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Hearing on Deterring PRC Aggression Toward Taiwan

Trends, Timelines, and Uncertainty: An Assessment of the State of Cross-Strait Deterrence

BY

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I. Introduction

Chairman Talent, Chairman Goodwin, distinguished members of the Committee, thank you for the opportunity to participate in today's hearing. It is a privilege to testify here on matters that are important to the vital national security interests of the United States and Taiwan, as well as those of our other allies and partners.

I will specifically address the ability of the United States and Taiwan to deter military aggression by the People's Republic of China (PRC) across the Taiwan Strait, both now and in the future. I will then examine PRC and U.S. capabilities, points of vulnerability for China (this term hereafter referring specifically to the PRC), and important points of uncertainty. Finally, I will offer policy recommendations about some of the steps that might be considered to improve cross-Strait deterrence, in the hopes of avoiding what would be, were it to occur, a catastrophic conflict for all concerned.

II. Status, trends and timelines in the cross-strait deterrence

When I consider the state of cross-Strait deterrence, underlain in large part by the associated military balance, my assessment is that we are entering a period of deep uncertainty. This is in stark contrast to the situation of perhaps twenty years ago, when I would have unhesitatingly predicted failure for the PRC in any attempt to invade, blockade, or bombard Taiwan. It is also in contrast to the situation that, absent significant changes in current trends, we seem headed towards in ten to twenty more years' time: PRC military domination of Taiwan. That we could be headed toward that situation should be unsurprising given the larger strategic environment. With rough economic parity between the United States and China, over a longer timeline U.S. efforts to prevent military coercion or invasion of Taiwan will run up against a clear asymmetry of both geography and national will, given what the stakes mean to China. As such, efforts to deter China must be extraordinarily focused on the parts of both the United States and Taiwan to remain successful. To date, they have not been. Instead, some of the United States' focus has been lost to distractions from Russia and the Middle East, while Taiwan's focus has at times wandered to investments in conventional "status" weapon systems such as fighter aircraft and armored vehicles, instead of the capabilities genuinely needed to deter a Chinese invasion. While the United States and Taiwan have begun to recognize and take action to address the growing scale of the threat from China, doing so specifically in the 2018 U.S. National Defense Strategy and in Taiwan's Overall Defense Concept, these efforts continue to face institutional inertia as well as impediments from those who would be negatively affected by their implementation. As such, they have thus far been of somewhat limited impact in terms of their implementation.

The ongoing trends related to the cross-Strait military balance that concern me the most are not those directly tied to comparisons between Taiwan and Taiwan-adjacent forces of the People's Liberation Army (PLA). Rather, I am most concerned about China's development of broader regional capabilities which are clearly intended to counter or deter a U.S. intervention to defend Taiwan (or other U.S. allies) against Chinese aggression through the imposition of prohibitive costs, or the threat thereof. These are most visible in the form of China's deployment of large numbers of capable precision-strike Intermediate Range Ballistic Missiles (IRBMs), its growing long-range bomber force, and its rapidly growing blue-water navy.

In my estimation the mid-to-late 2020s may be the period of greatest peril for a failure of cross-Strait deterrence. This timeframe will see the trailing edge of a period of mass retirement of late-Cold War-era U.S. platforms, combined with the continued growth and modernization of China's counter-intervention forces. In particular, the [retirement of the Navy's oldest cruisers](#), at nearly the same time as that of its four [guided-missile submarines](#) (SSGNs), will result in a significant drop in the available number of vertical-launch missile tubes that could be deployed in support of a Taiwan intervention. This will occur before many of the most important China-focused changes implemented by the United States and its allies begin to bear fruit, but after sufficient time has elapsed for China to rectify perhaps the biggest capability gap that it faces in terms of its ability to invade Taiwan—its capacity for sealift across the Taiwan Strait.

III. PRC capabilities to deter or deny U.S. intervention in a cross-Strait conflict

In an effort to prevent or deter U.S. intervention in a cross-Strait conflict, the PLA has been engaged in what could be accurately described as the largest and most rapid expansion of maritime and aerospace power in generations. Based on its scope, its scale, and the specific capabilities being developed, this buildup appears to be designed specifically to threaten or hold at arm's length U.S. forces in the western Pacific. Some of the most obvious manifestations of this can be seen in three specific areas:

- 1) **The rapid growth of the PLA's long range missile force:** Probably the most well-known threat to U.S. and allied forces in the western Pacific is the huge arsenal of precision-strike conventionally-armed ballistic missiles fielded by the Chinese PLA Rocket Force (PLARF). Already by far the world's largest, this force continues to grow at a rate that only makes sense for the purpose of threatening U.S. forces throughout the region. This is most apparent in China's force of DF-26 IRBMs, arguably one of the crown jewels of the Chinese military. Specifically, the Department of Defense's [2020 China Military Power](#) report recently revealed an apparent more-than-doubling, in a single year, of China's inventory of DF-26 launchers. We know from [Chinese TV footage](#) that DF-26 units practice reloading missiles routinely, and that the missiles have different warhead types that are swappable. Thus, if each of the 200-odd launchers had only one reload missile available (and there may be well more than that), this would eventually mean an IRBM force of more than 400 missiles, nearly all configurable to anti-ship or land-attack missions, including nuclear strike.

Given that China's DF-26 missile has been known about for several years, one might be tempted consider its deployment to be already "baked in" to considerations of cross-strait deterrence, and of the U.S.'s ability to intervene in a conflict. But the apparent scale of the IRBM force's expansion matters: going from what had been dozens of medium-range missiles, to what instead may be *hundreds* of much longer-range ones, will drive changes on a number of different levels. Quantitative changes of this magnitude can drive qualitative effects in a number of ways.

First, the number of available Anti-ship Ballistic Missiles (ASBMs) could broaden the PLARF's anti-ship mission from what has been thought of as a "carrier-killer" role to a broader and more generic "ship-killer" mission. China itself [describes](#) the DF-26 as capable against large *and medium-size* ships. With so many more ASBMs at hand, smaller groups or individual warships—such as destroyers, and [especially logistics ships](#)—could become "ASBM-worthy". In a similar vein, given the ability to swap the DF-26's warheads to a land attack mission, a more massive force of them could complicate the execution efforts such as the U.S. Marine Corps' [Expeditionary Advanced Base Operations](#) (EABO) concept. As long as China maintains a robust space-based radio-frequency sensing capability, ground units that transmit via means such as radar, drone control equipment, or command-and-control (C2) circuits, could be subject to attack by submunition-equipped IRBMs anywhere within the First and Second Island Chains.

