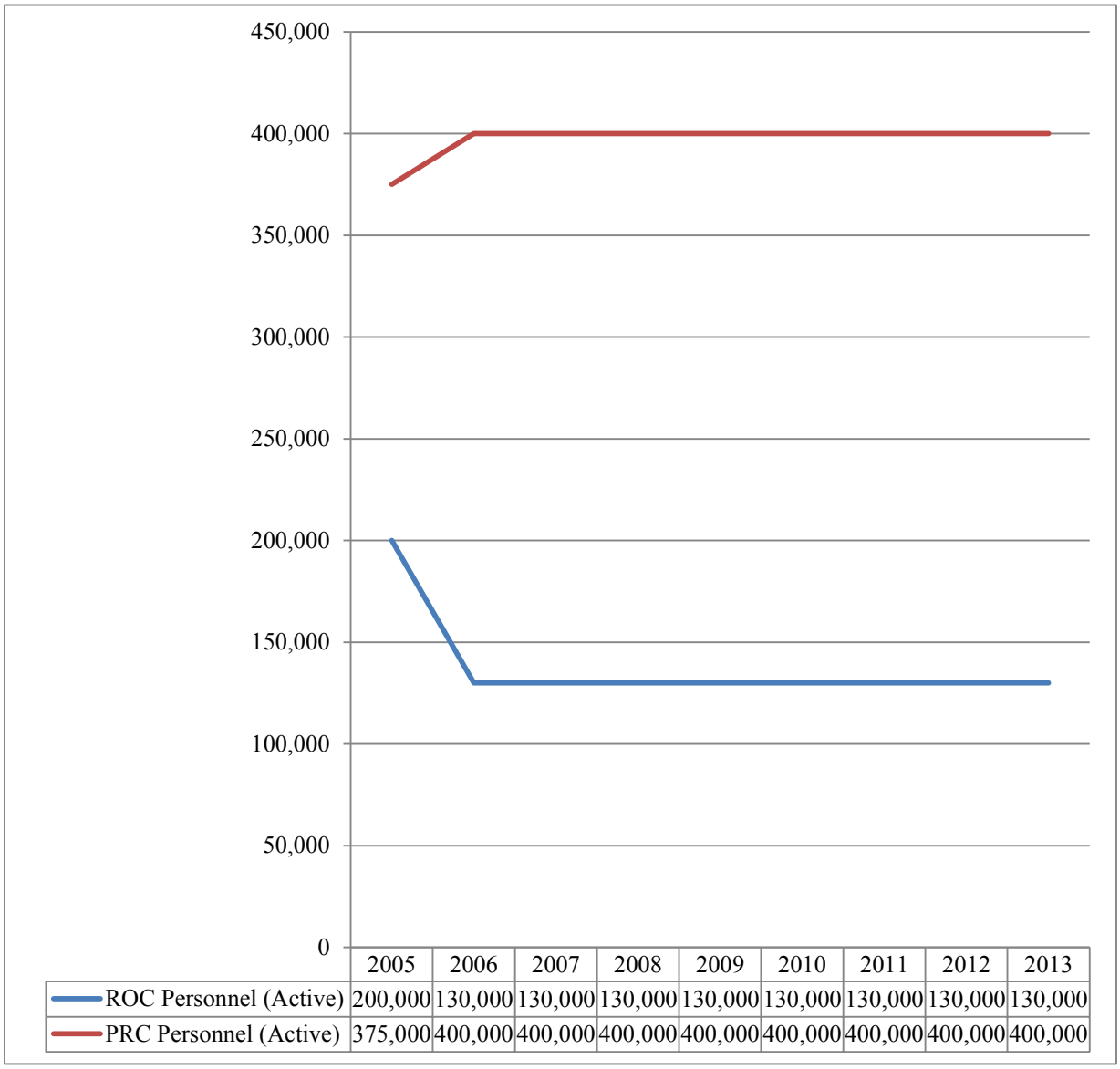
Figure 12.18 shows the comparative trends in MBT and artillery holdings. As the Figure indicates, the ROC has engaged in a significant reduction of both MBTs and artillery systems. The PLAA has also decreased its artillery holdings, but at the same time it has deployed additional tanks to the Taiwan Strait region – though in 2013, both of these deployments decreased over 2012 levels (but not relative to 2005 levels). These absolute trends indicate that the ground force balance has shifted in the PLAA's favor, as the PLAA has seen a relative increase in manpower and tanks compared to the ROC.

