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## **“The PLA Navy Anti-Access Role in a Taiwan Contingency”**

**A Paper by**

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**The paper represents the personal views of the author alone; and should not be interpreted as representing the position of the Center for Naval Analyses or the US Navy. CNA is a private not-for-profit research center and does not speak for the US Navy.**

## **Introduction:**

Anti-access and area denial are US coined terms, first introduced into official Defense Department lexicon in the 2001 Quadrennial Defense Review.<sup>1</sup> Both are now commonly used to characterize attempts to prevent the US military from intervening should China elect to attack Taiwan. The basic idea is to keep to keep approaching US Navy aircraft carrier Strike Groups from getting within tactical aircraft operating ranges. Or, as the Commander of the US Pacific Command Admiral Robert Willard recently testified, “...to challenge U.S. freedom of action in the region...”<sup>2</sup>

In Pentagon terminology anti-access (A2 in Pentagonese) is often used synonymously with the term “area denial,” or AD. They are normally referred to together, as in anti-access/area denial, or A2/AD. A very recent report by the influential research organization, The Center for Strategic and Budgetary Assessment (CSBA), differentiates among the two by equating anti-access (A2) as the attempt to deny access to large fixed bases, such as Kadena Air Force base in Okinawa, so US Air Force fighters cannot become involved in a cross strait conflict.<sup>3</sup> CSBA’s parsing now defines area-denial as those capabilities intended to defeat mobile maritime forces. When this paper was originally drafted anti-access was most commonly used to characterize both A2 and AD which is, I believe, how most analysts still think about the issue. I will continue to use anti-access as a generic way to capture the ideas resident in both A2/AD.

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<sup>1</sup> *The Report of the 2001 Quadrennial Defense Review*, September 30, 2001, Department of Defense, no longer available on DOD website, copy in author’s possession, p.25. The report speaks about anti-access and area-denial as they relate to one of America’s fundamental strategic concepts—*detering forward*. Specifically, it goes on to say, “Deterrence in the future will continue to depend heavily upon the capability resident in forward stationed and forward deployed combat and expeditionary forces.”

<sup>2</sup> Statement of Admiral Robert Willard, US Navy, Commander U.S. Pacific Command before the House Armed Services Committee on U.S. Pacific Command Posture, March 23, 2010, p 12. In author’s possession.

<sup>3</sup> Jan Van Tol and others, *Air Sea Battle: A Point of Departure Operational Concept*, Center for Budgetary and Strategic Assessment, May 2010, footnote 1 , p1.  
[http://www.csbaonline.org/4Publications/PubLibrary/R.20100518.Air\\_Sea\\_Battle\\_A\\_/R.20100518.Air\\_Sea\\_Battle\\_A\\_.pdf](http://www.csbaonline.org/4Publications/PubLibrary/R.20100518.Air_Sea_Battle_A_/R.20100518.Air_Sea_Battle_A_.pdf)

It goes without saying that these are US and not Chinese terms. They are useful characterizations, because they describe the operational objective (or military effect) the PLA is trying to accomplish if the operations are successfully executed. The PLA does not use these terms—it speaks to “active defense.” A good discussion of the strategic concepts that underwrite the anti-access concept is found in the PLA’s *Science of Military Strategy*. It says, “Active defense is the essential feature of China’s military strategy and is the keystone of the theory of China’s strategic guidance.” The PLA argues that “active defense” is actually a “strategic counterattack” because if an enemy “offends our national interests, it means the enemy has already fired the first shot.” It is the mission of the PLA “to do all we can to dominate the enemy by striking first.” It goes to instruct “we should try our best to fight against the enemy as far away as possible, to lead the war to the enemy’s operational base... and to actively strike all the effective strength forming the enemy’s war system.”<sup>4</sup>

It is important to recognize that while the focus of this paper is the PLA Navy, China’s approach to anti-access is in fact what should be considered a joint military operation—in that it involves more than one service. It involves the PLA Navy, PLA Air Force and the Second Artillery. Even though most of the fighting would take place off China’s littoral at sea or on neighboring islands with US bases, many of the most important capabilities that the PLA would employ are in fact in the other services and not the PLA Navy.

It is also important to recognize that from China’s perspective an anti-access campaign is inherently defensive, it is a responsive operational concept designed to react to the problems posed by US forces close to or closing the Chinese mainland. While it is being developed with a Taiwan contingency in mind, the concept itself has broader applicability than simply a Taiwan conflict scenario. This is a central point, these capabilities are important to China beyond a Taiwan contingency. The operational concept and attendant military capabilities resident in anti-access are also very important to the defense of the Chinese mainland from attack from the sea; a vulnerability that has

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<sup>4</sup> Peng Guangqian and Yang Youzhi, editors, *The Science of Military Strategy* (Beijing: Military Science Publishing House, Academy of Military Science of the People’s Liberation Army, 2005), pp 459-461.

plagued China since the Opium War era. Thus, even if the prospect of conflict over Taiwan evaporates at some point in the future, the PLA capabilities associated with anti-access will almost certainly not disappear.

This paper will attempt to put anti-access into some historic context, and briefly discuss the similarities and differences between China's current approach and what the Soviet Union had put in place to deal with a similar strategic vulnerability during the Cold War; namely how to cope with the threat posed by US Navy aircraft carrier Task Forces.

Finally, although Beijing's wartime anti-access strategy must take into account USAF bases in Okinawa, Guam and potentially South Korea, the operational aspects of dealing with this problem are not very complicated. Conventionally armed ballistic missiles have been used to attack fixed land targets since 1944, without much strategic or operational success because of small conventional explosive payloads and missile inaccuracy. Today this situation is very different. Attacking fixed land bases with ballistic missiles is a straight forward proposition. Airfields do not move. In the era of GPS enabled precision weapons, firing ballistic missiles at a specific latitude and longitude with a reasonable expectation that the missile will arrive at the intended geographic point is a not tactically challenging.

The key to the successful use of ballistic missiles to put airfields out of commission, given their relatively small warhead size, is determined by missile accuracy and the number of missiles available to attack and reattack versus the adequacy of active missile defenses, the effectiveness of passive defenses such as hardened aircraft shelters and the efficacy of rapid runway repair capabilities. To conduct a detailed examination of these factors is beyond the scope of this paper. Happily, recent testimony before the US-China Economic and Security Review Commission by a RAND expert provides a useful summation:

RAND has looked at the effects of various TBM (Theater Ballistic Missile) and cruise missile warheads against airbase targets, and numbers on the order of 30-50

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TBM per base appear to be sufficient to overload and kill air defenses, cover all of the open parking areas with submunitions to destroy aircraft parked there, and crater runways such that aircraft cannot takeoff or land. If 30-50 cruise missiles were fired along with the TBMs, they would complicate the air defense problem and could also damage or destroy a squadron's worth of aircraft shelters. There would likely also be damage to other critical airbase systems such as fuel storage and handling or maintenance facilities and equipment. Following such an attack, U.S. forces would have to extinguish burning aircraft, clear the airfield of debris and unexploded ordnance, repair runway craters and fly in replacement aircraft and support equipment before the base could generate useful combat sorties.<sup>5</sup>

This statement should not be construed as suggesting the problem is hopeless. Hardening against the small conventional warheads these missiles carry and improved techniques in rapid runway repair as countermeasures should not be dismissed out of hand.

The much more problematic issue for Beijing is in reaching a political decision to broaden the war by attacking US facilities on the territory of Japan or South Korea.<sup>6</sup> Would Beijing be willing to add to its enemies by attacking its neighbor's territory? Exploring this issue is also beyond the scope of this paper, but the problem should be kept in mind as yet another of the many difficult choices the leadership of China will have to confront if they ever elect to use force against Taiwan.

