

China's Military Modernization: The Implications of U.S. Security
And the East Asian Security Order

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Since the end of World War II, the United States has enjoyed near complete maritime dominance and absolute maritime security in the western Pacific Ocean and the South China Sea. Both the post-World War II and the post-Cold War East Asian strategic orders reflected U.S. maritime dominance and that contributed to enduring stability in East Asia's maritime regions. Where the United States enjoyed supremacy in East Asia, there was a "hegemonic peace;" on mainland East Asia, however, where France, the United States and the Soviet Union each contested in succession with Chinese power, there were multiple protracted wars.

After thirty years of economic growth, technological development, and significant increases in defense spending, the modernization of Chinese military capabilities suggests that the era of unqualified U.S. naval security may be coming to a close. If China can significantly challenge U.S. maritime dominance, there will be profound implications not only for U.S. security and U.S.-China relations, but also for the security of the smaller states of East Asia, the U.S. alliance system in East Asia, and the East Asian strategic order.

The potential challenge to U.S. security and regional stability will not simply reflect the development of the Chinese Navy. U.S. strategic presence in East Asia reflects American forward-based naval presence. But China's territorial presence in East Asia allows it to influence maritime affairs with a full array of military capabilities, so that the most significant Chinese maritime assets may not reflect Chinese naval modernization. In this respect, it can be misleading to focus on China's naval capabilities as the source of Chinese influence in maritime East Asia and of the emerging challenge to the regional security order. Rather, the focus must be on China's maritime projection capabilities, which can encompass not only China's improving naval capabilities, but also Chinese improving land-based capabilities that can challenge U.S. maritime supremacy and the post-World War II maritime strategic order.

This paper addresses China's improving military ability to challenge the contemporary maritime strategic order. It focuses on the challenge posed by China's sub-surface ships, its surface ships, and its increasingly important land-based capabilities. It analyzes the implications of those Chinese capabilities that already challenge U.S. maritime dominance and potentially important weapon systems that still face significant technological obstacles. This paper also addresses how the United States has responded to China's improving military capabilities to minimize the effect of those capabilities on U.S. maritime security and the regional maritime order. The paper concludes with a discussion of the implications of China's improving capabilities for the U.S.-China balance and regional stability.

CHINA IMPROVING MARITIME CAPABILITIES

China's emerging maritime power depends on three distinct capabilities. Its sub-surface ships, surface ships, and land-based capabilities combine to suggest a developing capability that can challenge the maritime status quo.

China's Capable Submarine Fleet

In the aftermath of the Cold War and post-Tiananmen U.S. termination of military technology transfers to China in 1989, Beijing turned to the Russia for access to advanced military technologies. In 1994 Beijing reached agreement with Moscow for China to purchase four Kilo-class diesel submarines and then in 2002 it contracted to purchase an additional eight kilo-class submarines. These acquisitions indicated that Beijing's maritime priority would be on submarine development, rather than on surface-ship acquisitions. During this same period, China agreed to purchase only four Russian Sovremenny-class destroyers, even though the destroyers' came equipped with the capable Russia SS-N-22/Sunburn (R-270 Moskit) anti-ship cruise missile.¹ The Chinese military understood that the U.S. Navy's superior reconnaissance and munitions capabilities and the limited range of the Sunburn missile combined to limit the ship's ability to move within range to attack U.S. ships and to make Chinese surface ships vulnerable to attack by U.S. forces. Russia's quiet diesel submarines were more suited to the challenge to Chinese security posed by the superior U.S. Navy