While the absolute trends in tanks lend themselves to easy comparison, the absolute trends in artillery are more difficult – both forces are reducing their artillery system numbers. **Figure 12.19** illustrates the relative trend in artillery force numbers and shows that the balance in artillery forces has shifted in the PLAA's favor – there are more PLAA artillery pieces per ROC artillery piece in 2013 than in 2005.

This trend in the PLAA's favor is only strengthened if the PLAA's rebound in artillery numbers is caused by the introduction of modern artillery pieces; such an action would reinforce the PLAA's relative combat advantage over ROC artillery.

Finally, **Figure 12.20** provides the DoD's 2013 assessment of PRC forces arrayed near Taiwan, in graphical format.

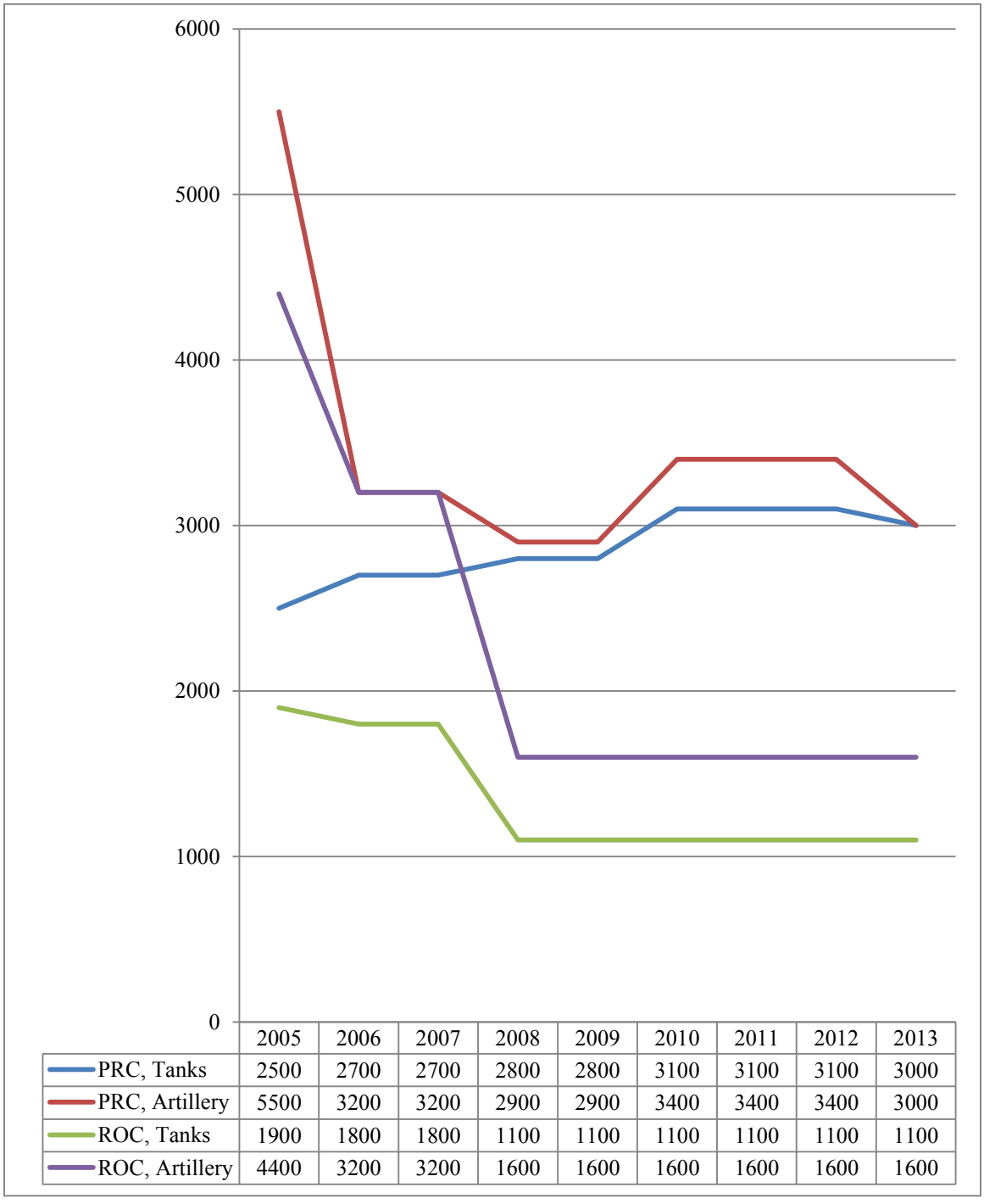
Figure 12.17: A Comparison of Manpower Trends in PLAA and ROC Army in the Taiwan Strait Region