### **Historic Context—Finding and Attacking Ships at Sea Before Radar and Satellites**

For most of recorded history when ships went to sea and sailed beyond the sight of humans on the coast or on other ships—typically 12-18 nautical miles depending on the height of eye of the observer above sea level—they “disappeared.” They were literally “over the horizon” and vanished from shore based surveillance until they once more returned to within sight of land—often with little or no advanced warning. Officials responsible for the defense of their countries from enemies with navies had only one

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<sup>5</sup> Jeff Hagen, “Potential Effects of Chinese Aerospace Capabilities on U.S. Air Force Operations,” Testimony presented before the U.S.-China Economic and Security Review Commission, May 20, 2010, p 2-3.

[www.uscc.gov/hearings/2010hearings/written\\_testimonies/10\\_05\\_20\\_wrt/10\\_05\\_20\\_hagen\\_statement.pdf](http://www.uscc.gov/hearings/2010hearings/written_testimonies/10_05_20_wrt/10_05_20_hagen_statement.pdf)

<sup>6</sup> David A Shlapak, David T. Orletsky and Barry Wilson, *Dire Strait? Military Aspects of China-Taiwan Confrontation and Options for U.S. Policy*, RAND, National Security Division, RAN, Santa Monica, Ca, 2000. pp 7-30.

option in dealing with the surprise of warships suddenly showing up—build and man forts along vulnerable coastlines. As a result over the millennia coastal defense fortifications were constructed to protect strategically important ports and cities.<sup>7</sup>

Wealthy countries were also able to build navies in the hopes they could seek out and defeat hostile navies before they could “materialize” off their coast. But before 20th century technology made it possible to search wide expanses of the ocean, finding a hostile fleet at sea was also very difficult. A classic example is the four month search by Lord Nelson in 1798 for the French fleet that eluded the British blockade and carried Napoleon’s army to Egypt.<sup>8</sup> Nelson was eventually successful; he found and destroyed the French Fleet at Aboukir Bay, but not before Napoleon landed and successfully conquered Egypt.

Building forts and coastal fortifications to defend against hostile navies especially those carrying invasion forces is something that reached its apogee in World War Two. In this great struggle, both the Germans and Japanese found that if you did not defeat the approaching naval force before it arrived at its objective area, it was virtually impossible to keep the invasion forces from coming ashore. Between late 1942 and the end to the war in 1945 neither the Germans nor the Japanese were able to throw the invading force back into the sea. In fact the Japanese themselves demonstrated in their 1941-42 campaigns throughout Southeast Asia that a powerful naval force that suddenly appeared in unexpected places could enable stunningly successful ground campaigns.

Thus issue for any country that worried about being attacked or invaded from the sea was finding a hostile naval force in the vastness of the open ocean so that the approaching

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<sup>7</sup> For a fascinating discussion of how the US military responded to this problem during the 19<sup>th</sup> century see Brain McAllister Linn, *The Echo of Battle: The Army’s Way of War*, Harvard University Press, Cambridge Massachusetts, 2007, p 11-39. The lessons of the Revolutionary War when the British captured New York, Newport, Charleston and Philadelphia and raided at will, and again during the War of 1812 when they burned Washington DC convinced planners that a chain of forts, a mobile commerce raiding navy and large militia were the only way to cope the threat of an invading force the crossed the Atlantic to attack the United states.

<sup>8</sup> See John Keegan, *Intelligence in War*, Alfred A Knopf, New York, 2003, 26-65 for a detailed discussion of the difficulties associated with finding ships at sea in the days of sail.

navy could be attacked before too late. Clearly reconnaissance by long range patrol planes is one option that was used to find warships at sea with some success in World War II—the location and eventual sinking the German battleship *Bismarck* being a classic example.<sup>9</sup> There was also the intelligence practice of intercepting radio transmissions from naval forces at sea, a tactic practiced since the First World War. Using the navigation technique of triangulation, a group of intercepting shore stations could develop the approximate location of the radio signal being sent from a ship at sea. Signal intercept is helpful, and is still in use by the PLA but it depends upon a “cooperative” enemy who is willing to actually use radio’s or in the modern era any electronic equipment that emits electronic signals that travel great distances; such as high power radars. If the naval force elected to remain “radio silent” it still took the human eye or aircraft radar to find a naval force at sea.

Finding a force at sea is the first problem, determining how best to attack it the next. During the Second World War the German Navy combined the techniques of radio signal intercept, code breaking and aircraft surveillance to locate convoys sailing across the North Atlantic. They used centralized command from the shore to alert and position the submarines they had at sea. German U-boat commanders were directed by routine radio signals from U-boat headquarters where to go to intercept allied convoys.

In the early years of the war before radar was installed on allied aircraft and convoy escorts the U-boats could surface and travel at a relatively high rate of speed to get into attack position. But once radar made the surface of the ocean inhospitable for surfaced U-boats, the inherent weakness of the slow submerged speed and limited battery life of diesel submarines greatly hampered the shore based command and control technique. It is worth considering, and is strategically very relevant, why German U-boats were never able to intercept and interrupt any of the vast allied invasion fleets that landed forces successively in North Africa, Sicily, Italy, Normandy and Southern France. The answer, I

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<sup>9</sup> The famous or infamous depending on your point of view, sinking of surrendered German battleships by Brigadier William “Billy” Mitchell in 1921 was intended to prove that bombers were better at finding and defeating approaching hostile naval forces than navies were. For a contemporary take on this debate, see



believe, is that they could not “find” them. Nonetheless the techniques implemented by the Germans to command their submarine forces remain to this day, largely because the very nature of how a submarine operates limits its ability to develop a comprehensive surveillance picture of its ocean operating area.<sup>10</sup>

### **The Soviet Experience in Dealing with a Threat from the Sea**

As the Cold War developed, the Soviets become increasingly concerned about their vulnerability to attack from the sea. They elected to pursue a defensive maritime strategy oriented to defeating sea based strikes against the Soviet Union and its allies. Not that they feared an invasion by the NATO or the US acting alone—the 1940 Nazi invasion was the simply the latest unhappy example of what happens to nations that try to invade Russia. Rather, what the Russian feared was US aircraft carrier task forces with air groups trained to deliver nuclear weapons.

It is forgotten by most today, but in the 1950’s the USN made a major investments to ensure that its carriers could employ nuclear weapons against the Soviet Union. The argument that was successfully made on Capital Hill was that the mobility of carrier groups would pose key targeting problems for the Soviets and thereby increase deterrence. This was how the US Navy continued to justify maintaining a carrier force structure in the face of US Air Force arguments that bombers alone were sufficient.<sup>11</sup>

It turns out the Navy arguments were correct. The problem of coping with aircraft carrier airwings carrying nuclear weapons made the Soviets realized they had to develop an ocean surveillance system (subsequently dubbed by US intelligence as Soviet Ocean Surveillance System [SOSS]) in an attempt to keep track of US carrier task forces. Over

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for example, William Mitchell, “Air Power vs. Sea Power,” *American Review of Reviews* 58 (March 1921):273-277.

<sup>10</sup> There are many fine studies of the Battle of the Atlantic and I have read most of them, in my judgment the best short summary of that campaign is Marc Milner, *Battle of the Atlantic*, Vanwell Publishing Limited, St Catherines, Ontario, Canada, 2003.

