

DDO (WYLES GULLEN)



On the
VERGE
of a
GAME-CHANGER

U.S. NAVY (DARRON STREET)





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A Chinese antiship ballistic missile could alter the rules in the Pacific and place U.S. Navy carrier strike groups in jeopardy.

Chinese leaders and strategists have been thinking of using land-based missiles to hit threatening sea targets for more than three decades. Today, the discussion is increasingly widespread, technical, and operationally focused. This suggests the possibility that China may be closer than ever to mastering such a system—with perhaps a strategically publicized test sometime in the future—or even to using it in the event of conflict. Indeed, the mere perception that China might have an antiship ballistic missile (ASBM) capability could be a game-changer, with profound consequences for deterrence, military operations, and the balance of power in the Western Pacific.

While Chinese ASBM capability remains uncertain, relevant U.S. government sources state consistently that Beijing is pursuing an ASBM based on a variant of the 1,500 km-plus range DF-21/CSS-5 solid propellant medium-range ballistic missile (MRBM). According to the Department of Defense, if supported by “a sophisticated command-and-control system,” e.g., accurate real-time target data, from China’s growing family of terrestrial and space-based sensors, ASBMs could hold U.S. carrier strike groups at risk in the Western Pacific. Further, China’s use of submunitions might render a carrier operationally ineffective without sinking it, thereby achieving its objectives with a (perceived) lower risk of escalation.¹

If China ultimately deploys a successful ASBM, rapid progress in its development will be traced to the 1995-96 Taiwan Strait Crisis, which convinced China’s leadership that carrier strike groups (CSGs) would be a vital platform for American power projection in any future Taiwan conflict in which Washington elected to intervene. Related military development has since accelerated markedly.

Asymmetric in nature and anti-access in focus, the resulting new platforms and weapon systems target the full range of vulnerabilities inherent in CSGs. One potential capability stands above the rest. An ASBM would exploit six decades of Chinese ballistic-missile experience, be fired from mobile, highly concealable platforms, and be able to strike targets hundreds of miles from China’s shores. The Second Artillery Corps (the People’s Liberation Army’s version of the former Soviet Union’s



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Strategic Rocket Forces) published a feasibility study in 2003, suggesting that related concepts have been under development for well over five years, and perhaps for more than a decade.²

While such mentions have appeared over the last few years in official reports and brief commentaries in various fora, the ASBM issue has only recently received widespread public attention in the United States. Two articles by a Chinese military affairs columnist, one claiming that by 2010 the Second Artillery will have a brigade of

documents. Second, PLA doctrinal publications describing how ASBMs might be used in operational scenarios suggest that programs are under development, but they leave unclear to what extent the PLA has mastered necessary capabilities. Finally, generalist deliberations on the feasibility of such weapons, with varying extents of doctrinal discussion, show tremendous disagreement even on fundamental issues. Some sources offer very specific details, but many of them contain obvious technical errors and mistaken assumptions.



A FAMILY RESEMBLANCE? According to Chinese sources, a DF-21/CSS-5 ASBM would be based on the U.S. Pershing II (left), as is the DF-15/CSS-6 missile (right). The Pershing II has adjustable second stage control fins for terminal maneuver. While the DF-15 pictured here lacks similar control fins, one with a reentry vehicle virtually identical to the Pershing II's may be found at <http://www.sinodefence.com/strategic/missile/df15.asp>.

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These writings reach several points of general consensus.

First, any ASBM would be based on an upgraded version of an existing Chinese MRBM, e.g., the DF-21/CSS-5. A DF-21D variant is reportedly closest to an antiship version, though some Chinese writings say this of the “C” version, and others refer to future modifications as well (e.g., a DF-21E). The prototype for such a weapon is generally held to be the U.S. Pershing II theater ballistic missile, deployed from 1984-88.

In addition, ASBMs would offer a variety of operational effects and value for Chinese maritime strategy—particularly with regard to Taiwan. Were this vision achieved, it could impose significant restrictions on U.S. naval operations during a Taiwan crisis, especially as complementary discussions in Chinese writings suggest holding U.S. theater land bases—

DF-21E ASBMs and giving a detailed notional sequence of their use, were translated, posted, and discussed on a naval affairs blog, which was then covered widely by the mainstream media.³

In light of these developments, it is useful to survey relevant Chinese writings for possible insights into the challenges that the People's Liberation Army (PLA) faces in developing a successful ASBM system, and how it might ultimately seek to use it in the event of tension or conflict.

