STRATEGIC ASIA 2012–13

CHINA'S MILITARY CHALLENGE

Edited by

Ashley J. Tellis and Travis Tanner

Naval and Air Forces

China's Modernization of Its Naval and Air Power Capabilities

Andrew S. Erickson

NBR THE NATIONAL BUREAU *of* ASIAN RESEARCH
Seattle and Washington, D.C.

EXECUTIVE SUMMARY

This chapter assesses China's modernization of its naval and air power capabilities and draws implications for U.S. interests in the Asia-Pacific.

MAIN ARGUMENT:
At the strategic and tactical levels, China's naval and air forces can now achieve a variety of effects unattainable a decade or two ago. Although these capabilities are concentrated on operations in the near seas close to mainland China, with layers radiating outward, the PLA is also conducting increasing, albeit nonlethal, activities farther from China's periphery, including in the Indian Ocean. Over the next decade and beyond, China's naval and air power forces could assume a range of postures and trajectories. At a minimum, a greater diversity of out-of-area missions will depend on strengthening and broadening anti-access/area-denial (A2/AD) capabilities. While China is likely to develop and acquire the necessary hardware should it elect to expend sufficient resources, "software" will be harder to accrue.

POLICY IMPLICATIONS:
- The PLA will continue to focus on high-end A2/AD capabilities to secure China's maritime periphery, along with its growing but low-intensity capabilities farther abroad.
- U.S. policymakers should seek ways to resist Chinese pressure in the near seas and cooperate with China in areas of mutual interest farther afield.
- The U.S. must demonstrate the ability to persist amid A2/AD threats in a manner that is convincing to China, allies, and the general public.
- The U.S. must demonstrate a commitment to sustaining a properly resourced and continually effective presence in the Asia-Pacific. Rebalancing by redirecting resources from elsewhere will be essential and determine the success of these initiatives.

China's Modernization of Its Naval and Air Power Capabilities

Andrew S. Erickson

The People's Republic of China (PRC) entered the second decade of the 21st century as a global economic and political power. The country is now in its third decade of rapid military modernization and boasts growing regional capabilities. Poverty in its vast interior, ethnic unrest in its western regions, and ongoing territorial and maritime disputes continue to necessitate that China prioritize military development and focus high-end military capabilities on its homeland and immediate periphery. Specifically, China's naval and air power modernization has been concerned largely with developing a variant of regional anti-access/area-denial (A2/AD)—or "active defense" and "counter-intervention" from Beijing's perspective—to deter Taiwan from declaring independence. An important part of this strategy is to demonstrate China's ability to hold U.S. forces at risk should Washington elect to intervene in a cross-strait crisis or other disputes in the near seas.

Operationally, asymmetric capabilities represent the core of the high-end development of the People's Liberation Army (PLA). Based partially on "nonlinear, noncontact, and asymmetric" (*sanfei*) operations, they match key Chinese strengths against U.S. weaknesses. China systematically targets physics-based limitations in U.S., allied, and friendly military platforms, thereby seeking to place them on the wrong end of physics. By developing the world's foremost sub-strategic missile force, for instance, the PLA

Andrew S. Erickson is an Associate Professor in the Strategic Research Department at the U.S. Naval War College. He can be reached at <andrew.erickson@usnwc.edu>.

The author thanks Ken Allen, Roger Cliff, Richard Fisher, Alison Kaufman, Nan Li, Oriana Mastro, William Murray, Ben Purser, and four anonymous reviewers for helpful suggestions and Jonathan Walton for invaluable research assistance.

exploits the fact that it is generally easier to attack with missiles than to defend against them. This affords China a defensive posture along interior lines and renders U.S. forces inherently vulnerable.

At the tactical level, China's actual approach of employing "active strategic counterattacks on exterior lines" may be more nuanced and change more with specific circumstances than Western depictions of A2/AD imply.[1] For example, compared with the U.S. and some allied militaries, the PLA continues to face weaknesses in command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR). For high-priority missions on China's periphery, however, the PLA can compensate for these limitations in complex real-time monitoring and coordination capability by massing forces selectively, maneuvering them specifically, and separating them in time and space. In peacetime, services may not be in perfect alignment and may have other tasks to perform.

With cross-strait relations stabilizing and China continuing to grow as a global stakeholder, the PLA Navy (PLAN) is likely to supplement this A2/AD strategy centered on Taiwan and the South China Sea, which China's current naval platforms and weaponry largely support, with "new but limited requirements for protection of the sea lines of communication (SLOC) beyond China's own waters, humanitarian assistance/disaster relief (HADR), and expanded naval diplomacy."[2] As the world's second-largest economy, China's interests increasingly extend beyond its shores to resource-rich areas of the developing world and the trade- and energy-choked SLOCs of the Indian Ocean. The country's manufacturing industries consume a tremendously high volume of imported resources, with 40% of oil arriving by sea.

By 2020, the PLA seeks a "regional [blue water] defensive and offensive-type" navy with extended A2/AD capabilities, limited expeditionary capabilities, and corresponding defensive and offensive air power.[3] Such a force would be able to deny access by holding opposing forces at risk throughout China's periphery and the approaches to it (out to and beyond the second island chain and the full extent of the South China Sea). In addition, this force could conduct marine interception operations and high-level noncombatant evacuation operations (NEO), when necessary, in the western Pacific and Indian Ocean.

---

[1] Anton Lee Wishik II, "An Anti-Access Approximation," *China Security* 19 (2011): 37–48.

[2] Office of Naval Intelligence, *The People's Liberation Army Navy: A Modern Navy with Chinese Characteristics* (Suitland, August 2009), 45.

[3] Nan Li, "The Evolution of China's Naval Strategy and Capabilities: From 'Near Coast' and 'Near Seas' to 'Far Seas,'" *Asian Security* 5, no. 2 (2009): 168.

Achieving this goal, however, will require significant improvements in China's defense industry, military organizational structure, and Second Artillery and space forces—all of which are beyond the scope of this chapter—as well as in personnel, training, and software integration. China is not making the necessary preparations to achieve a military with U.S.-style global power projection within the next ten to twenty years and apparently does not currently aspire to such a capability. While it is possible that changes or opportunities could alter Beijing's approach, at present, quality is being emphasized over quantity in many respects, to the point that the PLA of 2020–25—in terms of platforms, in particular, like all major modern navies—is likely to be far more capable, but limited in size. Indicators of dramatic deviations from this course would be visible well in advance, and the majority have not yet manifested themselves. This is hardly surprising, as many near-seas territorial and maritime claims remain unresolved, whereas the far seas (e.g., the western Pacific and Indian Ocean) lack such disputes and hence an obvious basis for strategic focus. Regardless, as China's naval and air forces continue rising, while its neighbors worry and the United States remains determined to advance U.S. interests in the strategic Asia-Pacific region, it is highly likely that the near seas, and possibly adjacent areas, will represent an important zone of strategic competition. China has fundamentally different strategic interests in the near and far seas, so one cannot take Chinese behavior in one area as indicative of the other.

This chapter begins by outlining China's national interests, the PLA's "new historic missions," and current naval and air power forces. It then identifies these forces' integration, limitations, and prospects for improvement before offering near-term strategic implications, with a focus on new strategic, operational, and tactical capabilities produced by the PLA's two decades of military modernization. The next section examines alternative naval and air power force postures and trajectories through 2025, while highlighting PLA goals, the new historic missions to date, necessary hardware and software, and visible indicators, including the possible establishment of overseas access points. The chapter then analyzes possible new effects, including enhanced Chinese leverage vis-à-vis the United States and its Asian allies and the PLA's ability to establish suzerainty in the near seas, before concluding with a discussion of larger strategic implications.

China's National Interests

Throughout its history, China has pursued three core grand strategic goals: "first and foremost, the preservation of domestic order and

well-being in the face of different forms of social strife; second, the defense against persistent external threats to national sovereignty and territory; and third, the attainment and maintenance of geopolitical influence as a major, and perhaps primary, state."[4] According to its 2010 defense white paper, China today pursues five major national interests, which build on the earlier foundation:[5]

- Safeguarding national sovereignty and security
- Promoting national development
- Maintaining domestic social stability
- Modernizing military forces
- Maintaining world peace and stability

In focusing on maintaining national sovereignty and furthering reunification, China devotes attention to border issues and territorial and maritime claims, which the United States has not had to confront for over a century. Based on these larger national interests, China's main military priorities, in descending order, include:[6]

- Addressing Taiwan's status, still the "main strategic direction" (*zhuyao zhanlüe fangxiang*)
- Fortifying and increasing China's maritime and aerial buffer zones
- Addressing territorial and maritime claims in the near seas
- Enhancing China's great-power status
- Achieving and maintaining a secure second-strike nuclear deterrent (with a sea-based component)

To pursue these priorities, China's leaders must direct the PLA's development. Building on Jiang Zemin's doctrinal foundation, Chairman Hu Jintao introduced a new military policy that defined the four new historic missions of the PLA at an expanded Central Military Commission (CMC) conference on December 24, 2004:

---

[4] Michael D. Swaine and Ashley J. Tellis, *Interpreting China's Grand Strategy: Past, Present, and Future* (Santa Monica: RAND, 2000), x.

[5] Information Office of the State Council of the People's Republic of China, *China's National Defense in 2010* (Beijing, March 2011), http://news.xinhuanet.com/english2010/china/2011-03/31/c_13806851.htm.

[6] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2011*, annual report prepared for Congress (Washington, D.C., August 24, 2011), 59, http://www.defense.gov/pubs/pdfs/2011_CMPR_Final.pdf.

- Ensuring military support for continued Chinese Communist Party (CCP) rule
- Defending China's sovereignty, territorial integrity, and national security
- Protecting China's expanding national interests
- Ensuring a peaceful global environment and promoting mutual development[7]

The last two missions reflected new emphases for the PLA, and the fourth was unprecedented. Hu required the PLA "to not only pay close attention to the interests of national survival, but also to national development interests; and not only to safeguard the security of national territory, territorial waters, and airspace, but also to safeguard electromagnetic space, outer space, the ocean, and other aspects of national security."[8]

In 2007, Hu elaborated on this shift: "As we strengthen our ability to fight and win limited wars under informationized conditions, we have to pay even more attention to improving noncombat military operations capabilities."[9] In an attempt to transform Hu's general guidance into more specific policy, articles in state and military media have argued that the PLA must go beyond its previous mission of safeguarding national "survival interests" (*shengcun liyi*) to protecting national "development interests" (*fazhan liyi*)—that is, economic growth.[10] That same year, a CCP constitutional amendment codified these missions further.[11] In March 2009, Hu exhorted military delegates to the National People's Congress to emphasize not only "building core military capabilities" but also "the ability to carry out military operations other than war [*feizhanzheng junshi huodong*]."[12] High-level PLA officers are now conducting sophisticated analysis of the noncombat military operations needed to promote these interests.

---

[7] "Qieshi jiaqiang jundui dang zuzhi nengli jianshe" [Earnestly Step Up Ability-Building within CPC Organizations of Armed Forces], *Jiefangjun bao*, December 13, 2004.

[8] Liu Mingfu, Cheng Gang, and Sun Xuefu, "Renmin jundui lishi shiming de youyici yushi jujin" [The Historical Mission of the People's Army Once Again Advances with the Times], *Jiefangjun bao*, December 8, 2005.

[9] Shen Jinlong, "Haijun fei zhanzheng junshi xingdong: Mianlin de tiaozhan ji duice" [Naval Noncombat Military Operations: Challenges Faced and Countermeasures], *Renmin haijun*, December 1, 2008.

[10] Tian Bingren, "Xin shiji jieduan wo jun lishi shiming de kexue fazhan" [The Scientific Development of the Historical Mission of Our Army in the New Phase of the New Century], *Zhongguo junshi kexue* (2007): 21–27.

[11] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2011*, 16.

[12] Ibid., 17.

China's 2010 defense white paper explains that "the PLAAF [PLA Air Force] is working to ensure the development of a combat force structure that focuses on air strikes, air and missile defense, and strategic projection, to improve its leadership and command system and build up an [informationized], networked base support system."[13] According to the U.S. Department of Defense, the PLA's new missions are "driving discussions about the future of the PLAAF, where a general consensus has emerged that protecting China's global interests requires an increase in the PLAAF's long-range transportation and logistics capabilities." Nevertheless, the report concludes that "it is likely that the Air Force's primary focus for the coming decade will remain on building the capabilities required to pose a credible military threat to Taiwan and U.S. forces in East Asia, deter Taiwan independence, or influence Taiwan to settle the dispute on Beijing's terms."[14]

PLA naval and aviation forces must thus prepare for the traditional missions of coercing Taiwan and furthering China's other territorial and maritime claims in the near seas, while also supporting increasing nontraditional operations. Indeed, aside from operations in the East and South China seas since 2002, China's major uses of naval and air power under Hu's tenure have been in the latter category. PLA out-of-area operations have taken the form of well-publicized peacetime missions that do not themselves demonstrate high-intensity military capabilities. The guided-missile destroyer *Qingdao* and supply ship *Taicang* visited ten countries in 132 days during 2002 in the PLAN's first global circumnavigation. Under the aegis of the fourth new historic mission, the PLAN has begun initial forays into HADR. Likewise, eleven counterpiracy task forces have deterred pirates in the Gulf of Aden since December 2008. China's first purpose-built (vice converted) hospital ship, the 10,000-ton Type 920 Daishandao-class (called *Heping Fangzhou*, or "Peace Ark"), was sent on an 88-day mission in August–October 2010 (Harmonious Mission 2010) to treat PLAN personnel in the Gulf of Aden and 15,500 people in Djibouti, Kenya, Tanzania, Seychelles, and Bangladesh. In October 2011 the *Peace Ark* began the PLAN's first operational naval deployment to the Caribbean, with port calls in Cuba, Jamaica, Trinidad and Tobago, and Costa Rica over three months as part of Harmonious Mission 2011.

The PLAN's nontraditional security contributions are likely to grow and could ultimately include direct support to UN operations. In September 2010 the training vessel *Zheng He* and guided-missile frigate *Mianyang*

---

[13] Information Office of the State Council of the PRC, *China's National Defense in 2010*.

[14] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2010*, annual report prepared for Congress (Washington, D.C., August 16, 2010), 25, http://www.defense.gov/pubs/pdfs/2010_cmpr_final.pdf.

called on Papua New Guinea, Tonga, New Zealand, and Australia. In February 2011, in its first operational Mediterranean deployment, the PLAN diverted the Jiangkai II–class frigate *Xuzhou* with an embarked Z-9C helicopter to escort a ship evacuating Chinese nationals from Libya. Simultaneously, the PLAAF sent four IL-76 transport aircraft to Libya via Khartoum, Sudan, to evacuate over 1,700 Chinese. Most recently, in April 2012, the *Zheng He* departed Dalian on the first single-ship global circumnavigation by a Chinese training vessel.

The Baseline of Current Capabilities

China is achieving rapid but uneven maritime and air power development. These capabilities, which are divided among PLA service arms, will be addressed in the following two sections.

Current Naval Power Capabilities

The PLAN has five service arms: submarine, surface, naval aviation, coastal defense, and marine corps. It has three fleets (North Sea, East Sea, and South Sea), as well as naval airbases and testing ranges, and controls 25 coastal defense districts with roughly 35 artillery and missile units (see **Tables A1** and **A2** in the Appendix).[15] The PLAN's greatest strengths include conventional submarines, offensive mines, and missiles. Since the early 2000s, the PLAN has made organizational changes to facilitate the mixing, matching, and supporting of vessels to enable their more complex and effective use operationally, both farther from their home ports and under different weather conditions.[16] It currently focuses on improving "combat force integration" and "strategic deterrence and counterattack" in the near seas and the ability to operate and counter nontraditional security threats in the far seas.[17]

Submarines. Arguably the true capital ship in the post–Cold War era, submarines are being prioritized by China as missile-delivery platforms. China is currently developing and producing as many as six different classes of submarines: two classes of indigenously designed diesel vessels, including the Yuan-class (Type 041), and four of nuclear vessels. The latter include the Shang-class (Type 093) and Jin-class (Type 094) nuclear-powered ballistic

---

[15] *Directory of People's Republic of China Military Personalities* (Honolulu: Serold Hawaii, 2011).