<sup>11</sup> Jerry Miller, *Nuclear Weapons and Aircraft Carriers: “How the Bomb Saved Naval Aviation,”* Smithsonian Institution Press, Washington DC, April 2001, passim.

the years they built an elaborate global network of electronic intercept stations that attempted to track the electronic emissions for US naval forces. Eventually, space based satellites optimized to detect radar signals entered the SOSS inventory. The Soviets also commissioned a small fleet of purpose built ocean going surveillance auxiliaries especially equipped to locate and track US carrier forces. Finally, the Soviet Navy developed a tactic that capitalized on the fact that in international waters any ship could sail in proximity to any other ship. They assigned selected surface combatants to essentially shadow US carrier forces at sea, by staying within visual contact, and often actually “joining” the US formation--known as “tattletales” these surface combatants had the primary mission of reporting every few hours on the exact location of the US carrier.<sup>12</sup>

The Soviets also realized that simply knowing the location of the carriers was not good enough; they also had to be able to deal with them if war broke out. The Soviets developed a defensive maritime strategy with thresholds established at various distances from the Soviet Union’s coasts. These thresholds were de facto “lines-in-the-water.” The first “line” was called the sea control zone, about 200 nautical miles from the coast. The second threshold was the sea denial zone which reached some 1250 nautical miles from the Soviet coast.<sup>13</sup> The high point of the Soviet approach to maritime defense was realized by the mid 1980s when the Kremlin had in place a force structure of about 270 attack submarines, 280 major surface combatants, and over 1,300 naval aircraft allocated

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<sup>12</sup> Joining the formation. Authors personal experiences while on active duty during the Cold War.

<sup>13</sup> Notions of sea control and sea denial date back to the writings of Alfred Thayer Mahan and his near-contemporary Julian Corbett, and stem from notions of “command of the sea.” A search of their writings will yield often-contradictory definitions of these terms. My understanding is that “sea control” means having the capability to prevent an enemy from using some segment of maritime geography for as long as one wishes. In other words, one party can use the sea at its pleasure while an opponent cannot. *This is hard to accomplish in practice unless one also controls the air above the water in question.* “Sea denial,” on the other hand, means temporarily controlling an area of water, with the recognition that control will be contested and that neither side has complete freedom to use the sea as it wishes. Many books talk about and around this topic. For the best-extended discussion, see Colin S. Grey, *The Leverage of Sea Power: The Strategic Advantages of Navies in War* (New York: The Free Press, a division of Macmillan, Inc., 1992), 19, 274.

between the North Atlantic, eastern Mediterranean, and Pacific maritime approaches to the Soviet Union.<sup>14</sup>

The Soviet concept of the combination of open ocean surveillance, long range land based aircraft with cruise missiles and nuclear powered submarines with large loads of anti-ship cruise missiles formed an imposing anti-access capability when the Cold War ended. Happily, the United States and the Soviet Union never had the opportunity to determine whether the anti-access concept of operations would succeed or not. What is clear in retrospect is that it was a sensible way for the Soviets to plan on how to keep a threatening naval force at bay so it could never approach close enough to launch nuclear equipped tactical aircraft against targets in the Soviet Union.

China, as a continental power that only recently is coming to grips with defending itself from a serious attack from the sea, it has apparently made a series of sensible decisions to adopt an approach that is remarkably similar to what the Soviets did. This is not a surprise since the concept is at once affordable and militarily practical. By affordable, I imply a comparison with trying to build a 21<sup>st</sup> century version of the Imperial Japanese Navy, in other words a balanced blue-water fighting force, that would be able to slug it out with the USN, in a battle for sea control of the Western Pacific. China is not pursuing that solution to the sea control problem, although what it is doing does not prejudice future attempts to replicate a capability similar to the one that Japan possessed between 1919 and 1944.

The discussion thus far has explored the concept of anti-access specifically without regard to China's geostrategic situation which is what generates the "demand signal" that creates the military requirement for "anti-access" in the first place.

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<sup>14</sup> This entire section is based upon the now declassified National Intelligence Estimate NIE 11-15-82D *Soviet Naval Strategy and Programs Through the 1990's*, March 1983 which is found in John B. Hattendorf Jr., *The Evolution of the U.S. Navy's Maritime Strategy, 1977-1986*, Naval War College Newport Paper 19, Center for Naval Warfare Studies, 2004.

## Why an Anti-Access Concept--The Geostrategic Context

Throughout China's long history, its strategic orientation could be categorized as continental and hence its strategic tradition—its way of thinking about and framing strategic issues—has been largely focused on land war. A PLAN Senior Captain writing in 2004 in the journal *Chinese Military Science* characterized this land based geostrategic perspective “from beginning to end” as emphasizing “land power at the expense of sea power.”<sup>15</sup> While this was historically accurate and probably was a widely held perspective among many PLA Naval officers, the truth is that by 2004 the leadership of the PLA had long since recognized China's growing dependence on the sea and its historic vulnerability along its seaward approaches.

China's strategic situation began to change with the collapse of the Soviet Union. The risk of cross-border aggression has moderated. The threat of invasion—the primary worry of Chinese or indeed most Eurasian strategists for many centuries—has all but disappeared. All the while, China's economic growth is dependent on trade, most of which is carried in containers loaded on ships. As a result security on the high seas is becoming a growing preoccupation for China, and as well for other globalized trading countries that historically were not strategically focused on the maritime domain. China is in the midst of what in fact is an evolving strategic *zeitgeist* that has impacts around the world.<sup>16</sup>

In China's case, this translates to protecting offshore sovereign interests and denying other nations the use of the high seas as an avenue by which to attack China. More specifically, this dates back to August 1985, when then-CMC Vice Chairman Yang Shangkun addressed an enlarged meeting of the PLA Navy Party Committee and directed that the concept of "offshore defense" become the strategic concept that should guide naval modernization. In effect, the PLAN was told to become more than merely a coastal

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<sup>15</sup> Senior Captain Xu Qi, “Maritime Geostrategy and the Development of the Chinese Navy in the Early Twenty-First Century,” 2004 *China Military Science*. Translated and published by Andrew Erickson and Lyle Goldstein in the *Naval War College Review*, Autumn 2006, Vol 59, No.4, pp 51-63.

defense force.<sup>17</sup> As former Navy Commander Vice Admiral Shi Yunsheng put it, "Following the enlarged Central Military Commission meeting in 1985, we established the Navy's strategy of offshore defense ...and defined the strategic mission of the Navy in the new period."<sup>18</sup>

In translating that strategy into reality one of the most important considerations that PLA strategic planners face is making certain their plans are synchronized with top level defense planning guidance which is known as the “major strategic direction”—that is, the direction and nature of the primary threat.<sup>19</sup> For the PLA this is central since it forms the basis for making operational plans and deciding what operational capabilities are required. In effect this is the PLA’s approach to what in the United States is called threat based planning. As the *Science of Military Strategy* makes clear the analyses that derives “the major strategic direction” forms the basis from which operational plans are then developed and appropriate forces are procured, postured, and trained.<sup>20</sup> It is “...the focal point of the struggle of contradictions between ourselves and the enemy...in the overall strategic situation; it is the vital point of *greatest importance* (emphasis added).” *The Science of Military Strategy* goes on to say, “The major strategic direction is basically determined according to the national strategic interests and the fundamental international and domestic strategic situation.”<sup>21</sup>

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<sup>16</sup> *The Science of Military Strategy*, 3–13. These pages contain a very interesting and fulsome discussion of China’s history of strategic thought.

<sup>17</sup> Chiang Shang-chou, "China's Naval Development Strategy—Building an Offshore Defensive Naval Armed Force," *Kuang Chiao Ching*, 16 December 1998 (FBIS). See also Paul H.B. Godwin, “Force Projection and China’s Military Strategy,” paper presented at the Sixth Annual Conference on the PLA at Coolfont, Virginia, June 1995, p.4. Dr Nan Li, “Reconceptualizing the PLA Navy in Post-Mao China: Functions, Warfare, Arms and Organization,” Institute of Defense and Strategic Studies (IDSS), Singapore, Working paper No. 30, August 2002, p.6.