Another way in which a DF-26-equipped PLARF could change things would be through its much greater reach, in particular the specific additional areas that it could strike. In the Philippine Sea, areas of relative sanctuary beyond the range of the shorter-range DF-21 lie well within range of the DF-26 (See Figure 1). These areas have mattered in how American and allied defense thinkers have looked at the regional anti-access/area-denial challenge (A2/AD, a term that did not originate in China), having previously posited the [ability to operate forces reasonably safely](#) outside the First Island Chain as a means to enable episodic operations closer-in to defend locations such as Taiwan. Looking further southwest, Chinese strategists have obsessed [since the early 2000s](#) over the "Malacca dilemma", referring to the vulnerability to interception of China's oil imports from the Middle East. With large numbers of IRBMs, the PLA could have the ability to strike U.S. and allied warships attempting to maintain such a blockade across southeast Asia. And similar missile coverage could extend across the vital sea lanes leading from the Middle East to Asia and Europe, with coverage extending from PLARF bases in western China (see Figure 2).

One factor specifically related to Taiwan that may be supporting the PLARF's growth in long range missiles is the [apparent deployment](#) by the PLA Ground Force (PLAGF) of a new long-range Multiple Launch Rocket System that appears capable of ranging either much or all of Taiwan, depending on the variant. By putting weapons in the hands of the PLAGF that are capable of conducting strikes across Taiwan, some of the shorter-range units of the PLARF may be able to convert to longer-range missiles, accelerating the transition of the PLARF from a force mostly focused on striking Taiwan with short range ballistic missiles (SRBMs) to one focused on broader goals such as deterring or denying U.S. intervention in potential conflicts across the Indo-Pacific.

To be sure, as has been discussed by the U.S. Navy's leadership before, the range arcs of the PLA's missiles [are not impenetrable](#), and the PLARF is [not the first](#) A2/AD challenge that the Navy and Marines have dealt with. There will, without a doubt, be a back-and-forth between seeker and jammer, hider and finder, that will mitigate - to a degree - the threat of the PLARF's long range missiles. But it is hard to deny a substantially increased level of risk, and over a much larger area.

The challenges discussed above are by no means restricted to U.S. maritime power projection, as the story is perhaps even worse for land-based tactical aircraft and bombers. Ships are at least moving targets, whereas fixed land bases exist at a known latitude and longitude, only a few keystrokes away from targeting. In 2017, a colleague of mine and I at the Center for a New American Security [estimated](#) that a pre-emptive Chinese missile strike on U.S. bases in Asia could crater every runway and runway-length taxiway at every major U.S. air base in Japan, and destroy more than 200 aircraft on the ground. We also estimated that, in addition to shorter-range missiles, an inventory of approximately 60 DF-21 medium-range ballistic missiles would be necessary to conduct such a strike.¹ Considering the National Air and Space Intelligence Center's [recent estimate](#) that China now possesses "approximately 350" medium and intermediate range ballistic missiles, the threat appears to have become graver than we estimated.²

In addition, since we issued our report in 2017, open-source imagery now indicates that China's ballistic missile forces may be developing the ability to target specific U.S. high value aircraft. This previously unpublished imagery (see Figure 3), from the PLARF's ballistic missile impact range in western China, shows the use of what appears to be a mock target specifically designed to imitate a parked E-3 Sentry airborne early warning and control aircraft (AWACS). While previous aircraft targets at this test range were mostly older Chinese models, sufficient to test the efficacy of ballistic missile warheads targeted at a specific location, the use of a mock target built to represent a specific U.S. aircraft type (no other nation in the region operates them) may indicate the development of a warhead with the capability to recognize and home in on specific aircraft, rather than having to blanket an entire airfield with munitions. If operationalized, this advance could reduce the number of missiles required for the PLARF to destroy key aircraft at U.S. and allied airfields throughout the region.

- 2) **The modernization and growth of China's long-range bomber force:** In recent years, China has also dramatically increased the capability of its force of long-range strike aircraft. China has the world's only operating bomber production line (see Figure 4), which has been producing brand-new, long-range aircraft [seemingly purpose-built](#) to strike American and allied bases well away from China's borders, and to overwhelm U.S. carrier strike groups.

Before the last decade, China's bomber force had fairly limited capabilities. Centered around the Xi'an Aircraft Company's H-6, a dated copy of the Soviet-era Tupolev Tu-16, its aircraft only carried a small number of missiles of fairly limited capability and could deliver them to a limited range. This began to change in 2009 with the introduction of the H-6K, a major redesign and update of the basic airframe. Equipped with completely new

¹ Thomas Shugart and Javier Gonzalez, "First Strike: China's Missile Threat to U.S. Bases in Asia" (Center for a New American Security, 2017), 13.

² "2020 Ballistic and Cruise Missile Threat" (Defense Intelligence Ballistic Missile Analysis Committee, 2020), 25.

engines and avionics, the H-6K enjoys a much longer combat radius ([about 3500km](#)), and is capable of carrying three times the number of missiles (6 compared to 2 each in previous versions), with each land-attack cruise missile having a much longer range compared to previous versions.

Incorporating the improvements provided by the PLA Air Force's H-6K, the PLA Navy has gained its own maritime strike-focused version of the aircraft—the H-6J. First seen [in 2018](#), the H-6J is capable of carrying 6 [YJ-12](#) long-range supersonic anti-ship cruise missiles (ASCMs), again three times as many as its predecessor. More recently, China [revealed the development](#) of a new model, the H-6N, which is capable of aerial refueling and carries a single, air-launched ballistic missile, with what appears to be a hypersonic glide vehicle. While it is as yet unclear what targets the H-6N's new missile is intended to strike, with the range extension provided by refueling, the reach of China's bomber force will grow ever further.

It is important to note that it is not only in individual platform capability that China's bomber force has been improving, but also in numbers. China is not merely replacing older bombers with improved ones; it appears to be growing the size of the force as well. Prior to the introduction of the H-6K, most estimates were that China's H-6 inventory was in the [mid to low-100s](#), with a total production run since the early 1960s of about 200 aircraft. In order to attempt to determine the approximate size of China's bomber force, over the last several years I conducted two surveys of available commercial satellite imagery, using open-source lists of Chinese bomber bases. These counts, which did not include any aircraft in flight, in hangars, deployed to secondary airfields, or otherwise missing from imagery, produced results of just over 200 aircraft in 2018, and more than 230 in 2020. Given that China has a number of [recently-built or upgraded](#) H-6 bases which have shelters for their aircraft, the actual numbers may be higher if bombers have already been assigned there and parked under cover. In any case, while a handful of aircraft in these totals may have been tankers or training aircraft, it is clear that China's bomber force likely now numbers well over 200, and has been growing substantially since production of the newer H-6 variants commenced. When combined with its potent conventional ballistic missile force, China's long-range striking power will be vastly greater than would be necessary to deal with any regional challenger, and seems clearly directed at gaining the ability to deny U.S. forces the ability to operate with reasonable risk at ranges from which they could deliver effective support to Taiwan.