China's focus on developing its sub-surface warfare capabilities posed a challenge to U.S. naval operations in the western Pacific Ocean. By the first few years of the twenty-first century, U.S. naval operations within 200 miles of the Chinese coast could no longer ignore Chinese capabilities. China's submarine force had now "complicated" U.S. naval operations. To minimize its vulnerability to Chinese capabilities, the U.S. Navy had to plan more circuitous and longer routes for a carrier strike force to gain access to the western Pacific Ocean, in particular to the Taiwan theater, during a conflict with China. Moreover, China's acquisition of Russian Kilo-class submarines enabled China to develop the expertise to manufacture its own advanced diesel submarines. In 2001 China's first Song-class submarine entered China's naval service. Then in 2010 China launched an improved version of the Song, the Yuan-class diesel submarine. The Yuan-class may be equipped with an air-independent propulsion (AIP) system, enabling extended-duration underwater operations and thus greater ability to avoid detection. These improved capabilities as well as improved training have allowed Chinese submarines to operate increasingly farther from the Chinese coast and to carry out increasingly sophisticated operations.²

¹ For a recent discussion of China's inventory of naval ships, see Ronald O'Rourke, China Naval Modernization: Implications for U.S. Naval Capabilities – Background and Issues for Congress, Congressional Research Service, Report for Congress, RL33153 (updated July 22, 2011). On China's acquisition of Russian ships and its development of indigenous technologies, see Bernard D. Cole, The Great Wall at Sea, sec. ed. (Annapolis: Naval Institute Press, 2010), chapter 5.

² The *Song* is discussed in Lyle Goldstein and William Murray, "Undersea Dragons: China's Maturing Submarine Force," International Security, vol. 28, no. 4 (Spring 2004); William S. Murray, "An Overview of the PLAN

The expansion of PLA Navy's diesel submarine force marked a significant improvement in China's naval capabilities and in the development of its anti-access capability in its coastal waters. China's submarines have challenged unimpeded U.S. naval operations in the western Pacific Ocean and undermined U.S. ability to engage the PLA Navy operating in the Taiwan Strait and to protect Taiwan from the mainland's coastal water ships and aircraft.

Nonetheless, China's existing submarine force has not fundamentally challenged the survival of the U.S. surface fleet or U.S. maritime supremacy and it has not significantly altered the U.S.-China regional balance. First, diesel submarines are intrinsically slow so that Chinese submarines would have difficulty in engaging U.S. ships in a carrier strike force. AIP cannot mitigate this weakness.³ Second, Chinese torpedoes have a very short range, approximately 20 nautical miles. Before Chinese submarines could engage a U.S. ship, it would become vulnerable to U.S. anti-submarine warfare (ASW) capabilities.⁴ Third, although China's diesel submarines are quiet, the U.S. Navy has improved its ability to identify and carry out surveillance of Chinese submarines. Finally, China coastal waters are encircled by a dense island chain from the Korean Peninsula to the Philippines that facilitates U.S. tracking of Chinese submarines as they enter the western Pacific Ocean and that contributes to U.S. anti-submarine warfare capabilities.⁵

Moreover, Chinese submarine capabilities cannot challenge the U.S. alliance system in East Asia. Because China's submarines possess only a limited ability to threaten directly the territorial security of other countries, they do not contribute to the PLA's maritime power-projection capability and coercive power against local powers and thus they do not enable China to challenge the strategic alignments between the United States and its maritime security partners or the East Asian security order.⁶

In apparent recognition of the intrinsic limitations of its submarine force and their torpedoes, in recent years China has begun to equip its submarines with anti-ship cruise missiles (ASCM). In 2007 the last Kilo-class submarine delivered to China was equipped with the Russian SS-N-27B ASCM. The U.S. Department of Defense reports that China has developed its own ASCM and that the missile will be deployed on both the Song and Yuan class submarines.⁷ Although China's submarines will have to surface prior to launching the ASCM,

Submarine Force," in Andrew S. Erickson, Lyle Goldstein and William Murray, eds., *China's Future Nuclear Submarine Force* (Annapolis: Naval Institute Press, 2007) Cole, *The Great Wall at Sea*, pp. 95-97.

³ William S. Murray, "Underwater TELS: PLAN Submarine Transformation," forthcoming in Andrew S. Erickson, ed., *China's Strategy for the Near Seas* (forthcoming, Naval Institute Press, 2012), p. 4.