<sup>18</sup> Chen Wanjun and Zhang Chunting, "Shouldering the Task of a Century-Straddling Voyage - Interviewing Newly Appointed Navy Commander Vice Admiral Shi Yunsheng," *Liaowang*, cited in David M. Finkelstein, "Reform and Modernization of the PLA Navy: From Marginalization to Major Importance," (CNA Corporation: April 2000).

<sup>19</sup> This entire section is drawn largely from Peng Guangqian and Yang Youzhi, editors, *The Science of Military Strategy*, 230–234.

<sup>20</sup> *Ibid.*, p.231.

<sup>21</sup> *Ibid.*, p.232.

In analyzing the “current international situation” from the perspective of Beijing the news is mixed. Over the past 15 years China’s leaders and diplomats have secured the PRC’s land frontiers by resolving or mitigating territorial disputes with Russia, Vietnam, Kazakhstan, Kyrgyzstan, and India. They have also negotiated “strategic partnerships” with most of these countries, and in the case of the “stans” and Russia, have knitted them into the fabric of a regional security relationship called the Shanghai Cooperation Organization (SCO).<sup>22</sup> As a result, the PRC does not face a credible military threat from its continental neighbors, nor does it have territorial dispute with them that could be the pretense for military action. Russia still possesses a substantial strategic nuclear force; however, that threat has been modulated by good political relations enshrined in the “Sino-Russian Good Neighborly Treaty of Friendship,” which went into effect on March 1, 2002.<sup>23</sup>

However, while its land frontiers are stable, looking east from Beijing beyond its eastern seaboard the situation is more strategically problematic. China’s maritime approaches are replete with unresolved sovereignty issues and genuine vulnerabilities. Strategic vulnerability from the sea is not a new issue for China. Weakness along its long maritime frontier has been a problem for Beijing since at least 1842, when the Treaty of Nanking ended the first Opium War and ushered in the so-called “Century of Humiliation.” The repeated military and diplomatic humiliations and defeats that China suffered were inflicted by Western powers including Japan that came mainly from the sea.<sup>24</sup>

Today, China has the resources and skill necessary to address the strategic problem that the vast majority of China’s outstanding sovereignty claims and unresolved strategic

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<sup>22</sup> This is my interpretation. For the latest official assessment see China’s National Defense in 2006 (PRC White Paper on National Defense), <http://www.opensource.ove/portal/server.pt/gateway/PTARGS> .The opening section of the latest PRC defense White Paper speaks to Beijing’s assessment of the security environment

<sup>23</sup> *People’s Daily on Line*, [http://english.peoples.com.cn/200202/28/eng20020229\\_91188.html](http://english.peoples.com.cn/200202/28/eng20020229_91188.html)

<sup>24</sup> Dean Cheng, *Shedding the Century of Humiliation: China’s Place in Asia*, a paper prepared for the Sino-Japan Strategic Rivalry Workshop, which took place at CNA headquarters, Alexandria, VA, April 2006.

issues are *maritime* in nature. Consider:

- Taiwan is an island. It is the combination of Taiwan's air defense and the threat of intervention by the US military (primarily the US Navy) that effectively keeps the Taiwan Strait a moat rather than a highway open to the PLA.
- Perhaps as strategically significant as Taiwan to a PLA planner is the geostrategic reality that the PRC's economic center of gravity is on its east coast, which, because it is a "seaboard," is extremely vulnerable to attack from the sea—a military task the United States is uniquely suited to execute.
- Territorial disputes with Japan over islands and seabed resources in the East China Sea have become more serious, and represent a potential flash point where Sino-Japanese interests are contested. Each state is emphasizing its claims by the periodic deployment of naval and coast guard vessels. The entire issue is maritime in nature.<sup>25</sup>
- Unsettled territorial disputes, and their concomitant resource issues, remain with respect to the Spratly Islands and the South China Sea. Again, this problem is maritime in nature.

Finally, Beijing's primary military competitor is the United States, which is the world's foremost naval power and which, as it has for the past 50 years, maintains a significant naval presence on "China's doorstep." Should China elect to use force to resolve either reunification with Taiwan or outstanding maritime claims, the United States is the one country that could militarily deny success. Also its air and naval presence in the region could stymie any attempt to use the growing capability of the PLA to settle these issues by *force majeure*. The United States is closely allied with China's "historic" antagonist

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<sup>25</sup> The Center for Naval Analyses has partnered with the Institute for Defense Analyses, National Defense University, and Pacific Forum/CSIS on an 8-month project that examines all aspects of the current state of Sino-Japanese relations. The study is paying particular attention to the disputes in the East China Sea. A final report was completed in December of 2006, and is available from this author. See the Japan Times of 10 September 2005, "Chinese warships make show of force at protested gas rig," <http://search.japantimes.co.jp/print/nn20050910a1.html>

Japan, which also has an excellent navy and a formidable maritime tradition.<sup>26</sup>

The importance of unresolved maritime issues to China's leadership was highlighted by the December 2004 Chinese Defense White Paper, which swept aside assumptions regarding land-force preeminence when stated that the PLA Navy, the PLA Air Force, and the ballistic missile force—the Second Artillery—are to receive priority in funding. Further, it explicitly lays out its ambitions for the PLA Navy, Air Force, and Second Artillery:

While continuing to attach importance to the building of the Army, the PLA gives priority to the building of the Navy, Air Force and Second Artillery force to seek balanced development of the combat force structure, *in order to strengthen the capabilities for winning both command of the sea and command of the air, and conducting strategic counter strikes* (emphasis added).<sup>27</sup>

### **The PLA's Approach to Implementing "Command of the Sea and Command of the Air**

I believe that it is not a coincidence that PLA's concept of offshore defense seems to be based on how the Soviets thought about maritime strategy.<sup>28</sup> As previously discussed, the Soviets developed a defensive maritime strategy with thresholds established at various distances from the Soviet Union's coasts. These thresholds were de facto "lines-in-the-

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<sup>26</sup> A expression of PRC angst over the strengthening of the US-Japan Alliance and Japan's evolution toward becoming a more normal major power is found in the 2006 PRC Defense White Paper in the first section of the paper that is dedicated to a discussion of "The Security Environment."

<sup>27</sup> PRC Defense White Paper, December 2004, Information Office of the State Council of the PRC, December 2004, Beijing. <http://english.people.com.cn/whitepaper/defense2004>

<sup>28</sup> Bernard D. Cole, *The Great Wall at Sea: China's Navy Enters the Twenty-First Century* (Annapolis, MD: U.S. Naval Institute Press, 2001), 163–164. Dr Cole makes the important point that PLAN Commander Liu Huaqing in the mid-1980s had been a student at the Voroshilov Naval Academy when Sergi Gorshcov, later leader of the Soviet Navy, was an instructor. See also an excellent discussion of Soviet influence in You Ji, "The Evolution of China's Maritime Combat Doctrines and Models: 1949-2001", Institute of Defense and Strategic Studies (IDSS), Singapore, Working paper No. 22, May 2002. p.2-8.



water.” The difference between the Soviets and China is that PLA has elected to define distance-related thresholds in terms of “island chains.”<sup>29</sup>

The Soviet template considered the waters closest to the mainland, out to approximately 200 nautical miles, an area that Soviet naval forces and land-based air forces must be able to “control.” Beyond this threshold, moving further to sea (to a range of about 1,200 nautical miles) the Soviets strategy was to “deny or contest” those waters to the US Navy. In other words, the military requirement is sea control close in and sea denial as the distances from the mainland increase.

For China the 200 nautical mile sea control zone results in a requirement for the PLA Navy to “control” the Yellow Sea, much of the East China Sea, the Taiwan Strait, at a minimum the northern portion of the South China Sea, and the Tonkin Gulf. Not surprisingly, this sea control area also closely approximates the PRC’s EEZ and also generally follows the contour of the so-called “first island chain” that stretches southeast from Japan, through the Ryukyu’s, Taiwan, and the Pratas and Paracel islands in the northern portion of the South China Sea.