- 3) **China's world-class naval expansion:** In addition to its growing regional air and missile strike forces, in recent years the PLA Navy has been engaged in a naval buildup unlike any seen since the U.S. "600-ship Navy" effort of the 1980s. Xi Jinping has declared on more than one occasion that China must have a "[world-class naval force](#)",³ and a program of naval construction appears to be underway to make that a reality. As an example, during the five years of 1982-1986, the U.S. Navy [procured 86 warships](#);⁴ over the years 2015-2019, China appears to have launched the same number. As a predictable result, the U.S. Department of Defense [recently revealed](#) that China's navy is now the "largest navy in the world" in terms of the sheer number of ships (see Figure 5).⁵ Chinese shipyards have been seen churning out large numbers of warships, including [aircraft carriers](#), state of the art multi-mission destroyers, and cruisers that are the world's largest current-production surface combatants (production of the U.S. Navy's larger, but more lightly-armed, Zumwalt-class destroyer has been truncated at three hulls). This naval buildup does not appear to be unbalanced in nature, as China has also been constructing modern at-sea replenishment ships and [amphibious assault ships](#) to carry its [rapidly-expanding Marine Corps](#).

Many commentators [have pointed out](#), and not incorrectly, that China's warships have been on average much smaller; that the U.S. Navy remains much larger in terms of its overall tonnage, i.e., the sheer heft of the force. Assuming that combat power at sea has a somewhat comparable density among modern warships, tonnage may

³ "President Xi calls for establishment of world-class naval force," CGTN, April 12, 2018.

⁴ "Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress", Congressional Research Service, January 26, 2021.

⁵ "Military and Security Developments Involving the People's Republic of China 2020", U.S. Department of Defense, Sep 1, 2020.

indeed be a better measure than the number of hulls.⁶ But by that measure the trend lines are little better. By my calculations, from 2015-2019 China launched almost six hundred thousand tons of warships, roughly fifty percent more than the United States launched over the same time period (see Figure 6). While the U.S. Pacific Fleet is currently much larger than the PLA Navy by tonnage, my rough calculations indicate that, on current trend lines, the PLA Navy will reach near-parity on this basis as well in fifteen to twenty years. Given that there are ongoing or planned major expansions both at the primary shipyard that builds China's [surface combatants and aircraft carriers](#), and at the one that [builds its nuclear submarines](#), it seems that the pace of Chinese naval shipbuilding is unlikely to slow over the long-term.

In summary, when one considers a Chinese military that includes a highly capable and rapidly growing blue-water navy, the development of a large force of long-range strike aircraft, and an ever growing and highly threatening ballistic missile force, it hardly seems like a defensive force intended only to uphold Chinese sovereignty and local interests, prevent piracy, etc. Rather, China's military seems like a force being forged specifically to deter or prevent U.S. military intervention in a scenario such as a cross-Strait conflict.

IV. U.S. capabilities and PRC vulnerabilities in a cross-Strait conflict

Even given the ominous developments discussed above, coercing or invading by sea a free nation of 24 million people—in particular one backed by what is still the world's most powerful military—will remain a high bar for the PLA. Additionally, as the PLA stretches its capabilities further away from its shores in search of power projection, it is in turn gaining its own new vulnerabilities as it begins to mimic in some ways the traditional American markers of world-class military capability.

- 1) **U.S. capabilities to intervene in a cross-Strait conflict:** The U.S. military has hard-won advantages over the PLA based on operational and warfighting experience, flexible and multi-purpose platforms, and difficult-to-replicate capabilities in key warfare areas.

First, the U.S. military has gained extensive experience conducting real-world combat operations over decades of conflict in the Middle East and Central Asia, whereas the PLA has had little combat experience since its invasion of Vietnam in 1979. At sea, the U.S. Navy has had generations of experience operating worldwide, whereas the bulk of the PLA Navy typically stays within the home waters of the western Pacific, with smaller numbers of ships dispatched on missions such as anti-piracy patrols in the Red Sea. All of this should provide a level of flexibility and capability for U.S. forces to respond to uncertain circumstances, something that may not be matched within the PLA. This may be true, in particular, in cases where units of both sides may lack guidance from above due to disrupted communications. One countervailing factor to consider is the possibility that U.S. experience gained mostly fighting insurgents in permissive environments will be of little utility (and perhaps even negative utility) in knowing how to fight a major war against a peer competitor.

While [some observers](#) have applauded China's apparent focus on asymmetric means of fighting, such as the use of artificial intelligence, unmanned systems, and ballistic missiles, we should keep in mind that the multi-purpose nature of U.S. power projection platforms may also help to provide operational flexibility in a cross-Strait conflict. As a specific example, consider the Navy's Arleigh Burke-class destroyer. This modern U.S. surface combatant, the evolutionary winner of centuries of warship development, can engage in diverse mission areas such as long-range anti-aircraft defense, strike warfare, anti-surface warfare, and anti-submarine warfare. If cut off from communication, it can use its own sensors to locate and attack enemy targets and defend itself and others; if its information systems are affected by cyber-attacks, there are personnel onboard who can take corrective measures to patch and restore them to service. By contrast, a battery of ground-based missiles has no significant capability

⁶ Factors that could cause this to be more likely would include similarities in warship design and capability, sufficiency of fleet logistics, and the state of personnel and materiel readiness. Factors that could cause divergence might include significant differences in munitions capability and magazine depth, effectiveness of C2 and fleet employment, and the ability to cope with battle damage.

to detect targets or to defend itself; if cut off from communication, its military capability is reduced to near-zero. If unmanned combat systems are similarly cut off from communication, their capability may also be severely affected, at least in the absence of truly forward-leaning lethal autonomy. While it is difficult due to classification and other factors to characterize the struggle that would surely take place to gain a command and information advantage in a cross-Strait conflict, what we can be sure of is that such efforts would be taking place on both sides, with mutual degradations of these functions likely to result. Over the course of a longer cross-Strait conflict such as a blockade, an extended bombardment, or a stalemated invasion, this seems likely to favor U.S. and allied forces due to their greater flexibility and operational experience.

Benefiting from decades of investment, the United States also holds significant military advantages in areas such as undersea warfare, stealth aircraft, and the worldwide reach of its naval forces and Marine Corps. These areas, particularly technically-demanding ones such as submarine quieting and stealth technology, will take time for China to erode, though we should remain watchful given recent indications such as China's apparent building of a [new class of submarines](#), as well as the forthcoming debut of China's own long-range [stealth bomber](#). Working against these U.S. military advantages, over time the cost of individual platforms on which the U.S. military relies has gone up, with resulting reductions in the numbers available given other resource pressures such as ongoing combat operations and rising personnel costs. As a result, as some of the last waves of late-Cold War U.S. platforms retire, the U.S. military is seeing ongoing reductions in the number of combat-capable platforms available, with looming retirements of some of the Navy's most capable surface combatants, a mid-2020s trough in the number of nuclear-powered fast attack submarines, and an Air Force aircraft inventory whose average age has increased to [almost 30 years](#). While the Navy, for one, has a plan to increase its numbers in coming years, much of the technology supporting its proposed use of unmanned vessels is still developmental in nature, with deployment at a meaningful warfighting scale still years away and without certainty of success. The level of budgetary support to achieve fulfillment of this plan also [seems somewhat uncertain](#) given budget pressures in the wake of the COVID-19 pandemic, as well as congressional mistrust in the wake of troubled programs such as the Littoral Combat Ship and Zumwalt-class destroyer.

