A Chinese Anti-Ship Ballistic Missile: Implications for the USN

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WHY CHINESE ANTI-SHIP BALLISTIC MISSILES MATTER

China is pursuing the development of very long-range, land-mobile, maneuverable re-entry vehicle-equipped (MARVed)[1] anti-ship ballistic missiles (ASBMs), apparently a variant of the DF-21 medium-range ballistic missile (MRBM).[2] Like the Chinese development program itself, public awareness of the potential regional "keep out" capability of Chinese ASBMs is gaining steam in the West, as evidenced by the May 2009 issue of *Proceedings*.[3]

Such an unprecedented anti-access capability—to hit a ship underway with a ballistic missile--has numerous implications for the U.S. Navy, the U.S. military, and American strategic mobility both in the Asia-Pacific and globally.[4] China's potential development of an anti-ship ballistic missile would give it an anti-access weapon that could hold U.S. carrier strike groups at bay. Experts believe such a missile would be a DF-21 variant, a member of the Dongfeng family of missiles.[5] As U.S. Naval War College professors Andrew Ericson and David Yang point out in their May 2009 *Proceedings* article, "On the Verge of a Game-Changer", China probably does not yet have a ballistic missile capable of destroying the major components of a U.S. aircraft carrier, but Beijing is pursuing this capability, and "(a) Chinese anti-ship ballistic missile could alter the rules in the Pacific and place U.S. Navy carrier strike groups in jeopardy."[6]

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[1] MARVed: Fitted with a Maneuverable Re-entry Vehicle, a self-targeting ballistic warhead that maneuvers in the final phase of flight to hit a target that initially is detected, selected, and tracked by off-board, typically over-the-horizon or on-orbit systems.

[2] For the most recent authoritative unclassified analysis of this developing Chinese anti-access capability, see Annual Report to Congress: Military Power of the People's Republic of China, 2009, Office of the Secretary of Defense, Washington, D.C.

[3] See Andrew S. Erickson and David D. Yang, "On the Verge of a Game-Changer"; and Paul S. Giarra, "NOW HEAR THIS: Watching the Chinese", both from *Proceedings*, U.S. Naval Institute, Annapolis, Maryland, Vol. 135/5/1,275 May, 2009. The cover of this May 2009 issue of *Proceedings* depicts a U.S. Navy Nimitz class aircraft carrier and its AEGIS escort in flames after being struck by a Chinese anti-ship ballistic missile.

[4] A briefing on these implications was presented at the fourth annual U.S. Naval War College China Maritime Studies Institute conference--"Maritime Roles for Chinese Aerospace Power"--in Newport, Rhode Island December 11 and 12, 2008.

[5] Military Power of the People's Republic of China, 2008, op. cit.

[6] Andrew S. Erickson and David D. Yang, op. cit.

Imagine very long-range artillery with great accuracy, that was land-mobile, making counter-battery fire virtually impossible. Then imagine that someone had the idea to turn it seaward and make it capable of hitting a ship under way by adding a "shell" that could actively seek and home in on its target. This is what China's ASBM amounts to: extraordinarily long-range coastal artillery.

Chinese ASBMs are a "keep out" capability designed to attack naval surface platforms, which are the centerpiece of American naval power and the basis for U.S. deterrence strategy. In any reasonable future scenario, American security depends on unimpeded naval power. Dealing with a complex, fractious, and increasingly insecure world will require that the United States be able to exploit the maritime external lines of communication. China's development of ASBMs makes moving to and remaining in near-ashore sea areas problematic for us. Just getting there is going to be half the fun.

If left unchecked, Chinese ASBMs will have dramatic implications for the other U.S. Services, as well as for friends and allies. No other American military operations, whether air, ground, or amphibious, are feasible in a region where the Navy cannot operate. China's strategic intent is to put at severe risk the eyes, ears, and fists of American power projection systems built for short-range, persistent operations in the Asian littoral and China's maritime approaches. Conversely, ballistic missiles ranging American bases and en route facilities make naval operations very problematic. Not only do the Marines, Air Force, and Army share a vital common vested interest with the Navy and American allies in defeating an ASBM capability, but it is unthinkable that the Navy could defeat a Chinese ASBM threat without profoundly joint and combined approaches.

Thus, the Chinese ASBMs represent a remarkably important asymmetric attempt to control the sea from the shore. The capability is not yet operational, but the Chinese appear to believe they can develop the technologies and integrate the individual systems required. In part, they are exploiting earlier Soviet and American developments.

The Chinese capability will depend upon--and represents the real advent of--network warfare. Their missiles have to be aimed at the general area of a network-detected naval target, where their internal guidance systems can take over. Like the Soviets before them, the Chinese are now trying to solve this difficult reconnaissance-strike problem. But unlike the Soviets, and armed with technology they never had, the Chinese appear to believe that they can make this complex capability work. Commanders and analysts should watch for at-sea testing to gauge Chinese progress and intentions. Just as China already has shot down an old satellite to make the point that they can do it, at-sea testing of an ASBM capability will represent a clear indication of Chinese ant-access intentions as well as capabilities.

Much is riding on whether the Chinese can actually succeed in developing an ASBM. For persistent long-term operations, the U.S. Navy is based primarily on aircraft carriers and their embarked air wings. Without extraordinary efforts to provide for air-to-air refueling, naval aircraft have an effective tactical radius of less than 1,000 nautical miles. The DF-21, a relatively short-range option for ASBM capability, has a similar range, "in excess of 1,500 kilometers" according to the 2009 Defense Department report on China's military power[7].

The numbers are going to be in China's favor. In a wartime situation, even if every U.S. interceptor hit and destroyed an inbound ASBM, naval missile magazines are very limited and cannot be reloaded at sea. This is a glaring deficiency for the U.S. Navy. It severely limits the attributes of mobile and flexible striking power, and turns high-tech, network warfare into a simple battle of attrition favoring the offense. It also reflects a forgotten lesson: that sustaining strategic maritime mobility as exercised by the U.S. Navy depends upon at-sea logistics as part of a fleet train formidable in its own right, that enables replenishment and re-supply on the move.

Bad news does not improve with age. Once the Chinese develop an ASBM capability, it is bound to escalate in sophistication and effectiveness and proliferate widely over time— the gift that keeps on giving— further complicating America's military posture. But this is an opportunity for U.S. Navy technical and analytical introspection regarding the resources, organizations, processes, and continuity that the United States must have for coming to grips with this and other complex operational and technical challenges.