If the entire South China Sea is included within the first island chain threshold the “sea control” zone runs beyond 200 nautical miles, in that one area. While this deviation makes it even harder to actually execute the mission of sea control because of the increase in water space, including the entirety of Beijing’s territorial claims in the South China Sea in the sea control zone makes sense. Plotting 200 nm EEZ’s radius circles around each of the various islands and features makes it easy for the PLA to conclude the South China Sea belongs within the sea control area. It also creates a “requirement” to improve the military potential of disputed islands as bases or outposts in the South China Sea. For example, the airfield on Woody Island in the Paracel Group is an important contributor to the ability to execute a sea control mission in the South China Sea.

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<sup>29</sup> Senior Captain Xu Qi, in Erickson and Goldstein, *Naval War College Review*, pg 57.

Beyond the first island chain threshold the open ocean expanse extends to the what the PLA terms the “second island chain.” This is second threshold approximates the Soviet 1200 nm “line in the water.” Except in China’s case the line is probably closer to 2400 kilometers or 1300 nm because this the range the Chinese ascribe to Tomahawk cruise missiles.<sup>30</sup> This vast area between 200 to 1300 nautical miles, essentially encompasses the Philippine Sea. This is the area in which use of the seas would be “contested.” The PLA ambition is to win the contest for sea control and deny it to US naval forces.

This discussion is not as arcane as it might seem. These thresholds establish requirements for specific PLA Navy capabilities and as such are a “driver” of what capabilities the PLA will seek in its weapons and platforms. By establishing specific distances and areas where certain “military effects” are desired it becomes simpler to then define precise operational characteristics for specific weapons systems, and to determine how many ships, submarines and aircraft are required to accomplish the intended missions.

The first and most important requirement of a layered defense of the seaward approaches to China is an effective surveillance system that covers ocean approaches. Finding ships on the high seas is even today very difficult because of the vastness of the oceans. Also, since ships move, determining the location of a ship only once is not very helpful because in a short time it has moved. Since ships at sea travel around the clock, night and day, even at relatively modest speeds when compared to land travel, over a 24 hour period they travel a long way. One must keep track of moving ships by constantly updating the surveillance “plot.” In addition, a surveillance system must be able to distinguish between merchant ships, and oil tankers, many of which are quite large, and warships.

Without effective surveillance, it is impossible to position offensive weapons systems or intercept moving naval task forces. As discussed, the Soviets built an integrated surveillance system that was composed of radio-direction-finding, electronic “spy ships” that could locate electronic signals, and space-based satellites designed to detect either

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<sup>30</sup> Li Xinqi, Tan Shoulin, Li Hongxia (The Second Artillery Engineering College, Xian, China.): “Precaution Model and Simulation Actualization on Threat of Maneuver Target Group on the Sea”, August

electronic or infrared emissions from ships. It is worth noting that surveillance satellites are in relatively low orbits around the earth, and therefore pass overhead quickly. Thus, to achieve constant, around-the-clock coverage of any geographic area requires a large constellation of satellites so one is always positioned over the desired surveillance area. That is why high-altitude drone aircraft have become such important new surveillance tools: they can loiter over a specific area for a long time.

The second element in the Soviet approach to layered defense was land-based long-range aircraft that could be employed *en mass* to fire long-range anti-ship cruise missiles. The Soviet tactic was to send raids composed of two regiments (perhaps 45 aircraft) against each carrier battle group, to ensure that enough bombers would survive the fighter aircraft's defensive screens to get within range to launch ship-killing cruise missiles.

It was this tactical threat that drove the US Navy to develop the well-known Aegis radar-based air-defense system. The system was built specifically to permit missile defense ships to shoot down barrages of cruise missiles. China does not have anything equivalent to the Soviet Backfire bomber carrying long range AS-4 anti-ship missiles and, as a result, this aspect of its layered defense is not yet especially capable. The closest things it has to the Backfire are the FB-7 fighter-bomber and the Chinese variant (B6H) of the venerable Soviet Badger bomber. Neither of these aircraft has the range of the Backfire or carries especially long-range cruise missiles.<sup>31</sup>

The third aspect of the Soviet layered strategy was the use of submarines that were directed to their targets in much the same way that German U-boats were sent toward transiting convoys: they were vectored by commands from shore, based on surveillance information. The PLA Navy is adapting this approach. It has focused on more modern, high-performance, conventionally propelled submarines, which, while lacking the time

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1, 2005, in authors possession.

<sup>31</sup> Anti-ship cruise missile range is important if the attacker hopes to be successful. The ideal situation for attacking aircraft is to be able to launch its cruise missiles before it enters the defensive umbrella of the surface ships, so the defender is confronted with having to shoot at cruise missiles—a difficult target. It is much easier for modern surface to air missiles to intercept aircraft. The colloquial characterization of this tactical problem is to “shoot the archer before he launches his arrows.”

on station and submerged speed of nuclear-powered submarines, are much more difficult to detect. But, because conventionally powered submarines do not have sustained endurance, they are also more dependent on accurate surveillance to help them locate their intended targets.

The Soviets recognized the vulnerability of their surface ships to both US submarines and US carrier aircraft, both of which could attack the Soviet ships before they had closed US ships to within cruise missile firing ranges. As a result, the Soviets intended to use its surface ships in roles closer to shore, either to defend against air raids headed toward the Soviet mainland or as last-ditch defenses.

Today, PLA Navy surface combatants suffer from the same vulnerability. It is likely that the PLA Navy would opt for the same solution as the Soviets: to wit, use surface warships closer to shore. In the PLA Navy's case, this would mean keeping them within the first island chain as last-ditch defenders, or to search for enemy submarines, or to fight the Taiwan Navy if the scenario included an attack on Taiwan.<sup>32</sup>

### **Offshore Defense (anti-access) In a Taiwan Scenario**

Anyone who interacts with Chinese from the PRC will almost inevitably, at some point, be informed about how important Taiwan is to China, because it is a matter of China's national sovereignty and territorial integrity.<sup>33</sup> Taiwan is the remaining unresolved territorial issue from China's Century of Humiliation.

During much of the Cold War, when China's military potential was focused on a threat from the Soviet Union, or was consumed by the "Cultural Revolution," and remained

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<sup>32</sup> Hattendorf, *The Evolution of the U.S. Navy's Maritime Strategy, 1977–1986*, pp. 101–181. On page 170, a map displays Soviet sea denial and sea control areas in the Pacific. This entire section on the Soviet approach to layered defense is also informed by the author's personal experience in the 1980s, when he spent 4 years conducting strategic studies and program assessments oriented toward understanding and defeating Soviet maritime strategy.

wedded to a doctrine of “people’s war,” the PLA really did not have the means to surmount the barrier that the Taiwan Strait presented to the application of PLA power to Taiwan. During this time, when the PRC threatened Taiwan with military punishment, its threats were largely empty. The PRC was “a paper tiger.”

In retrospect, after the 1950s this did not matter much. Mao could trigger a Cultural Revolution and Deng could focus on the Soviets because there was little threat that Taiwan would be permanently lost to China. The political leaders on both sides of the strait sought the same end: eventual reunification of the island and mainland. The argument was over what party would be in charge of the “uniting,” not over whether to have one Taiwan and one China. For a long time Beijing displayed little urgency in improving its ability to either credibly deter Taiwan’s independence or to field the means to capture it.<sup>34</sup>

This changed during the early 1990s, when the advent of democracy and notions of a *de jure* independent Taiwanese state began to politically resonate in Taiwan. In turn, Beijing made policy pronouncements on the use of force to prevent the permanent separation of Taiwan from the mainland. Taiwan became an operational *idée fixe* for the PLA, which sought to field capabilities that would lend credibility to these pronouncements. In this process of fielding capabilities that could deter a declaration of independence by Taiwan, the PLA Navy has *not* played a central role.<sup>35</sup>

The PLA’s single-minded focus on the operational problem of Taiwan has resulted in weapons and military capabilities that allow the PLA to “reach out and touch” Taiwan in a way that in earlier decades was not possible. This has translated into two PLA focus

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<sup>33</sup> The PRC White Paper on National Defense 2006, Electronic version in English found at [www.opensource.gov/portal/server.pt/gateway/PTARGS](http://www.opensource.gov/portal/server.pt/gateway/PTARGS)

<sup>34</sup> Harry Harding, “Speech before the Asian Affairs Committee of the Association of the Bar of New York on November 1, 2000,” reprinted in the National Committee for US–China Relations newsletter of March 2001.