- 2) **PLA vulnerabilities in a Taiwan scenario:** As has been documented in this commission's previous reports, perhaps the greatest vulnerability that China faces in its ability to bring Taiwan to heel is an apparent lack of sufficient amphibious sealift capability to deliver and sustain an invasion force that could defeat Taiwan's ground forces. Taiwan's added focus on developing its own A2/AD capabilities, as delineated in its Overall Defense Concept, would help to exacerbate this limitation by focusing on the use of weapons such as mines and ASCMs to inflict losses on PLA amphibious forces. The actualization of this can be seen in Taiwan's [ongoing deployment](#) of supersonic [HF-3](#) ASCMs both at sea and ashore, as well as a [planned purchase](#) of as many as 400 subsonic Harpoon ASCMs from the United States. Additionally, in recent years the U.S. Department of Defense has developed or purchased a number of new ASCMs such as the Maritime Strike Tomahawk (MST), Naval Strike Missile (NSM), and Long Range Anti-Ship Missile (LRASM) in an effort to rapidly increase its ship-killing capabilities in the wake of decades of relative neglect of this mission area. It has also embarked on efforts to upgrade existing Harpoon ASCMs and has re-introduced their use [onboard U.S. attack submarines](#).

More points of PLA vulnerability are likely to emerge as China continues to develop the capability to engage in long-range power projection, as the forces that it will need to do so will become subject to interdiction in manners similar to those that have provoked concerns about the vulnerability of U.S. power projection platforms. Put simply, if one desires to go somewhere over the sea or through the air, one will have to leave the protective clutter of the earth, as well as the protective umbrella of defensive coastal sensors and weapon systems, and become subject to detection and attack on the open sea or airspace. More specifically, China's new aircraft carriers and large amphibious ships will make lucrative targets for U.S. attack submarines, having to venture into deep water if they are to project power outside of China's near seas. China's nuclear submarines are [noisy](#) and still limited in numbers, and thus also would be subject to detection and destruction after they leave their home waters. The level of support required for China's large bomber fleet will probably limit them to a relatively small number of

known fixed bases and avenues of approach, making them also subject to destruction in flight on their way to distant targets. The relevance that all of this has for a Taiwan scenario is largely related to how far PLA power projection forces will be able to push back U.S. and allied forces, and what costs China may suffer in doing so as its newer, prestige platforms come under threat.

V. Points of uncertainty

Considering all of the factors discussed above—extraordinarily rapid advances in Chinese military capabilities; enduring U.S. and allied strengths, as well as new warfighting initiatives; and the difficulty of coercing a proud, democratic nation like Taiwan—what I am left with is a humbling sense of uncertainty as to the spectrum of possible results in a cross-Strait conflict. We should remind ourselves that there has not been a major power conflict, particularly at sea, within the last 75 years. Entire generations of weapon systems have come and gone without seeing significant use in peer combat. As a specific data point, it bears considering that the only currently commissioned warship in the U.S. Navy that has sunk another warship in combat [is the USS Constitution](#), from the War of 1812.

To provide some perspective for when one hears confident predictions about how a major U.S.-China war would play out, keep in mind that during the last major power war in the Pacific, most platforms involved ended up being used for quite different purposes than that for which they were originally designed. Battleships, intended to be the main striking force of both sides' navies, ended up being used mostly for shore bombardment and anti-aircraft defense, with aircraft carriers (thought to be most useful as scouts) taking the place of the striking arm of the fleets. U.S. submarines, intended mostly for scouting and attrition of enemy battlefleets, ended up being focused on sinking merchant ships and strangling the Japanese economy. The B-29 bomber, which was originally developed to interdict fleets in mid-ocean from bases in the continental United States, ended up mostly being used to firebomb Japanese cities.⁷ Considering this, we would do well to exercise humility in our planning for the future, and do what we can to ensure that the forces that we do deploy are as resilient and flexible as possible.

With this sense of uncertainty in mind, in my assessment the following unanswered questions come to the fore regarding the future military balance and state of cross-Strait deterrence:

- 1) **Will China close its gap in cross-Strait sealift capacity?** While some may take comfort that China may appear to lack sufficient amphibious lift to conduct a cross-Strait invasion, this is not a factor upon which Taiwan's defense should rest, as China may be able to close this gap faster than may be commonly understood.

First, while previous commission reports have documented the growing level of integration, as part of China's Military-Civil Fusion effort, between the Chinese civilian shipping industry and the PLA, some may not appreciate the scale of such integration or of the improvements in relevant merchant fleet capabilities in recent years. Take for an example the case of Bohai Ferry Group, the primary Chinese ferry operator across the Yellow Sea. As described [by the manager](#) of the group (a Communist Party Deputy), in recent years the group has constructed 7 new large roll-on/roll-off passenger ships specifically built to national defense requirements, has used them to transport military equipment more than 40 times, and has increased its ferries' vehicle capacity by a factor of 100 over the last 20 years. This sort of vehicle transportation capability could contribute significantly to China's overall sealift capacity, in a manner not normally accounted for by assessments of the PLA Navy's amphibious fleet.

Next, we must consider that given the scale of its status as the world's largest shipbuilder, as well as the fact that its prime shipyards are dual-purpose producers of civilian and military vessels, China may be able to build sealift capacity fast enough that we may already be within the window of strategic surprise with respect to China's capability to conduct a successful cross-strait invasion. That is, China may be able to increase its sealift capacity,

⁷ Ian Toll, *Twilight of the Gods: War in the Western Pacific, 1944-1945* (New York: W.W. Norton & Company, 2020), 335.

one of the last missing pieces in its ability to invade Taiwan, faster than Taiwan and the U.S. may be able to make strategic changes in response, given the typical pace of change within our democratic systems. For some perspective on the Chinese shipbuilding capacity to which I am referring, during the emergency shipbuilding program of World War II, which supported massive, mechanized armies in two theaters of war thousands of miles from home, U.S. shipbuilding production peaked at [18.5 million tons](#) annually,⁸ and the United States finished the war with a merchant fleet that weighed in at [39 million tons](#).⁹ In 2019, during peacetime, China built more than 23 million tons of shipping, and China's merchant fleet (including Hong Kong's) totals more than [300 million tons](#). We would also do well to note that China's shipyards have recently commenced serial production of large amphibious assault ships, with three 40,000 ton Type 075 Landing Ship Dock (LHDs) launched [within the past two years](#) alone.