Chinese Discussion of ASBMs

Three types of relevant writings are openly available. First are the technical analyses of specific ASBM issues. These tend to be theoretical, and it is unclear how readily they can be translated into concrete engineering solutions. Some claim that the theories involved have been validated, and actual solutions may be contained in other

such as those on Okinawa—at risk.

Finally, key technical challenges are target acquisition and terminal guidance. However, there appears to be little discussion in the Chinese literature about specific Chinese capabilities in these areas, except general statements of feasibility and implicit assumptions in doctrinal publications that ASBMs are available for use, or will be soon.

Technical Sources

The Second Artillery dominates available technical ASBM assessments, suggesting that it may control the majority of any Chinese ASBM programs. As the PLA's strategic rocket force, with equal attention devoted to (and the vast majority of its recent acquisitions in) conventional forces, and 78.2 percent of its cadres now holding a bachelor's degree or above, it would seem the logical choice to handle such a challenging new mission. Most of the available technical articles devoted explicitly to

ASBM issues are written in full or in part by individuals associated with the Second Artillery Engineering College in Xi'an, suggesting that this institution may play a major role in ASBM development. The most prolific contributor is the PLA uniformed civilian Tan Shoulin, a leading professor at the college who advises master's students and specializes in "missile weapon fire-power applications."

Second in institutional prominence is the Second Artillery Equipment Department in Beijing—with some involvement by the Second Artillery Equipment Research Institute as well, the latter of which may suggest that some degree of procurement, or at least active consideration thereof, is under way. Individuals associated with Second Artillery bases are occasionally involved as well.

Doctrinal Sources

How does the Second Artillery think about using ASBMs? *Science of Second Artillery Campaigns*, which likely serves as an educational handbook for the service, details five possible tactics:

- "Harassment strikes against the military bases of the enemy's allies around our periphery as well as the carrier battle groups."
- Frontal firepower deterrence by firing intimidation salvos in front of a CSG "to serve as a warning."
- Flank firepower expulsion: interception of a CSG by PLAN forces coupled with intimidation salvos "launched toward the enemy carrier battle group opposite our relatively threatened flank."
- Concentrated fire assault: "When many carrier-borne aircraft are used in continuous air strikes against our coast, in order to halt the powerful air raids, the enemy's core carrier should be struck like a 'heavy hammer.' The conventional missile forces should be a select group carrying sensitive penetrating submunitions and, using the 'concentrated firepower assault' method, a wide-coverage strike against the enemy's core carrier should be executed,

Notional Maximum Range of DF-21/CSS-5 from Locations in Mainland China



Source: Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009*, Annual Report to Congress.

striving to destroy the enemy's carrier-borne planes, the control tower [island] and other easily damaged and vital positions."

- Information assault: "Directed against the enemy's command and control system or weak links in the Aegis system, conventional missiles carrying anti-radiation submunitions or electromagnetic pulse submunitions can be used when enemy radar is being used and their command systems are working, with anti-radiation submunitions striking radar stations and EMP submunitions paralyzing the enemy's command and control system."⁴

The document states that theater ballistic missiles extend the Second Artillery's strike range and seems to assume that it would have ASBM inventory sufficient to permit a wide variety of warning shots. It ignores the possibility that these could easily be misinterpreted as failed attempts to strike the CSG and thus be dangerously escalatory.

Technical and doctrinal materials would seem to be more authoritative, but such literature has limitations. Specialized studies might reflect championing of programs that could be expected to benefit the Second Artillery, as well as jockeying for publicity among researchers. Doctrinal publications would seem to be far

less prone to service-bias but may reflect aspirations or projected capabilities (as opposed to the existence of concrete hardware and supporting infrastructure). It is thus useful to examine the generalist literature, wherein there is widespread debate on all major aspects of ASBM development and employment, for indications of challenges and dilemmas China may face as it proceeds in these areas.