<sup>35</sup> While Taiwan is a priority for campaign planning and is the PLA’s most likely contingency, it would be a mistake to consider Taiwan as the only reason that the PLA is modernizing. See James Mulvenon and David Finkelstein, eds., *China’s Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the PLA*, CNA, Conference Report, (CNA Washington DC, December 2005, 12).

areas: putting hundreds of ballistic missiles in the hands of the Second Artillery; and purchasing excellent Russian tactical aircraft systems, which have allowed the PLA to credibly begin to match Taiwan's heretofore qualitatively better aircraft. The two strands of development go hand in hand. The missiles will punish Taiwan, destroy its command and control, and ground its air force, and the tactical aircraft will exploit this effort by seizing and sustaining air superiority (or "air control") over the strait and perhaps Taiwan itself. Control of the air over the Taiwan Strait is the essential prerequisite for an invasion of Taiwan.<sup>36</sup>

However, if the PRC wants to do more than merely punishing Taiwan, if it wants to undertake a "regime change" operation, it must "put boots on the ground," it must invade. This remains a very difficult proposition. In a campaign to invade Taiwan, the PLA Navy has two important missions one offensive and one defensive. First, it is responsible for getting the army across the strait once air superiority has been achieved. It is also responsible for dealing with Taiwan's small navy, either at sea or by sealing it into its naval bases by mining the entrances closed. The requirement to get the army to Taiwan is a "driver" for one aspect of PLA Navy building, and has resulted in a steady growth of small, purpose-built amphibious warships. The PLA Navy also has at its disposal the substantial and modern Chinese merchant fleet and a mobilized fishing fleet.<sup>37</sup>

But the Navy can only be assured of fulfilling its mission, if air superiority is achieved. Everything hinges on the Second Artillery and PLA Air Force's ability to execute their missions. If they can achieve and sustain air superiority over the strait, getting the army to Taiwan would be within the capability of the PLA Navy.<sup>38</sup>

Getting it to Taiwan is not the most difficult problem for the PLA Navy. The PLAN's

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<sup>36</sup> U.S. Department of Defense, *Annual Report to Congress [on] Military Power of the People's Republic of China 2009*. Washington, 2009, pages 3-6 for a discussion of the forces postured opposite Taiwan.

<sup>37</sup> *Ibid.*, p 4 and 30 for a discussion of PLAN amphibious and expeditionary forces.

<sup>38</sup> David A. Shlapak, David T. Orlesky, Toy I. Reid, Murray Scott Tanner, and Barry Wilson, *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute*, RAND, National Security Division, 2009, p 31-84. This is the most complete unclassified analyses of the issue of gaining air-superiority over the Taiwan Strait; and it is not encouraging for Taiwan.

most important and most difficult mission is to stop the US Navy from intervening, and thwarting an invasion. The PLA Navy must deter or defeat approaching US Navy carrier strike groups to keep them out of the fight long enough for the combined forces of the Second Artillery, the PLA Air Force, and the army to succeed. “Success” means creating the circumstances necessary to cross the strait (establishing air superiority), successfully getting ashore and establishing a defensible foothold on Taiwan, and subsequently causing the government in Taipei to surrender or flee. Any one of these factors can be upset if the United States is able to effectively intervene. In other words, the PLA Navy has an important role in a joint “strategic” mission involved with keeping the most disruptive element of US power at bay long enough for the actual assault to be effective. This mission is in harmony with PLA doctrinal emphasis on what is called “key point strikes.”<sup>39</sup>

### **Assessing the PLA Capability to Deny Access**

The conceptual approach to accomplishing the anti-access mission was discussed within the context of a Soviet operational template. The translation of the conceptual approach to a specific operational task for the PLA highlights strengths and shortcomings as well as areas where it is reasonable to expect the PLA to focus its future efforts. The most obvious shortfalls in the PLA are its weakness in the area of surveillance of the open ocean and its shortage of land-based aircraft available to attack enemy warships before those ships can launch aircraft that could interfere with the Taiwan attack or conduct attacks against mainland China.

Without surveillance, the PLA’s ability to execute its anti-access mission would be severely handicapped. The 2009 version of the Defense Departments Annual Report on

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<sup>39</sup> “Key point strikes” calls for the concentration of the PLA’s most powerful capabilities to destroy or degrade *the enemy’s best capabilities* in order to (1) level the technological playing field at the inception of hostilities, and (2) disrupt the enemy’s campaign before it can achieve operational momentum. The PLA’s approach rests upon the correct selection of “enemy vital targets” and “key point application of force” against those targets. David Finkelstein, *Evolving Operational Concepts of the Chinese People’s Liberation Army: A Preliminary Exploration*, Alexandria, VA: The CNA Corporation, 2001, xxx.

China's military power says, "China is deploying advanced imagery, reconnaissance, and Earth resource systems with military applications. Examples include the Yaogan-1, -2, -3, -4, and -5, the Haiyang-1B, the CBERS-2 and -2B satellites, and the Huanjing disaster/environmental monitoring satellite constellation. China is planning eight satellites in the Huanjing program that are capable of visible, infrared, multi-spectral, and synthetic aperture radar imaging. In the next decade, as Beijing fields a more robust constellation of reconnaissance satellites, it probably will employ commercial satellite imagery to supplement existing coverage."<sup>40</sup> According to open sources, China currently has several satellites in orbit that can contribute to ocean surveillance. Significantly, in April 2006 Beijing launched its first radar satellite. It carries synthetic aperture radar, which is excellent for identifying ships and can probably observe a ship as small as 20 meters in length.<sup>41</sup>

The land-based air component of the layered defense consists of both PLA Air Force and PLA Naval Air Force aircraft. Based on open-source information, the only PLA Air Force bombers with anti-ship missiles are a single regiment (about 20 aircraft) of the Badger-variant B6H bomber. These aircraft have been practicing over-water missions and anti-ship attacks since around 2002. The PLA Air Force also has one regiment of FB-7 fighter-bombers and two of the new Russian-built Su-30MKK multi-role regiments that could be used in anti-ship roles. PLA Naval aviation has about 80-JH-7s (four regiments) capable of carrying the improved, 180 km-range (97 NM) C-803K ASCM, and about 40 H-6Ds (badger variant bombers) Most significantly, the PLAN AF has acquired a regiment of Su-30 MK2s armed with the supersonic Kh-31A (AS-17A) air-to-surface missile.<sup>42</sup>

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<sup>40</sup> DOD Annual Report to Congress, "Military power of the Peoples Republic of China 2009," March 25, 2009, [www.defense.gov/pubs/pdf/s/China\\_military\\_power\\_report-2009.pdf](http://www.defense.gov/pubs/pdf/s/China_military_power_report-2009.pdf)

<sup>41</sup> Conversation with Mr. Dean Cheng: CNA China analyst and a leading expert on Chinese space activities. See also his conference report, *China's Space Program: Civilian, Commercial and Military Aspects, A CNA Conference Report*, Alexandria, VA: The CNA Corporation, May 2006.