FAIR WARNING

It is fortuitous that the U.S. Naval War College's China Maritime Studies Institute translated for publication the Chinese *Shipborne Weapons* journal article "The Effect of Tactical Ballistic Missiles on the Maritime Strategy System of China."[8] Given its operational and strategic implications, the article might as well have been titled: "The Effect of China's Potential Asymmetric Strategy for Land Control of the Sea through Tactical Anti-Ship Ballistic Missiles on the United States Navy's Maritime Strategy and American Global Mobility." In what amounts to fair warning to U.S. Navy commanders and strategic planners, the *Shipborne Weapons* article raises a series of important and timely questions for American strategic planners, and introduces a set of challenges that will stretch the capabilities, resources, and imaginations of American analysts. [9]

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[7] Military Power of the People's Republic of China, p. 29.

[8] Wang Wei, "The Effect of Tactical Ballistic Missiles on the Maritime Strategy System of China." *Shipborne Weapons* No. 84 (August 2006): 12-15.

[9] This analysis was drawn from a briefing on Chinese ASBMs, Paul S. Giarra, "As '*If*' Becomes '*When*': Chinese Maritime Over-the-Horizon Targeting (OTH-T) and Mobile,

Not since the 15th century has China's Navy come to sea in a meaningful way. Ultimately it will be up to Beijing to answer the question of whether or not the PLA Navy is "coming out." As often as not, the question posed by American naval officers and maritime strategists has been whether or not the Chinese would mirror American naval capabilities, as reflected by the perennial interest in whether a PLA Navy aircraft carrier was looming on the horizon. Likewise, Chinese submarine developments and shipborne anti-surface unit warfare and anti-air warfare developments have provoked interest in Japan and the West, and in particular a renewed interest in ASW. For the most part, however, the jury has not returned a verdict on the scope, scale, and form of Chinese naval ambitions.

However, the PLA Navy's more or less symmetric "coming out" is not the same as asymmetric Chinese measures designed to keep out the U.S. surface fleet. The prospect of Chinese land-based mobile, MARVed (maneuverable re-entry vehicle) ASBMs able to range U.S. and Allied surface units at extremely long range (thousands of miles) magine extraordinarily long range, mobile coastal artilleryis sufficiently different in kind from conventional maritime anti-access capabilities to merit very serious due diligence in Washington, Canberra, and Tokyo. Such a capability, if successfully developed and fielded, also would be different in degree from previous Chinese anti-access methods, due to the stifling effect such an asymmetric land-based Chinese system could have on American strategic mobility as the U.S. Navy has come to understand and exploit it.

While it is not clear from unclassified sources that the PLA could or would field land mobile, MARVed ASBMs, it is increasingly apparent that the Chinese are considering doing so. The *Shipborne Weapons* article translated by CMSI suggests that there is more than one channel to the sea buoy for China, and alternatives to Western doctrine and practice for Chinese maritime strategy and naval capabilities. The *Shipborne Weapons* article on Chinese ASBMs is not "new news." Chinese writers have been publishing on the subject for some time.[10] Fortunately for the U.S. Navy, CMSI had the perspicacity to

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MARVed Anti-Ship Ballistic Missiles (ASBMs) -- Implications for the U.S. Air Force of Potential U.S. Navy Consequences," 9 July 2007. This briefing showcases the translated *Shipborne Weapon* article on Chinese ASBMs.

[10] "Movement Forecast Model and Precision Analysis of Maneuvering Targets at Sea," Second Artillery Engineering Academy, 2005; "Concept of Using Conventional Ballistic Missiles to Attack a Carrier Fleet," *Science and Technology Research*, No. 1., 2003; "Study of Attacking an Aircraft Carrier Using Conventional Ballistic Missiles," Institute of Engineering (Second Artillery Corps), Xian 2002; "Preliminary Analysis on the Survivability of a US Aircraft Carrier," *Guided Missiles*, No. 5, 2000; op. cit., Jason E. Bruzdzinski, *Military Operations Research in the People's Republic of China: The Influences of Culture, "Speculative Philosophy" and Quantitative Analysis on Chinese Military Assessments*, June 2007, The MITRE Corporation, McLean, Virginia.

find, select for translation, and publish for broader review this particular article, which does a good job of laying out Chinese views on this potential new capability.

Chinese ASBMs have the potential to be the manifestation of asymmetric warfare in the sense that Andrew Marshall, Director of the Office of Net Assessment in the Office of the Secretary of Defense the Secretary originally meant when he talked about the Revolution in Military Affairs. For very little investment relative to the capacity of the Chinese economy, the Chinese seem to be acquiring an effective answer to forward U.S. deployment against them.[11]

While Chinese ASBMs might not come under the heading of an "Assassin's Mace," given that such a technically demanding system-of-systems capability inherently is so visibly part of a large reconnaissance-strike complex, they are nevertheless an apt example of asymmetric Chinese approaches to sea control and maritime security.

CHINESE COMMENTARY AND AMERICAN CAVEATS

What the Chinese Are Saying about Land Mobile ASBMs: A Lot!

As with other significant defense programs and strategies, the Chinese are saying quite a bit publicly regarding speculation, rationale, and plans for a new anti-ship ballistic missile capability in open source academic, military and media writing. This springs from the literary nature of China, where writing and the keeping of records play a large cultural role—a process now more widespread than ever with the advent of a modern publishing industry. In fact, there is so much information available to military analysts that simply collecting, collating, and translating relevant Chinese writings is a daunting analytical task in itself. Translation is particularly problematic for Western analysts, given the paucity of technical trained Chinese linguists and the lack of satisfactory progress in machine translation capability available to the journeyman analyst.

Media reporting and speculation plays a role in publicizing potential new capabilities such as Chinese ASBMs, and as elsewhere, the wonders of the Internet enable sharing and distribution of relevant information. While the prospect of Chinese ASBMs to challenge the American Navy in the Asia-Pacific may not be exactly new news, the issue is reaching critical analytical mass in the unclassified realm of open source materials and unclassified analysis.

Caveats Regarding Chinese Writings

Lest one become carried away by the prospect of analytical richness, several caveats are in order here, as with all aspects of Chinese military writings. Spoofing and deception

[11] Correspondence with the author from a senior American Asia specialist, June 2007.

are part of China's stock in trade. Decades of speculation regarding PLA(N) aircraft carriers is a case in point: what amounts to a cheap way to distract the opposition. Therefore, a healthy dose of skepticism is a good thing when it comes to breathtaking new Chinese military capabilities. Language and cultural misunderstandings are another analytical stumbling block. That American analysts on occasion find themselves translating from the Chinese articles that originated in the United States is a good reminder that it takes some effort to keep the record straight. Furthermore, American analysts generally just scratch the surface of what is available in open source literature. Any effective response will have to do a better job of assessing what is being said across the board in China in order to gauge the significance of articles such as this one on ASBMs.[12]

Strategic Signaling

With these caveats in mind, the potential for genuine strategic signaling by Beijing regarding this new ASBM capability must be taken seriously: no nation that depends upon strategic mobility and maritime power can afford to be wrong about such a capability. In this particular case, in a stroke of competitive strategy, China might be particularly motivated to let us know what is coming, in order to focus American attention just where Beijing wants it, in an area where it might be difficult to surmount budgetary and perhaps political restrictions. Determining the veracity of the *Shipborne Weapons* article on ASBMs, and other Chinese expositions like it, is thus a high priority analytical task.