[16] U.S. Office of Naval Intelligence, *China's Navy 2007* (Washington, D.C., 2007), 39–40.

[17] Information Office of the State Council of the PRC, *China's National Defense in 2010.*

missile submarines (SSBN) and the follow-on Type 095 nuclear-powered attack submarine (SSN) and Tang-class (Type 096) SSBN.

PLAN organizational interests, long-term force development, and prospects for stressing missile-defense systems at vulnerable azimuths likely propel SSBN development in the direction of constant deterrent patrols. China's first Type 094 SSBN was launched in July 2004, its second was launched in 2006, and its third in 2009; additionally, as many as three hulls remain under construction.[18] However, the JL-2 submarine-launched ballistic missile (SLBM) has not reached initial operational capability. Moreover, China's nuclear-powered submarines remain relatively noisy, suggesting that Types 095 and 096, or other variants, could be the first truly capable vessels, although that remains to be seen.[19] China's conventional submarines, by contrast, are already relatively quiet,[20] and in this area the PLAN boasts the world's premier force (see **Table A3** in the Appendix).

Surface combatants. Since the early 1990s, China has deployed four Russian-purchased Sovremenny-class destroyers and nine classes of indigenous surface vessels: five new incrementally improved classes of destroyers and four new classes of indigenously constructed frigates (the latter two classes are based on the earlier two). Though still one of the world's largest, China's fleet has decreased in number but increased rapidly in quality, value (due to platforms fielding such weapons as antiship missiles), the sophistication and range of its air-defense systems, and the diversity of possible missions.[21] The PLAN's emphasis on smaller frigates over larger destroyers further represents a transition from quantity to quality. This parallels other navies' shift to assigning missions to smaller classes of ships because of the increasing cost of larger platforms. As part of an overall focus on missiles, many surface vessels and conventionally powered submarines are apparently prioritized as delivery platforms for antiship cruise missiles (ASCM).[22]

China's fast-attack craft include over 60 stealthy Houbei-class (Type 022) wave-piercing missile catamarans. The high-speed, low-observability catamaran, which is based on an Australian ferry design, has become a key component of the new PLAN. This impressive

---

[18] "Jin Class (Type 094)," *Jane's Fighting Ships*, July 30, 2012.

[19] Ronald O'Rourke, "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress," Congressional Research Service, CRS Report, August 10, 2012, 13, http://www.fas.org/sgp/crs/row/RL33153.pdf.

[20] Ibid., 14.

[21] Zhang Ju and A Wen, "Quanfu wuzhuang de xin shiji huweijian" [The Complete Armaments of the New Century's Frigate], *Feihang daodan*, no. 5 (2008): 23.

[22] William Murray, "China's Undersea Warfare: A USN Perspective" (paper presented at China Maritime Studies Institute Annual Conference, U.S. Naval War College, May 11, 2011).

antisurface weapon system—armed with eight YJ-83 ASCMs, each with a range of approximately 50 nautical miles[23]—might be given a mission to quickly destroy Taiwan's surface force, in the event of hostilities, if that fleet survived earlier attacks. However, the 022's limited endurance would not allow it to operate for extended periods at much greater distances, and its operational capability in heavy seas remains unclear. The 022's minimal in-water profile and high speeds could make it very difficult to hit with torpedoes or ASCMs. The use of such small, fast craft to attack carrier strike groups would represent a modern, cruise missile–focused realization of swarming tactics, a traditional PLAN concept.[24]

As limitations in air- and sea-lift are overcome, PLA amphibious forces, supplemented by large civilian vessels (e.g., roll-on/roll-off ferries), might support operations against Taiwan and perform diversified tasks such as NEOs and HADR in increasingly strategic littoral areas and beyond. China is also building additional hulls of the 17,600-ton Yuzhao-class (Type 071) landing platform dock, a large flush-deck amphibious ship. Cheaper and quicker to build than a big-deck flattop, 071s are limited in their quantity and quality of firepower but are truly modern amphibious assault vessels.[25] For an overview of PLAN capabilities, please see **Tables A4**, **A5**, and **A6** in the Appendix.

Current Air Power Capabilities

The PLAAF is divided into seven military-region air forces, thirteen deputy corps–level and division leader–level command posts, and three airborne divisions assigned to the 15th Airborne Corps. PLAAF and PLAN aviation forces currently possess 2,300 operational combat aircraft, of which 490 are currently capable of conducting operations against Taiwan without refueling.[26] Their range is limited severely by China's lack of multiple operational carriers, substantial aerial refueling capabilities, and overseas bases. Still hampered to some extent by bottlenecks in China's domestic aviation industry, the PLAAF continues to import large numbers of advanced aircraft, components, and aero-engines from Russia and has

---

[23] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2012,* annual report prepared for Congress (May 18, 2012), 23, http://www.defense.gov/pubs/pdfs/2012_CMPR_Final.pdf.

[24] Nan Li, "All at Sea: China's Navy Develops Fast Attack Craft," *Jane's Intelligence Review*, September 2009, 3.

[25] Ye Qi, "Yaowang 'xiaoping ding': Qian tan Zhongguo daxing liangqi zuozhan jianting de weilai" [The Long View on the "Flattop": An Overview of the Future of Chinese Large Amphibious Vessels], *Dangdai haijun* (2011): 42–44.

[26] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2012,* 24, 29.

"encountered some difficulty in expanding its fleet of long-range heavy transport aircraft" and tankers.[27] Still primarily focused on fighters and fighter-bombers, China's air forces have very little aerial refueling capability and hence only several hundred miles of reach.

The PLAAF is finally making varying degrees of progress, however, in a wide range of areas. China has produced its own fourth-generation fighters, the J-10 and J-11B (an all-Chinese variant of the Russian Flanker Su-27) and is developing the J-15 carrier-based fighter and the J-20 low-observability aircraft. PLA aircraft are also outfitted with a variety of increasingly advanced weapon systems. In some cases, particularly involving cruise missiles, these systems have extended the operational utility of otherwise obsolescent platforms. For an overview of China's air power order of battle, see **Table A7** in the Appendix.

The PLAAF also controls the majority of ground-based air defenses, which operate under the 1999 concept of the new "three attacks" (against stealth aircraft, cruise missiles, and armed helicopters) and "three defenses" (against precision strikes, electronic jamming, and electronic reconnaissance and surveillance).[28] According to a U.S. Department of Defense report, the PLAAF "has continued expanding its inventory of long-range, advanced SAM [surface-to-air missile] systems and now possesses one of the largest such forces in the world."[29] The PLAAF has also received multiple battalions of upgraded Russian S-300/SA-20 PMU-2 long-range (200 kilometers) SAM systems since 2006. Russia's most modern SAM system available for export, the SA-20 PMU-2, offers Taiwan Strait coverage and reportedly provides limited ballistic- and cruise-missile defense capabilities.[30] China has also introduced the indigenously develeoped HQ-9 (see **Table A8** in the Appendix).

PLAAF aviation. The PLAAF is transitioning from a past mission of territorial air defense to both offensive and defensive operations. Over the past two decades, it has shifted from playing a supporting role in offense-capable missions to assuming a more active role. According to China's latest defense white paper, the PLAAF is currently developing "a combat force structure that focuses on air strikes, air and missile defense, and strategic projection, to improve its leadership and command system and build up

---

[27] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2012*, 33–34.

[28] Han Tingjin and Qi Zeqing, eds., *Fangkongbing xin "san da san fang"* [The Air Defense Forces' New "Three Attacks and Three Defenses"] (Beijing: PLA Press, 2001).

[29] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2012,* 24.

[30] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2011*, 32.

an informationized, networked base support system."[31] To this end, it has pursued an aggressive procurement program and reformed its defense industry to produce a new generation of fighter aircraft and refit and modernize its bomber fleet (see **Table A9** in the Appendix). Specifically, the PLAAF has acquired fourth-generation (third-generation, in Chinese terminology) Russian fighters (Su-27 and Su-30MKK) and transports (Il-76), air-defense systems, and domestically produced bombers (H-6) and fighter aircraft (J-10, J-11B, and JH-7A), as well as upgrades to older fighters such as the J-7 and J-8II. PLAAF aircraft are now equipped with Russian and domestic missiles and precision-guided munitions.

PLAN aviation. Chinese naval aviation has traditionally lagged behind even the PLAAF, probably in part because during the Cold War Beijing had no hope of controlling the airspace on its maritime periphery. In contrast, the PLAAF played a useful, if very limited, role in safeguarding China's airspace and contesting the airspace over North Korea in conjunction with major Soviet assistance during the Korean War. Although inter- and intra-service PLAAF-PLAN coordination still needs improvement, recent equipment upgrades and enhanced doctrine and training will increase China's prospects of conducting effective joint operations in the future. Already, the PLAN controls a formidable land-based air force (see **Table A10** in the Appendix).

Airborne intelligence, surveillance, and reconnaissance (ISR). Aircraft play an essential role in maritime reconnaissance because they can be rapidly redirected in a fluid tactical environment. China's fixed- and rotary-wing aircraft and unmanned aerial vehicles (UAV) are playing a significant role in peacetime signals intelligence (SIGINT) and communications intelligence (COMINT). In wartime, they would contribute to air defense and antisubmarine warfare (ASW).

China employs a growing variety of fixed-wing aircraft as dedicated ISR platforms offering an important airborne capacity for managing military operations. To enhance PLAAF and PLAN effectiveness, China is improving its airborne ISR capabilities by developing several variants of airborne early warning aircraft. These include two major indigenous platforms that improve on previous efforts based on modified Ilyushin Il-76 and Tupolev Tu-154 variants. In addition, China is developing the KJ-2000 indigenous airborne warning and control system (AWACS) aircraft based on the Russian Il-76 to conduct surveillance, perform long-range air patrol,

[31] Information Office of the State Council of the PRC, *China's National Defense in 2010.*

and thereby coordinate naval air operations.[32] For example, a November 2007 exercise held jointly by the South Sea Fleet and East Sea Fleet in the South China Sea included employment of one or more KJ-2000s.

China's smaller KJ-200/Y-8 "balance beam" airborne early warning and control (AEW&C) aircraft complements the KJ-2000 by performing tactical electronic warfare more economically. Most of China's more than one hundred Y-8s are divided among transports, but there are also seven "Gaoxin" variants that perform such missions as electronic intelligence (ELINT), SIGINT, communications relay, electronic warfare and countermeasures, AEW, and ASW.[33] Tupolev Tu-154 variants perform similar roles. On March 12, 2010, a PLAAF KJ-200 may have been spotted by the Japan Maritime Self-Defense Force near the Miyako Strait.[34]

In addition to dedicated AEW&C platforms, the PLAAF and PLAN possess reconnaissance regiments with a wide range of other specialized aircraft. Relevant fixed-wing aircraft, including a number of H-6s (derivatives of Russia's Tu-16), also conduct reconnaissance and ELINT. In late 2003, a Su-30MKK fighter used synthetic aperture radar to surveil the length of Taiwan electronically.[35]

Helicopters. In contrast to recent improvements in fixed-wing aviation, helicopters remain limited—perhaps because the PLA is wary of acquiring a large number of helicopters until improved models are available. Most helicopters in the PLA's disproportionately small fleet, totaling 700–800 airframes, are either imports or copies of foreign models (see **Tables A11** and **A12** in the Appendix).[36] This weakness was exposed most directly following the tragic Sichuan earthquake of May 12, 2008, when relief

---

[32] At present, China has AEW&C rather than true AWACS. In a Western AWACS system, the operator of the aircraft communicates directly with the operators of affiliated aircraft to update them regarding information gathered. Service newspaper accounts suggest that flight officers on Chinese AEW&C aircraft, by contrast, are merely airborne radio operators who relay information through a PLA commander in a ground control tower. They are not yet part of a culture of aircraft controlling aircraft. PLAAF and PLAN control of aircraft is conducted on a unit basis, in which the commander, a deputy commander, or the chief of staff is either in the control tower or the division/regiment's command post and talks to aircraft only in their own units. This raises the question of who in a KJ-200, KJ-2000, or Y-8 aircraft would control pilots from multiple units. Moreover, it remains uncertain where the information goes, where it is fused, how and when it is disseminated, and how far down the chain of command it goes.

[33] "Yun-8 Turboprop Transport Aircraft," SinoDefence website, http://www.sinodefence.com/airforce/airlift/y8.asp.

[34] Torbjørg Hemmingsen, "Enter the Dragon: Inside China's New Model Navy," *Jane's Navy International*, April 20, 2011.

[35] "Air Force, China," *Jane's World Air Forces*, June 10, 2012.

[36] This total includes roughly one hundred PLAAF and one hundred PLAN helicopters. See Dennis J. Blasko, "Chinese Helicopter Development: Missions, Roles, and Maritime Implications," in *Chinese Aerospace Power: Evolving Maritime Roles*, ed. Andrew S. Erickson and Lyle J. Goldstein (Annapolis: Naval Institute Press, 2011), 154.

operations were limited significantly by the lack of helicopters, particularly those with heavy-lift capacity. China is attempting to remedy its helicopter deficiency further by developing joint ventures with foreign manufacturers. For example, Eurocopter has begun assembly and production of medium-sized helicopters in China. Likewise, helicopter-delivered submarine-detecting sonar buoys will help the PLAN address one aspect of its serious long-term weakness in ASW.

Deck aviation. PLAAF and PLAN aviation already have a wide variety of bases from which to operate on China's immediate maritime periphery. A new dimension of Chinese air power is emerging, however, in the form of deck aviation. The most comprehensive and far-reaching question concerning PLAN modernization is the extent to which Beijing will supplement its navy (now based fundamentally on submarines and surface ships) with large-deck aviation, likely needed for the PLAN to move beyond Taiwan to genuine blue water power projection. In the order in which they are likely to be considered, Chinese carrier missions will probably include training, naval diplomacy, NEOs, HADR, the assertion of claims in the South China Sea, and support for SLOC operations against low-intensity threats.

Having begun sea trials in August 2011, the rebuilt Soviet carrier ex-*Varyag* will become operational in 2012. However, according to the U.S. Department of Defense, "it will take several years for an operationally viable air group of fixed and rotary wing aircraft to achieve even a minimal level of combat capability." To achieve this objective, the PLAN "has initiated a land-based program to begin training navy pilots to operate fixed-wing aircraft from an aircraft carrier."[37] In addition, the Defense Department states that "this program will probably be followed in about three years by full-scale ship-borne training aboard" the ex-*Varyag* and that "China likely will build multiple aircraft carriers with support ships over the next decade."[38] China's first indigenously constructed carrier, which would likely be based on the ex-*Varyag*, could achieve operational capability as early as 2015.[39]

China is developing the J-15 shipborne fighter based on the Russian Su-33—albeit with more advanced, indigenously made avionics, including a wide-angle holographic head-up display, as well as more complex trailing-edge double-slotted flaps. J-15 prototypes reportedly made their maiden

---

[37] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2011*, 46.

[38] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2012,* 22.