<sup>42</sup> Roger Cliff, "The Development of China's Air Force Capabilities, RAND Document Testimony Before U.S.-China Economic and Security Review Commission, May 20, 2010. [www.uscc.gov/hearings/2010hearings/written\\_testimonies/10\\_05\\_20\\_wrt/10\\_05\\_20\\_cliff\\_statement.pdf](http://www.uscc.gov/hearings/2010hearings/written_testimonies/10_05_20_wrt/10_05_20_cliff_statement.pdf)



In sum, the PLA Air Force and Naval Aviation Force can field about ten regiments of aircraft with cruise missiles to attack approaching warships—perhaps 200 aircraft. Based on a metric of two regiments per carrier battlegroup, the PLA could muster enough aircraft to attack a three or four carrier force. But it has not fielded a long-range, air-launched cruise missile that would permit these aircraft to launch while remaining outside the surface-to-air missile envelope of US warships. As a result, the aircraft would be vulnerable to fleet air defenses.

As the anti-access concept unfolds today, its submarine force is the most important PLAN capability. This makes sense, given the inherent difficulty in locating very quiet modern submarines. The PLAN gets a great deal of value from submarines because locating a submarine is perhaps the single most difficult operational task that any military faces—because water is not transparent. History has shown that trying to search for them the search locates a great number of ship and aircraft resources. According to the Office of Naval Intelligence:

Chinese submarine procurement has focused on smaller numbers of modern, high-capability boats. Now there are fewer submarines in the PLA(N) inventory than there were at any point in the 1980s. Currently, the submarine force consists of six nuclear-powered attack submarines [SSNs], three nuclear-powered ballistic missile submarines [SSBNs], and 53 diesel-electric attack submarines [SSs]. Over the next 10 to 15 years, primarily due to the introduction of new diesel-electric and non-nuclear-powered air independent power (AIP) submarines, the force is expected to increase incrementally in size to approximately 75 submarines.<sup>43</sup>

In the 10 years between 1995 and 2007, the PLA Navy commissioned 38 new submarines. As previously mentioned, because the vast majority of the PLA Navy submarine force is conventionally powered it has one significant operational drawback; limited endurance and speed.<sup>44</sup> Nonetheless, today it is an imposing force, and there is every expectation that it will continue to improve and to add more nuclear-powered subs.

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<sup>43</sup> Office of Naval Intelligence, *The People's Liberation Army Navy, A Modern Navy with Chinese Characteristics*, Suitland (MD), Office of Naval Intelligence, August 2009, p 21.

<sup>44</sup> Ronald O'Rourke, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, CRS Report for Congress, updated December 23, 2009. CRS website, Order

According to a PLA open source assessment, the refueled combat radius of an F/A-18 is 1200 nautical miles. Whether this is accurate or not is not the point. What is germane is that the article gives a hint at what range the PLAN starts to worry about an approaching aircraft carrier. It also suggests that this the how far from home they might elect to position submarines so they could concentrate and attack carrier forces before aircraft could be involved in an air battle over the Taiwan Strait.<sup>45</sup> If the intent is to delay the US Navy, and perhaps even deter it from proceeding toward Taiwan, the PLA Navy will have to mass submarines in large numbers once carrier forces have been located in order to raise the risk to US surface ships to the point where commanders might elect to stay outside the denial area until it clear of PLAN submarines. This may take as many as six or more submarines per approaching carrier strike group.

Assuming that three to four US carriers would respond to an attack against Taiwan, the PLA Navy would need at least 18 to 24 submarines on station. Its ability to sustain that posture would be a function of how often submarines rotated home and how long it would take to transit between homeport and patrol station. If one assumes it takes three to keep one on station (one on station, one going home, one getting ready to go), somewhere between 60 to 75 modern submarines would be required to sustain an anti-carrier submarine force. In other words, it is reasonable to expect the PLA Navy to continue to grow a modern submarine force if it is to execute an anti-access strategy with confidence.

### **The Anti-Ship Ballistic Missile Problem**

China has taken the Soviet anti-access one step further. The PLA has added a new and very threatening element to the layered defense that comprises anti-access—one that is

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Code RL 33153: 8. This is the single best open-source compilation of information on the PLA Navy available to scholars and research specialists.

<sup>45</sup> Li Xinqi, Tan Shoulin, Li Hongxia (The Second Artillery Engineering College, Xian, China.): “Precaution Model and Simulation Actualization on Threat of Maneuver Target Group on the Sea”, August 1, 2005, in authors possession. This assessment is based on the author’s judgment and is not informed by any particular insight into PLA Navy plans. The logic is straight forward, if the objective is to deny access, then it is important to keep sea-based airpower as far away as possible.

uniquely Chinese and uses one of the PLA's most effective capabilities. This new wrinkle is to use ballistic missiles to attack moving surface warships. Traditionally, ballistic missiles were considered a poor weapon to use against ships at sea: ships move, and once the missile is fired, the aim point of a ballistic trajectory, by definition, cannot be altered to account for target motion.

What the PLA is trying to do is place seekers in high-explosive missile warheads that will activate as the warhead descends into the target area, and then steer the warhead to the moving ship. This is a task that depends on accurate surveillance (once again) plus missile warhead maneuvering technology that can slow down the warhead when it reenters the atmosphere so the seekers are not burned up by the heat of reentry.<sup>46</sup>

The Second Artillery is clearing working on this problem. In a paper published by the Second Artillery Engineering College, the authors conclude:

Providing terminal guidance to ballistic missiles is critical to the successful launch of a precision attack on a slow moving large target at sea. Based on the results from simulation, missiles with terminal guidance capability can have a relatively large range of maneuverability, which may be as large as 100 kilometers (53nm)...Large surface targets at sea, such as aircraft carriers, are relatively poor in maneuverability. It cannot effectively escape an attack within a short period of time. Therefore, a ballistic missile with terminal guidance capability...is fully capable of effectively attacking this type of target with high precision.<sup>47</sup>

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<sup>46</sup> DOD Annual Report to Congress, *"Military power of the Peoples Republic of China 2009*, p21. The report contains a diagram from a 2006 Second Artillery publication that illustrates this missile concept. Over the course of 2009 this issue of ASBM's has received considerable attention. See for example; Michael S. Chase, Andrew S. Erickson and Christopher Yeaw, "Chinese Theater and Strategic Missile Force Modernization and its Implications for the United States," *The Journal of Strategic Studies*, February 2009: 67-114; Andrew S. Erickson and David D. Yang, "On the Verge of a Game-Changer," *U.S. Naval Institute Proceedings*, May 2009: 26-32; Andrew Erickson, "Facing A New Missile Threat From China, How The U.S. Should Respond To China's Development Of Anti-Ship Ballistic Missile Systems," *CBSNews.com*, May 28, 2009; Andrew S. Erickson and David D. Yang, "Using the Land to Control the Sea? Chinese Analysts Consider the Antiship Ballistic Missile," *Naval War College Review*, Autumn 2009, Vol 62, No 4 pp 53-86.

<sup>47</sup> Tan Shoulin and Zhang Daqiao, (Second Artillery Engineering College, Xian, China), "Determination and Evaluation of Effective Homing Range for Ballistic Missile Attacking Aircraft Carrier," *Information Command and Control System and Simulation Technology*, Vo 128, No. 4, August 2006, pp.6-9.

If the PLA can master and field this weapon system, it will be able to present as serious a challenge to the US Navy as the one presented by Soviet Backfire-launched cruise missiles before the introduction of the Aegis radar system. Aside from the technical challenge associated with missile warhead design, the command and control problem of determining an accurate location of an aircraft carrier, getting that information to a missile firing unit in a timely fashion, translating positional information into a guidance solution for the missile which has to include missile time of flight before the target ship moves beyond the terminal seekers window is also an issue.<sup>48</sup> The central point is however, that these all appear to be solvable problems. In this authors judgment this capability, assuming that it is eventually successfully fielded, when combined with the PLAN's robust submarine force, presents the US Navy with an operational challenge that is actually more difficult to surmount than the anti-access capabilities it faced during the Cold War from the Soviet Union.