Utility and Feasibility

The generalist literature is broadly consistent concerning the operational effects of ASBMs and their potential value for Chinese maritime strategy. ASBMs are promoted as a means to overcome conventional inferiority by exploiting technological asymmetry, deter intervention to give China more maneuvering space, and offer both escalation control and a “trump card” for victory if deterrence fails. Skeptics writing in a China Shipbuilding Industry Corporation journal, however, charge that ASBMs offer limited power-

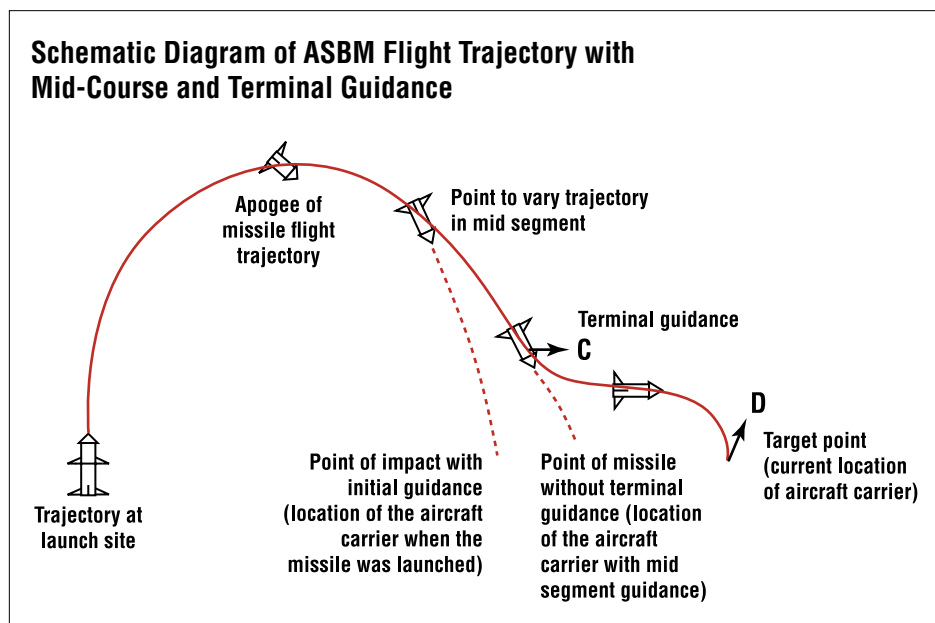
craft and overseas bases for signals intelligence. They believe that China’s other tracking methods are inadequate, even in combination. Strangely, they seem to overlook the possibility of China possessing relevant land-based over-the-horizon radars.

- *Target defense penetration.* Skeptics, with their claims that slowing the warhead for terminal guidance makes it prohibitively vulnerable to interception, seem relatively unpersuasive. Optimists advocate multi-axis saturation attacks to overwhelm CSG defenses, without appearing to acknowledge the difficulty of coordinating them.

- *Hitting a moving target.* How to strike a CSG that moves during location, data transmission, and ASBM delivery? Skeptics contend that ballistic missiles are less accurate than cruise missiles because the former’s trajectory is relatively fixed. But optimists maintain that as long as the initial ASBM trajectory is reasonably accurate, appropriate homing corrections can be made. They suggest improving precision with passive radiation homing and activating

terminal guidance at higher altitude to allow the seeker to scan a larger area, and selecting opportune moments for attack, e.g., when tailwinds or at-sea replenishment preclude significant mobility.

- *Causing sufficient damage.* Several experts detail CSG damage-control equipment. But the conventional wisdom seems to be that multi-axis saturation attacks (to defeat defenses) and/or submunitions (to distribute damage), delivered accurately, can achieve a mission kill by targeting critical exposed areas (e.g., the carrier’s aircraft, island, and C⁴ISR equipment).