[39] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2011,* 46.

flight on August 31, 2009, and their first takeoff from a land-based simulated ski jump on May 6, 2010.[40] Google Earth and Internet photos suggest that the cities of Huludao and Xian have pilot training facilities, and substantial footage is available of land-based J-15 flight testing.[41] In addition, as of the end of July 2012, Internet photos showed the ex-*Varyag* in port in Dalian with J-15 fighter and Z-8 AEW helicopter mock-ups on the deck.[42]

Developing and training the necessary forces for long-range combat capabilities is extremely difficult, however. Building an aircraft carrier is one thing; mastering the complex "system of systems" that enables air power projection requires years of time and typically entails the loss of expensive aircraft and hard-to-replace pilots.

UAVs. Inspired by the global buildup of UAVs and drones by the United States and others, China is purchasing foreign models, transforming piloted aircraft into unmanned aerial combat vehicles, and developing indigenous variants. This is an area of particular emphasis and investment; more than 25 UAV prototypes or models were on display at the 2010 Zhuhai Air Show, up from 12 in 2008. According to the U.S. Office of Naval Intelligence, "China is developing UAVs that have the potential to bring multimission capabilities to the maritime environment. In recent years, Chinese officials have openly touted the benefits of UAVs, such as low manufacturing costs, lack of personnel casualties, and inherent 'stealth-like' characteristics."[43] In fact, a UAV has already been spotted deployed from a PLAN vessel.[44] China's growing UAV arsenal offers improved reconnaissance and strike capabilities, including the ability to penetrate Taiwan's defenses by disabling early warning and missile-defense radars. Nevertheless, China may face significant challenges in developing, sustaining, and protecting the electronic tethers of its UAVs. For an overview of China's capabilities concerning UAVs, see **Table A13** in the Appendix.

---

[40] Daniel J. Kostecka, "From the Sea: PLA Doctrine and the Employment of Sea-Based Airpower," *Naval War College Review* 64, no. 3 (2011): 13, http://www.usnwc.edu/getattachment/61dc4903-260f-4158-947c-d40fd2f708c5/From-the-Sea--PLA-Doctrine-and-the-Employment-of-S.

[41] See "J-15 Test-Flight Compilation," YouTube video, posted by IvanXylakantsky, May 6, 2011, http://www.youtube.com/watch?v=G6AcVQmk8Eg.

[42] See, for example, "Jian 15 zai shang hangmu, kefu dianci jianrong" [Jian-15 Fighter Jet Is Again Moved on Board the Aircraft Carrier, the Problem of Electromagnetic Compatibility Has Been Overcome], *Ta Kung Pao*, July 18, 2012, http://paper.takung.cn/html/2012-07/18/content_4_4.htm.

[43] Office of Naval Intelligence, *Modern Navy with Chinese Characteristics*, 28–29.

[44] "China Increases Naval UAV Use," United Press International, April 9, 2012, http://www.upi.com/Top_News/Special/2012/04/09/China-increases-naval-UAV-use/UPI-87321333977162/.

Capability Realization, Integration, and Limitations

Notwithstanding its growing strengths, particularly in hardware, the PLA suffers from manifold weaknesses and limitations in software development and capabilities integration. Despite progress, achievements remain uneven, and actual combat capabilities are uncertain. Most importantly, while the current generation of U.S. Navy officers lack combat experience against a major military and have always been essentially unopposed at sea, their PLA counterparts lack combat experience entirely. The most recent PLAN combat was a skirmish with Vietnam over disputed islands in 1988. China's air forces have not fought combat engagements since the late Vietnam War, when a small number of U.S. Navy and U.S. Air Force aircraft were shot down by Chinese fighters off the southern China mainland and Hainan Island. Some Chinese analysts argue that current nontraditional security missions offer the equivalent of combat experience, and hence represent a partial exception. For example, Major General Jin Yinan of China's National Defense University has written: "For a military, the results of participating in this kind of action are not just about gaining experience at combating pirates. It is even more about raising the ability to perform missions on seas far away."[45] Another source states that "non-war military operations have a very important practical significance for improving the ability of the armed forces to counter security threats of many kinds and accomplish a diverse array of military tasks."[46] High-level exercises with advanced militaries such as the Russian Air Force, to the extent that they are actually substantive, may help as well.

In analyzing PLA progress, then, hardware determinism must be avoided. Doctrine, human capital, and training—particularly the complexity and realism of joint operations—represent three other significant limitations. The PLAAF and PLAN forces lack experienced pilots but are gradually expanding their corps and increasing flying hours—though it remains less clear what they are accomplishing specifically. Fighter and bomber pilots average 100–150 flight hours per year, while transport pilots average more than 200.[47] China's maritime and air forces appear to suffer from three main training shortfalls. First, the state of education, training, and jointness in China's maritime and air

---

[45] Ben Blanchard, "Chinese Naval Ships to Head for Somali Waters," Reuters, December 26, 2008, http://uk.reuters.com/article/2008/12/26/uk-somalia-piracy-china-idUKPEK29613620081226.

[46] Guo Yan, "Jiefangjun duoyanghua junshi renwu tisheng zhandouli" [The PLA's Diversified Military Tasks Enhance Combat Effectiveness], *Zhongguo guofang bao,* August 26, 2008, http://mil.sinoth.com/Doc/web/2008/8/26/14045.htm.

[47] Institute for International Strategic Studies (IISS), *The Military Balance 2012* (London: Routledge, 2012), 237.

forces, including professional military education for its leaders, remains unclear. In particular, the education, skill, and overall quality of the enlisted forces remain critical unknowns.[48]

Second, although markedly improved in recent years, the realism of training conducted remains limited. For China's air forces, this appears particularly true vis-à-vis jamming, minimum altitude, and night flight operations. Chinese military publications emphasize the importance of flying in a "complex electromagnetic environment" but fail to clarify whether China's air forces actually train under conditions of their own jamming and understand fully the practical ramifications. If jamming is merely simulated, how will they know what would happen under real conditions?

Yet major improvement efforts are underway, despite the impediments of the organizational culture. The PLAAF is in the process of creating air brigades, and PLAAF and PLAN pilots are being given autonomy to develop their own flight plans instead of simply following instructions from the control tower. Likewise, the sophistication and range of exercises are rapidly improving, albeit from a low baseline. China did not send combat aircraft abroad until August 2007, when the PLAAF deployed eight JH-7As and six Il-76 transports to Russia for the Peace Mission 2007 exercise. Then in September 2010 the PLAAF sent four H-6Hs and two J-10s into Kazakh airspace for a day of modest participation in the Peace Mission 2010 exercise.[49] The following month, in its longest exercise deployment to date, the PLAAF sent four J-11s for its Anatolian Eagle 2010 exercise with Turkey, China's first with a NATO military. In June–July 2010, the PLAN executed surface-vessel attack exercises that included ASCM-firing Houbei-class catamarans from the East Sea Fleet's 16th Fast Attack Flotilla. In recent years, amphibious forces have conducted assault and island-seizure exercises in the South China Sea, including an exercise in July 2012 with over twelve warships, drawing

---

[48] U.S. National Air and Space Intelligence Center, *People's Liberation Army Air Force 2010* (Wright-Patterson Air Force Base, August 1, 2010).

[49] The exercise was scripted, unrealistic, and minimally coordinated. The aircraft flew out of a base near Urümqi. Two J-10s escorted two H-6s into Kazakhstan. The J-10s refueled inside China. A KJ-2000 escorted them to the border and likely simply relayed commands. In Kazakh airspace, the bombers dropped bombs, and the J-10s conducted jamming. Two more H-6s were escorted by Kazakh pilots, but they had difficulty communicating. Upon completion of the exercise, the aircraft returned to Urümqi. Thus, two army aviation Z-9 attack helicopters were the only Chinese aircraft actually based in Kazakhstan for the exercise. See Daniel M. Hartnett, "Looking Good on Paper: PLA Participation in the Peace Mission-2010 Multilateral Military Exercise" (forthcoming).

from all three fleets.[50] The PLAN has conducted few high-level exercises outside the near seas, but in April 2010, June 2011, and May 2012 dispatched exercise-engaging flotillas comprising some of its most advanced platforms through the East China Sea and the Miyako Strait. Joint and combined arms exercises are also increasingly prevalent.

Finally, a third critical shortfall concerns the integration of operational capabilities. For example, it is unclear how China is able to deconflict the aircraft and SAMs working in the same airspace—still a difficult problem for U.S. forces in actual battle conditions. PLAAF writings suggest that SAMs and aircraft conduct "combined-arms training," but by U.S. standards this would be considered "opposition-force training," with the aircraft attacking areas the SAMs are covering. Documentation of SAMs and aircraft working together against attacking aircraft and naval aviation aircraft flying combat air patrols to protect PLAN ships against attacking aircraft remains elusive. Can PLAAF and naval aviation aircraft actually fly in the same airspace covered by the various services' SAMs? How do they coordinate to ensure the SAMs do not shoot down friendly aircraft? Will the fighters fly out and meet enemy aircraft with SAMs covering them, or will the aircraft be the last line of defense in case the SAMs do not shoot down the enemy?

Other challenges also remain. Organizational rigidity and "stove-piping" will likely remain problems, rooted as they are in political structures that the CCP refuses to change significantly. The attendant challenges of real-time coordination among sensors and systems owned by different services will also likely continue to hamper C4ISR and target deconfliction. The PLA likewise faces considerable challenges in integrating existing platforms and weapon systems. More positively, China's overall industrial capabilities and comprehensive approach to technological acquisition should help it surmount the vast majority of technological bottlenecks (including high-level military aero-engine production). But in terms of hardware and the ability to use it, the PLA remains particularly weak in ASW, mine countermeasures, anti-air warfare, and C4ISR.

Strategic Implications

As the above analysis of capabilities suggests, China is already a world-class, if uneven, military power—but one with a regional, not global,

[50] Pan Xiaomin and Wu Chao, "'Luzhan menghu qiaoran jinji wuming jiao" [Fierce Tigers of Land Warfare Quietly Invade Unnamed Reef], *Renmin haijun*, December 17, 2008; Wei Gang, Li Yanlin, and Wu Chao, "Haijun jianting biandui shouci huan Nan Zhongguo Hai yuanhang xunlian" [A Chinese Naval Ship Formation Conducts the First Long-Voyage Training Sail around the South China Sea], *Renmin haijun*, December 2, 2008, 1; and Yang Bai, "Shuaxin 3 xiang jianting buji jilu" [Three Underway Replenishment Records Have Been Reset], *People's Navy,* June 22, 2009.

focus. The most common source of error in Chinese and U.S. analyses of Chinese naval and air power development is the conflation of two factors: scope and intensity. Chinese naval and air power development should be observed through the lens of distance and can best be understood in terms of radiating range rings or ripples of capability. Like water displaced by a stone, waves of capability radiate outward, dissipating progressively.

Geographic Context

Close to home, China's military capabilities designed to control near-seas water and airspace are escalating rapidly. Four of the PLAN's five campaigns appear to apply there specifically: naval base defense, antiship, anti-SLOC, and blockade. According to three professors at China's Naval Command College, "At present and for a long time to come, safeguarding near-seas security should be the primary goal of China's maritime security strategy."[51] All four of the PLAAF's focus areas—strike, air and missile defense, early warning and reconnaissance, and strategic mobility—as well as the PLAAF's leading role in A2/AD operations, apply to the near seas. Likewise, all four of the PLAAF's campaigns—offensive, air defense, air blockade, and airborne—and its joint role in anti–air strike campaigns apply there primarily. Additionally, both services play key roles, along with the Second Artillery, in the joint blockade campaign. The PLA thus has many ways to mitigate the limitations to its Taiwan and near-seas operations.

Secondary capabilities are allocated for the border area with India, where China enjoys force and geographic advantages. Given the PLAAF's lack of transports and difficulties in operating fixed-wing aircraft in the Himalayas' thin air and extreme weather, land-based air power lags behind ground forces. The latter can exploit China's Qinghai-Tibet railway and superior road network to move forces rapidly—as seen in the PLA's effective road-building operations leading up to the 1962 Sino-Indian War. Because snow covers airfields through most of the year, save for July–September, army aviation helicopters provide the primary air support to ground troops. There is a token presence of J-10s and J-11s, but the logistics remain challenging and their air-air role is unclear, other than perhaps conducting combat air patrol for ground forces.

Last, nontraditional security forces are allocated to unstable areas of southwest China, and now slightly beyond. For example, a border defense

---

[51] Feng Liang, Gao Zichuan, and Duan Tingzhi, *Zhongguo de heping fazhan yu haishang anquan huanjing* [China's Peaceful Development and Maritime Security Environment] (Beijing: World Knowledge Press, 2010), 300–301; and Nan Li, "The People's Liberation Army Navy as an Evolving Organization" (paper presented at Center for Intelligence Research and Analysis Conference, June 2012), 26. The author is indebted to Professor Li for permission to cite.

unit of the People's Armed Police (PAP) began patrolling the Mekong River alongside neighboring nations' forces in December 2011.

By contrast, PLA capabilities designed to influence conditions farther afield are making much slower progress, starting from a much lower baseline. Two of the PLAN's campaigns, anti-SLOC and maritime transportation protection, might apply beyond the near seas, but this remains unclear, particularly in high-end warfare conditions. The PLAAF might contribute long-range transportation and logistics, but it currently lacks platforms and experience. Conducting combat operations in contested environments at this range is, and is likely to remain, much harder for China. Chinese efforts in this environment are intended primarily to shape peacetime conditions, address nontraditional security threats, and support low-end deterrence rather than to prepare for warfare with other great powers far from China.

Regional Impact

Securing China's homeland and continental periphery remains Beijing's central military imperative. In this respect, the PLA and the PAP are already well equipped to defend the status quo. Efforts to influence territorial claims are supported by military strength but informed by concerns about domestic stability in China's restive border regions populated by ethnic and religious minorities. China's leaders believe that they cannot be seen by their domestic Han audience as being too soft on territorial claims and that such softness would encourage separatism in Xinjiang and Tibet. Protection for trade- and resource-focused efforts to integrate economic activities and infrastructure with bordering nations is also a growing concern.

Beijing has settled its territorial disputes with all land neighbors except India and Bhutan, and these are unlikely to be resolved militarily given the population of non-Chinese citizens in those areas. In October 2011, Indian defense minister A.K. Antony stated that India and China would "establish a 'mechanism' to better handle 'intrusions into each other's territory'" as part of a larger effort to contain their border dispute.[52] Maritime claims and influence thus constitute China's principal area of presence-expansion and hence the primary variable in China's territorial defense and reunification policies.