Finally, we would be wise to assume that China will bring all of its tools of maritime power to bear in ensuring success in a cross-Strait invasion, including the use of the China Coast Guard, the world's largest such force; and its fishing fleet, specifically in the form of the People's Armed Forces Maritime Militia (PAFMM). In something like the form of a reverse-Dunkirk, we should expect that instead of only dealing with dozens of gray-painted PLA Navy amphibious vessels and their escorts, we would likely see a Taiwan Strait flooded with many hundreds of fishing boats, merchant ships, and Coast Guard and Maritime Safety Administration vessels. It is worth noting that Chinese PAFMM vessels have already been seen using radar reflectors and other tools to increase their radar signatures to resemble that of larger vessels;¹⁰ in the event that U.S. and Taiwanese weapons such as ASCMs and torpedoes are unable to effectively distinguish between key amphibious assault ships and all of the other vessels that may be provided as decoys, we may find the number of anti-ship weapons able to be brought to bear to be lacking, especially given what are likely to be vigorous Chinese efforts at jamming, spoofing, and missile defense.

- 2) **In a conflict, would the PLA strike U.S. forces preemptively, degrading their ability to respond?** As China's ability to strike U.S. forces in the region has grown, some analysts have continued to assess that China is unlikely to quickly strike major U.S. bases and forces in the region, out of a concern that such a move would widen a conflict in a way that China would not desire. This may be true, with the United States and its allies able to marshal and disperse forces before major damage is done, thereby retaining sufficient military capability to respond meaningfully in support of Taiwan during a cross-Strait conflict. An optimistic reading of Chinese strategic documents would support this view, focusing on China's statements that its doctrine of "active defense" is largely defensive in nature, that its preferred concept of "war control" would seek to keep a crisis below the level of military conflict, and that it would in any case seek to minimize the spread of any such conflict to additional countries.

Such an interpretation minimizes a number of factors which indicate that, in some situations, China may indeed opt for large-scale and crippling pre-emptive strikes against U.S. forces and bases in the region. First, as other analysts [have pointed out](#), China's strategic writings advocate, in cases where conflict seems inevitable, "seizing the initiative early, through rapid, violent, and possibly pre-emptive attack."¹¹ The nature of precision strike weapons, coupled with the relative difficulty of replacing modern and sophisticated weapon systems, has also created powerful first-mover advantages in going first—and going big—in a conflict. This factor is amplified by what seem to be additional offense-dominant, first-mover advantages in the cyber and space domains. Finally, and perhaps most obviously, the PLA appears to be putting significant resources into building just such a strike force, as discussed above, and [has been seen exercising](#) and testing it accordingly.

- 3) **How would key weapon system interactions play out?** To a far greater extent than in major-power wars in the past, the resolution of peer conflicts in the precision-strike era may be dramatically affected by individual

⁸ "U.S. Shipping and Shipbuilding: Trends and Policy Choices", Congressional Budget Office, August 1984.

⁹ Thomas Cochran, "How Many Tons of Ships Do We Have Now?", in *EM 25: What Shall We Do with Our Merchant Fleet?* (January 1946).

¹⁰ Michael McDewitt, *China as a Twenty-First Century Naval Power* (Annapolis: Naval Institute Press, 2020), 215.

¹¹ Alison Kaufman and Daniel Hartnett, "Managing Conflict: Examining Recent PLA Writings on Escalation Control" (CNA China Studies, 2016), 68.

weapon, sensor, and information system interactions whose resolution may not be truly known until the shooting actually starts. Given the smaller numbers of platforms, the accuracy of individual weapons, and the relative difficulty of replacing all of them, the consequences of the interplay of jammer versus seeker, sensor versus signature, and hacker versus data stream are likely to propagate from the tactical to the operational and perhaps strategic level in ways not seen before. As one specific and obvious example, a conflict where China's ASBMs could be consistently made to miss through the use of jammers might be a completely different war than one where that was not the case. We should expect to be surprised, and the ability to adapt quickly may well be the key to victory.

VI. Policy recommendations

Given the scale of the problem—detering the invasion of a small island nation by its far larger and implacably hostile neighbor—and in light of the scale of China's ongoing improvements in military capability (with Taiwan's main source of support coming from thousands of miles away), the United States and Taiwan must carefully focus their efforts to ensure continued deterrence of cross-Strait aggression. Specifically, given China's likely desire to ensure "war control" prior to escalation, deterrent efforts must focus on denying China confidence that military aggression against Taiwan would succeed.

Influenced by a Marxian belief in correct processes and scientific principles, China's strategists are [thought to believe](#) that "crises and wars need to be controlled" out of a concern that "an uncontrolled war could derail China's economy and in the process foster widespread domestic discontent and instability that would threaten the legitimacy of the Chinese Communist Party".¹² It is this factor—the desire to avoid uncertainty and ensure the stability of the CCP—and not the prospect of known costs, that is most likely to deter China from engaging in armed conflict. Assuming that the primary goal of U.S.-Taiwan policy continues to be deterrence of a cross-Strait conflict, we should therefore encourage measures that are likely to raise the uncertainty of success in the minds of Chinese leadership, seeding doubt as to whether the PLA can establish effective "war control" at the level of armed conflict and thus delaying a decision to move up to the next level of conflict in the continuum that it sees between peace, a "quasi-war" struggle, and open conflict.¹³ Efforts to merely impose costs and "provide off-ramps" to deter a conflict may not be enough, as China's strategists have indicated that China's core interests, such as its claim to sovereignty over Taiwan, "[must be protected, presumably even at a high cost](#)".¹⁴

To succeed, efforts to create uncertainty in the minds of China's leadership must directly attack the PLA's theory of victory, which is based on waging "[system destruction warfare](#)"—efforts to paralyze and destroy an enemy's operational system—and which the PLA would intend to actualize via "system-vs-system operations featuring information dominance, precision strikes, and joint operations." These operations would focus on disruption of U.S. and allied information flow, attacking command and control, reconnaissance, and firepower capabilities and networks; and disrupting the time sequence and tempo of our operational architecture.¹⁵ Of note, a perfect example of such efforts would be the potential capability to single out and strike high-value command and control assets like the E-3 Sentry AWACS aircraft, as discussed above.

With these factors in consideration, my specific recommendations for how to attack the PLA's theory of victory—thereby reducing the PLA's confidence in initiating a cross-Strait conflict—are as follows:

- 1) **Undermine China's plans to strike at U.S. and allied command and control and firepower capabilities at the start of a conflict:**

¹² Burgess Laird, "WAR CONTROL: Chinese Writings on the Control of Escalation in Crisis and Conflict" (Center for a New American Security, 2017), 6.

¹³ Kaufman and Hartnett, "Managing Conflict", 20-30.

¹⁴ Kaufman and Hartnett, "Managing Conflict", 79.

¹⁵ Jeffrey Engstrom, "Systems Confrontation and System Destruction Warfare: How the Chinese People's Liberation Army Seeks to Wage Modern Warfare" (RAND Corporation, 2018), x.