⁴ Murray, "Underwater TELS," p. 2; Cole, *Great Wall at Sea*, p. 98.

⁵ Toshi Yoshihara and James Holmes, "Can China Defend a 'Core Interest' in the South China Sea?," *Washington Quarterly*, vol. 34, no. 2 (Spring 2011); Owen R. Cote, Jr., "Assessing the Undersea Balance," SSP Working Paper WP11-1, Massachusetts Institute of Technology, pp. 12-14, at http://web.mit.edu/ssp/publications/working_papers/Undersea%20Balance%20WP11-1.pdf; Mark Cozad, "China's Regional Power Projection: Prospects For Future Missions in the South and East China Seas," in Roy D. Kamphausen, David Lai and Andrew Scobell, eds., *Beyond the Strait: PLA Missions Other Than Taiwan* (Carlisle, PA: Strategic Studies Institute, US Army War College 2009), p. 300.

⁶ Cozad, "China's Regional Power Projection," p. 292-293.

⁷ U.S. Department of Defense, *Annual Report To Congress: Military and Security Developments Involving the People's Republic of China, 2011*, (Washington, D.C.: U.S. Department of Defense, 2011), pp. 2-4, 29-30, at http://www.defense.gov/pubs/pdfs/2011_CMPR_Final.pdf.

the greater range of the missiles compared to Chinese torpedoes will enable the submarines to achieve greater surprise and possess greater security from U.S. naval forces, thus enabling them to pose a greater challenge to U.S. operations in the western Pacific Ocean.

China's Surface Fleet

China's limited purchase of the Russian Sovremenny-class destroyer reflected its understanding of the vulnerability to U.S. naval forces of surface ships equipped with limited-range munitions and with steam turbine engines that limit their acceleration and operational maneuverability. China's subsequent development of its own destroyers, including the Luhai-class and Luyang class, suffered from similar limitations. Overall, China's surfaced fleet has thus far played a marginal role on constraining U.S. naval operations anywhere in the Western Pacific.

In August 2011 China launched its first aircraft carrier, the ex-Russian Varyag, which was sold to China in 1998. China's first aircraft carrier suffers from many of the same limitations as its destroyers. It is propelled by a steam turbine engine, which limits its maneuverability and its ability to remain at sea for an extended period. In addition, developing the aircraft for the carrier will be a challenge. China's remains unable to manufacture advanced turbo engines and it must import its aircraft engines from the Soviet Union.⁸ China's J-15 carrier aircraft remains a project, not a capability, and even should it become a capability it may well be dependent on Russian engines and spare parts. And merely leaning to operate aircraft from the carrier in all-weather conditions will be a long-term challenge. Management of the carrier and its support vessels will also challenge the PLA Navy's operational abilities. Moreover, as a "small" 55,000 ton "ski-jump" aircraft carrier, China's first carrier will be able to deploy relatively few aircraft and only aircraft that operate with a minimal munitions payload. Thus, not even the deployment of the Chinese aircraft carrier can contribute to the ability of the Chinese surface fleet to challenge U.S. maritime security. On the contrary, many observers argue that the Chinese aircraft carrier will simply become just one more surface-ship target for the U.S. Navy. Even a Chinese fleet of three carriers would do little to change PRC capabilities, except insofar as it diverts funds from more effective PLA Navy programs.⁹

But just as China is now configuring its many submarines to deploy ASCMs, it is also configuring nearly its entire surface fleet with ASCM launchers. William Murray of the U.S. Naval War College writes that nearly every PLA Navy surface ship carries ASCMs, including the Luyang II-class destroyer (sometimes referred to as the Luzhou-class), the Russian Sovremenny-class destroyer, and the new Houbai-class fast-attack catamarans. The range of China's ASCMs ranges from 97 nautical miles to 151 nautical miles.¹⁰ The combination of the quantity of China's surface ships and the range of the cruise missiles may compensate for the

⁸ Evan S. Madeiros, et. al., *A New Direction for China's Defense Industry* (Santa Monica, CA: Rand Corporation, 2005), chap. 4.