"The Effect of Tactical Ballistic Missiles on the Maritime Strategy System of China": What the *Shipborne Weapons* Article Says

The *Shipborne Weapons* article calls for a certain analytical perspective from the outset. This analysis stipulates that comments by the author of the *Shipborne Weapons* article regarding Taiwan-related geopolitics, strategic space, escalation control, etc., apply equally to both theater wide operations against the United States Navy absent considerations of Taiwan--i.e., in the broader context of Sino-American relations.

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[12] By the end of World War II, there were established heavily resourced and well-staffed codebreaking and translation production lines to deal with the volume and timeliness of intercepted Japanese and German radio messages. For example, for descriptions of how World War II cryptanalysis production was optimized to leverage scarce linguistic, mathematical, cryptanalysis, and analytical resources in support of voluminous requirements, see *The Emperor's Codes: The Breaking of Japan's Secret Ciphers*, by Michael Smith, and *Double-Edged Secrets – U.S. Naval Intelligence Operations in the Pacific During World War II*, by W.J. Holmes. It is unlikely that the United States will mount anything like that response in support of China analysis anytime soon, given that the U.S. government cannot seem to produce sufficient Arabic linguists for the American Embassy in Baghdad.

Likewise, the *Shipborne Weapons* author's comments apply more generally at the strategic level in the Asia-Pacific in the Sino-American state relationship, again with its own fundamental dynamic separate and distinct from considerations of Taiwan. Furthermore, Chinese doctrinal, political, and operational observations in *Shipborne Weapons* regarding Taiwan extrapolate well to mobile targets at sea, and are treated accordingly.

Therefore, subsequent comments by this author will take the following approach: that in essence Taiwan is a stalking horse for the broader bilateral relationship between Beijing and Washington; that the implications of a potential Chinese ASBM capability apply equally to the broader case; and that in military-operational and geostrategic terms, land attack ballistic missile attributes assigned by the *Shipborne Weapons* writer are shared equally by anti-ship ballistic missiles.

Parsing the Article

The observations contained in the *Shipborne Weapons* article may be summarized as follows:[13]

ASBMs resolve China's operational inferiority at sea.

- Strategic systems can be forced to the rear ("at a shallow depth") by defenses (i.e., B-52s in a tactical role.)
- Compared to aircraft, ballistic missiles can play an "outstanding role" for "third world countries" for "penetration of the enemy's defense space."
- "By means of ballistic missiles, the party in the inferior position with respect to combat aircraft can still deliver firepower against the party in the dominant position."
- "Simply put, the emergence of TBMs enables the weaker side, for only a small price, to offset to a certain extent the expensive air combat system effectiveness from the stronger side."
- [This development] may to some extent help to remedy the inferiority of the quality of traditional naval combat platforms.

ASBMs enable China to penetrate defensive systems.

- ". . . a strong capability for penetration of the enemy's defense system."

ASBMs provide an asymmetric anti-naval capability that would enable China to control the sea from the shore.

- "Use of Tactical Ballistic Missiles Under the Concept of Relying on Land to Control the Sea"

[13] Unless otherwise specified, phrases in the section are all direct quotations from the *Shipborne Weapons* translation.

- . . . With regard to naval combat systems, if the TBM maritime strike system is created, then the Chinese military in any future potential conflict at sea will have a relatively asymmetrical means of firepower delivery.
- . . . (At) the strategic level, . . . (if) a TBM sea combat system comes into existence, then during any future high-intensity conflict at sea in the coastal waters of China, this system, among various national means of offensive and defensive firepower delivery, will provide a relatively asymmetrical combat environment.

ASBMs are technically achievable.

- . . . the surface vessel target creates a strong contrast against the background and is clearly much easier to recognize.
- Speed and maneuverability of the naval target is a relatively trivial matter, in relation to ASBM speeds.
- Surface ships are highly integrated (i.e., therefore vulnerable to disruption and mission kill) physical platforms.
- . . . for China, there will be no so-called technological "bottleneck" when it comes to controlled, motor-driven [course correction of] ballistic missiles in outer space.
- . . . (missile) control during the reentry stage and other kinds of guidance technology during the final stage . . . were used for the "Pershing" missiles developed during the Cold War period. Currently, TBMs in the service of (the PLA) also use this kind of technology. Thus, it can be assumed that the technical problems of the missile itself are not insurmountable.

ASBMs increase China's strategic-military space on her maritime approaches.

- ". . . (at) the strategic level, (ASBMs) increases China's military and political area of operational space with respect to the eastern maritime flank . . ."
- This . . . creates a greater policy decision space for (China) with respect to Taiwan.
- In addition to the value [of TBMs] as a means of retaliation, [these weapons] will also serve as an "existential threat" to counter the adversary's deployments at sea.
- . . . the problem of intervention by foreign military forces is one that cannot be neglected. [Therefore] it is necessary to undertake strategic deployments in advance, which will contain the opportunities for this intervention to a minimal level.

ASBMs provide China strategic-political room for maneuver.

- . . . TBMs offer . . . a third choice other than the all out use of force or alternatively reliance on non-military means . . . to undertake the military strategy of "fighting without entering."
- . . . Still another effect is that the existence of asymmetric means of attack under this kind of high-intensity environment objectively sets up for both sides, from the psychological point of view, an "upper limit" for the scale of potential conflict.

This will enable both parties in the conflict to more easily "return to rationality." Therefore, [China will] have increased space for maneuver in coping with maritime disputes.

ASBMs enable China to avoid strategic complications of land attacks.

- . . . this means of firepower delivery essentially precludes any kind of "engagement" between the two sides, thus it provides (China) with the ability to take control of the military action as well as the trend and development of its corresponding political effects.
- From (China's) point of view, there will not be too many problems of either a military or political nature concerning the maneuver and deployment of tactical missiles on its home territory.

ASBMs facilitate for China the establishing of escalation control/dominance.

- Conversely, the available maneuver space for the Taiwan authorities is correspondingly compressed, therefore reducing the risks.
- Ballistic missiles . . . provide the aforementioned "quasi-war" action with a workable control function.
- There is another useful role for the TBM. Over a long period of time, the deployment along the mainland's coasts of medium and short-range TBMs has already had a significant psychological impact . . .
- Whether to change the number of missiles deployed become(s) a means to exert influence upon the island's internal political situation.