At the strategic level, China's maritime and air power capabilities are already creating a potential window of vulnerability for U.S. forces. Beijing enjoys a sweet spot of stability, comparatively rapid development, and the tail end of a demographic dividend. In contrast, Washington, still burdened by the costs of the conflicts in Iraq and Afghanistan, and possibly distracted

[52] IISS, *The Military Balance 2012*, 216.

by Iran, confronts fiscal and policy adjustments. With around 30% of Asia's defense spending, not including U.S. expenditures in the region, China is poised to consolidate power regionally.[53] The focus of strategic friction is the near seas and the airspace above them, where China seeks to carve out a zone where it is exempt from the international legal norms of the global commons in order to redress perceived historical injustices and return to great-power status.[54]

The East China Sea: Most dangerous and volatile. Because of Taiwan's and Japan's claims and strength of forces, as well as the likelihood of U.S. involvement in any crisis or conflict, this sea has the greatest possibility for high-end warfare and hence the most dangerous force-on-force engagements. Central to these unresolved conflicts is Taiwan's status. Despite ongoing bottlenecks in several areas, the PLA's acquisition of large amounts of sophisticated equipment in important categories is shifting the balance of military power to China, probably permanently. The resulting inventory of modern aircraft and associated weapons is increasing the PLA's ability to achieve sea and air superiority in the Taiwan Strait and even over the island itself. If unopposed by U.S. or Japanese forces, the PLA could today conduct an intensive air, missile, and naval firepower strike and blockade campaign against Taiwan. In that sense, there simply is no longer a cross-strait balance between Taiwan's military and the PLA. However, according to *Jane's*, "the navy is not ready to [defeat] combined American and Japanese naval operations to thwart an attack on Taiwan and formal PLAN amphibious forces are insufficient to enable a Taiwan invasion of necessary scale to achieve victory."[55] The disputes with Japan over the Senkaku/Diaoyu Islands and the exclusive economic zone (EEZ) represent a second area of possible conflict. *Jane's* assesses that "the PLAN is on the verge of obtaining a credible sea denial capability against the U.S. Navy in the western Pacific and an ability to undertake offensive operations against Japan and Taiwan, absent U.S. military support."[56]

The South China Sea: Less dangerous, more active. Though less likely to see high-intensity conflict, the South China Sea is the most likely to witness friction and unexpected encounters between Chinese and foreign military platforms. China has shown willingness to use force in the sea, which is the

---

[53] IISS, *The Military Balance 2012*, 216.

[54] Peter A. Dutton, "Cracks in the Global Foundation: International Law and Instability in the South China Sea," in *Cooperation from Strength: The United States, China and the South China Sea*, ed. Patrick M. Cronin (Washington, D.C.: Center for a New American Security, 2012), http://www.cnas.org/files/documents/publications/CNAS_CooperationFromStrength_Cronin_1.pdf.

[55] "China," *Jane's World Navies*, August 6, 2012.

[56] Ibid.

only site of PLAN conflict over the past four decades, and Chinese interests are increasing there. Following counterproductive overreach in 2010, since June 2011 Beijing has been taking a more measured approach to sovereignty claims. PLA-affiliated individuals continue to advocate preemptive strikes against Vietnam and the Philippines, however, and Chinese civil maritime forces engaged in a stand-off with a Philippine naval vessel in April 2012 near the contested Scarborough Reef. Beijing appears open to resource-sharing, but not claim resolution, and may yet reassert itself.

The Yellow Sea: Indirect risks. Despite the threat of North Korean destabilization, which places the Yellow Sea within the most likely zone of conflict—albeit not with China per se—this sea remains the calmest. To be sure, China is extremely sensitive about the Yellow Sea for historical reasons, as it has seen invasions come through that area, and there are continued concerns that China's capital is vulnerable to attack from this direction. In addition, the Yellow Sea contains important Chinese coastal areas and shipping lanes. In part because of such sensitivities, Beijing has expressed opposition to the United States holding exercises in the Yellow Sea.[57] Nevertheless, Chinese disagreements with both Koreas are ongoing but limited. Beijing's primary goal is to restrict outside military influence so as to control both the adjacent sea areas and the Korean Peninsula's future.

The Projected Evolution to 2025

The PLA's modernization is driven by China's national interests at home and abroad. While the PLA might prefer to focus on honing its regional A2/AD capabilities, events abroad and out of China's control will ultimately determine where the PRC and PLA leadership decides to invest in the future. In particular, access to energy and natural resources is one of China's critical national interests and will drive some of the decisions on how much and what type of expeditionary capabilities the PLA needs to develop.

At Jiang Zemin's behest, China's military developed a "three-step action plan" for the PLA in 2002: "lay a solid foundation for force informationization and mechanization by 2010, complete force mechanization and the initial stage of informationization by 2020, and complete informationization for all the services and national defense modernization by 2050."[58]

---

[57] "Why China Opposes U.S.–South Korean Military Exercises in the Yellow Sea," *People's Daily*, July 16, 2010, http://english.peopledaily.com.cn/90001/90780/91342/7069743.html.

[58] David Lai, "Introduction" in *The PLA at Home and Abroad: Assessing the Operational Capabilities of China's Military*, ed. Roy Kamphausen, David Lai, and Andrew Scobell (Carlisle: Strategic Studies Institute, 2010), 15, http://www.strategicstudiesinstitute.army.mil/pdffiles/pub995.pdf.

Completely unchallenged for more than half a century after the PLA's overarching "active defense" strategy was implemented in the 1930s, the relative dominance of China's ground forces is finally decreasing, though at uncertain speed. The PRC's defense white papers consistently refer to the PLAN, PLAAF, and Second Artillery as "strategic services," whereas the ground forces have no out-of-area missions save peacekeeping and are not afforded this distinction. There are mounting indications that the PLA may replace the current military regions with a streamlined, outward-looking organizational posture.[59] These emerging developments suggest that the ground forces are becoming less dominant within the military and that the other services may grow correspondingly over time in funding and mission scope. This perception is only reinforced by the gradually increasing, though still disproportionately low, representation of PLAN, PLAAF, and Second Artillery representatives on the CMC,[60] on the CCP Central Committee, and at the helm of PLA institutions.

The PLAAF strategy—"integrated air and space, [preparation for] simultaneous offensive and defensive operations" (*kong-tian yiti*, *gong-fang jianbei*)—was approved in 2004.[61] The PLAAF is upgrading its inventory and competing with the General Armaments Department and Second Artillery to control military space assets. But the PLAN is even further ahead in terms of new mission areas and its relevance to China's growing global interests. The PLAN was granted its near-seas defense strategy around 1985, making it an independent service with an independent mission for the first time. Proposed by Deng Xiaoping in 1979 and endorsed by PLAN commander Admiral Liu Huaqing in 1987, the concept of "active defense, near-seas operations" (*jiji fangyu*, *jinhai zuozhan*) was subsequently operationalized.[62]As the most comprehensive,

---

[59] In an interview, Major General Peng Guangqian, Academy of Military Science, and Zhang Zhaozhong, National Defense University, state that in the future China's ground forces will be downsized, the PLAN will be enhanced and become the second-largest service, the PLAAF and Second Artillery will stay the same, and new services such as space and cyber forces will be established. Senior Captain Li Jie says that China's approach to carriers will be incremental and that, once acquired, they will be deployed to important sea lanes and strategic sea locations for conventional deterrence and also deployed for nontraditional security missions. See Ma Zhengang, "'Zhongguo moshi' hui qudai 'Meiguo moshi' ma?" [Can the "Chinese Model" Replace the "American Model"?], *Renmin wang,* October 22, 2009, http://cn.chinareviewnews.com/doc/50_1074_101111301_2_1022081349.html; and Wu Ming and Qiu Lifang, "Qi da junqu de huafen" [The Division of the Seven Military Regions], Xinhua, April 8, 2008.

[60] Due to time-in-grade requirements, service chiefs are not always appointed immediately to the CMC. See Kenneth Allen, "Assessing the PLA's Promotion Ladder to CMC Member Based on Grades vs. Ranks—Part 1," Jamestown Foundation, China Brief, July 22, 2010, http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=36660.

[61] Yao Wei, ed., *Zhongguo kongjun baike quanshu* [Chinese Air Force Encyclopedia, vol. 1] (Beijing: Hangkong gongye chuban she, 2005), 57.

[62] Li, "The Evolution of China's Naval Strategy and Capabilities," 150, 156.

strategic, multirole, multidimensional, diplomatically relevant, and internationally oriented of the services, the PLAN may benefit most from the PLA's increasingly outward orientation.[63] Specifically, its goal of becoming a regional blue water navy by 2020 would appear to correspond to the PLA's three-step plan.

Potential Force Postures

China's Naval Future

What are the PLA's prospects for developing power-projection capabilities by 2020, the projected end of Beijing's "strategic window of opportunity," and beyond? What are its prospects for consolidating great-power autonomy while the United States remains preoccupied in Afghanistan, with Iran, and with counterterrorism more generally? Broadly speaking, China's future naval and air posture may progress along a continuum defined by the ability to sustain high-intensity combat under contested conditions at progressively greater distances from China, as shown in **Table 1**.

The first three benchmarks fall under the rubric of "sea denial," which is the ability of a country to prevent opponents from using a given sea area without controlling it. The next four benchmarks are variants of "sea control," which is a country's ability to allow its own vessels to operate freely in a given sea area by preventing direct attacks from opponents. Most naval theorists would differentiate between these two approaches, the latter of which is far more demanding than the former and requires a much broader range of capabilities, even for operations within the same geographic area. It is not simply a question of being able to do more from farther away. A robust version of the first benchmark thus lies within China's grasp today; however, there is no guarantee that the last will ever be pursued fully.

Experts at China's Naval Military Studies Research Institute envision that by 2020 China will have a "regional [blue water] defensive and offensive-type" navy.[64] This, in turn, will hinge on compatible air power capabilities. U.S. government projections echo Chinese aspirations. According to the Department of Defense, between now and 2020 "the PLA is likely to steadily expand its military options for Taiwan, including those to

---

[63] The author thanks Nan Li for these points. This process is being facilitated by gradual development and potential consolidation of China's civil maritime forces, which are assuming missions within China's coastal waters and EEZ that previously occupied the navy.

[64] Li, "The Evolution of China's Naval Strategy and Capabilities," 161, 168.

TABLE 1 Previous and potential naval and air force postures

Posture	Sea/air denial	Sea/air control	Scope	Nature
Near-coast defense	X	–	Delay enemy invasion of waters/airspace up to ~12 nm from China's coastline and ~300 miles inland.	Lasted from 1949 to the 1980s. The PLAN defended strategic straits: Bohai, Taiwan, and Qiongzhou. Air forces defended territorial airspace. Both supported ground forces.
Near-seas active defense	X	–	Achieve sea or air control for a certain time in certain areas of the near seas, the first island chain, and its inner and outer rims.	Designed to deter enemy interference by nuclear and conventional means, safeguard resources, defend major wartime SLOCs, and recover Taiwan and other territories. Defensive and offensive missions for naval and air forces.
Regional anti-access	X	–	Ability to deny access by holding opposing forces at risk throughout China's periphery (sea and air within and on either side of the first island chain).	Similar in scope to present efforts but far more robust in realization.
Extended blue water anti-access	X	–	Ability to deny access by holding opposing forces at risk throughout China's periphery and all approaches thereto (out to and east of the second island chain, throughout the South China Sea, and to its southwest) to a distance of 1,000+ nm from territorial waters or airspace.	Represent the low-end and high-end versions of a regional (blue water) defensive and offensive navy. Related air force capabilities include aerial refueling, antiship missiles, overwater flight operations, long-duration maritime patrol and intelligence collection, and strategic bombing.
Limited expeditionary	–	X	All the above, and the ability to conduct MIO and high-level NEO when necessary in and above the far seas (western Pacific and Indian Ocean).	

Table 1 continued.

Posture	Sea/air denial	Sea/air control	Scope	Nature
Blue water expeditionary	–	X	All the above, some form of limited-intensity global presence, and the ability to surge combat-ready forces in and above core strategic far-ocean areas (e.g., Persian Gulf).	Represent the low-end and high-end versions of a "global, far oceans, blue water" navy, as PLAN planners categorize today's U.S. Navy. China does not aspire to such a navy in the medium term, although some interpret Liu Huaqing's writings as calling for such a navy by 2050.
Global expeditionary	–	X	All the above and the robust presence of combat-ready naval and air forces in all major strategic regions of the world.	

SOURCE: Nan Li, "The Evolution of China's Naval Strategy and Capabilities: From 'Near Coast' and 'Near Seas' to 'Far Seas,'" *Asian Security* 5, no. 2 (2009): 150, 156, 160, 168; and Phillip C. Saunders and Erik Quam, "Future Force Structure of the Chinese Air Force," in *Right-Sizing the People's Liberation Army*, ed. Roy Kamphausen and Andrew Scobell (Carlisle: Strategic Studies Institute, 2007), 381.

deter, delay, or deny third party intervention."[65] Additionally, "by the latter half of the current decade, China will likely be able to project and sustain a modest-sized force, perhaps several battalions of ground forces or a naval flotilla of up to a dozen ships in low-intensity operations far from China."[66] As Nan Li explains, "This type of navy can compete effectively for control of the seas within its own region. In the meantime, it also possesses the capability to project power beyond its own region and compete effectively for sea-control and impose sea-denial in the seas of the other oceans, as did the British Navy during the Falklands War."[67]

China's Future Air Power

Air power will help determine how far China's military will operate intensively out-of-area in conjunction with its sea power. Whereas naval capabilities interact strongly with geography, air power provides surveillance and protection for sea power and is largely a product of range and technical parameters. Chinese air power development should thus be understood in the context of the aforementioned naval-force postures. To support power projection overseas, both for national prestige and for limited missions beyond Taiwan, Beijing must extend air power range and lethality. This requires strategic airlift, aerial refueling, enhanced deck-aviation capability, and long-range strike capabilities, as well as modest access rights to overseas military facilities. With respect to precision-strike capabilities beyond the near seas, Guam likely represents an initial target. Allocation of missions and operating areas among PLAAF and PLAN forces will present challenges, particularly once the latter contains carrier-based aircraft. Regardless, the China issue manager at the U.S. National Air and Space Intelligence Center projects that "China will have one of the world's foremost air forces by 2020."[68]

Barometers for Naval and Air Buildup

The biggest uncertainty for the PLA over the next two decades is the extent to which China will develop capabilities supporting major combat force-projection beyond Taiwan and the near seas. Specifically, can the PLA do more than simply sharpen sea-denial (submarine-centric) capabilities

---

[65] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2011*, 2.

[66] Ibid., 27.

[67] Li, "The Evolution of China's Naval Strategy and Capabilities," 161, 168.

[68] Wayne A. Ulman, "China's Military Aviation Forces," in Erickson and Goldstein, *Chinese Aerospace Power,* 38.

and instead achieve blue water sea-control, which would require air dominance as well? Here, hardware acquisition and deployment are straightforward to monitor and thus offer a useful indicator. For example, a significant increase in constructing replenishment-at-sea ships and Type 056 escort ships would signal a serious plan to increase naval power-projection capabilities. On the other hand, PLAAF power projection might be facilitated by procurement of additional transports, such as the Y-20 four-engine aircraft based on the Il-76. However, the PLA already enjoys access to commercial airlines, whose B-747 freighter variants can carry roughly twice the cargo of an Il-76.

Although the PLA's assets, trained personnel, and experience are currently insufficient to support long-range missions to defend SLOCs, it is conceivable that the PLA could gradually acquire the necessary funding and mission scope. Certainly, modern multi-mission warships enjoy the flexibility to perform operations in a wide range of circumstances and locations. But fully pursuing robust long-range capabilities demands larger, more numerous platforms. With respect to force structure, indicators of a more ambitious Chinese naval presence, particularly one concerned with SLOC protection, are presented in **Table 2**.

Perhaps the strongest indicator of Chinese intentions to develop blue water power-projection capabilities would be the PLA's pursuit of reliable access to overseas shore supplies and air- and naval-basing infrastructure to improve transit and on-station time. China remains far from having overseas bases. But recent debate among PLA scholars and other analysts suggests that China may be actively reconsidering its traditional approach of avoiding "hegemonism" and "power politics" by eschewing such facilities wholesale.[69] While there are indications of growing Chinese influence in the South Pacific for commercial and perhaps even monitoring purposes, the Indian Ocean—with its rich littoral resources, busy energy SLOCs, and diverse access options—seems the most likely Chinese beachhead location. There Beijing will probably pursue access incrementally in countries such as Pakistan and Burma that are politically insulated from Indian and U.S. pressure, as well as in nonaligned countries like Oman that enjoy well-balanced relations internationally and hence cannot easily be pressured to eschew closer cooperation with China. Facilities will probably be exposed and challenging to defend, however, and the host nations may destabilize (see **Table 3**).