As a general axiom, planning for a cross-Strait conflict against the PLA should *not* rely on any of the following to succeed:

- Units or forces that require anything but episodic communication or data flow (for example, unmanned vehicles that rely on consistent human oversight to do their job, particularly given current policy restraints on lethal autonomous weapons).
- Any important fixed and hard-to-repair facility on or within the Second Island Chain (for example, fixed fuel tanks, headquarters buildings, repair facilities, and fixed communications equipment).
- Assuming that political considerations may require letting the PLA shoot first, any non-stealthy and non-dispersed platforms within DF-26 range at the beginning of a conflict (for example, aircraft on the ground at major U.S. and allied bases, valuable ships within ASBM range, and non-dispersed air and missile defense assets). To be clear, this applies specifically to the beginning of a conflict, when the PLA has a peacetime-quality targeting picture, and may not apply to forces brought in after conflict has begun and the PLA's targeting picture has been degraded.

It should go without saying, for those familiar with U.S. military forces and facilities in the region, that on any given day this list describes the bulk of them. This is not to say that forces or facilities that meet this description would not be useful in a conflict with China, or for purposes of peacetime presence operations. But they should not be *relied upon* for victory, or to deter the PRC from taking aggressive military action against Taiwan.

When Congress is presented with plans and programs that do rely on any of these types of forces, facilities, and capabilities to deter China, hard questions should be asked about how they will evade targeting in China's planning for war initiation. Any corrective action that results should not be to take steps to improve survivability, minimize attrition, etc., but rather to find *different* capabilities, to ensure that China's leadership knows that our plans *do not rely on* capabilities that are within their easy reach in the region. Otherwise, the PLA may simply add additional resources (such as building hundreds *more* missiles) to ensure they gain the confidence that they desire to be able to move forward with conflict initiation.

Any fixed facilities or non-dispersed forces that are still fielded within the region must be provided with robust and visibly-exercised defenses against precision strike, such as hardening and robust ballistic missile defense. The point in this case is not to provide a 100% assured, leak-proof defense, but to at least raise some doubt as to whether the PLA's precision strikes would succeed at scale. Network-dependent forces within the region must similarly build resilience against command-and-control disruption via means such as the extensive and well-rehearsed use of independent "mission command", forward-leaning rules of engagement, and capable organic sensors. The PLA must not believe that it can paralyze U.S. and allied forces by cutting them off from command and control and targeting networks, *even if they are wrong in this belief*.

- 2) **Visibly prepare for protracted war:** In order to undermine China's confidence that it can win by seizing the initiative via a short, violent fait-accompli, or by cutting Taiwan off from the international system, we should take visible action to ensure U.S. and allied preparation for a protracted conflict. This could include measures such as stockpiling critical supplies on Taiwan to ensure support for the population during an extended blockade, conducting joint exercises with allies and partners that are focused on at-scale interdiction of Chinese maritime commerce, and designing common and easy-to-produce weapons and platforms whose production could be rapidly ramped up in the event of a protracted conflict. The last of these could include plans to bring to bear the industrial capabilities of our allies as well, such as the substantial shipbuilding capacity of Japan and South Korea. China must see visible commitment on the part of the United States and our allies and partners, and not gain the confidence that it can win via a short, sharp, system-destruction-type campaign.
- 3) **Deploy munitions at a greater scale that can distinguish and target specific Chinese transport ships:** On a far more granular level, but one that is crucial given the nature of the threat, Taiwan and the United States should deploy large numbers of survivable advanced anti-ship weapons which are capable of identifying and targeting specific vessels. Our forces must not only be able to inflict losses and impose costs on whatever vessels

happen to be in the Strait during a cross-Strait invasion attempt; they must be seen as able to strike hard specifically at the landing force, generating uncertainty as to the likelihood of its ability to get ashore.

Munitions that are capable of identifying and engaging specific naval targets already appear to be available in the form of newer ASCMs such as LRASM and NSM; however, under current procurement plans they do not seem likely to be able to be delivered in sufficient numbers to ensure the defeat of a PLA cross-Strait landing. Specifically:

- The NSM is only used by the Navy onboard its Littoral Combat Ships, and potentially [onboard amphibious assault ships](#), either of whose survivability operating within the missile's [roughly 100 nautical mile](#) range from the Taiwan Strait would be highly questionable. While the Marine Corps is trying to move forward with [plans to deploy](#) the NSM in small ground units, these missiles would only be able to reach the Strait from Marine units actually deployed on Taiwan; efforts to develop longer-range ground-based anti-ship missiles have quickly run into [Congressional opposition](#).
- While both the Air Force and Navy are moving forward with purchases of LRASM, neither service's current plans seem likely to ensure delivery of sufficient volumes of these weapons to the Taiwan Strait. Specifically, the Navy's LRASMs are all intended to be carried onboard carrier-based F/A-18 strike fighters, whose unrefueled striking range (with Air Force tanker bases potentially under attack) is far less than the range of China's counter-intervention systems. As discussed above, while the Navy is likely to [pursue countermeasures](#) to weapons like the DF-26, for deterrence to work the PLA's planners must be aware of and respect those countermeasures' efficacy, otherwise the PLA is likely to discount the threat that carrier-based LRASMs pose to an invasion force.

In the case of the Air Force, whose bombers might potentially be able to reach within range of the Strait from outside of the region, [planned purchases](#) of LRASM currently total less than 180, only roughly 10 sorties worth of munitions if the bombers were loaded to capacity. Given the likelihood of some percentage of bomber losses to defensive fighters, aircraft and missile malfunctions, and what is sure to be a vigorous anti-missile defense over the Chinese fleet, this seems like an insufficient number of weapons to truly drive fear into the hearts of the PLA's planners.

- The Navy is also moving forward with plans to upgrade some of its Tomahawk missiles to provide an anti-ship role via the Maritime Strike Tomahawk (MST) upgrade, which may include an [imaging infrared sensor](#) capable of specific target recognition; [current plans](#) envision roughly 450 such upgrade kits purchased by the mid-2020s. However, these weapons will be carried mostly on Navy surface ships, whose access within effective range may be problematic, as well as onboard submarines whose numbers and available missile cells will be declining over the period, particularly after the Navy's guided missile submarines (SSGNs) leave service in the mid-2020s.

In order to better increase the uncertainty of the PLA's leaders as to whether an invasion force could succeed in crossing the Taiwan Strait, the deployment of smarter missiles capable of singling out the PLA's most valuable ships should be accelerated and increased in scale, particularly in survivable units such as dispersed ground units, submarines, and long-range bomber aircraft. These units should also begin testing and practicing, in a visible manner, the ability to distinguish and strike specific vessels among crowds of decoy ships, demonstrating focused effectiveness against the combined military-civil effort that the PRC would likely apply to a cross-Strait invasion attempt.

This concludes my prepared remarks. Thank you for the opportunity to present this information to you today.