ASBMs require extensive operational and intelligence preparation of the battlefield.

- . . . the key to ballistic missile strikes against targets at sea lies in the preparation of the maritime battle space. [This will require] the timely precision reconnaissance of the target's orientation, as well as the problem of transferring this data. This is the prerequisite condition for attack against a moving target.
- Preparation of the sea battlefield will require:
    - marine surveillance satellites, electronic reconnaissance satellites, imaging reconnaissance satellites, communication satellites and other space-based systems; airborne early warning aircraft and unmanned reconnaissance aircraft; airbase systems; shore based over-the-horizon radars; and underwater sonar arrays.

ASBMs rationalize a necessary and appropriate national level Chinese "public investment."

- "It is worth noting that these systems must be viewed as a 'public investment'--part of a comprehensive naval combat operations system."

INITIAL ANALYTICAL CONCLUSIONS

The *Shipborne Weapons* article suggests several initial conclusions:

- ASBMs are an extremely attractive, self-reinforcing option for China.
- Chinese ASBMs would provide the PLA with a potential significant operational level capability that had strategic implications.
- At least some Chinese analysts think that ASBMs are technically feasible.
- Chinese ASBMs would be part of a Chinese system of systems reconnaissance-strike complex.
- Chinese ASBMs would be potentially destabilizing, to considerable U.S. strategic disadvantage.
- As "*If*" China fields ASBMs becomes "*When*" China fields ASBMs, the military-strategic balance of power will change in the Asia-Pacific.
- More than ever before, the U.S. Navy cannot afford to forego the advantages of Joint approaches to data collection, analysis, planning, and operations.
- Conversely, the U.S. Air Force has a significant strategic stake in this ostensibly maritime issue, because the Asia-Pacific is an aerospace theater as well as a maritime one: when the U.S. Navy catches cold, the U.S. Air Force sneezes.
- This is the time to muster significant analytical resources to verify or disprove the prospect of an effective future Chinese ASBM capability. The United States cannot afford to be wrong about this potentially destabilizing Chinese development.

Historical Examples of Technical Breakthroughs with Operational and Strategic Effects

Other military-technical breakthroughs have had immediate operational effects. One familiar example from Asia-Pacific military history is that of the Imperial Japanese Navy's shallow-running aerial torpedoes at Pearl Harbor, which enabled Japan's operational success against Battleship Row when it was presumed (despite the recent British precedent at Taranto against the anchored Italian Fleet) that such an attack on the U.S. Fleet was not possible.

Another relevant and evocative example of technology enabling an immediate operational and strategic effect, and thereby changing everything overnight, might be the Battle of Hampton Roads in March 1862, also known as the Battle of Monitor and Merrimack, in which the debut of the naval ironclad dramatically changed naval warfare even more broadly.

If China can succeed in integrating the elements of a complex over-the-horizon targeting capability, then an anti-ship ballistic missile capability might turn out to be another example of a military-technical breakthrough that had not only operational, but strategic effects.

China is Pushing the Envelope in Other "Challenge Areas" As Well

It is even more daunting to consider other Chinese "Challenge Areas,"[14] in which the PLA seeks breakthroughs in unprecedented areas in a long-term campaign of military challenge, thereby belying--or at least complicating--prospects for Sino-American cooperation in the global maritime commons:

- Space Warfare (as potentially supported by cis-Lunar and Moon based operations[15])
- Space Information Architecture
- Ballistic Missile Defenses and Countermeasures
- Manned Moon Presence
- Advanced strategic ICBMs and MRBMs
- Energy Weapons
- 5th Generation Fighter Aircraft
- Unmanned Combat and Surveillance aircraft
- Advanced diesel-electric and Nuclear Submarines
- Aircraft Carriers
- Large Amphibious Assault Ships
- Large 60 ton Capacity Airlifters
- Airmobile Army Forces

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[14] Richard D. Fisher, Jr., *Two Cheers For the 2007 PLA Report*, International Assessment and Strategy Center, http://www.strategycenter.net/research/pubID.162/pub_detail.asp., June 20th, 2007.

[15] Chris Lay, Dr. Robert Angevine, and Renny Babiarz, "Indicators and Evidence of an Emerging U.S.-China Strategic Space Competition, Final Report," prepared for The Office Of Net Assessment, Office of the Secretary of Defense, The Strategic Assessment Center, Science Applications International Corporation, April 2005.

Why might China "push the envelope" in the maritime and other domains? The explanation of first resort is generally Beijing's determination to dominate any military confrontation with the United States over Taiwan, as manifested by control of China's littoral and coastal waters out to the First Island Chain. However, this rationale is complemented by looming considerations of sea lane security and the seaborne flow of oil "for the lamps of China," which raises the issue more generally of the vulnerability of China's seaborne commerce, and tacit (and uncomfortable) dependence upon the U.S. Navy for freedom of the seas. China's perceived dependence and vulnerability, whatever the objective facts, are bound to have real psychological effects on strategic planning.

In this regard Chinese strategic stakes in the maritime domain include:

- Dependence upon Sea Lines of Communication for
    - Access to markets
    - Access to raw materials for China's growing infrastructure and industries
    - Energy supplies delivered by sea, and

- Increasingly important "string of pearls"[16] political connections with client states in regions as disparate and distant as Africa, Latin America, and the Mideast

- China's Merchant Marine

- State prestige
    - Including the contextual irony of China's own growing surface Navy

- Regional power projection forces

- Naval post-conflict strategic exploitation

Sino-American Competition: Anti-Access vs. Strategic Mobility

These broader considerations of China's stake in the maritime domain point to Chinese motivations deeper than concerns regarding a conflict over Taiwan, and suggest a more fundamental bilateral competition with the United States, which, inter alia, pits a Chinese anti-access strategy against the U.S. dependence upon strategic mobility in the Asia-Pacific and globally.

In the context of a military net assessment, a *competition* takes place over time between rival powers striving for military advantage with strategic implications. Construing and

[16] Christopher J. Pehrson, *String of Pearls: Meeting the Challenge of China's Rising Power Across the Asian Littoral*, Carlisle Paper, Strategic Studies Institute, U.S. Army War College, Carlisle, PA, 25 July 2006.

defining competitions have been used as tools by the Dr. Andrew Marshall, Director of the Office of Net Assessment. The Battle of Britain is an example of one campaign in a strategic aerial bombardment vs. air defense competition between the Allies and the Axis powers during the Second World War. The outcome of a competition depends upon myriad intuitive but less obvious factors in addition to capabilities, systems, platforms, tactics, and operations, such as:

- Doctrine
- Personnel
- Governance
- Command and Control
- Decision Processes
- Organizations
- Industrial Base
- Scientific Base
- Technology
- Strategic Choices & Proclivities
- Defense Economics
- Sustainability

These factors suggest the beginnings of the broadest outline for an analytical schema regarding Chinese capabilities, applicable to each of the above Chinese challenge areas, and to the issue of Chinese ASBMs in particular.[17]

Defining the nature of the competition is the first salvo in anticipating, equipping for, deterring and/or fighting the battle envisioned in it, and this includes "winning without fighting". Competitions can take place without a shot fired, but result in strategic outcomes nevertheless, such as the Soviet-U.S. submarine vs. antisubmarine warfare competition of the Cold War. This latter aspect of competitions resonates with particular poignancy with the PLA.