---

[69] Li Peng, "Main Characteristics of China's Foreign Policy" (excerpts from speech at the 96th Inter-Parliamentary Conference, Beijing, September 19, 1996), http://www.china-embassy.org/eng/zmgx/zgwjzc/t35077.htm.

TABLE 2 Indicators of emerging blue water/air capabilities

Capability	Approach
PNT	Beidou/Compass system transitions from regional to global coverage.
C4ISR	Increasingly integrated global network.
ASW	More, and increasingly quiet, nuclear-powered submarines. Regular deployments of SSNs, and surface warships, and the demonstrated ability to provide deployed air superiority for ship- and land-based aircraft with significant ASW prowess.
Area air defense	More advanced surface vessels with long-range area air defense systems and aircraft to support radar. Increased Soviet-style adoption of long-range antiship cruise missiles in surface fleet to compensate for lack of proximity to land-based missile forces on extended missions. Introduction of improved hardware variants, increasing practice of their utilization.
Long-range air power	Development/procurement of strike and long-range transport aircraft, possibly long-range stealthy bombers, helicopters to operate off carriers and land bases overseas; aerial refueling capabilities; related doctrine and training programs.
Military production	Establishment of new, modern shipyards dedicated to military ship production or expansion of areas in coproduction yards that are dedicated to military ship production. Improved facilities and practices for manufacturing aircraft and aero-engines. Increased production in extant facilities.
At-sea replenishment	Expansion of the PLAN auxiliary fleet, particularly long-range, high-speed oilers and replenishment ships.
Remote repair	Development of ability to conduct sophisticated ship and aircraft repairs overseas, either through tenders or land-based repair facilities.
Operational readiness	More complex, joint exercises. Coordinated multi-axis antiship/carrier operations. Steady deployment to vulnerable SLOCs to increase presence, familiarity, and readiness. More long-range training missions.
Overall capacity	Maturation of advanced levels of increasingly joint PLA doctrine, training, and human capital. More all-weather, overwater, attack training for pilots.
Overseas facilities	Acquisition of "places," if not "bases," to support the above capabilities, e.g., in the Indian Ocean. The cultivation of true "allies" in a Western/U.S. sense as opposed to "friends and acquaintances."

TABLE 3 PLAN ports of call and possible naval and air access points

Port (country)	Chinese investment (reported)	Type	Development status	Draft limits (m)
Salalah (Oman)	None	Deepwater; major container transshipment port for the Persian Gulf	Already well-established; construction of new port-side fuel bunkering facility underway; massive container terminal expansion plan contracted out	17.5
Aden (Yemen)	None	Container/bulk cargo	Modest port; berth extension planned	15.8
Djibouti (Djibouti)	None	Principal port for Ethiopian cargo transshipment; containers, bulk cargo	Container terminal phase 1 construction completed; can berth 2 large container vessels together	12
Gwadar (Pakistan)	$198 million; funded 80% of the initial $248 million city construction; provided technicians, skilled workers	Commercial port receiving break bulk cargos, with capacity to handle containers	Significant infrastructure foundation; further development to include 15 berths, ship cargo handling equipment, port machinery, and warehouses; not commercially viable at present	14
Karachi (Pakistan)	None	Pakistan's largest, busiest port	Already well-established; development of bulk cargo, deepwater container terminals, and other expansion underway, including 18-m container terminal	9.8 upper harbor; 12.2 approach channel (13.5 in future)
Hambantota (Sri Lanka)	$360-million export buyer's credit from China's EXIM Bank; Chinese contractors constructing	Large deepwater port under development	To be constructed in 4 stages over 15 years. Phase 1 accommodated first vessel in 2010; general cargo berth of 610 m; handles vessels up to 100,000 DWT; phase 2 initiated	16 (17 in future)

Table 3 continued.

Port (country)	Chinese investment (reported)	Type	Development status	Draft limits (m)
Colombo (Sri Lanka)	$1.5 billion Chinese-built port completed 2012; agreement to build second port; Chinese firms pledged ≥ $500 million over the next 10–15 years	Currently Sri Lanka's main port; South Asia's largest, busiest port	Deepwater port opened in 2012; Colombo South Harbor Development project will increase depth to 18 m, then 23 m; phased development of 4 new terminals with 3–4 berths each	15
Trincomalee (Sri Lanka)	Apparently none as of June 2012, but future investment likely	Large natural harbor; South Asia's only completely sheltered harbor	Under development	13
Chittagong (Bangladesh)	Agreement to finance collocated deep sea port, help establish rail/road links in $8.7 billion package	Bangladesh's main sea port; 6 general cargo berths and 11 container berths (3 dedicated with gantry crane)	New collocated port to be completed in three phases by 2015; will increase capacity from current 1.1-million to 3-million TEU for container traffic, and 30.5-million to 100-million tons for bulk cargo	7.5–9.15
Sittwe/ Kyaukpyu (Burma)	Chinese funding development of two deep sea ports, special economic zone near Sittwe in Kyaukpyu; connecting infrastructure	Natural harbor near large rice-exporting port of Sittwe (being developed with Indian assistance); terminus of oil pipeline from Kunming, China	Kyaukpyu deep sea port on Maday Island by Than Zit river mouth; initiated in 2009, project will produce 91 berths, accommodate 300,000-ton oil tankers; May 2010 MOU between China and Burma to develop land route Kunming-Mandalay-Kyaukpyu (which will connect to Sittwe)	8.2

Table 3 continued.

Port (country)	Chinese investment (reported)	Type	Development status	Draft limits (m)
Victoria (Seychelles)	Possible investment, nature unclear	Port with currently limited facilities	Restoration of east coast phase 3 underway, including development of new commercial/ fishing harbor	11.5
Singapore (Singapore)	None	Large, sophisticated, commercial ports; busiest in world; 1 terminal, 9 sub-ports; military ports	Already well-established but potential for further development	22

SOURCE: *Ports & Terminals Guide 2011–12* (Redhill: IHS Fairplay, 2012); Port of Salalah, http://www.salalahport.com; Port of Aden, http://www.portofaden.net; "Useful Links," Djibouti Free Zone, http://www.djiboutifz.com/en/useful-links/useful-links.html; Gwadar Port, http://www.gwadarport.gov.pk; Karachi Port Trust, http://www.kpt.gov.pk/index.htm; Project Sri Lanka Ports Authority, http://www.slpa.lk/index.asp; "Sri Lanka's Chinese-Built Port Opens for Business," Agence France-Presse, June 5, 2012; Chittagong Port Authority, http://cpa.gov.bd/portal/; "China to Invest US$8.7 billion in Bangladesh," *Marine News China*, May 15, 2010; Myanmar Port Authority; Seychelles Port Authority, http://www.spa.sc/; and Maritime and Port Authority of Singapore, http://www.mpa.gov.sg/.

Hardware Trends

A wide variety of platforms and weapon systems are coming online or being integrated into the PLA force structure. Those that the PLA avoided or limited previously for lack of capability or need will likely now be developed as emerging capability and need converge. China will doubtless achieve and implement several potentially cutting-edge breakthroughs in military technology, which could improve its A2/AD capabilities radically. It will continue to favor missiles, particularly conventional variants, of increasing range, precision, and advanced characteristics. Maturing and diversifying anti-satellite (ASAT) capability will emphasize ground-based kinetic kill vehicles and lasers. The ability to launch saturation attacks with cruise missiles will come from air-, sea-, undersea-, and land-based platforms in multi-axis coordination. Antiship ballistic missile capability will likely include multiple operational variants of growing range. Beijing's Compass, or Beidou II, position, navigation, and timing system will be deployed globally by 2020. Land-based J-20 "stealth" aircraft, if operated and maintained to achieve minimal-signature capabilities despite their potentially problematic architecture and Chinese inexperience in maintaining their sensitive surface coatings, could have similar impact when they become operational around 2018, probably for strike missions against enemy early warning and tanker aircraft, as well as ships.

China's defense industry will likely be given the requisite resources and master the relevant technology. The key variable in determining the actual performance of these systems is the extent to which the PLA is capable of sufficient bureaucratic coordination and adaptation to exploit new technologies and operational concepts. The remaining uncertainties are largely organizational: Will the ground forces acquiesce to the PLAN and PLAAF becoming more important proportionally? To what extent will inter-service rivalry limit the development of long-distance capability? To what degree can joint wartime confidence be achieved? Although new long-range capabilities could provide potent command and control options, such developments would necessitate continued transformation of the PLA and stoke ongoing debates regarding decentralization.

During this time frame, other Chinese capabilities will develop less disruptively. Type 094 and 096 SSBNs with JL-2 and follow-on SLBMs will afford China's nuclear forces a sea leg, but will be more expensive than land-based mobile forces, as well as more vulnerable because of acoustic problems. China may develop significant amphibious forces with long-range expeditionary platforms, including perhaps six to eight Type 071

landing platform docks and three to eight Type 081 landing helicopter docks.[70] However, these will be vulnerable to submarine-launched torpedoes and antiship missiles and can only carry several hundred personnel each. Hence, no foreseeable number could have any impact on a Taiwan campaign, but they would be suitable for small-island landings (e.g., in the South China Sea), NEOs, and special operations.

Even PLA success in developing out-of-area capabilities, however, could have unintended consequences. Mastering long-range platforms and C4ISR would create extensive deployment, logistics, and communications chains out of area, or what geostrategists term "exterior lines."[71] The systems thus exposed could be jammed or geolocated, creating tremendous vulnerabilities. Key platforms would operate in international waters and airspace over which sovereignty cannot be claimed even with the most revisionist legal interpretation (in contrast to a country's own EEZ and the airspace above it).

Resulting Possibilities

At the strategic level, many uncertainties persist, including the trajectory of China's rise. Key internal and external challenges may slow Chinese growth and limit defense spending increases. Political instability could reprioritize government spending. For these reasons, and because of the diminishing returns on investment explained above, China's ability and willingness to develop robust capabilities beyond the near seas and their immediate approaches remains unclear.

Strategic Effects

Assuming China avoids major internal problems, the near seas will likely become more favorable to China's claims as the country's overall power and military capabilities increase. In the Yellow Sea, Beijing's influence over any major changes in the status quo of the Korean Peninsula is likely to mitigate Korean claim disputes with Beijing. Similarly, in the South China Sea, Beijing may be able to persuade some maritime neighbors to pursue joint resource development or even settle claims in exchange for resource ownership. In contrast, disputes in the East China Sea may see only partial resolution on Beijing's terms. The Taiwan issue could come much closer to settlement, with economic integration,

---

[70] Kostecka, "From the Sea," 20.

[71] Milan N. Vego, *Operational Warfare* (Newport: Naval War College Press, 2000), 172–75.

military imbalances, and possible mainland domestic reforms persuading islanders to embrace a loose symbolic confederation. However, cross-strait political agreements could also trigger internal instability and consequent strategic introversion. The disputes with Japan over the Senkaku/Diaoyu Islands and EEZ boundary, by contrast, are unlikely to be resolved. Even if demographic and other challenges continue to reduce Japan's power relative to China's, Tokyo's administration of the islands and bilateral acrimony will frustrate efforts at accommodation, and Beijing is unlikely to risk a Falklands scenario to seize them.

Farther afield, Beijing will probably continue to rely on the global system, from which it benefits as a free or minimum-payment rider. Containing no Chinese claims and serving as a major conduit for Chinese inputs, the far seas offer cooperative benefits and conflict deterrents. The Indian Ocean contains great-power navies that prioritize its security given their proximity and reliance on SLOCs for commerce and energy flows. The United States will continue to exploit strategically located Diego Garcia, provided that rising seas do not compromise its utility. India's navy will enjoy an increasingly strong presence in its own backyard and make considerable diplomatic efforts to thwart excessive Chinese influence in littoral nations. Likewise, the Japanese, Korean, and Australian navies will leverage their presence and partnerships to safeguard supply lines.

At the operational level, then, a more robust version of A2/AD in the near seas will likely remain the PLA's core focus because China appears unlikely to gain similarly strong, unilateral interests in the far seas. Uncertainties include how far and how comprehensively its "range rings" extend and how extensive combat capabilities become in the far seas. At the tactical level, the key question will be to what extent the PLA can mitigate vulnerabilities along new exterior lines. In terms of software, the key question will be how the PLA changes the overall organizational structure and the way that the PLAN and PLAAF train.

Political Implications

Size, geographic proximity, and economic integration make China likely to gain leverage vis-à-vis key Asian competitors. Less clear is whether China will challenge strategic stability, or the geostrategic status quo, in Asia. What seems certain is that the maritime and aerospace arenas will continue to witness great-power competition in East Asia, where Beijing desires

preeminence. Given China's overall rise, however, there will be considerable spillover effects in the Asia-Pacific more broadly, particularly in the strategic Indian Ocean region. China's approach of "using the land to control the sea" exemplifies how technology and geography are often interlinked.[72] Furthermore, by harnessing capitalism's positive aspects, China has the potential for competitive dynamism far surpassing that of the Soviet Union.

The United States thus increasingly faces a strong competitor with the ability to contend in all aspects of national power. Key variables concerning the influence of U.S. forces in the near seas will be their size and ability to operate in an A2/AD environment through some combination of distributed, less-vulnerable architecture and active countermeasures. However, China's rise as a major regional maritime and aerospace power may mark the end of an era in which the U.S. military enjoyed unobstructed access to the entire global commons. The central question is whether Washington will need to accept a zone of Chinese suzerainty in East Asia, and whether such an exception can be accommodated without compromising core U.S. interests or establishing an unacceptable precedent.

Alternatively, can the United States affordably counter China's asymmetric military approaches and reclaim the technological advantage in a relatively comprehensive fashion? Approaches to relevant platform and weapon systems may include shifting to less-manned and unmanned systems; limiting reliance on manpower wherever feasible; shifting some operations to smaller, dispersed, and networked elements; moving from the sea surface to the harder-to-access undersea (and, in some cases, air) realms; substituting passive defenses for active ones; adopting new approaches to basing and presence; and targeting China's own physics-based limitations with improved and more extensively deployed missiles, mines, and submarines. Of course, as the United States develops such advanced systems as autonomous underwater vehicles, China may follow suit.

Conclusion

The Chinese naval and air forces' evolving role in defending China's expanding economic interests has broad significance. For now, China seems to be pursuing a multilayered approach to naval development. This approach is marked by a consistent focus on increasingly high-end A2/AD capabilities to support major combat operations on China's

---

[72] Wang Wei, "Zhanshu dandao daodan dui Zhongguo haiyang zhanlüe tixi de yingxiang" [The Effect of Tactical Ballistic Missiles on the Maritime Strategy System of China], *Jianzai wuqi* 84 (2006): 12–15.

maritime periphery and relatively low-intensity but gradually growing capabilities to influence strategic conditions in Beijing's favor farther afield.

While China will no doubt build several carriers over the next decade, its naval and air forces are likely to develop within today's multilayered rubric for the foreseeable future, with parallel implications for U.S. security interests. China's military has achieved rapid, potent development by maintaining an A2/AD posture along interior lines and exploiting the physics-based limitations inherent in the performance parameters of U.S. and allied platforms and C4ISR systems. This should be of tremendous concern to Washington. But dramatic breakthroughs here cannot easily be translated out of area.

Just as these limiting factors increasingly threaten U.S. platforms operating in or near China's maritime periphery, they likewise haunt China's forces, which still lag considerably behind the United States' in overall resources, technology, and experience, as they venture farther afield. Thus far, Chinese decision-makers, having carefully studied the lessons of the Soviet Union's overextension, seem unlikely to expend overwhelming national resources to fight these realities. Despite growing concerns abroad, they have too many imperatives closer to home demanding funding and focus. Ongoing requirements for China's naval and air forces to secure Chinese near-seas interests also make it highly unlikely that a force that is modest, or even smaller, in quantity will be able to sustain a robust top-end footprint in the far seas, no matter how much its capabilities improve.