	2005	2006	2007	2008	2009	2010	2011	2012	2013
ROC Personnel (Active)	200,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000
PRC Personnel (Active)	375,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

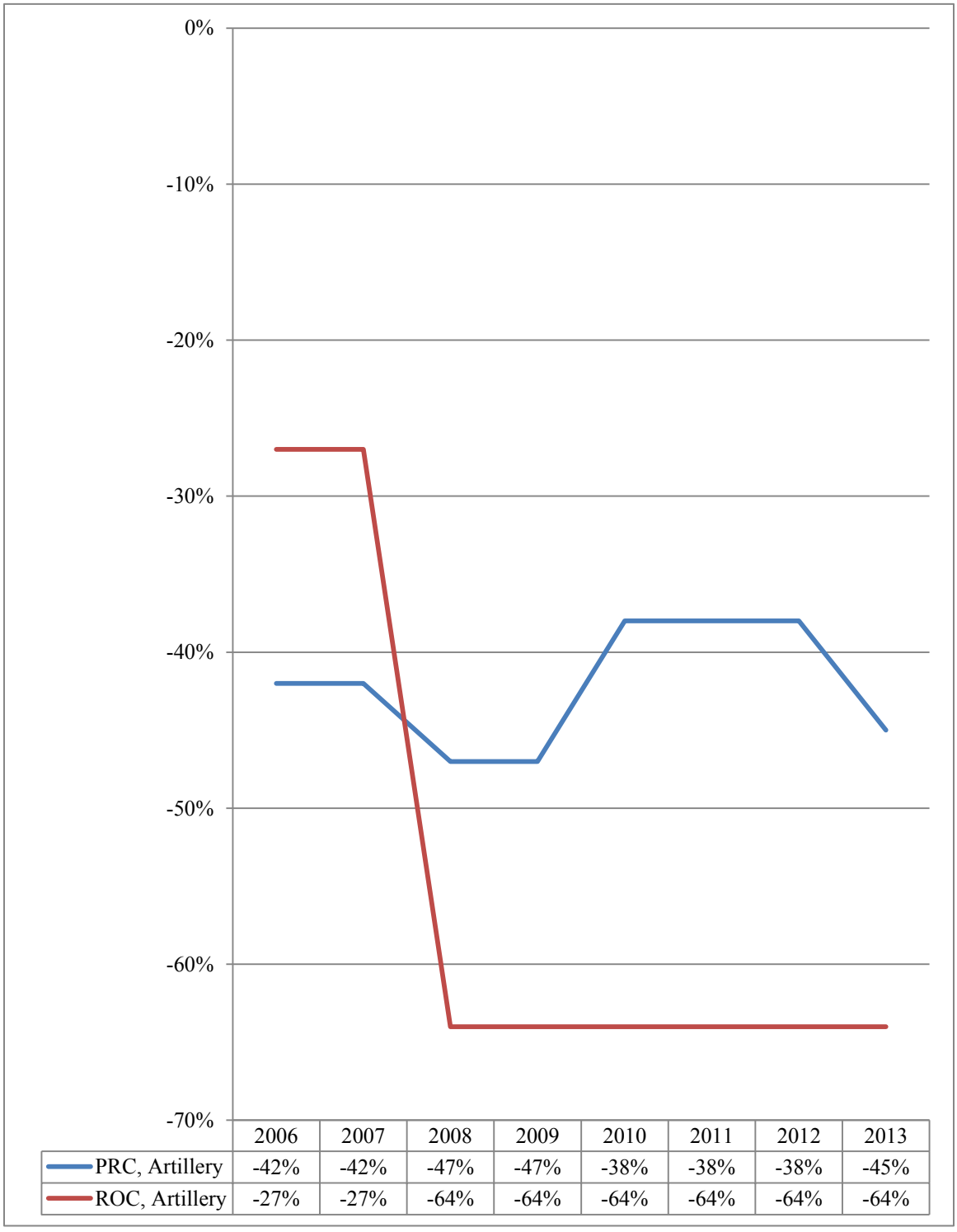
Figure 12.18: A Comparison of Trends in PLAA and ROC Equipment Holdings in the Taiwan Strait Region