Appendix: Graphs and Figures

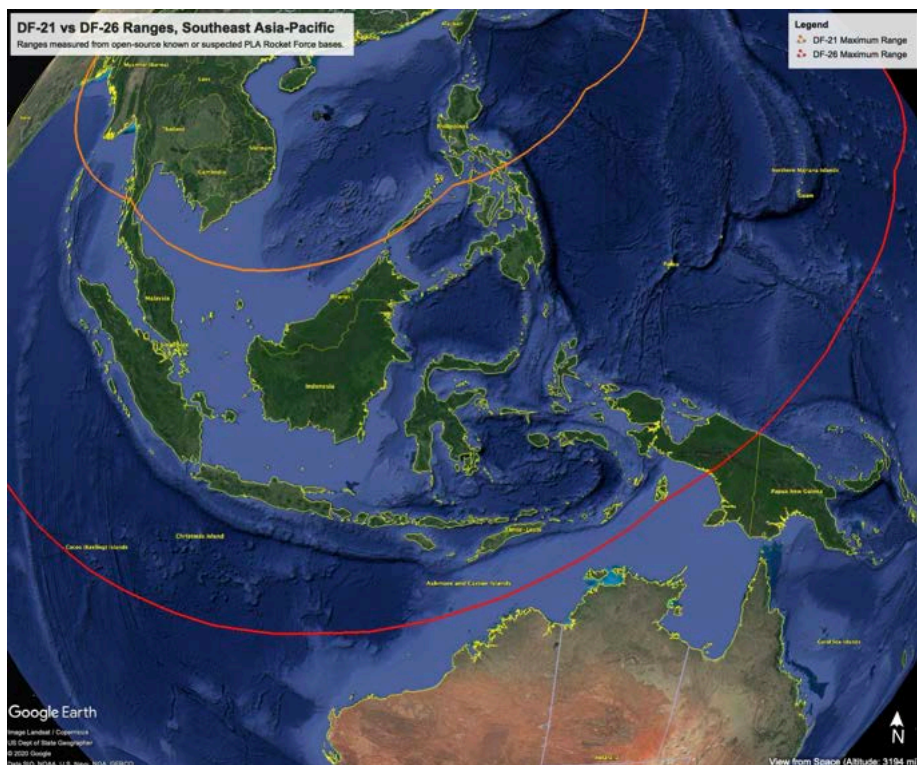


Figure 1: Estimated effective ranges, DF-26 IRBM vs DF-21 MRBM, western Pacific

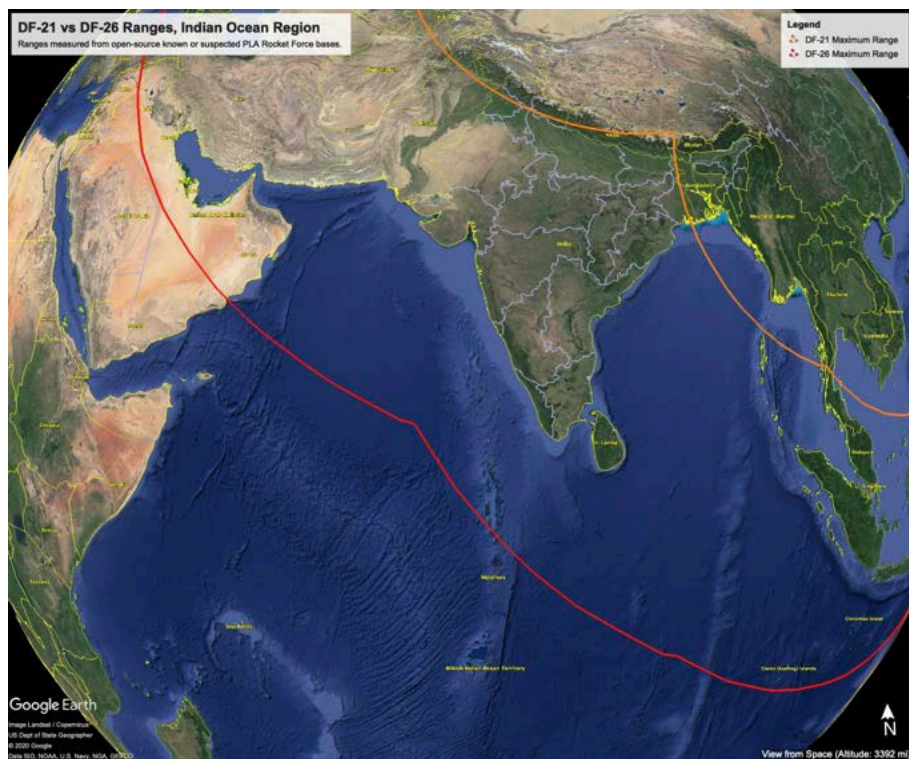


Figure 2: Estimated effective ranges, DF-26 IRBM vs DF-21 MRBM, Indian Ocean and Persian Gulf



Figure 3: Possible mockup E-3 AWACS target, western China. Sources: DigitalGlobe (upper left) and Google Earth (lower right).