⁹ Robert S. Ross, "China's Naval Nationalism: Sources, Prospects, and the American Response," *International Security*, vol. 34, no. 2 (Fall 2009).

¹⁰ Murray, "Underwater TELS." Also see Office Of Naval Intelligence, U.S. Department of Defense, *The People's Liberation Army Navy: A Modern Navy with Chinese Characteristics* (Washington, D.C.: U.S. Department of Defense, 2009), pp. 18-20, at <http://www.fas.org/irp/agency/oni/pla-navy.pdf>; Cole, *Great Wall at Sea*, p. 112.

PLA Navy's limited ASW capability and augment its limited submarine capability and thus significantly expand the PLA Navy's ability to deploy a survivable naval attack force that can challenge the security of the U.S. Navy operating in the Western Pacific Ocean. Rather than try to develop a traditional carrier-centered surface fleet to contend with U.S. naval power in East Asia, China is relying on its development of sea-based missile platforms.

The PLA Navy's acquisition of a substantial number of submarines and surface ships equipped with ASCMs may enable it develop over the next decade the capability to move beyond a coastal anti-access capability that can defend China's coastal waters in a Taiwan contingency. As China's navy continues to develop advanced technologies and training, it may develop a distant-water capability that could challenge the security of U.S. naval operations in the South China Sea and the Indian Ocean.

China's Land-Based Maritime Capabilities

In the early post-Cold War era, China's development of an anti-access capability relied not only on Russian submarines but also on the development of land-based coastal capabilities that could challenge U.S. naval ships operating in China's immediate coastal waters. This coastal capability depended on the acquisition of Russian missiles and aircraft.

In 1991 China contracted to purchase from Russia its first batch of S-300 and SA-10 surface-to air missiles (SAM). By 2005 China had taken delivery of nearly 1,500 Russian surface-to-air missiles, and from 2005 to 2009 it had ordered more than 1,000 additional missiles. China is now manufacturing its own S-300 missiles. These missiles are deployed to protect China's major cities and communication nodes and they are deployed along the Chinese coast across from Taiwan. The extended range of the S-300 can defend the airspace up to 120 miles from the Chinese coast.¹¹

Chinese military aircraft also contribute to China's anti-access capability. Since the early 1990s China has purchased Russian Su-27 and Su-30 military aircraft. By the 2008 it had possessed approximately 170 such advanced aircraft, most of which have been deployed in proximity to the Taiwan Strait. China is now producing the J-11, its own version of the Su-30, using Russian jet engines and other advanced Russian technologies

China's land-based air capabilities have transformed the air-defense environment in China's coastal waters and the U.S.-China force-on-force balance in the Taiwan theater. China's large quantity of highly capable long-range SAMs mobile have made it increasingly risky for U.S. aircraft, including carrier-based F-18s and F-22s operating from Japan and Guam, to operate over the Taiwan Strait and elsewhere within 100 miles of the Chinese coast.¹²

¹¹ Roger Cliff, "Chinese Military Aviation Capabilities, Doctrine, and Missions," and Garth Hekler, "Chinese Early Warning Aircraft, Electronic Warfare, and Maritime C4ISR," in Andrew S. Erickson and Lyle J. Goldstein, Chinese Aerospace Power: Evolving Maritime Roles (Annapolis: Naval Institute Press, 2011), pp. 138; 247; Bernard D. Cole, "China's Growing Maritime Power: Implications for the United States," in in Mark Mohr, ed., The Chinese Liberation Army: Should the United States Be Worried (Washington, D.C.: Asia Program, Woodrow Wilson Center, 2006); Michael McDevitt, "The PLA's Anti-Access Role in a Taiwan Contingency," paper prepared for the 2007 International Conference on PLA Affairs, Taipei, Taiwan.