	2005	2006	2007	2008	2009	2010	2011	2012	2013
PRC, Tanks	2500	2700	2700	2800	2800	3100	3100	3100	3000
PRC, Artillery	5500	3200	3200	2900	2900	3400	3400	3400	3000
ROC, Tanks	1900	1800	1800	1100	1100	1100	1100	1100	1100
ROC, Artillery	4400	3200	3200	1600	1600	1600	1600	1600	1600

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.19: A Comparison of Relative Trends in PRC and ROC Artillery Forces (percentage increase over 2005 levels)



	2006	2007	2008	2009	2010	2011	2012	2013
PRC, Artillery	-42%	-42%	-47%	-47%	-38%	-38%	-38%	-45%
ROC, Artillery	-27%	-27%	-64%	-64%	-64%	-64%	-64%	-64%

Source: DoD, *Military Power of the People's Republic of China* 2005-2008; *Military and Security Developments Involving the People's Republic of China* 2009-2013.

Figure 12.20: PRC Force Deployment near Taiwan - Part One

Source: DoD, *Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p.78.

Figure 12.20: PRC Force Deployment near Taiwan – Part Two

Source: DoD, *Military and Security Developments Involving the People's Republic of China 2013*, May 2013, p.78.

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…. On March 16, 2011, Taiwan National Security Bureau Director-General Tsai De-sheng restated a previous claim from August 2010 that the PLA already had tested and was deploying the DF-21D.The 2011 ROC National Defense Report confirmed that "a small quantity of" DF-21D ASBMs "were produced and deployed in 2010." ("Taiwan's Intelligence Chief Warns about the PLA's Growing Strategic Weapon Systems," China Brief, March 25, 2011).
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processing capabilities necessary to support DF-21D employment...[and also] employs an array of non-space based sensors and surveillance assets capable of providing the targeting information" (Bloomberg, January 3, 2011). Two days later, Dorsett added "The Chinese have tested the DF-21D missile system over land a sufficient number of times that the missile system itself is truly competent and capable. …they have ISR, they have sensors onboard ship that can feed into the targeting aspect of it. So could they start to employ that and field it operationally? Yes, I think so" (*Air Force Magazine*, January 5, 2011).