Perhaps most sobering, naval influence and operations remain untested in the age of long-range, large-scale missile threats. The December 10, 1941, sinking of the battleship *Prince of Wales* and the battlecruiser *Repulse* by land-based bombers and torpedo bombers of the Imperial Japanese Navy in the Naval Battle off Malaya offers one of the better examples of the risk of disregarding A2/AD threats.[73] With ships viewed increasingly as targets, stressed U.S. taxpayers may ask increasingly what port calls and naval diplomacy actually accomplish. This is part of a larger pattern in which U.S. military influence and operations have not demonstrated the ability to persist amid A2/AD threats. They will need to do so increasingly, in a manner that is convincing to their Chinese counterparts, allies, and the general public.

While these overall dynamics seem readily apparent, the implications for U.S. policy and influence in the Asia-Pacific remain uncertain. As recent agreements to rotate U.S. Marines into Darwin, Australia, amid overall strengthening of U.S.-Australian security ties suggest, Washington

---

[73] Correlli Barnett, *Engage the Enemy More Closely: The Royal Navy in the Second World War* (New York: W.W. Norton and Company, 1991), 391–92.

is devoting a greater proportion of its forces to the region as part of a larger rebalancing strategy, while seeking to deploy them with a flexible, light footprint. In the region more broadly, it remains unclear what shape this policy will take and to what extent the five U.S. treaty allies (Japan, South Korea, Australia, the Philippines, and Thailand) and other security partners (such as Singapore) will be willing to grant access. This strategy will also be subject to domestic public opinion, the extent to which regional nations are willing to depend on the United States and each other, and perceptions concerning the United States' and China's relative power and intentions. Finally, there is the question of whether this renewed U.S. focus and prioritization, coupled with enhanced cooperation with other regional actors, will be sufficient to counter Beijing's growing capabilities and deter their operational employment. To address these challenges, Washington must demonstrate its commitment to a sustained, properly resourced, and continually effective presence in the Asia-Pacific. It must work constructively with a broad range of allies, friends, and partners—including China, in many respects—to achieve broader public goods. To do so in this time of austerity will require rebalancing by redirecting resources from elsewhere. Such prioritization is the essence of strategy.

Appendix: PLA Naval and Air Forces

Except where otherwise indicated in notes and citations, the following methodology was used to determine order-of-battle categories and numbers. Data from unclassified U.S. government reports, including the latest Department of Defense and Office of Naval Intelligence reports, was taken as authoritative, although limited in coverage. Beyond these, IISS's *The Military Balance* provided an overall baseline for the tables in this appendix, as it is the most demonstrably reliable comprehensive source available. The latest relevant *Jane's* reports were used to supplement this data. These reports are less demonstrably reliable, but no other open source save *The Military Balance* approaches their comprehensiveness. With regard to certain naval vessels, some calculations were made using Google Earth images. With regard to certain aircraft, some calculations were made using the latest *Directory of Military Personalities* and websites such as Chinese Military Aviation and China Defense Forum. Photographs and data from these websites were used to compile aircraft BORT and ship hull numbers, thereby enabling estimates to be made based on the assumption that there are approximately 24 aircraft per regiment (although that figure might vary).

The differing figures offered by IISS, *Jane's*, and the more specific methods were adjudicated in the following fashion:

- where a value appeared to be an overall figure as opposed to one for the respective variants into which a given platform was divided;
- when a value appeared to reflect recently higher numbers of a platform that was in the process of being reduced in number; or
- when the values of naval hulls were very close and the *Jane's* value of three correlated with a logical division among the PLAN's three fleets.

In most such exceptions, the *Jane's* figures were used. In the event of a large disparity between IISS and *Jane's* that did not stem from one of these three scenarios, the number not selected for the matrix is noted. In the rare event that the more specific methods approach yielded a higher figure, that figure was used instead on the assumption that such methods would often yield an incomplete figure (i.e., due to incomplete photographic coverage) but would be unlikely to yield an exaggerated one. Finally, all findings were vetted with experts on open source order-of-battle estimation. Subsequently, missing information was filled in using SinoDefense.com, which, though outdated regarding platform numbers, offers apparently reliable information concerning history and platform lineage. Given the difficulty in estimating PLA order-of-battle numbers, these findings must be treated with caution.

TABLE A1 China's naval order of battle

Platform	North Sea Fleet	East Sea Fleet	South Sea Fleet	Total in 2012	Total in 2015 (projected)	Total in 2020 (projected)
Nuclear-powered ballistic-missile submarines[a]	3	0	1	4	4–5?	5?
Attack submarines (total)	21	35		56	~70	~72
Nuclear-powered attack submarines (SSN)	3	2		5	?	?
Diesel-powered attack submarines (SS)	18	30		48	?	?
Aircraft carriers	1			1[b]	1?	2?
Destroyers	10	8	8	26	~26	~26
Frigates	9	44		53	~45	~42
Subtotal of above ships				*137*	*~146–47?*	*~146–47?*
Amphibious ships	2	26		28	?	?
Medium landing ships	5	18		23	?	?
Missile patrol craft	19	67		86	?	?
Mine warfare ships	40			40	?	?
Major auxiliaries	50 (5 are fleet AORs)			50	?	?
Minor auxiliaries and service/support craft	250+			250+	?	?

SOURCE: U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2012*, annual report prepared for Congress (May 18, 2012), 31; and Ronald O'Rourke, "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress," Congressional Research Service, CRS Report for Congress, RL33153, August 10, 2012, 38.

NOTE: *a* indicates "Jin class (Type 094)," *Jane's Fighting Ships*; and *b* indicates that aircraft carrier is undergoing sea trials and is projected to become operational in 2012.

TABLE A2 PLAN coastal defense forces (ground-launched)

Type	Role	Manufacturer	Launch platform	Range (km)	Payload (kg)	Speed (supersonic/ subsonic)	Guidance (initial/terminal)	Total in service
YJ-62C/C-602	Antiship cruise missile (ASCM)	CASIC Third Academy	Eight-by-eight wheeled TEL, 3 tubular ribbed missile canisters, 20-degree launch elevation. Typical battery: 4 TELs, C2 vehicle, support vehicle	280+	210	Subsonic	Inertial/active terminal guidance	120
HY-4/YJ-63/C-201/ CSSC-7 "Sadsack" (improved HY-4A version)	ASCM / turbojet	CASIC Third Academy	–	135/ 200–280	513; high explosive shaped charge warhead	–	Inertial with GPS updates for mid-course guidance/ multimode active-passive monopulse radar for terminal guidance	?
HY-3/C-301/ CSSC-6 "Sawhorse" (improved HY-3A version)	ASCM (dual ramjets)	CASIC Third Academy	Typical battery: 4 missiles on their launchers, 4 missile transport vehicles, radar and command vehicle, 3 power supply vehicles	35–140/ 180	513; fragmentation warhead	Supersonic (Mach 2.0)	Inertial mid-course guidance with radio altimeter controlling cruise altitude/active monopulse radar seeker, likely similar to YJ-16; delayed contact fuse, active laser proximity fuse	50–150

Table A2 continued.

Type	Role	Manufacturer	Launch platform	Range (km)	Payload (kg)	Speed (supersonic/ subsonic)	Guidance (initial/terminal)	Total in service
YJ-16/C-101/ CSSC-5 "Saples"	ASCM (dual ramjet)	CASIC Third Academy	–	–	300; high explosive semi-armor piercing	Supersonic	Inertial/active monopulse radar, 10–20 GHz (X-band) seeker	?
HY-2A/CSSC-3 "Seersucker"	ASCM	CASIC Third Academy	–	95	454; hollow-charge warhead	Subsonic (Mach 0.9)	Autopilot/active radar; alternative IR seeker	?
HY-1A/CSSC-2 "Silkworm"	ASCM	CASIC Third Academy	–	40	454; hollow-charge warhead	Subsonic (Mach 0.9)	Autopilot/active radar	?
130-mm	Coastal artillery	–	–	–	–	–	–	250
100-mm	Coastal artillery	–	–	–	–	–	–	500
85-mm	Coastal artillery	–	–	–	–	–	–	500

SOURCE: *Jane's Strategic Weapon Systems*; and *Jane's World Navies*.

TABLE A3 Submarines

Class	Manufacturer	Role	In service	First hull commissioned
Jin (Type 094)	Huludao Shipyard	Ballistic-missile, nuclear-powered	3[a]	2007
Xia (Type 092)	Huludao Shipyard	Ballistic-missile, nuclear-powered	1	1987
New "Qing (Type 043)" with large sail	Wuchang Shipyard	Ballistic-missile? (Test?) Other missions? Diesel-powered	1[b]	2010
Shang (Type 093)	Huludao Shipyard	Attack, nuclear-powered	2	2006
Han (Type 091/091G)	Huludao Shipyard	Attack, nuclear-powered	3	1980
Kilo (Project 877EKM/636)	Various Russian shipyards	Patrol, diesel-powered	12	1995
Yuan (Type 041)	Wuhan/ Changxing Island shipyards	Patrol, diesel-powered (likely air-independent-power)	8–9	2006
Song (Type 039/039G)	Wuhan/ Jiangnan shipyards	Patrol, diesel-powered	13	1999
Ming (Type 035)	Wuhan Shipyard	Patrol, diesel-powered	19	1971
Golf (Type 031)	Dalian Shipyard	Ballistic-missile (test), diesel-powered	1	1966
Romeo (Type 033 Wuhan SSG)	–	Test platform; 6 YJ-1 (CSS-N-4) Sardine AShM, 8 single 533-mm, diesel-powered	1	–
Romeo (Type 033 SS)	–	Diesel-powered	Numbers uncertain; being retired	~1962

SOURCE: IISS, *The Military Balance 2012*; *Jane's World Navies*; and, for *a*, "Jin class (Type 094)," *Jane's Fighting Ships*.

NOTE: *a* indicates operational as a submarine but not as a missile launcher until the JL-2 SLBM trials are complete; and *b* indicates launched but apparently not yet commissioned.

TABLE A4 PLAN surface fleet

Class	Manufacturer	Role	In service	First hull commissioned
Luyang II (Type 052C)	Jiangnan/ Changxing Island shipyards	Destroyer (area air-defense)	8	2004
Luyang I (Type 052B)	Jiangnan Shipyard	Destroyer (area air-defense)	2	2004
Luzhou (Type 051C)	Dalian Shipyard	Destroyer	2	2006
Sovremenny (Project 956E/956EM)	North Yard, Russia	Destroyer	4	1999
Luhu (Type 052A)	Jiangnan Shipyard	Destroyer	2	1994
Luda-class (Type 051DT/051G/051G II)	Dalian Shipyard	Destroyer	4[a]	1991
Luda (Types 051/051D/051Z)	Various	Destroyer	8[b]	1971
Luhai (Type 051B)	Dalian Shipyard	Destroyer	1	1999
Jiangkai II (Type 054A)	Huangpu/ Hudong-Zhonghua shipyards	Frigate (air defense)	16–19	2008
Jiangkai I (Type 054)	Hudong-Zhonghua/ Huangpu shipyards	Frigate	2	2005
Jiangwei II (Type 053H3)	Huangpu/ Hudong-Zhonghua shipyards	Frigate	10	1998
Jiangwei I (Type 053H2G)	Hudong-Zhonghua Shipyard	Frigate	4	1991
Jianghu I/II/V (Type 053H/053H1/053H1G)	Hudong-Zhonghua/ Jiangnan/ Huangpu shipyards	Frigate	22[c]	Mid-1970s
Jianghu IV (Type 053HTH)	Hudong-Zhonghua Shipyard	Frigate	1[d]	1986
Jianghu III (Type 053H2)	Hudong-Zhonghua Shipyard	Frigate	3	1986

Table A4 continued.

Class	Manufacturer	Role	In service	First hull commissioned
Houbei (Type 022)	Various	New-generation, fast-attack craft (missile)	60+	2004
Houjian/Huang (Type 037-II)	Huangpu Shipyard	Fast-attack craft (missile)	5–6	1991
Houxin (Type 037/IG)	Qiuxin/Huangpu shipyards	Fast-attack craft (missile)	16	1991
Huangfeng (Type 021) (Osa I Type)	?	Fast-attack craft (missile)	11	1985
Haiqing (Type 037-IIS)	Qiuxin/Qingdao/ Chongqing/ Huangpu shipyards	Fast-attack craft (patrol)	25	1992
Hainan (Type 037)	Chongqing/ Qingdao/ Qiuxin/Huangpu shipyards	Fast-attack craft (patrol)	50	1963
Shanghai II (Type 062C)	Shanghai/various shipyards	Fast-attack craft (gun)	35 (declining numbers)	1961
Haizhui/Shanghai III (Type 062/1)	?	Patrol craft (coastal)	25[e]	1992
Haijiu (Type 037-I)	?	Patrol craft (large)	3	1984
[Unknown]	?	Patrol craft (harbor)	3	1997
Wolei (Type 918)	Dalian Shipyard	Minelayer	1	1988
Wozang (Type 082-II?)	Qiuxin Shipyard	Minehunter/ minesweeper	2	2005
T-43 (Type 6610)	Wuhan/ Guangzhou shipyards	Minesweeper (ocean)	16	1966
Wochi (Type 081)	Qiuxin/Shanghai/ Wuhan shipyards	Minesweeper (coastal)	7	2007
Wosao (Type 082)	?	Minesweeper (coastal)	16	1988
Futi (Type 312)	?	Minesweeper (drone)	4	Early 1970s
Yuzhao (Type 071)	Hudong-Zhonghua Shipyard	Amphibious assault ship/ LHD	3	2008

Table A4 continued.

Class	Manufacturer	Role	In service	First hull commissioned
Yuting II (Type 072 III)	Various	Landing ship tank (LST)	10	2003
Yuting I (Type 072 II)	Hudong-Zhonghua Shipyard	LST	10	1992
Yukan (Type 072)	Wuhan Shipyard	LST	7	1980
Yushu	Hudong-Zhonghua/Wuhu/Qingdao/Lüshun shipyards	Landing ship mechanized (LSM)	10	2004
Yuhai (Type 074) (Wuhu-A)	Wuhu/various shipyards	LSM	10	1995
Yuliang (Type 079)	Various	LSM	30	1980
Yudeng (Type 073)	Hudong-Zhonghua Shipyard	LSM	1	1994
Yudao (Type 073)	?	LSM	1	1980
Yubei (Type 074A)	Qingdao/Zhanjiang/Shanghai/Dinghai shipyards	Landing craft utility (LCU)	10	2004
Yuqing (Type 068/069)	Hudong-Zhonghua/Dahe/Guangzhou shipyards	LCU	20	Late 1960s
Yunan (Type 067)	Hudong-Zhonghua/Hangzhou/Qinhuangdao shipyards	LCU	120	1968
Type 271-II/III	Qingdao/Changsha shipyards	LCU	25	1970
Jingsha II	Dagu	Hovercraft/landing craft air-cushion (LCAC)	10	1979
Yuyi	Qiuxin Shipyard	Hovercraft/LCAC	1	2008

SOURCE: IISS, *The Military Balance 2012*; and *Jane's World Navies*.