¹² For a discussion of the survivability of China's SAM batteries, see Alan Vick, et. al., Aerospace Operations Against Elusive Ground Targets (Santa Monica, CA: RAND, 2001)

China also transformed the maritime theater in the vicinity of Taiwan by deploying land-based short-range and medium-range conventional ballistic missiles against Taiwan. By the first years of the twenty-first century it had deployed over 500 ballistic missiles against Taiwan; by the end of the decade it had deployed over 1,000 such missiles against Taiwan. In so doing, China has used its land-based capabilities to degrade the capabilities of U.S. forward naval presence and to transform the Taiwan naval theater. Because Chinese missiles cannot be defended against by either Taiwan or U.S. capabilities, including missile defense systems, Chinese missiles have provided the PLA with capabilities to project coercive power in the Taiwan Strait and across the strait onto Taiwan.¹³

The combination of Chinese land-based air-defense missiles, advanced land-based aircraft, and ballistic missiles deployed on China's coast on the Taiwan Strait, as well its submarine force, fundamentally altered the strategic environment in the Taiwan Strait. China's modern air defense system has degraded the ability of the U.S. Air Force to protect Taiwan from Chinese aircraft and ships operating in the Taiwan Strait and the U.S. military could not prevent Chinese missiles from penetrating Taiwan's airspace and destroying high-value Taiwan targets. U.S. air and naval power could still *deter* mainland use of force against Taiwan, but it could no longer *defend* Taiwan from the cost of war with the PRC.

This weakening of U.S. ability to defend Taiwan had a transformative effect on Taiwan's mainland policy. Faced with growing dependency of its security, as well as its economic prosperity, on mainland forbearance and the corresponding development of Chinese coercive military power, Taiwan opted to cooperate with the mainland. In 2008 Taiwan's voters elected Ma Ying-jeou as president. Ma opposed the Taiwan independence movement and advocated closer economic and political cooperation with the mainland. Taiwan's leaders have also increasingly recognized the futility of providing for Taiwan's defense with a large defense budget and with expensive high-technology platforms purchased from the United States.¹⁴ These trends in Taiwan's mainland policy have had implications for U.S.-Taiwan defense cooperation and for U.S. expectations of the reliability of future U.S.-Taiwan security relations.

But it is misleading to equate the rise of Chinese military power in the Taiwan theater with an emergent transformation of the U.S.-China balance in East Asia. In recognition of the secondary strategic importance of Taiwan in 1949 the United States ceded Chinese control over Taiwan. It only reversed course in June 1950 following the beginning of the Korean War, when the U.S. was waging war against communism and was concerned for its region-wide credibility to resist communist use of force. The contemporary peaceful transformation of the Taiwan defense environment does not challenge U.S. credibility, U.S. ability to protect its regional security interests or the East Asian security order. In many respects, the Taiwan theater is the least important maritime theater in East Asia.

¹³ Robert S. Ross, "Taiwan's Fading Independence Movement," *Foreign Affairs*, vol. 85, no. 1 (March-April 2006).

¹⁴ Republic of China Ministry of National Defense, *National Defense Report 2011*, (July 2011,) at http://www.mnd.gov.tw/2011mndreport/en/pdf/100report_english.pdf; Fu S. Mei, "Taiwan's Defense White Paper Shows New Candor on Challenges Ahead Publication," *China Brief*, vol. 11, no. 16, at [http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews\[tt_news\]=38360&tx_ttnews\[backPid\]=25&cHash=2cb0380d3e0301fadcea86b1d132de95](http://www.jamestown.org/programs/chinabrief/single/?tx_ttnews[tt_news]=38360&tx_ttnews[backPid]=25&cHash=2cb0380d3e0301fadcea86b1d132de95); William S. Murray, "Revisiting Taiwan's Defense Strategy," *Naval War College Review*, vol. 61, no. 3 (Summer 2008), at <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA519356&Location=U2&doc=GetTRDoc.pdf>.