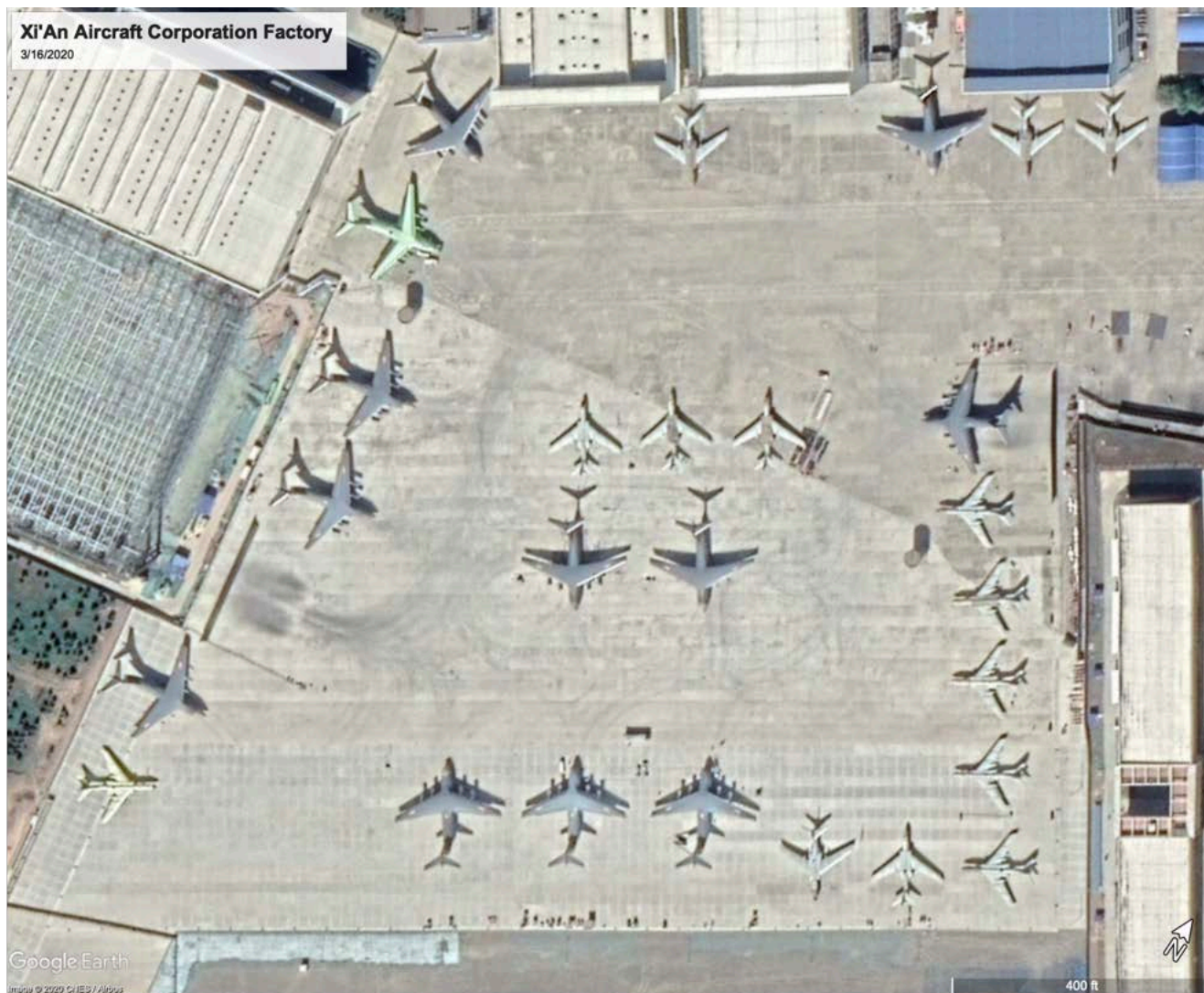


Figure 4: New H-6 bombers and strategic airlift aircraft under construction in Xi'an, China, March 2020. Source: Google Earth.

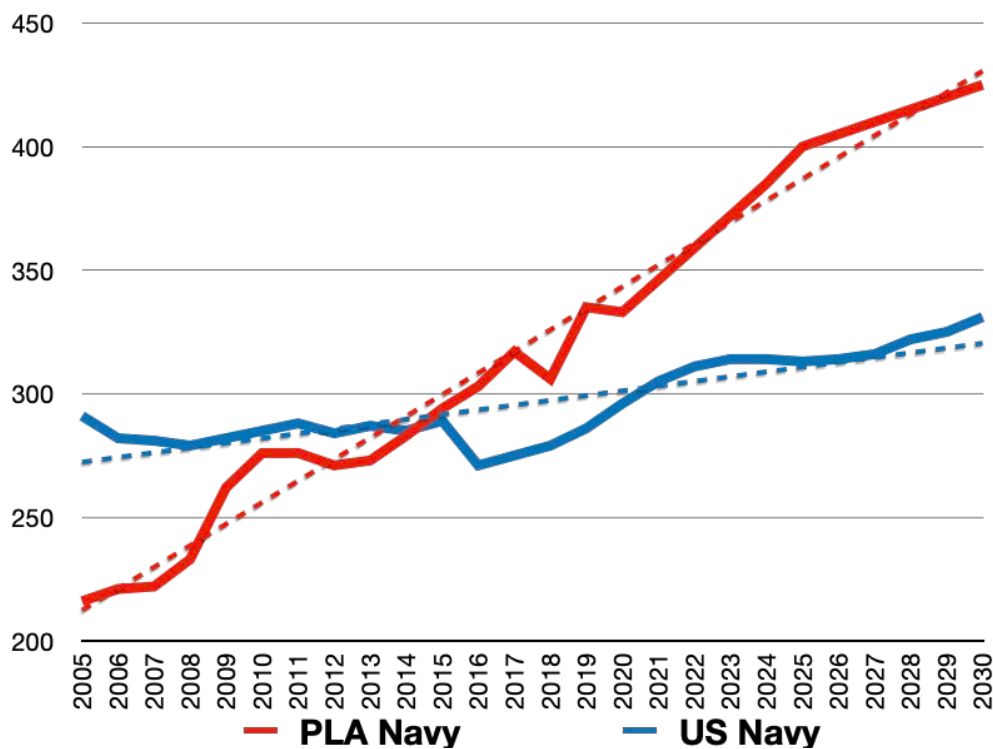


Figure 5: Total battle force ships, US Navy and Chinese PLA Navy (totals past 2020 are estimates)¹⁶

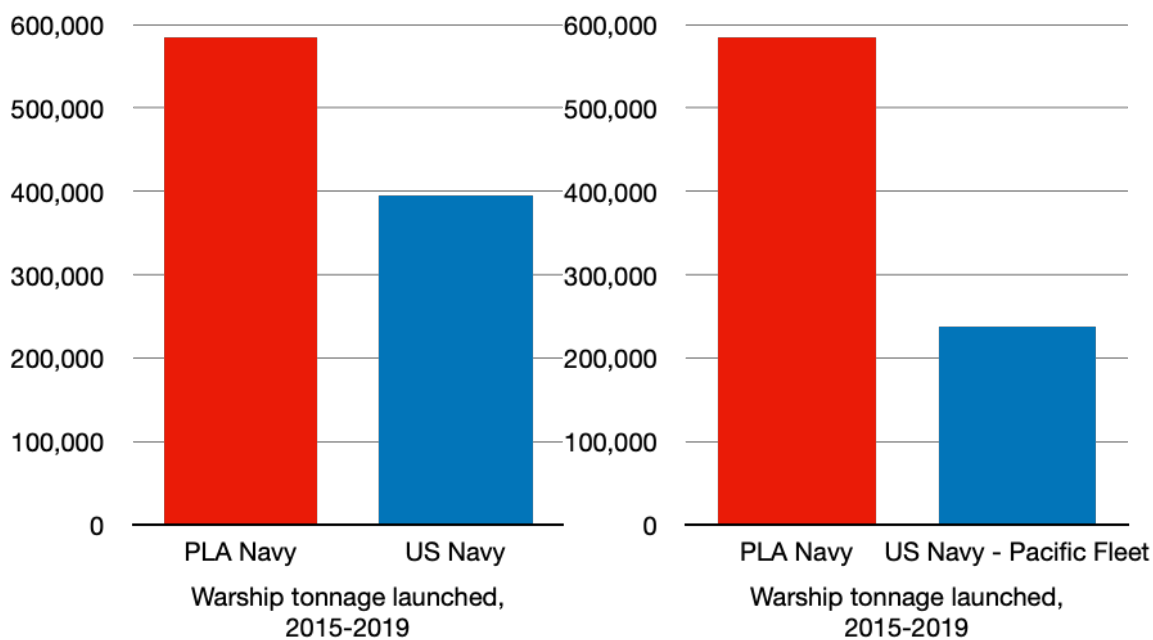


Figure 6: Total warship tonnage launched, 2015-2019. "US Navy - Pacific Fleet" is 60% of US Navy total.¹⁷

¹⁶ Source Data: Congressional Research Service, "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress" (dated 27 January 2021), and "Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress" (dated 26 January 2021).

¹⁷ Author's calculations, using data obtained from Janes, Congressional Research Service, the Center for Strategic and International Studies, Google Earth, The Diplomat, and other sources.