### **Translating Concept into Reality—still a way to go**

The preceding discussion about how the PLA Navy might execute an anti-access operation in support of a Taiwan invasion scenario is not based on any special insight on my part into PLA Navy's plans. Rather, it is based on a good understanding of how the Soviet Union thought through the very same operational problem—defense against attacking carrier forces.<sup>49</sup> It is also based on what the PLA is actually doing in terms of fielding new submarines, aircraft and surveillance systems, and what they are writing about what they would like to be able to do in the future.

Clearly, the Department of Defense believes that the PLA is working to field an anti-

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<sup>48</sup> This assessment is not based on any specific knowledge of how the PLA will attempt to accomplish this task, keeping in mind that these are the normal steps involved with employing most long-range weapons systems. For the best discussion directly related to an ASBM see Eric Hagt and Mathew Durwin, "China's Antiship Ballistic Missile: Developments and Missing Links, *Naval War College Review*, Autumn 2009, vol 62, p 89. See also ONI, *The People's Liberation Army Navy, A Modern Navy with Chinese Characteristics*, p 26-27.

<sup>49</sup> In the 1980s, the USN developed a maritime strategy, which involved a 600-ship force, in order to defeat the Soviet Strategy. See Hattendorf, *Evolution of US Maritime Strategy*, passim.

access operational concept based on open ocean surveillance, land-based cruise missile firing aircraft, submarines and maneuverable warhead ballistic missiles. In each of these areas the PLA still has work to do before its anti-access is fully operationally ready. As mentioned, the most dangerous future capability is the anti-ship ballistic missile (ASBM) problem, because defenses against ballistic missiles are inherently difficult because the target is so difficult to shoot down because it is traveling at such great speed.

Trying to “trick” missile seekers—both ballistic and cruise—into attacking a false target or simply missing is a tactic all navies have been working since the introduction of anti-ship cruise missiles era in the 1960’s. That obviously is something to continue to consider when thinking through operational and tactical problems presented by maneuvering warhead ballistic missiles.

While maneuvering ballistic missiles are a future problem, the most troublesome problem today are the modern conventional powered submarines because they are the most difficult to detect. During the Cold War the US was able to track Soviet submarines because their machinery and propulsion systems made detectable noise.<sup>50</sup> Modern quiet submarines, be they conventionally or nuclear powered, have greatly reduced or eliminated this tactical liability. As a result locating them depends on the concept first introduced in World War I of sending a pulse of sound into the water and in the hopes of it “bouncing off” a submerged submarine to reveal its location.

If the PLA becomes serious about making major investments in the land-based aircraft portion of its anti-access “weapons triad” will also become a matter of some concern. New generations of aircraft launched cruise missiles than fly at very high speeds and incorporate “stealth” technology are available on the open market, and could be relatively

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<sup>50</sup> ONI, *The People’s Liberation Army Navy, A Modern Navy with Chinese Characteristics*, p 22-22, provides an interesting diagram that illustrates the relationship between radiated noise and relative detectability. See also, Dr Owen Cote, Jr, “The Third Battle: Innovation in the US Navy’s Silent Cold War Struggle with Soviet Submarines,” March 2000, [www.navy.mil/navydata/cno/n87/history/cold-war-asw.html](http://www.navy.mil/navydata/cno/n87/history/cold-war-asw.html) , passim. For a more sensationalized treatment see, Sherry Sontag and Christopher Drew, *Blind Man’s Bluff: the Untold Story of American Submarine Espionage*, Public Affairs a division of Persus Books, 1998, passim.

quickly introduced into both the PLA Naval Air Force as well as the PLA Air Force.

Finally, without an effective open ocean surveillance system that can locate and then continuously track approach warships, none of the hardware capabilities just discussed will be of great use. The ocean remains very large, and ships, even ones as large as an aircraft carrier, are very, very small compared to the vastness of the Pacific. Surveillance is the “brain” needed to make anti-access a reality. It is also the central nervous system of an anti-access war fighting capability and if it can be disrupted the entire anti-access concept of operations can be degraded.

The history of twentieth and twenty-first century warfare reveals that countries are in a constant competition that revolves around introducing a new capability, which is eventually addressed by a counter-capability, which is eventually trumped once again by counter-counter-capability. If the PLA succeeds in fielding a credible anti-access strategy it will almost certainly be addressed by the United States and its allies, otherwise America would not be a credible guarantor of the security of its friends and allies who find themselves either in or on the first island chain. Because a successful PLA anti-access capability would render the US unable to protect its vital interests in East Asia it is reasonable to expect that the United States will keep a close watch on improving PLA capabilities in this area and not stand idly by.

The recently released Quadrennial Defense Review (QDR) is quite clear on this point, and highlights a new US conceptual approach that is intended to deal with the anti-access problem. This US counter-capability has been named Air Sea Battle (ASB). How this concept might take shape is outlined in the aforementioned CSBA report called AirSea Battle.<sup>51</sup> The conclusion seems clear; Washington will do whatever it takes to make certain its capabilities in East Asia match or stay ahead of the PLA’s in this vital area.

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<sup>51</sup> Quadrennial Defense Review Report, Department of Defense, February 2010, p. 32, [www.defense.gov/qdr/images/QDR\\_as\\_of\\_12Feb10\\_1000.pdf](http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf) Jan Van Tol and others, *Air Sea Battle: A Point of Departure Operational Concept*, Center for Budgetary and Strategic Assessment, May 2010, passim. [www.csbaonline.org/4Publications/PubLibrary/R.20100518.Air\\_Sea\\_Battle\\_A\\_/R.20100518.Air\\_Sea\\_Battle\\_A\\_.pdf](http://www.csbaonline.org/4Publications/PubLibrary/R.20100518.Air_Sea_Battle_A_/R.20100518.Air_Sea_Battle_A_.pdf)

Therefore it is likely that the future of East Asia is likely to witness a long drawn out assured access versus anti-access capabilities competition between the US and China.

end

China's Naval Modernization: Cause for Storm Warnings? National Defense Univ SYMPOSIUM June 16, 2010 8:25am - 5:15pm Institute for National Strategic Studies National Defense University. Washington, DC See Events group for NDU summary. NDU.EDU INNS website. \* Superlative Online Library for Pros You must log in or register to reply here. Share China's 2019 defense white paper further outlined the need to build a strong and modernized naval force that is capable of carrying out operations on the far seas. Fleet Breakdown By Country. Fleet Breakdown by Country. The modernization of the People's Liberation Army Navy (PLAN) has resulted in a growth in fleet size and capabilities. Research conducted by RAND suggests that China's surface fleet in 1996 consisted of 57 destroyers and frigates, but only three of these vessels carried short-range surface-to-air missiles (SAM), making them virtually defenseless against modern anti-ship cruise missiles (ASCM). China's naval modernization effort encompasses a wide array of platform and weapon acquisition programs, including anti-ship ballistic missiles (ASBMs), anti-ship cruise missiles (ASCMs), submarines, surface ships, aircraft, unmanned vehicles (UVs), and supporting C4ISR (command and control, communications, computers, intelligence, surveillance, and reconnaissance) systems. China's naval modernization effort also includes improvements in maintenance and logistics, doctrine, personnel quality, education and training, and exercises. Mapping China's Cultural Genome - a curated collection of Chinese-language materials and English-language analyses pertaining to Chinese culture, values, and soft power under the leadership of Xi Jinping. 5. The Physics of Space War: How Orbital Dynamics Constrain Space-to-Space Engagements.