More important, China's land-based capabilities in the Taiwan theater are contingency-specific. They do not yield China defensive or coercive maritime capabilities that extend beyond the Taiwan theater to challenge U.S. naval dominance or its strategic partnerships that are the foundation of region-wide security order. Its land-based SAMs cannot expand its air defense capabilities beyond a coastal anti-access capability. The Chinese Air Force has yet to develop aircraft that contend for air superiority with U.S. aircraft. The J-11 is a Chinese version of the Su-27/Su-30 and it remains dependent on Russian technologies. The J-20 "stealth" aircraft remains a program rather than a capability. China's jet engine industry continues to confront technological obstacles. And even should China develop advanced aircraft, the limited range of such aircraft will limit their impact on the maritime regional order. China will require an extensive system of overseas airbases before it can rely on land-based military aircraft to affect U.S. naval capabilities; it will need to develop capabilities to project power into distant waters to affect region-wide U.S. maritime superiority and the security of U.S. allies. This will require different capabilities than those that China has used to reshape the Taiwan theater.

China is now developing new missile systems that may affect U.S. capabilities in maritime theaters. China's anti-ship ballistic missile (ASBM) program is designed around the DF-21D, a medium-range mobile ballistic missile. The DF-21D has a range of 800 nautical miles and it may be developed with a range approaching 1,500 nautical miles. A land-based ballistic missile that could reliably target U.S. surface ships, especially U.S. aircraft carriers, would enable the PLA to transform the maritime balance, not only because it would enable China to inflict high costs on the U.S. Navy but also because the ASBM could neutralize U.S. maritime air assets and thus improve the PLA Navy's ability to operate securely in distant waters and challenge the security of smaller states without the support of Chinese carrier-based aircraft.¹⁵ Moreover, because it is based on land, the ASBM would be a relative secure platform. Unlike U.S. air attacks against radar systems in Iraq in 2003 and Libya in 2011, U.S. targeting of Chinese interior radar installations with conventional munitions would entail considerable risk of significant escalation, so that the United States would likely be deterred from attacking China's ASBM sites.

The ASBM has received considerable media attention, but perhaps more significant for the maritime balance is China's development of conventional intermediate range ballistic missiles that can target distant fixed assets. Such systems are far less technologically challenging than the ASBM but can have significant political and strategic consequences. China is developing missiles that can target U.S. air and naval facilities in Japan, Singapore, and Guam. This capability could enable China to degrade U.S. forward presence and its wartime naval operations.¹⁶ This capability could also affect U.S. political relations with its regional security partners. Just as Chinese short-range and medium-range ballistic missiles undermined Taiwan's security by diminishing U.S. ability to defend Taiwan and thus re-shaped Taiwan's mainland policy, Chinese conventional intermediate-range ballistic missiles could have a similar coercive

¹⁵ Andrew S. Erickson and David D. Yang, "Using the Land to Control the Sea?," *Naval War College Review*, vol. 62, no. 4 (Autumn 2009).

¹⁶ For discussion of the capability for U.S. naval basing in Japan, see Toshi Yoshihara, "Chinese Missile Strategy and the U.S. naval presence in Japan: the Operational View from Beijing," *naval war College Review*, vol. 63, no. 3 (Summer 2010).

effect on U.S. security partners elsewhere in East Asia and could thus erode U.S. peace-time strategic presence maritime East Asia and contribute to instability in the regional security order.

OBSTACLES TO CHINA'S DEVELOPMENT OF MARITIME CAPABILITIES

China has made considerable progress toward developing capabilities that could challenge U.S. naval dominance. Nonetheless, China has yet to develop an operational capability that yields its sufficient relative gains to transform the regional maritime balance and the U.S. alliance system in maritime East Asia. It faces obstacles from both technological challenges and from U.S. counter-measures.