Source: Tan Shoulin and Zhang Daqiao, Second Artillery Engineering College, Diao Guoxiu, PLA Unit 96311, Huaihua; “Determination and Evaluation of Effective Range for Terminal Guidance for a Ballistic Missile Attacking an Aircraft Carrier,” *Command Control & Simulation*, Vol. 28, No. 4 (August 2006), p. 6. Republished in: Office of the Secretary of Defense, *Military Power of the People’s Republic of China 2009*, Annual Report to Congress.

projection capabilities, are highly escalatory if employed, and might trigger nuclear retaliation.⁵

Chinese debates about ASBMs’ utility parallel widespread disagreements over their technical feasibility. Analysts generally agree that five major technical challenges must be surmounted to achieve a functioning ASBM:

- *Detection.* Pessimists claim that carriers are too small relative to the potential search area to be detected by satellite images. Optimists maintain that CSGs—with their massive electromagnetic footprints—can be detected, e.g., with space-borne sensors.
- *Tracking.* Skeptics maintain that requisite satellite coverage is unattainable, as are sufficient naval and surveillance

Artillery-PLA Navy bureaucratic competition. The Second Artillery produces many technical analyses, invariably optimistic, that tend to assume that ASBM development is feasible, perhaps because it will—or already does—control an ASBM program. Students at the Second Artillery Engineering Academy have written far more ASBM-related master’s theses than have naval students. Even an officer from the Naval Command Academy has written that “the Second Artillery is the major factor in successfully attacking an enemy [CSG].”⁶

By contrast, the vast majority of PLAN- and shipbuilding industry-affiliated analyses suggest that ASBM development is technically problematic or use of the weapons

Inter-Service Rivalry?

A noticeable pattern in ASBM analyses may be interpreted as signs of Second



BASIS FOR AN ASBM? DF-21/CSS-5 missile launchers parade through Beijing's Tiananmen Square on 1 October 1999 to commemorate the 50th anniversary of the People's Republic's of China. Positively identified pictures of a DF-21 outside its canister with second-stage fins are not known to exist. But (as Internet photos of the DF-15/CSS-6 indicate) China has such a reentry vehicle, which could easily be mounted atop the DF-21 booster.

would have dangerous unintended consequences. Perhaps this is because ASBMs would not be controlled by the PLAN and might reduce its resources.

In an interesting suggestion of at least some cooperation between the Second Artillery and the PLAN on ASBM-related issues, however, PLAN representatives have cowritten ASBM-specific articles with researchers from the Second Artillery Engineering College, and PLAN-affiliated institutions research intensively such related topics as ship detection and tracking.

Sending a Message

How and to what extent might Beijing be seeking to influence strategic communications regarding ASBMs? Information manipulation should certainly be expected; discussion is likely regulated to send a desired message. Given the sensitivity of the topic, we might suppose that the current Chinese literature on ASBM development is a carefully controlled discussion. We should probably assume that at least a large portion of articles published are intended to influence U.S. perceptions, especially as available technical analyses are published in journals fairly accessible to foreigners, complete with English titles and abstracts.

The writings could also represent an inexpensive partial deterrent. China's media were studiously reticent following the nation's successful anti-satellite test on 11 January 2007, and to this day China's government has remained

virtually silent even in the face of repeated inquiries by foreign governments and non-governmental organizations. By contrast, there has been far more (unofficial) chatter surrounding the ASBM program, and yet no public indication has emerged that any weapon of this kind will be tested in the near future. From a signaling perspective, this may be a highly cost-effective way to achieve some deterrent effect until the capability is fully realized. If so, public discussion might decrease as capabilities mature.

Another possibility is that the writings could signal ongoing ambivalence. Confusion and contradictions in the generalist literature might reflect larger debate within China concerning the efficacy of ASBMs in practice regardless of their technological feasibility. They might also serve as a targeted effort to mask actual capabilities by diverting attention from existing systems, or ones in rapid development. Manipulating selected articles in journals known to be read outside China would be a particularly effective instrument in an informational campaign.

At some point, when its capabilities are developed sufficiently, Beijing might reveal to the world a dramatic test—with or without advance warning—geared to influencing official and public opinion in the United States, Taiwan, and Japan. Such an unprecedented public demonstration might signal either growing Chinese power during a time of stability, or Chinese resolve in a time of diplomatic tension or crisis. The fact of a hit, however manipulated, could change the strategic equation.

What To Do

While there is ongoing public debate concerning their feasibility and efficacy, the idea of developing ASBMs is clearly appealing to many in China, particularly in the Second Artillery. From the Chinese analytical perspective, any successful ASBM deployment would have three implications:

- Reinforcement of land-based approaches to maritime security.
- Emphasis on multi-axis saturation attacks.
- Greater confidence in PLA ability to restrict U.S. Navy operations and control escalation—even under ambiguous circumstances.