China's continuing anti-surface ship developments are part of what amounts to a U.S.-China strategic mobility vs. anti-access "*competition*," in the very best Net Assessment sense of the word.[18] The United States depends upon strategic mobility across the broad

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[17] For a more detailed discussion of an analytical taxonomy relevant to Chinese mobile, MARVed ASBMs, see Paul S. Giarra, "When "If" Becomes "When": Thinking About How to Think About Chinese Mobile Maneuverable Re-Entry Anti-Ship Ballistic Missiles and Effective Long Term Competitive Analysis--Initial Questions for Analysis Resource Managers," Occasional Paper, Hicks & Associates, 24 June 2007.

[18] In the context of a military net assessment, a competition takes place over time between rival nations striving for military advantage with strategic implications. The Battle of Britain

reaches of the Pacific, and throughout the Asia-Pacific littoral, and upon the geostrategic advantages of penetrating access to the Asian heartland. If Beijing intends to challenge what amounts to American maritime dominance, the PLA will have to secure and defend China's maritime approaches, and stymie U.S. strategic advantages of unimpeded access throughout the Asia-Pacific.

Implications for Competitive Strategies

As intended by the Net Assessment practice, defining and embellishing this competition raises all sorts of implications for competitive strategies, both American and Chinese. The point for American planners is to consider the nature and implications of the competition. Since it takes two sides to compete, American planners should consider ways to strengthen aspects of the competition that favor the United States, and alternatives and work-arounds to those factors favoring China.

Internal to the Sino-American anti-access vs. strategic mobility competition, there are available many options for doctrinal, strategic, and operational tactics, techniques, and procedures (TTPs); and those technological, and asymmetric responses the U.S. might consider in order to defeat Chinese capabilities in detail. Once the competition has been parsed, possibilities such as command and control warfare, and ways to deconstruct the necessary integrity of a Chinese OTHT system of systems, will begin to make themselves evident. External to the competition, and defined by it, are numerous opportunities for competitive strategies that in concept would prompt desired responses or preclude negative actions by Beijing at the strategic level, viz.: fomented land border crises that preclude maritime aspirations; penetrating bombers that divert assets to air defense, etc.

If these options sound familiar, they should. They come from the Cold War playbook, written specifically to deter, constrain, and defeat the Soviet Union in an earlier era, and remain generally relevant to future peer and near-peer competitions. As during that earlier era, coming to grips with the implications of emergent Chinese anti-access capabilities amounts to an extended, complex analytical and decision support challenge confronting U.S. political leaders, legislators, military commanders, defense officials, diplomats, and intelligence analysts. For this set of actors, the initial cognitive and analytical engagement is always difficult, and sometimes the most difficult step of all in meeting such a challenge.

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is an example of one campaign in a strategic aerial bombardment vs. air defense competition, the outcome of which is dependent upon myriad factors such as doctrine, sustainability, industrial and scientific base, technology, defense economics, and strategic choices and proclivities, in addition to tactics and operations. Defining the nature of the competition is one of the first steps in anticipating and equipping for the struggle. Competitions can take place without a shot fired, but result in strategic outcomes nevertheless, such as the Soviet-U.S. submarine vs. antisubmarine warfare competition of the Cold War.

This competition is much more sophisticated and complex than simply considering whatever missile the PLA might develop, just as a complex over-the-horizon targeting capability envisioned here is about more than simply the land mobile, MARVed anti-ship ballistic missile. Both competitions and systems of systems generally amount to more than the sum of their parts. Considering each part in turn is a necessary prerequisite to understanding how to derail the competition by diverting it, or how to defeat the system in detail by disconnecting it. Therefore, thinking about the array of technical, doctrinal, and operational components that embody such a capability and its attendant collection and analysis challenge is the necessary first step in managing effective organizational, resource, analytical, and political responses, at both the strategic and operational levels.

Inter-Service Dependence: The U.S. Air Force Stake in Chinese ASBMs

The complexity of this potential Chinese challenge raises an interesting question for Navy commanders and strategists: the extent to which the U.S. Air Force has a large stake involved, and an operational/strategic flank to protect. Inter-Service dependence, and the lack thereof, is an old subject worth reviewing in the Asia-Pacific context.

Americans remember with thanks that it was Japan that wrote the book during World War II on exposing its own strategic flanks. The woeful lack of coordination between the Imperial Japanese Army and Navy prior to and during WWII, far worse than the American case, was a mortal blow to Tokyo's aspirations in the region, just as the disastrous broader lack of strategic and operational coordination between Japan, Germany, and Italy was a fatal blow to the Axis.

However, American inter-Service planning and operational collaboration prior to Pearl Harbor is another example of disjunction with permanent relevance for the United States, and this disruptive ethic transcended the entire preceding interwar period. This might be a good time to assign several sharp Air Force strategists to N 3/5 to help with the new Maritime Strategy, and at the same time detail several Navy strategic planners to CHECKMATE at Air Force Headquarters.

Range and Risk in Naval Warfare: The Potential Operational Effect of Chinese ASBMs

At the operational level, maritime commanders try to range their adversaries at sea through stealth or weapons range because the offense--firing first from the greatest range--has the advantage. Since modern naval vessels are "highly integrated physical platforms" in Chinese parlance (i.e., therefore vulnerable to disruption and mission kill), naval weapons have a high probability of at least mission kill if they can hit the target. If opponents can be ranged routinely, then the operational effect becomes strategic, hence the importance of aircraft carriers to American strategic maritime dominance.

Naval commanders also recognize that, as at Gettysburg and again on the Western Front in World War I, weapons at sea are far ahead of tactics. Therefore, if at all possible, they must and will maneuver to avoid contact if the correlation of forces is unfavorable. The inherent range advantage of Chinese MARVed ASBMs able to range surface ships at sea--what amounts to coastal artillery of extraordinary range (thousands of miles vs. 29 miles)--will affect the range and risk calculations of surface unit commanders, and could shift the maritime balance for the U.S. strategic commander in the Pacific.

Numbers Count

Numbers count when the range advantage monopoly is broken, especially to a force structure that has so much capability concentrated in so few hulls.