NOTE: *a* is from IISS and comprises 2 Luda mod (Type 051DT), 1 Luda II (Type 051G), 1 Luda III (Type 052G II). *b* is from *Jane's;* Type 051/Luda-class destroyer *Yinchuan* (107) was decommissioned on April 5, 2012. *c* is from IISS and comprises 9 Jianghu I (Type 053H), 8 Jianghu II (Type 053H1), and 6 Jianghu V (Type 053H1G). *d* is from IISS and indicates Type 053H1Q are in a training role. *e* indicates that IISS lists 34+ for this value.

TABLE A5 Selected PLAN amphibious vehicles and weapons

Type	Manufacturer	Role	In service	First delivery
Type 05/ZBD2000/ ZBD-05	China North Industries Corp (NORINCO)	Amphibious assault vehicle (AAV)/light tank	124[a, b]	2005
Type 63A/ZTZ-63A/ WZ213	NORINCO	Amphibious light tank	62[c, d]	?
Type 05/ZTD-05	NORINCO	AAV/armored personnel carrier (APC)	124	?
Type 63C/YW531C	NORINCO	Amphibious APC	62[c]	?
Type 77-I/77-II/WZ511	NORINCO	Amphibious APC	400[e]	?
ZBD-04	NORINCO	Amphibious IVF	?[f]	?
Type 86/WZ501/YW501	NORINCO	Amphibious infantry fighting vehicle	62	?
122-mm Type 54 (similar chassis to Type 63A)	NORINCO	Self-propelled field howitzer	40+[g]	?
122-mm Type 89	NORINCO	Self-propelled howitzer	20+[h]	?
Type 07	NORINCO	Artillery	20+	?
122-mm Type 83	NORINCO	Multiple rocket launcher (MRL)	83	?
107-mm Type 89 (improved variant of Type 63)	NORINCO	MRL	?	?
130-mm Type 63-1/70	NORINCO	MRL	?	Production complete, in service, no longer marketed.
Hongjian/Red Arrow 73 (HJ-73) (multiple variants)	NORINCO	Anti-tank guided missile (ATGM)	?	?
Hongjian/Red Arrow 8 (HJ-8) (multiple variants)	NORINCO	ATGM	?	?

Table A5 continued.

Type	Manufacturer	Role	In service	First delivery
120-mm Type 98 (PF-98)	NORINCO	Anti-tank rocket system	?	?
82-mm	NORINCO	Mortar	?	?
Hongnu/Red Cherry (HN-5)	NORINCO	Man-portable surface-to-air missile system	?	?

SOURCE: IISS, *The Military Balance 2012*; *Jane's World Navies*; *Jane's Armour and Artillery 2012*; and *Jane's Armour and Artillery Upgrades 2012*.

NOTE: *a* indicates that *Jane's World Navies* lists 400. *b* indicates that *Jane's Armour and Artillery 2012* estimates that approximately 600 ZBD2000s will be built in total. *c* indicates that *Jane's World Navies* lists 800. *d* indicates *Jane's Armour and Artillery 2012* estimates 150. *e* indicates that this system is not listed in IISS. *f* indicates *Jane's Armour and Artillery 2012* estimates 500 total in PLA service. *g* indicates *Jane's World Navies* lists 100. *h* indicates that *Jane's Armour and Artillery 2012* lists 500 total in PLA service. Numerical discrepancies may reflect numbers actually in PLAN service versus total numbers (including exports in some cases).

TABLE A6 Auxiliaries

Class	Manufacturer	Role	In service	Commissioned
Yuanwang 6	Jiangnan Shipyard	Space event support ship	1	2008
Yuanwang 5	Jiangnan Shipyard	Space event support ship	1	2007
Yuanwang 3	Jiangnan Shipyard	Space event support ship	1	1995
Type 851/851G/ NATO: Dongdiao 232	Qiuxin Shipyard	Intelligence ship	2	1999
Dadie (Type 814A)	Wuchang Shipyard	Intelligence ship	1	1986
Type 813/NATO: Xiangyanghong 21 (V350/ Nandiao 350)	Hudong-Zhonghua Shipyard	Intelligence ship	1	1983
[Unknown]	?	Survey ship	1	~2005
Haiyang 20	?	Research ship	1	~2005
Type 636A/ NATO: Kanjie/ Li Siguang 871	?	Research ship	1	1998
Dahua	Hudong-Zhonghua Shipyard	Survey and research ship	2–3	1997
Kan	Shanghai?	Survey and research ship	2	1985
Binhai	Niigata Engineering Company, Japan	Survey and research ship	1	1975
Ganzhu	Zhujiang	Survey and research ship	1	1975
Yenlai	Hudong-Zhonghua Shipyard	Survey and research ship	5	1970
Shuguang	?	Survey and research ship	1	?
Yanha	?	Icebreaker	3	1989
Yanbing (modified Yanha)	?	Icebreaker	1	1982

Table A6 continued.

Class	Manufacturer	Role	In service	Commissioned
Dachou	Wuzhou Shipyard	Torpedo recovery vessel	1	2006
Dongba	–	Twin-hull remote-controlled target barge (with cube reflectors to direct ASCMs)	2+	–
Daishandao (Type 920)	Guangzhou Shipyard International	Hospital ship	1	2008
Nankang	Guangzhou Shipyard International	Hospital/ medical transport ship (small)	1–4[a]	1991
Dalao (Type 926)	Guangzhou Shipyard International	Submarine rescue ship	1–3	2010
Dadong (Type 946A)	Hudong-Zhonghua Shipyard	Submarine rescue ship	1	1982
Dazhou (Type 946)	Guangzhou Shipyard	Submarine rescue ship	2	1977
Type 648	?	Submarine tender	1	1985
Dalang (Type 922 II/III)	Guangzhou/ Wuhan shipyards	Submarine salvage and rescue ship	4	1987
Dajiang (Type 925)	Jiangnan Shipyard	Submarine salvage and rescue ship	3	1976
Roslavl	China-built, Soviet design	Tug	19	Mid-1960s
Gromovoy	Luda Shipyard/ Shanghai International	Tug	17	1958
Daozha	?	Tug	1	1993
Hujiu	Wuhu	Tug	10	1980s
Tuzhong	Hudong-Zhonghua Shipyard	Tug	3	1980
Yannan	?	Sea-going buoy tender	7	1980

Table A6 continued.

Class	Manufacturer	Role	In service	Commissioned
Yanbai	?	Degaussing	5	?
Qiongsha	Guangzhou Shipyard	Troop transport	6	1980
Fuchi (Type 903)	Hudong-Zhonghua/ Huangpu shipyards	Replenishment ship	2	2004
Nanyun/ NATO: Fusu Qinghaihu (885)	Kherson Shipyard, Ukraine; outfitted at Dalian Shipyard	Replenishment ship	1	1996
Fuqing (Type 905)	Dalian Shipyard	Replenishment ship	2	1979
Fulin	Hudong-Zhonghua Shipyard	Replenishment ship	15+	~1972
Jinyou	Kanashashi Shipyard, Japan	Coastal tanker	3	1989
Guangzhou	?	Coastal tanker	5–8	1970
Leizhou	Qingdao/ Wudong	Coastal tanker	9	Late 1960s
[Unknown]	?	Supply tanker	4	?
Danyao (Type 904A)/Fuxianhu 888	Guangzhou Shipyard International	Supply ship	1	2007
Dayun (Type 904)	Hudong-Zhonghua Shipyard	Supply ship	2	1992
Yantai	?	Supply ship	3	1992
Dandao	?	Supply ship	7[b]	Late 1970s
Fuzhou	?	Supply ship	26–27[c]	1970

Table A6 continued.

Class	Manufacturer	Role	In service	Commissioned
Danlin	?	Supply ship	13[d]	1962
Shengli	Hudong-Zhonghua Shipyard	Auxiliary	2	1980
Hongqi	?	Auxiliary	6	?
Hull 88	–	Crew quarters ship (with ex-*Varyag*, Dalian)	1	–
Shichang	Qiuxin	Training ship	1	1997
Daxin (Type 795)	Qiuxin	Training ship	1	1987

SOURCE: IISS, *The Military Balance 2012*; and *Jane's World Navies*.

NOTE: *a* indicates that Nankang ships are extremely limited in capacity; perhaps only 1 is currently operational. *b* indicates that *Jane's* gives this value as 13. *c* indicates transport ships for liquid, consisting of 18 oil and 8–9 water. *d* indicates 7 oil transport ships and 6 refrigerated container ships for the South Sea Fleet.

TABLE A7 China's air power order of battle

Platform	Total in 2012	Total in 2015 (projected)	Total in 2020 (projected)
PLAAF			
Bombers	80	?	?
Fighters	~1,363	?	?
AWACs/ reconnaissance/ ELINT/EW/C2	~98	?	?
Transport/combat support/utility	~355	?	?
Tankers	~10	?	?
Trainers	~590	?	?
Helicopters	20–100[a]	?	?
Subtotal above aircraft	*~2,516–2,596*	*?*	*?*
PLAN aviation			
Land-based maritime-strike aircraft	~145	~255	~258
Carrier-based fighters	0	~60	~90
Helicopters	~34–100+[b]	~153	~157
Subtotal above aircraft	*~179–245+*	*~468 (+helicopters)*	*~505 (+helicopters)*

SOURCE: "Air Force, China," *Jane's World Air Forces,* June 10, 2012; O'Rourke, "China Naval Modernization," 33; for *a,* low estimate is drawn from "Air Force, China," and high estimate is from Dennis J. Blasko, "Chinese Helicopter Development: Missions, Roles, and Maritime Implications," in *Chinese Aerospace Power: Evolving Maritime Roles*, ed. Andrew S. Erickson and Lyle J. Goldstein (Annapolis: Naval Institute Press, 2011), 154; and, for *b*, low estimate is drawn from O'Rourke, "China Naval Modernization," and high estimate is from Blasko, "Chinese Helicopter Development," 154.

TABLE A8 PLAAF air-defense systems

Type	Role	Manufacturer	Launch platform	Range (km)	Payload (kg)	Guidance
S-300 PMU (SA-10C "Grumble")/ PMU-1 (SA-10D) /PMU-2 Favorit (SA-20 "Gargoyle")[a]	Surface-to-air missile (SAM)	Russian; some licensed production	–	–	–	–
HQ-9/-9A (B?)/FT-2000/2000A[b]	SAM	CASIC	–	90-120 (HQ-9)/100 (FT-2000)	130; HE fragmentation	Inertial with updates, semi-active radar (HQ-9)/ inertial/GPS, passive radar (FT-2000)
HQ-12A (KS-1A/-2/FT-2100)	SAM	–	Battery has a phased-array radar guidance station, four twin-missile launch vehicles on a HY 2220 six-by-six truck chassis, a communications vehicle, a command and control vehicle, and associated support vehicles	40 (HQ-12), 50 (HQ-12A)	100; HE blast/ fragmentation	Command; phased-array radar

SOURCE: "Air Force, China"; and *Jane's Strategic Weapon Systems.*

NOTE: *a* indicates that there are approximately eight PLAAF S-300 regiments, which may increase to twenty, with 30–48 missiles each. *b* indicates this is the active-guided version, which has reportedly been in service in small numbers since 2003.

TABLE A9 PLAAF fixed-wing aircraft

Type	Manufacturer	Role	In service	First delivery
H-6 (including -G/-H/-K/-M missile variants)	XAC	Bomber	82	1968
JH-7A	XAC	Fighter (ground attack/strike)	83[a]	2004
Q-5 "Fantan"	HAIC	Fighter (ground attack/strike)	120	1970
J-8H	SAC Shenyang	Fighter (interceptor/ air defense)	144	2002
J-8F	SAC Shenyang	Fighter (interceptor/ air defense)	80	2003
J-8D	SAC Shenyang	Fighter (interceptor/ air defense)	80?[b]	1990
J-8B	SAC Shenyang	Fighter (interceptor/ air defense)	90[c]	1988
Su-30MKK "Flanker"	Sukhoi, Russia	Fighter (multirole)	73	2000
J-11B/BS1[e]	SAC Shenyang	Fighter (multirole)	96	2004
J-11A (Chinese kit-assembled Su-27SK)	SAC Shenyang	Fighter (multirole)	96	2001
Su-27SK "Flanker-B"	Sukhoi, Russia	Fighter (multirole)	43	1992
J-10B	CAC	Fighter (multirole)	10	2009
J-10A/S	CAC	Fighter (multirole)	216	2001
J-7G	CAC	Fighter (multirole)	50	2003
J-7E	CAC	Fighter (multirole)	144	1993
J-7C	CAC	Fighter (multirole)	48	1985
J-7B	CAC	Fighter (multirole)	183	1980
KJ-2000 (A-50 "Mainstay"/ Il-76MD)	Beriev, Russia/ XAC-modified	Airborne early warning and control	4[d]	2004
Y-8W/KJ-200	SAC Shaanxi	Airborne early warning and control	5	2007
Y-8G	SAC Shaanxi	Reconnaissance/ surveillance	7	2007
JZ-8F	SAC Shenyang	Reconnaissance/ surveillance	24	?
JZ-8	SAC Shenyang	Reconnaissance/ surveillance	24	?

Table A9 continued.

Type	Manufacturer	Role	In service	First delivery
JZ-6	SAC Shenyang	Reconnaissance/ surveillance	48	1976
Y-8XZ	SAC Shaanxi	Electronic warfare	2	2007
Y-8CB	SAC Shaanxi	Electronic warfare	4	–
Tu-154M/D "Careless"	Tupolev, Russia	Electronic intelligence	4[g]	1998
Y-8T	SAC Shaanxi	Command/control	3	2007
737-300	Boeing, U.S.	C3I	2[f]	?
H-6U	XAC	Tanker	10[g, h]	1998
737-800	Boeing, U.S.	Transport	2[f]	2010
737-700	Boeing, U.S.	Transport	2[f]	2003
737-300	Boeing, U.S.	Transport	15[g, l]	1988
Il-76MD "Candid"	Ilyushin, Russia	Transport	14	1991
Tu-154M "Careless"	Tupolev, Russia	Transport	12[g, n]	1986
An-30 "Clank"	Antonov, Ukraine	Transport	8[j]	?
An-26 "Curl"	Antonov, Ukraine	Transport	12	?
An-24 "Coke"	Antonov, Ukraine	Transport	10	?
Y-7	XAC	Transport	41[h, o]	1984
Y-8	SAC Shaanxi	Transport (medium)	25[k, m]	1981
Y-12	HAI	Transport (light)	8	–
Y-11	HAI	Transport (light)	20	–
CRJ-700	Bombardier, Canada	Transport (passenger)	5	–
CRJ-200	Bombardier, Canada	Transport (passenger)	5	–
Challenger 870	Bombardier, Canada	Utility	5[f, g]	2005
Challenger 800	Bombardier, Canada	Utility	5[f, g]	1997
Y-5	SAIC	Utility	170[p]	1958
Su-27UB "Flanker-C"	Sukhoi, Russia	Trainer	32	1992
JL-9/FTC-2000	GAIC	Trainer	~12+?	–

Table A9 continued.

Type	Manufacturer	Role	In service	First delivery
JL-8 (Export designation: "Karakorum")	HAIC	Trainer	300	1998
An-30 "Clank"	Antonov, Ukraine	Trainer	6[j]	1975
JJ-7	GAIC	Trainer	50[q]	1985
JJ-6	SAC Shenyang	Trainer	100	1970
JJ-5	CAC	Trainer	?	1966
CJ-6/A	HAIC	Trainer	350[r]	1963

SOURCE: IISS, *The Military Balance 2012*; "Air Force, China"; and "Picture Gallery: J-11/11B/11BS," Chinese Military Aviation, website, May 28, 2012, http://cnair.top81.cn/gallery.htm#J-11.