All does not hinge on putative ASBM capability: demonstration of other anti-access capabilities (e.g., streaming antiship cruise missile [ASCM] attacks) could have substantial effect. But ASBMs pose a threat qualitatively different from ASCMs. The United States has not had decades to address the problem, interception windows are far shorter, and launch platforms cannot be targeted (i.e., “shooting the archer instead of the arrow”) without contemplating highly escalatory strikes in mainland China.

Any signs of Chinese ASBM capability are therefore likely to greatly concern the U.S. Navy. The U.S. military as a whole must also face the issue, however, as its operations in East Asia writ large could be affected. Such a prospect should make American planners seek lasting solutions. Land-based air power in theater will not solve the problem, as land attack is already a common operational approach and mission of the Second Artillery. China is clearly pursuing conventional missiles to attack land air bases, whose coordinates are known, at ever longer ranges. It may be possible to render a CSG sufficiently safe through the use of decoys, obscurants, and electronic countermeasures to confound China’s over-the-horizon targeting and missile seekers. Should this prove unrealistic, however, it may be necessary to place a greater proportion of high-level combat capabilities on submarines, unmanned aerial platforms, long-range air based beyond China’s strike range, and low-observable surface platforms so that some easily detected platforms lacking relative counter-targeting (e.g., CSGs) need not be forward deployed.

At the political level, Washington must emphasize to Beijing that ASBM development on its part would undermine the 1988 Intermediate-Range Nuclear Forces (INF) Treaty between Washington and Moscow, which has prevented both nations from possessing conventional and nuclear ground-launched ballistic (and cruise) missiles with ranges of 500-5,500 km (e.g., the U.S. Pershing II). Chinese demonstration of the strategic value of missiles with precisely such characteristics would likely motivate other nations to develop ASBMs of their own. The resulting strategic tension would fuel additional military procurement and energize long-term investment to

counter or balance against Chinese ASBM capabilities, an arms race that would leave all parties worse off than before.

Responding to these unprecedented strategic challenges will require the U.S. military and its civilian leadership to face hard truths. The most perilous approach would be one in which these vital guardians of our national credibility continue to insist that the United States maintains its previous ability to keep the peace in critical strategic areas (e.g., the Taiwan Strait), when in fact the military advantages that underpinned that ability are diminishing, at least in a relative sense. Such a discrepancy between rhetoric and reality—particularly if perceived by the public—would steadily erode Washington’s regional credibility and might at the same time encourage overconfidence by Beijing in its own capabilities.

Either of these factors might heighten the perceived value of, and make more likely, a public demonstration of Chinese anti-access capability. Striking a surface vessel or mockup with an ASBM in peacetime, if not met with a proper U.S. response, could undermine Washington’s standing by making it appear that ways of war had undergone radical change, to the detriment of U.S. power projection and influence. In the event of war, the consequences could be catastrophic, particularly if the PLA overestimated its ability to regulate escalation. To hedge against these negative outcomes, the United States must redouble its efforts to promote peace and cooperation while ensuring that its own capabilities remain strong should deterrence fail. These challenges, which confront an already time- and resource-pressed Obama administration, demand close scrutiny from scholars, analysts, and policy makers alike. ❄

1. Office of the Secretary of Defense, *Military Power of the People’s Republic of China 2009*, Annual Report to Congress, pp. 21, 48.
2. Huang Hongfu, “Conception of Using Conventional Ballistic Missiles to Strike Aircraft Carrier Formation,” *Scientific and Technological Research*, Scientific and Technological Committee of the Second Artillery Corps, 2003, No. 1, pp. 6-8.
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4. Yu Jixun, ed., People’s Liberation Army Second Artillery Corps, *The Science of Second Artillery Campaigns* (Beijing: PLA Press, 2004), pp. 401-02.
5. Huo Fei and Luo Shiwei, “Arrows Without Bows—An Evaluation of the Effectiveness and Employment of Anti-Aircraft-Carrier Ballistic Missiles,” *Modern Ships*, No. 325, April 2008, p. 28.
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