Consider that there are only about two dozen capital ships in the U.S. surface fleet:

- 11 or 12 heavy aircraft carriers operating in carrier strike groups; and
- 12 aviation capable "straight deck" amphibious assault ships operating in expeditionary strike groups

Even adding to these numbers the other high value units of the U.S. and potential coalition fleets--major combatants, command ships, replenishment ships, hospital ships, and transports--there are relatively few capital ship targets.

The capital ships--the big deck carriers--are robust, but they are by no means unsinkable. With so few high value assets, commanders and planners have to consider whether a successful attack against even one of these ships, let alone a loss, would be psychologically devastating at home and operationally debilitating at sea. The potential result of such effects would be a significant decrease in overall U.S. Naval power—real and perceived—in the region.

Given that prudent allies and interested observers, reading the same Chinese publications and perfectly capable of doing the strategic and operational math, are making their own calculations in advance, this is not a casual or theoretical issue for the U.S. Navy. Commanders and planners will want to know more about China's technical ASBM capabilities in order to develop operational and technical options for defense, since innovative and effective asymmetric countermeasures might reduce the necessary costs and necessary defensive levels of effort of fleet defense per se.

Nevertheless, U.S. Navy and regional and functional combatant commanders would have to give high priority to active fleet defense against Chinese MARVed ASBMs, against which even "minimal" operational and technical options would be difficult and expensive. While too early for definitive comparisons, much less conclusions, consider

the level of effort in the Navy's Cold War response to the Soviet anti-carrier threat, and that period's strategic investment in significant collection, analysis, war planning, decisionmaking, and procurement. Over the course of the competition with the Soviets, for example, the heavy opportunity costs of defensive systems in Navy hulls detracted considerably from battle group strike power.

Caution Will Dictate the Quest for Understanding

In the context of the developing bilateral anti-access vs. strategic mobility competition, and in the event of specific ASBM developments, prudence will dictate great political and operational caution, *on both sides*. It will be incumbent upon U.S. leaders to understand *Chinese* calculations from a *Chinese* perspective, regarding decision-making on the part of the PRC leadership leading to attacks on American Carrier Strike Groups and Expeditionary Strike Groups with ASBMs at extremely long ranges. Among other scenarios, Americans will have to consider Chinese reactions to American naval deployments, as well as surprise attacks when these U.S. naval formations have not yet made any overtly aggressive moves against China.

Can the Chinese Succeed Where the Soviets Failed?

If the Chinese can achieve what the Soviets attempted, and bring to bear long range strike assets in a new way against mobile naval targets, this would be a warfighting breakthrough of strategic and arguably historical consequence. This Chinese capability would put allied navies and the world's merchant shipping at significant risk, thereby upsetting the current strategic military calculus that ships at sea cannot be targeted effectively by long range systems. The stakes are very high.

A Chinese ASBM capability would be the embodiment of what once were the Soviet Navy's aspirations for a reconnaissance-strike complex of sea- and space-borne sensors and regiment-sized attacks by anti-ship bombers armed with long range anti-ship cruise missiles, coordinated with submarine and surface vessel attacks. Is it possible that China could succeed where the Soviets appear to have failed at constructing an over-the-horizon reconnaissance-strike complex?

Cold War historians might consider whether the Soviets actually did fail, or whether their reconnaissance-strike achievements were masked by the inconclusive way the Cold War ended. At the least, perhaps the Soviet Union left as its legacy a reconnaissance-strike complex poison pill. Furthermore, metrics of success differ. It will be up to savvy American China analysts to determine, *from the Chinese perspective*, how Beijing would measure reconnaissance-strike success, given its deterrent and political as well as operational implications.

From an American perspective, the offense at sea (and in this case the PLA is striving to turn the tables and gain the operational offensive) has an inherent advantage. For the U.S. Navy, technical breakthroughs that would make MARVed ASBMs a viable option for China would be particularly dramatic for three reasons:

1. First, the reconnaissance-strike complex as a whole is not cheap, but it is much less expensive than defensive systems.

2. Second, for that reason large numbers of penetrating systems can be fielded that are able to overwhelm defenses in coordinated attacks.

3. Third, in a naval context, interceptor missile at-sea magazine capacity on board targets and escorts is severely limited, and defensive load-outs would be exhausted rapidly in a saturation-attack scenario, given current U.S. Navy force structures and ship designs. This third point plays out time after time in various analytical venues.

Obviously, ABM interceptors will not be the only countermeasure fielded against a Chinese ASBM threat. The U.S. Navy learned during the Cold War not to concentrate on the arrow if the archer could be targeted. This is one area in which inter-Service cooperation could be a point of leverage, since offensive counter-air (i.e., penetrating stealthy missile, UCAV, and aircraft counter-ASBM attacks against launchers, bases, and C4ISR facilities) is a possible capability that the Air Force can bring to bear to support and reinforce naval access to the region. Since China's Integrated ISR system may be especially vulnerable, this is an obvious potential topic for Joint, RCC, and Combined Allied planning.

Clearly, difficult technical and system integration hurdles would have to be overcome before China could field a viable MARVed ASBM force. However, in addition to American technologies that the Chinese freely admit to having compromised (including the Pershing missile and its MARVed warhead), there is a long history of relevant Soviet ASBM and reconnaissance-strike developments, not all of which were fielded, available to guide and support Chinese development efforts.

For instance, the Soviets developed a version of an anti-ship ballistic missile system in the late 1960s. The SS-NX-13 was an SS-N-6-sized weapon that was to be fired from Yankee SSBN launchers. As it developed, it had some form of maneuvering RV with a radar seeker for terminal guidance. It was not clear at the time whether or not it was to be nuclear armed. The range, as far as could be determined by the test series, looked to be somewhere near 500km or about 300 nm. This was one of a series of weapons that was to be the terminal end of the broader naval reconnaissance-strike complex being developed at the time.

Other system-of-systems elements were the AS-19 ASM carried by the Backfire bomber; SS-N-19-equipped surface ships; and the SS-N-3/19 in submarines. The RORSAT and EORSAT systems with the Bear D reconnaissance aircraft provided the detection front end to find carriers and provide data-linked locating directly to weapons platforms. [19]

Obviously, these Soviet achievements represent significant experience and technology that might well have found its way to China during the extensive military exchanges that have occurred between Russia and China. Many scientists, researchers, and technicians also have been provided to China over that period, at least in a role supporting some of the weapons and space systems that have been the subject of sales and exchanges.[20] [21]

IMPLICATIONS

Implications for the U.S. Navy

Chinese over-the-horizon targeting (OTHT) reconnaissance-strike success where the Soviets failed would stimulate a strong technical and operational response from the U.S. Navy. The extent of that response can be imagined by recalling the extent of Cold War anti-Soviet measures taken by the Navy, with significant emergent implications for the U.S. Navy's force structure, doctrine, and strategies.