Limits to China's Technological Development

Rather than compete with the United States by developing a modern naval fleet that could challenge the U.S. Navy, China has focused its resources on developing the missile as the one military platform that can effectively challenge U.S. maritime supremacy. Given China's level of technological and organizational sophistication, this is a sensible policy. First, missiles rely on a narrow and accessible technology that can contribute to effective military capabilities against any adversary, in contrast to the multiple technologies that must be developed and integrated to enable development of sophisticated naval power. Second, effective operation of missiles requires far less organizational and managerial sophistication than the organizational and managerial sophistication required to deploy effectively a naval fleet. Third, missiles are far less expensive than ships. Despite the growth of the Chinese GDP since 1978 and the corresponding significant growth of the Chinese defense budget, given the size of the Chinese ground force army and the many domestic and national security missions that China's PLA must prepare for, cost is not an insignificant consideration for the PLA.

Nonetheless, China still faces many significant technological obstacles before it can be confident that its sea-based and land-based missile forces can effectively contend with U.S. naval capabilities. The most difficult challenge remains the targeting of a moving object in a large ocean, in which there are many moving objects. China's long-range surveillance system depends on over-the-horizon (OTH) radar systems. Yet OTH radar systems possess intrinsic accuracy limitations associated with the technology and the operating environment. A surveillance system for both ballistic missiles and sea-based anti-ship cruise missiles that can reliably target moving objects at sea will depend on a dense system of low earth orbit surveillance satellites. China has deployed very few of these satellites.¹⁷

China has made considerable progress toward developing an ASBM system. It has tested the missile on land and it has developed various surveillance technologies.¹⁸ Nonetheless, it is not clear that China will develop the necessary integrated system of multiple technologies that

¹⁷ Cote, "Assessing the Undersea Balance Between the U.S. and China," pp. 16, 14, 23-24.

¹⁸ Eric Hagt and Matthew Durnin, "China's Antiship Ballistic Missile: Developments and Missing Links," Naval War College Review, vol. 62, no. 4 (Autumn 2009); O'Rourke, China Naval Modernization: Implications for U.S. Naval Capabilities, pp. 9-16.

will enable deployment of a reliable system that can yield the PLA operational capabilities that can fundamentally affect U.S. naval operations.

Similar technological obstacles also impede China's development of an ASCM naval force. Before Chinese submarines and surface ships can fully operationalize a ship-based ASCM system that can target a U.S. aircraft carrier, for example, Chinese ships must first be able to locate the carrier and communicate its location to the ship. OTH radar systems are just as inadequate for long-range targeting for ship-based ASCMs operating as they are for land-based ASBMs. Moreover, real-time communication of targeting information to submerged submarines remains a challenge.

U.S. Counter-Measures and the Maritime Balance

China is rapidly developing land and naval capabilities that will increasingly complicate U.S. naval operations. This trend is inevitable and it will continue. But even should China master the many complex technologies and systems necessary to operate an effective anti-ship missile capability, there is no "magic bullet" that can fundamentally over-turn the maritime balance in East Asia. This is because even as China develops its own advanced military technologies, the United States is devising counter-measures and it continues to modernize its own advanced military capabilities.

The United States possesses various options to degrade China's surveillance systems. Existing camouflage/obscurants and electronic warfare capabilities can interfere with advanced surveillance technologies that support Chinese land-based and sea-based missile systems.¹⁹ Moreover, the irony of China's development of advanced military technologies is that the resulting capabilities make China's military vulnerable to the same non-kinetic "asymmetric" measures that China could presumably use against the superior U.S. military. Advanced surveillance technologies that enable location of ships at sea and missile targeting are vulnerable to U.S. cyber warfare technologies and anti-satellite capabilities. Thus, the United States could degrade much of China's ability to target U.S. naval assets without having to physically attack Chinese territory. Assuming the "worst-case" of mutual blinding of surveillance and targeting capabilities, the superiority of U.S. air and naval platforms would enable the United States to retain maritime supremacy and significant naval operational freedom.²⁰

But the advent of new technologies that jeopardize the survivability of large surface ships also requires the United States to transition to less vulnerable maritime platforms.²¹ The United States has already begun this process with the development of next-generation naval platforms. United States deployed its first nuclear-powered cruise missile submarine (SSGN) in 2007 and in June 2010 it simultaneously deployed four SSGNs in the Pacific Ocean. Each SSGN can carry 154 Tomahawk cruise missiles and special operations forces. The United States is also developing sophisticated unmanned aerial vehicles (UAVs). It is developing the Unmanned Combat Air System (UCAS) for deployment on surface ships. The UCAS will enable

¹⁹ On obscurants, see Thomas J. Culora, "The Strategic Implications of Obscurants: History and the Future," *Naval War College Review*, vol. 63, no. 3 (Summer 2010).