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According to State Department figures from the latest New START data exchange, as of September 1, 2012 the United States had 1,722 deployed strategic warheads and Russia had 1,499 deployed strategic warheads. This is a respective drop of 15 and increase of 9 warheads since the data exchange six months previously. U.S. totals are lower than the estimates in the chart primarily because New START counts bombers as having one warhead each, even though up to 20 warheads can be assigned to each bomber. In Russia's case, the number of warheads assigned to delivery systems in the chart also includes warheads assigned to submarines in overhaul, which are also not counted as deployed by the treaty. Under New START, both the United States and Russia must reduce their stockpiles of deployed strategic warheads to less than 1,550 warheads by 2018. According to the December 2012 State Department report, operations to reduce U.S. missile launchers will begin in 2015.
The US government disclosed in April 2010 that as of September 30, 2009, the total US stockpile had 5,113 warheads. On March 1, 2013, Drs. Hans Kristensen and Robert S. Norris revised that total to an estimated 4,650 warheads. This number excludes approximately 3,000 thousand warheads awaiting dismantlement, whereas the totals in the chart above include weapons awaiting dismantlement.
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Note: Nuclear weapons programs are generally shrouded in secrecy and all of the totals listed above should be considered estimates. The numbers in the chart above are based on the most recent available estimates from the Bulletin of the Atomic Scientists Nuclear Notebook series by Robert S. Norris and Hans M. Kristensen. The specific sources include 2013 data on "Non-P5 Nuclear-Armed States" and "US Nuclear Forces," 2012 data on "Indian Nuclear Forces," and 2011 data on "British Nuclear Forces."
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[415] "A key factor in assessing how many weapons North Korea can produce is whether North Korea needs to use more or less material than the IAEA standards of 8 kg of Pu and 25 kg for HEU per weapon. The amount of fissile material used in each weapon is determined by the design sophistication. There is no reliable public information on North Korean nuclear weapons design.
In all, estimates of North Korea's separated plutonium range between 30 kg and 50 kg, with an approximate 5 kg to 6 kg of this figure having been used for the October 2006 test and an additional amount probably used in the May 2009 test…This amounts to enough plutonium for approximately five to eight nuclear weapons, assuming 6 kg per weapon. Taking the nuclear tests into account, North Korean could possess plutonium for four to seven nuclear weapons. A 2007 unclassified intelligence report to Congress says that "prior to the test North Korea could have produced up to 50 kg of plutonium, enough for at least a half dozen nuclear weapons" and points out that additional plutonium is in the fuel of the Yongbyon reactor… North Korea claimed to have reprocessed that fuel in the summer of 2009 (see below).
Questions arise in determining how much plutonium North Korea produced between 2003, when the IAEA monitors were kicked out of the country and the seals were broken at Yongbyon, and 2007, when international monitoring resumed. A South Korean Defense Ministry white paper from December 2006 estimated that North Korea had made 30 kg of weapons-grade plutonium in the previous three years, potentially enough for five nuclear bombs. The white paper also concurred with U.S. estimates that North Korea's total stockpile of weapons-grade plutonium was 50 kg. …. The accounting issue was further complicated when North Korea reportedly declared a lower number of 37 kg of separated plutonium in its declaration under the Six-Party Talks. No agreement has been reached on verifying the amount of plutonium stocks through inspections (see discussions on declaration, verification below). In January 2009, an American scholar who had visited Pyongyang said the North Koreans told him that 30.8 kg amount had been "weaponized," possibly meaning that the separated plutonium might now be in warheads. The DPRK officials also told him that they would not allow for warheads to be inspected."
Mary Beth Nikitin, *North Korea's Nuclear Weapons: Technical Issues*, Congressional research Service, RL34256, April 3, 2013, http://www.fas.org/sgp/crs/nuke/RL34256.pdf.
[416] Mary Beth Nikitin, *North Korea's Nuclear Weapons: Technical Issues*, Congressional research Service, RL34256, April 3, 2013, http://www.fas.org/sgp/crs/nuke/RL34256.pdf.
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Atomic Scientists, April 5, 2013, http://www.thebulletin.org/web-edition/features/interview-siegfried-hecker-north-korea-complicates-the-long-term-picture. An earlier ISIS analysis noted that, "Dr. Siegfried Hecker of Stanford University released a report on November 21, 2010 detailing his recent visit to the Yongbyon nuclear site in North Korea. Hecker describes his visit to a building containing 2,000 gas centrifuges located on the site of the fuel fabrication facility at Yongbyon dedicated, according to his hosts, to producing low enriched uranium (LEU). He notes that the building is approximately 120 meters long and has a blue roof. ISIS assesses that this building can be seen in a November 4, 2010, DigitalGlobe satellite image in figure 1 below. Hecker also noted that the building had been repurposed, as he had visited this building in 2008 at which time it did not contain centrifuges (figure 2 shows the same building in February of 2007). Figure 3 shows the location of the plant relative to the entire Yongbyon site. In an October 2010 report, ISIS assessed that "the data support that North Korea has the capability of building, at the very least, a pilot plant," of gas centrifuges, with a pilot plant defined as between 500 and 1,000 centrifuges. If there are 2,000 centrifuges installed at the Yongbyon site, that number is greater but consistent with the ISIS finding, and thus not completely unexpected. Nonetheless, learning of the existence of this plant is extremely significant, and the new information requires deep study. It is also true that a centrifuge plant does not exist in a vacuum. It is still unknown where North Korea researches, develops, and manufactures centrifuges. David Albright and Paul Brannan, "Satellite Image Shows Building Containing Centrifuges in North Korea," ISIS Reports, November 21, 2010, http://isis-online.org/isis-reports/detail/satellite-image-shows-building-containing-centrifuges-in-north-korea/.

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[430] *Military and Security Developments Involving the People's Republic of China 2011*, Office of the Secretary of Defense, Annual Report to Congress, p. 36.
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