For the U.S. Navy, successful Chinese OTHT capability would raise the prospect of Chinese anti-surface unit warfare being waged at extreme ranges from homeland-based, distributed, and on-orbit platforms that would be component parts of a PLA over-the-horizon reconnaissance-strike complex. American force structures and platforms optimized for the offense at the expense of defensive capabilities and assuming relatively insignificant maritime opposition unexpectedly would find themselves in harm's way, and their power projection capabilities effectively held beyond operational range. Without an effective counter, the surface fleet would be held at (very) long ranges. This means, among other things, that operational and strategic power projection calculations based on tactical ranges of U.S. Navy tactical aircraft would be thrown into a cocked hat. Short-range aircraft in the Navy's current and future air wings, and even offensive land attack cruise missiles would not be relevant to peer competitions.

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[19] Author's correspondence with a veteran American naval intelligence analyst and strategic planner who was involved in these issues during the Cold War, 2007.

[20] Op cit.

[21] This raises the additional issue of proliferation, further complicating naval planning. As the number of ballistic missile-armed nations multiplies, so will the ability to engage mobile maritime targets. If MARVed ASBMs can be developed, then, as goes the proliferation of ballistic missiles, generally so will proliferate this new anti-ship capability.

Likewise, Marine Corps assumptions of near-shore over-the-horizon ship-to-objective maneuver would not appear to be realistic in the face of an effective Chinese ASBM capability, since the platforms whence the Marines would stage would be held out of the peer and proliferated peer client conflict.

The limiting factor of U.S. Navy shipboard ABM interceptor magazine capacity would be one factor in prompting development of shipborne and off board DEW defenses against ASBMs. The U.S. fleet, on the defensive, would be at the strategic disadvantage vis-à-vis China, marking a drastic shift in the correlation of forces for the United States in the Asia-Pacific for the first time since 1942.

Would the U.S. Navy Change its Force Structure in Response to Chinese Mobile MARVed ASBMs?

Senior observers have opined that the Navy would not or could not change its force structure. Considerations of significant force structure changes necessarily come hard to a Service built around platforms with a 50 year service life. When external factors intrude on POMs and shipbuilding plans, might the Navy change course? There are a number of historical examples from the last century that illustrate possible alternatives to doing nothing:

- Embark on a Pearl Harbor-style housecleaning, pressing the advantage of new capabilities after a decapitating attack.

- CNO Arleigh Burke's approach:
    - Invest about 10% of the budget "on spec" in transformational capabilities, and have them ready when they are needed.
    - This amounts to what Admiral William Moffett achieved when he, John Towers, and others established American Naval aviation, based around platforms and a cadre of mission-oriented personnel who were committed to a fledgling professional community, and prepared by extensive experimentation to rise to new occasions.
    - Their contributions enabled the Navy to carry the fight to the enemy after Pearl Harbor despite the demise of the battleship "gun club."

- The Hyman Rickover approach to capability development:
    - Single-minded, inside the system (more or less!), painful to watch but eminently successful, and directed with brilliance during his tenure.
    - Other salient examples include Cold War ASW; Combat Air Patrol Fleet Air Defense; the Submarine-Launched Ballistic Missile; and the Aegis weapons system.

- The Manhattan Project:

- Top down
- Externally imposed
- Massive "off-budget" resources
- Accelerated development
- The country's best minds
- Ruthless means to an end
- A surprise to the Services
- Disruptive strategic consequences of historic significance

National Strategic Considerations

Apart from the potentially drastic consequences an effective Chinese ASBM capability would have for the United States at the military operational and military strategic level, American political leaders would have to consider national level geostrategic effects, varying in degree based on the success of professed Chinese aims.

Diminished escalation control: If one may apply the First Law of Thermodynamics to preliminary Chinese calculations of increased escalation control through ASBMs, then in such a competition the total control over available escalation remains constant, and in a zero sum game, the United States would lose some ability to dominate escalation. This is especially true in a future proliferated world of more than the current four nuclear players in the Asia-Pacific (the United States, China, Russia, and North Korea), and in particular in scenarios in which American and Chinese nuclear stockpiles reach effective parity through some combination of mutual reduction and/or escalation.

Diminished political dominance: In the global political system as presently configured, American political dominance has been enabled by military dominance, as reflected in its virtually unchallenged strategic mobility. This dominance manifests itself through a strategic doctrine of forward deployment that emerged at the end of the Second World War and was defended and pressed home against the Soviet Union during the Cold War. This dominance has enabled allies and alliances to commit to mutual goals and strategies with the United States. Chinese ASBMs would intend to challenge the idea of that political and military dominance by physically threatening its basis in fact.

Limited effects-based options: In the military vernacular, effects-based options are those alternatives made available to political leaders through the effects of military action. Effective Chinese ASBM capabilities and strategies would preclude many military effects heretofore available to American commanders in support of desired political goals.

Are Clean Sheet Deterrence Theories and Strategies Necessary?

It is too early to determine whether the advent of a viable Chinese ASBM capability would require new theories of deterrence and force different American geopolitical strategies. However, such a prospect does raise the more general notion of a new peer competitor in the Asia-Pacific with significant anti-access and power projection capabilities. Getting ahead of this strategic level problem, given the long lead times for new systems and organizational responses, is precisely why strategically oriented intelligence collection, reconnaissance, surveillance, reconnaissance, information processing, and analysis of China is so important today.

The prospect of Chinese land mobile ASBMs requires a new start in reviewing strategic assumptions and force structure plans. If it achieved nothing more than to provoke thoughtful consideration of what the prospect of a peer competitor in the Asia-Pacific might mean, then the CMSI publication of the *Shipborne Weapons* article has provided a signal service.

Unintended Consequences, Multi-player Scenarios, and Cascading Drivers:

China already casts a large shadow in the Asia-Pacific. Ironic in light of this discussion of military hard power potential, it is China's soft power "Charm Offensive" that currently is making significant inroads into American spheres of influence.[22] The prospect of a near-peer military competitor as exemplified by China's "Challenge Areas," in combination with this charm offensive and China's growing economic clout, is shaping up to force a reconsideration throughout the region of loyalties and commitments vis-à-vis the United States. The consequences over time of choices by regional actors may lead to unintended and unforeseen consequences, new regional security drivers, new multi-player alignments, unprecedented escalation scenarios, and cascading geostrategic and operational effects. This has the potential for very different outcomes, and places a very high premium on careful surveillance, data and intelligence collection, extensive war gaming, and thoughtful technical and political analysis.

WHAT NEXT?