²⁰ Cote, "Assessing the Undersea Balance Between the U.S. and China," pp. 23-25.

²¹ On the declining utility of aircraft carriers, see Robert C. Rubel, "The Navy's Changing Force Paradigm," *Naval War College Review*, vol. 62, no. 2 (Spring 2009).

development of smaller, faster, stealthier and less expensive aircraft carriers that can elude surveillance systems better than existing aircraft carriers. United States UAV Predator and Reaper missions over the Pakistan–Afghanistan border region have established the effectiveness of UAV combat missions. The United States is also developing Unmanned Underwater Vehicles (UUV) for ASW missions and payload delivery, which will challenge the effectiveness of China’s diesel submarine force and its surface fleet, including their ASCM capabilities.²²

These emerging technologies will also enable the United States to offset the vulnerabilities of its fixed naval facilities in East Asia. Numerous, smaller and less vulnerable platforms can deploy from more distant and more secure facilities without sacrificing capability. The political challenge for the United States will be to transition to these less visible smaller naval platforms and more distant basing arrangements without seemingly ceding the region to Chinese power and thus without degrading the credibility of its commitment to defend the maritime states in East Asia and thereby undermining its regional alliance system.

The United States possesses many critical advantages that enable it to respond effectively to ongoing advances in China’s maritime capabilities. The challenge for the United States is to carry out a timely transition to a twenty-first century navy that depends less on large, expensive and vulnerable surface ships that carry unnecessary and expensive manned aircraft that depend on expensive and vulnerable forward-based facilities. This is a political and organizational challenge, rather than a technological or financial challenge.

CONCLUSION

The modernization of Chinese maritime capabilities is a significant development in great power politics in East Asia. The PLA Navy has developed far greater ability to impose significant costs on the U.S. Navy, so that the U.S. naval can no longer sail East Asian waters unimpeded by a competitor navy. Force protection is an increasingly difficult task for the U.S. Navy.

But China’s ability to impose increased costs on U.S. naval forces does not provide it with a war-winning capability vis-a-vis the United States that can transform Chinese risk-taking or with a coercive capability that can threaten the security of U.S. strategic partners and U.S. maritime alliances and destabilize the regional security order. Well into the twenty-first century the United States can retain conventional military superiority in maritime East Asia. Moreover, at stake in the emerging U.S.-China maritime competition is the balance of power in East Asia. There is no great power interest more likely to elicit major war than the regional balance of power, so that U.S. resolve and credibility to contend with improved Chinese capabilities should not be in doubt.

²² Department of the Navy, U.S. Department of Defense, The Navy Unmanned Surface Vehicle (Usv) Master Plan (Washington, D.C.: U.S. Department of Defense, 2007), at <http://www.navy.mil/navydata/technology/usvmppr.pdf>; Ronald O’Rourke, Unmanned Vehicles for U.S. Naval Forces: Background and Issues for Congress, Congressional Research Service, Report for Congress, RS21294 (updated July 26, 2006), at <http://www.dtic.mil/dtic/tr/fulltext/u2/a477639.pdf>.

The PLA is no longer a mere Third World military force. It now poses a major challenge to the operational freedom of the U.S. Navy. But nor has the PLA become the most powerful military force in East Asia. The United States retains numerous significant advantages that enable it to approach the PRC with confidence, rather than with exaggerated alarm, and to sustain its regional alliances and the post-Cold War regional security order. Such confidence and strategic advantages can inform not only U.S. defense strategy for East Asia, but also can inform the full range of U.S. diplomatic and political relations between the United States and its East Asian security partners.