NOTE: *a* indicates that the Chinese Military Aviation website offers no photos with JH-7 aircraft PLAAF BORT numbers. *b* indicates that the Chinese Military Aviation website lists 4 regiments but all were later upgraded to J-8H. *c* indicates that *The Military Balance 2012* lists only 24. *d* indicates that according to *Jane's*, these are not yet fully operational and a further 2 are required. *e* indicates that this is an indigenized Su-27 variant and that the total includes 1 development aircraft used for system trials. *f* indicates these are not yet fully operational and a further 2 are required. *g* indicates civil-registered. *h* indicates an undisclosed number of additional aircraft awaiting modification. *i* indicates that value includes some modified to HYJ-7 configuration for use in navigation and bomber training tasks. *j* indicates that *Jane's* lists the An-30 "Clank" as transport/survey and lists 6 of those in total. *k* indicates *The Military Balance 2012* lists 40+ Y-8s, but this appears to include some subcategories that *Jane's* breaks out separately. *Jane's* lists 2 Y-8s devoted to "combat support," and it is unclear whether this represents 2 additional airframes or different roles from transport. *l* indicates that *The Military Balance 2012* lists 10. *m* indicates that *The Military Balance 2012* lists a total of 9 B-737s (VIP) for light transport. *n* indicates that *Jane's* lists 5. *o* indicates that *Jane's* lists 50. *p* indicates that *Jane's* lists 200. *q* indicates that *Jane's* lists 100. *r* indicates that *The Military Balance 2012* lists 400.

TABLE A10 PLAN fixed-wing aviation

Type	Manufacturer	Role	In service	First delivery
H-6G	XAC	Bomber (missile variant)	30[b]	2005?
H-6D	XAC	Bomber (missile variant)	?[b]	1985
JH-7A	XAC	Strike fighter/ bomber	75[a]	2004
JH-7	XAC	Strike fighter/ bomber	50–65[a]	1998
Su-30 MKK2 "Flanker"	Sukhoi, Russia	Fighter (interceptor/ air defense)	24	2004
J-8 IV "Finback D"	SAC Shenyang	Fighter (interceptor/ air defense)	20[c]	1990
J-8 II "Finback B"	SAC Shenyang	Fighter (interceptor/ air defense)	20[c]	1990
J-8 I "Finback A"	SAC Shenyang	Fighter (interceptor/ air defense)	70[e]	1990
J-7 IV (J-7E)	CAC	Fighter (multirole)	24	1992
J-7 II (J-7B)	CAC	Fighter (multirole)	40	1971
J-11BH/BSH	SAC	Fighter (surface attack)	4+	–
J-10A/S	CAC	Fighter (multirole)	24	–
Q-5 "Fantan-A"	HAIC	Fighter (surface attack/strike)	35	1970
SH-5	HAIC	Maritime patrol/ antisubmarine (flying boat)	4	1986
H-5 (Il-28 Beagle)	HAIC	Antisubmarine	20[f]	?
Y-8JB	SAC Shaanxi	Electronic intelligence	4–5	2004
Y-8J/W	SAC Shaanxi	Airborne early warning and control	4	1998
HZ-5	?	ISR	7	?
H-6U	XAC	Tanker	3	1998
Yak-42D	Yakovlev, Russia	Transport	2[d]	1990

Table A10 continued.

Type	Manufacturer	Role	In service	First delivery
Y-8X "Cub"	SAC Shaanxi	Transport (medium)	4	1985
Y-7H	XAC	Transport (light)	6	–
Y-7	XAC	Transport (light)	4	1984
Y-5	–	Transport (light)	50	–
JL-9/FTC-2000	GAIC	Trainer	12+	–
JL-8 (Export designation: "Karakorum")	HAIC	Trainer	12	1998
JJ-7	GAIC	Trainer	4	1985
HY-7	?	Trainer	21	?
HJ-5	?	Trainer	5	?
CJ-6/6A	HAIC	Trainer	38	1963

SOURCE: IISS, *The Military Balance 2012*; and *Jane's World Navies*.

NOTE: *a* indicates deliveries ongoing. *b* indicates that the H-6D may be being replaced with the H-6G. *c* indicates that *The Military Balance 2012* lists 24 J-8F Finback and 24 J-8H Finback. *d* indicates civil-registered. *e* indicates that *Jane's* lists 29. *f* indicates that *Jane's* lists 30.

TABLE A11 PLAAF helicopters

Type	Manufacturer	Role	In service	First delivery
Zhi (Z)-9/SA-365 Dauphin (multiple variants)	HAI; French technology, licensed production	Light-utility twin-engine helicopter	20	1989
Z-8/SA-321 Super Frelon	CHAIG; French technology, licensed production	Multirole medium helicopter	10[a]	1977
AS-332 Super Puma	France (precursor to Z-8)	Multirole medium helicopter	6+	–
Mi-17V-5/7 "Hip"	Mil, Russia; Russian technology, limited local production	Multirole medium helicopter/ utility	20–50?	?
Mi-171	Mil, Russia	Transport (medium)	4+	–
Mi-8 Hip	Mil, Russia	Transport (medium)	50	–
Bell 214	Bell, U.S.	Transport (medium)	4	–

SOURCE: IISS, *The Military Balance 2012*; and *Jane's World Air Forces.*

NOTE: *a* indicates *The Military Balance 2012* lists 18+.

TABLE A12 PLAN helicopters

Type	Manufacturer	Role	In service	First delivery
Ka-31	Kamov, Russia	Airborne early warning	2–8+[d, e]	–
Zhi (Z)-8/ SA-321 Super Frelon	CHAIG; French technology, licensed production	Airborne early warning	1+[d]	–
Z-9/SA-365 Dauphin (multiple variants)	HAI; French technology, licensed production	Maritime/ antisubmarine	25[a]	1989
Z-8/SA-321 Super Frelon	CHAIG; French technology, licensed production	Maritime/ antisubmarine	40[b]	1977
Ka-28PL/PS "Helix-A"	Kamov, Russia	Maritime/ antisubmarine	15[c]	1999
Mi-17V-5/7/ Mi-8 "Hip"	Mil, Russia; Russian technology, limited local production	Transport	8	?

SOURCE: IISS, *The Military Balance 2012*; *Jane's World Navies* (low estimate); Blasko, "Chinese Helicopter Development," 154 (high estimate); "Russia Starts Ka-28 ASW Helicopter Deliveries to Chinese Navy," *Defence Professionals News*, October 9, 2009, http://www.defpro.com/news/details/10411/; Internet photos; and "Kamov Ka-31 Helix B," *Jane's Fighting Ships*, March 2, 2012.

NOTE: *a* indicates data from *Jane's* that only 11 are still in service. *b* indicates that *The Military Balance 2012* breaks this value down as: search and rescue, 2 Z-8S; heavy transports, 15 SA321 Super Frelon, 20 Z-8/Z-8A, and 3 Z-8JH. *c* indicates that *The Military Balance 2012* breaks this down as antisubmarine warfare, 13 Ka-28 Helix A; and airborne early warning, 2 Ka-31. *Jane's* lists up to 12 more awaiting delivery. *d* indicates value drawn from Internet photos. *e* indicates that China has ordered a total of 9 according to *Defence Professionals News*. *Jane's* states that 8 were delivered by 2011 and are now in service.

TABLE A13 Selected unmanned aerial vehicles (UAV)

Designation	Type	Manufacturer	Range/ endurance	Comments
COMBAT/SURVEILLANCE				
Harpy	Unmanned combat aerial vehicle (UCAV)	Israeli Aircraft Industries	250-km/hr speed, 3-km service ceiling, 400–500-km mission radius, 2-hr endurance	Israel supplied 100 in 2001; China may have reverse-engineered and produced additional units. Propeller-driven, 120–135 kg. Loiters until detects pre-programmed radar emission, dives directly at emitting radar antenna, destroys it with 32-kg explosive warhead.
Winglong/ Pterodactyl 1	UAV/medium-altitude, long-endurance (MALE)	?	5-km service ceiling, 20-hr endurance	Perhaps China's most-established indigenous UAV. Project launched May 2005; prototype displayed at 2008 Zhuhai Airshow; tested in 2008, weapons trials beginning 2009; cleared for export June 2009; redesigned significantly by 2010. 1,150-kg maximum takeoff weight, 200-kg payload; Ku-band sitcom antenna, 2 HJ-10 (ADK-10) 50-kg laser-guided anti-tank missiles. 100-hp reciprocating engine.
CH-3/PW-3	UCAV	China Aerospace Science and Technology Corp (CASC)	5-km service ceiling, 2,398-km range, 12-hr endurance	In production. Approved for export; potential competitor of Winglong/ Pterodactyl 1. Unveiled at 2008 Zhuhai Airshow; foreign order reported October 2009. Optimized for low-to-medium close air support missions. S-band data link. 60-kg max payload; 2 AR-1 semi-active-laser-guided missiles. Propeller-driven, reciprocating piston engine.
WJ-600 (turbojet) /600A (turbofan)	UAV/MALE	China Aerospace Science and Industry Corp (CASIC)	600-km/hr max speed, 10-km service ceiling, 6-hr endurance	Delivered to PLAAF. First displayed at 2010 Zhuhai Airshow. High-speed ISR and strike missions: optical reconnaissance, SAR, electronic warfare, and target simulation payload options. 2 KD-2/TB1 air-to-surface missiles, ZD1 laser-guided bomb. Jet-engined, unlike most other Chinese UAVs.

Table A13 continued.

Designation	Type	Manufacturer	Range/endurance	Comments
COMBAT/SURVEILLANCE				
ASN-209 tactical UAV system	UAV/medium-altitude, medium-endurance (MAME)	Xian Northwest Polytechnic University ASN Technology Group Company (Xian ASN)	180-km/hr max speed, 5-km service ceiling, 10-hr endurance	Xian's leading tactical UAV, one of the few that is armed. ASN series includes more than a dozen designs, at least seven of which have been approved; some of these have been produced in small numbers. Marketed by China National Aero-Technology Import & Export Corp; civil and military applications. 320-kg military payloads (up to 50 kg): SAR, electrooptical (EO), multifunction, ground moving target indication (GMTI), electronic intelligence (ELINT), electronic warfare (EW), ground target designation (GTD), communications relay. Propeller-driven, piston engine. Guidance and control likely autonomous. Parachute recovery, skid landing.
ASN-229A reconnaissance and precise-attack UAV	UAV	Xian ASN	180-km/hr max speed, 8-km operating altitude, 10-km service ceiling, 1,998-km operational radius, 20-hr endurance	Possible service entry ~2011. Single piston-engine. Tactical, reconnaissance payload: combined EO/infrared (IR)/laser rangefinder/designator. SATCOM datalink. Mini precision-guided weapon.
"Luoyang UCAV"	UCAV	Guizhou Aircraft Corporation Industry (GAIC)/ Luoyang Optoelectro Technology Development Center (LOEC)	?	Likely based on WZ-9/WZ-2000; turbofan powered; unveiled in 2008. Similar in size to U.S. Predator-2. Armed with TY-90 air-to-air missile (AAM) and AR-1 air-to-surface missile (ASM). LOEC developing wide range of UAV weapons. Home to LOEC and AVIC's 613 Research Institute, Luoyang is China's military electrooptical sensor payloads center.

Table A13 continued.

Designation	Type	Manufacturer	Range/endurance	Comments
		COMBAT/SURVEILLANCE		
J-6	UCAV	Shenyang Aircraft Corp (SAC)	640-km radius with 2 drop tanks	Converted from J-6 fighters; about 200 reportedly in service in 2008.
		SURVEILLANCE		
Changhong 1/ WZ-5/A	UAV/high-altitude, long-endurance (HALE)	Beijing University of Aeronautics & Astronautics (BUAA)	800-km/hr max speed, 17.5-km operating altitude, 2,500-km range, 3-hr endurance	Production finished; still in PLA, civil agency service. Offered for export from 2000 onward, no sales reported. Airframe based largely on Northrop Grumman BQM-34A Firebee aerial target, overall design based on Teledyne Ryan Model 147H (AQM-34N) shot down over China before 1972. Development began in 1969, entered service for training/tactical reconnaissance in 1981. Updated in the late 1990s with digital flight control/management system and an inertial navigation system with embedded GPS. 1,700-kg (65-kg payload). 8.35 kN BUAA WP11 turbojet. Launched by Y-8E aircraft, preprogrammed flight plan, recovered mid-air during parachute descent.
ASN-207	UAV/MAME	Xian ASN	Parameters similar to/ possibly greater than ASN-206	Improved version of ASN-206. Market-ready, possibly already in PLA service. Leads unarmed reconnaissance portion of Xian's extensive ASN series. 250–480 kg.
ASN-206	UAV/short-range, multirole	Xian ASN	209-km/hr max speed, 5-km service ceiling, 150-km range, 8-hr endurance	In PLA service. Capable of conducting ISR and EW and countermeasures with various optical/laser instruments, imagery downlink. 222 kg 7.3 kW SAEC (Zhuzhou) HS-700 four-cylinder two-stroke engine. Launched via booster rocket, parachute recovery. Operating in tandem with similar UAV performing relay function extends max speed to 180 km/hr, service ceiling to 8 km, range to 600 km, endurance to 16 hr.
ASN-104/ -105B	UAV (extended range) light		2-hr endurance	In PLA service. 2 hrs or more of real-time reconnaissance. Single Xian 4-cylinder 2-stroke engine.

Table A13 continued.

Designation	Type	Manufacturer	Range/endurance	Comments
SURVEILLANCE				
W-30/50	UAV	Nanjing Research Institute on Simulation Technique	–	Reportedly in PLA service. Video camera with real-time telemetry/imagery downlink. 2-stroke engine.
PW-1/2	UAV	Nanjing Research Institute on Simulation Technique	–	PW-1 reportedly in PLA service; PW-2's status unknown. Video camera with real-time telemetry/imagery downlink. 2-stroke engine.
WZ-9 (WZ-2000)	UAV/MALE	GAIC	–	Unveiled at 2000 Zhuhai Airshow, updated version revealed 2002. Twin turbojet-powered. Visually similar to General Atomics' Predator. Possibly technology demonstrator, apparent flight testing.
BZK-005 Heavy UAV		BUAA	219-km/hr max speed, 8-km service ceiling, 40-hr endurance	Apparently began development in 2005, first seen in video at 2006 Zhuhai Airshow; present status uncertain. 1,250 kg; 150-kg payload includes EO/IR capabilities, with real-time data transmission, apparent SATCOM antenna. Piston engine, propeller-driven.

Table A13 continued.

Designation	Type	Manufacturer	Range/endurance	Comments
VERTICAL TAKEOFF AND LANDING UNMANNED AERIAL VEHICLE (VTUAV)				
Yotaisc X200	VTUAV/ rotary wing	–	150-km cruise speed, 220-km/hr max speed, 5-km service ceiling, 5-hr endurance	Undergoing flight tests, ready to field September 2012. Multiple units reportedly sold to military customer for land-based operations. Autonomous. Coaxial main rotor configuration, rotor diameter 3.2 m, 3.16-m height, and 1.76-m length. Standard aviation-fuel powerplant.
Yotaisc X200S	VTUAV/ rotary wing	–	–	Maritime variant of X200, more powerful diesel engine. May be fielded in 2013.

SOURCE: Data derived from *Jane's Unmanned Aerial Vehicles and Targets*; and Robert Hewson, "Unmanned Dragons: China's UAV Aims and Achievements," *International Defence Review, Jane's*, January 23, 2012.

NOTE: Given the recent profusion of display items and photos from multiple enterprises and universities, it is particularly difficult to determine the actual status and characteristics of specific systems. The data in this table is, therefore, notional and must be interpreted with caution. Unless otherwise specified, all figures represent maximum operational parameters.