Analytically, this will require the United States to connect the dots, by getting *the right* warfighters talking to intelligence analysts and strategic planners in order to assess collection requirements, judge analysis, and recommend actions based on conclusions produced. This will necessitate all source information gathering, including from allies and from China's rich trove of open source material, as well as an across the board analysis of Chinese capabilities: from education to the factory floor, and to the barracks

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[22] See De Castro, Renato Cruz, "China, the Philippines, and U.S. Influence in Asia," American Enterprise Institute On-Line, *Asian Outlook*. July 6, 2007, http://www.aei.org/publications/pubID.26450/pub_detail.asp

and waterfront. There will be force structure implications, with potentially significant implications for Navy force structure, including, inter alia, far less reliance upon surface vessels. However, bad news does not improve with age, and ignoring the problem will only exacerbate it.

Effective competitive strategies will require detailed and actionable knowledge, first and foremost so as to be able to chart strategic, technical, and operational responses. Commanders and planners also must prepare to tell the strategic story: to the political leadership who must articulate potential responses to the nation; and to the Congress who will be asked to pay the bills. These functions will also require extensive information and analysis.

WHY NOW?

Not since the early days of the Cold War has the United States faced such an analogous requirement for strategic surveillance, reconnaissance, and analysis. This appears to be a period with China similar in many ways to that which President Eisenhower faced with the Soviets, when he recognized that insufficient surveillance, reconnaissance, and intelligence challenged his ability to respond effectively to the USSR's strategic challenge.

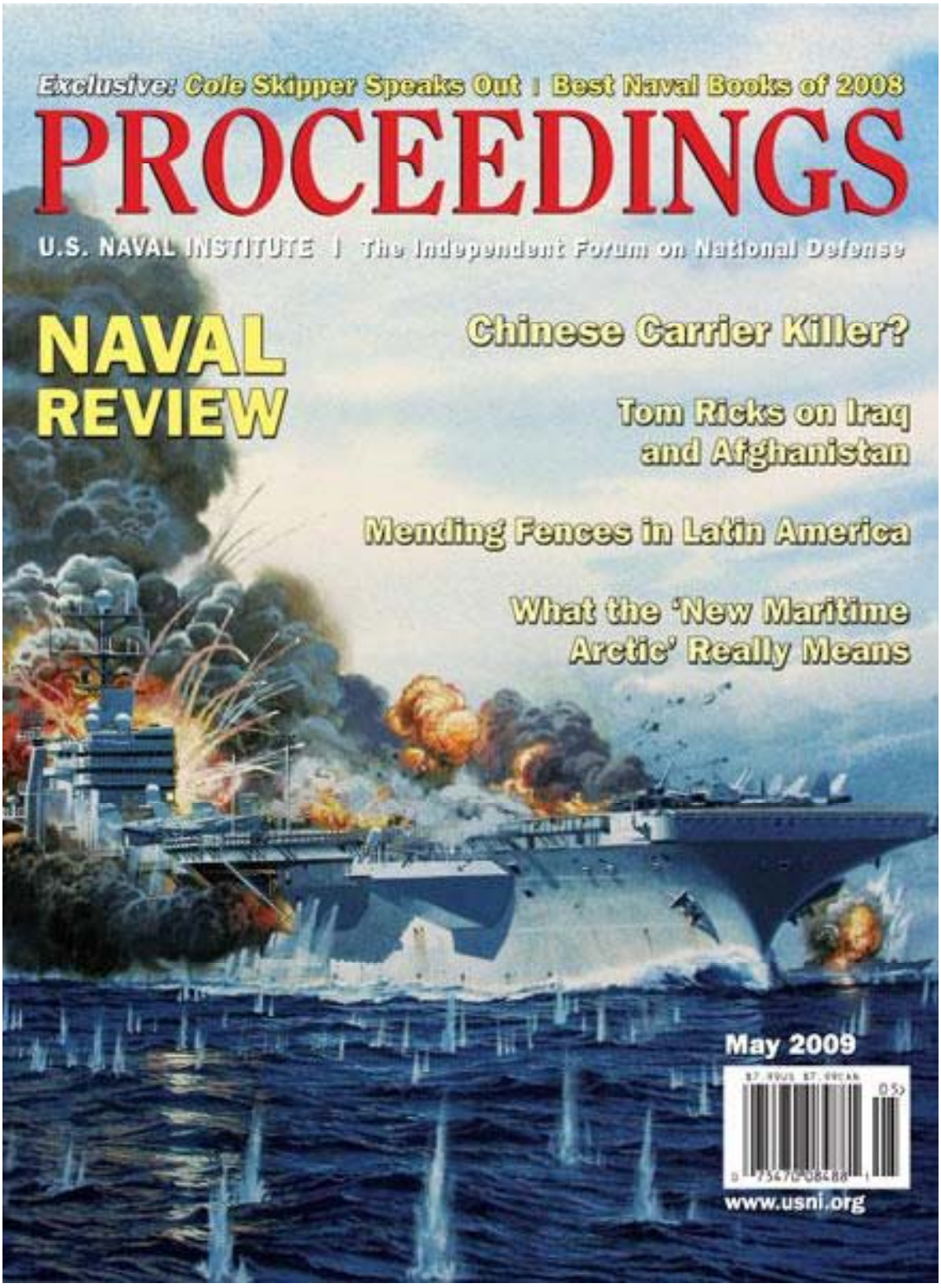
In that earlier case, soon after taking office President Eisenhower was confronted by the strategic challenge of not being able to see into the Soviet Union. With the pending advent of intercontinental ballistic missiles and the development of Soviet long range bombers that could reach the United States, the President knew that the inability to determine Soviet strategic developments would either put the United States at risk of strategic surprise, or force him to overreact, with potential strategic, economic, political, and constitutional ramifications.

President Eisenhower responded by commissioning airborne and on-orbit strategic reconnaissance systems that are taken for granted today, but which were unprecedented--and largely undreamed of--at the time. The profound and underappreciated steps he took to organize, integrate, and deploy technical, financial, political, and bureaucratic resources for what became an iconic strategic success offer many lessons, and perhaps templates, for responding to potential challenges China is preparing for us.

Not since the early days of the Cold War has there been such an analogous requirement for penetrating intelligence collection and analysis, and effective military-technical responses. The emergence of a Chinese OTHT system of systems anti-access capability described above, and the fielding of ASBMs, has many implications for analysis organization, processes, and resources. This is the time for a fundamental review of strategic reconnaissance, surveillance, and analysis approaches, procedures, organization,

and resources. Delaying consequential analysis that otherwise could lead to effective action would only transform an operational and strategic challenge into a moral one.

http://www.usni.org/magazines/proceedings/index.asp



Credit: Tom W. Freeman