



Keeping A2/AD at Bay: The Imperative for Base Defense in the Western Pacific

By Lt Col Thomas R. McCabe, USAF (Ret.)

About the Forum

The Mitchell Forum exists to give an open venue to authors with ideas and thoughts on national defense and aerospace power. The series features topics and issues of broad interest and significant impact on current and emerging policy debates. The views expressed in this series are those of the author, and not necessarily those of the Mitchell Institute.

Abstract

China is developing and deploying modern military systems, especially conventional ballistic and cruise missiles, that could, if deployed in sufficient numbers, give it the capability to stage a comprehensive conventional surprise attack against American and allied air bases in the western Pacific Ocean. Because those bases are close to China, they would have only a short window for missile warning. Further, these air bases lack robust, modern hardened facilities (many were built before the advent of contemporary precision-guided munitions); therefore, such an attack could all too plausibly neutralize most of the aircraft at those bases at the time of attack, in particular by ballistic missiles. Since the US must expect to be on the receiving end of an initial salvo, the US military must be able to defeat or at least survive this threat. Leaders should consider several countermeasures, including dispersal, passive defense, and active defense. For decades, American bases in the Republic of Korea (South Korea) have operated on the assumption that they are on the front line of a potential conventional war and taken measures accordingly. While circumstances have changed on the Korean Peninsula, the risk of war in the Western Pacific area has arguably increased. The time has come for civilian leaders and military commanders in charge of US aircraft and assets at all other bases in the region to think of these assets as being on the “front line” as well, and take the necessary protective measures.

Introduction

The emerging Chinese anti-access/area denial (A2/AD) threat in the Western Pacific must be considered a potentially revolutionary change in the military situation across the region.¹ Although the likelihood of actual hostilities is at present low, and China-Taiwan relations are relatively stable, China's salami-slicing tactics in the South China Sea have so far proven effective and involved little direct use of military coercion.² Deploying large numbers of ballistic missiles and modern aircraft with cruise missile capability and the range to reach American and allied bases in the region is a major part of China's effort to unilaterally change the balance of power across the Western Pacific, while simultaneously attempting to politically redefine the rules of maritime conduct and establish China as the dominant military power in the region. The threat is most acute in the area between the Chinese mainland and the "First Island Chain," which stretches from the Japanese home islands into Southeast

Asia.³ The US must expect this situation to grow steadily worse as China continues its military modernization by pursuing what amounts to multiple parallel revolutions in its air and space forces. The Trump Administration has recognized this evolving threat, and moved to shore up longstanding alliances. US Secretary of Defense James Mattis has reaffirmed American partnerships with both Japan and the Republic of Korea (the ROK, otherwise known as South Korea), and Secretary of State Rex Tillerson endorses a hardline policy against China on the South China Sea, which he elaborated on during his confirmation hearings.

The first portion of this paper evaluates the nature and capability of the increasing Chinese A2/AD threat to American and allied bases in the Western Pacific, particularly air bases. The second discusses the vulnerability of these bases, and implications of the threat against them. Finally, this paper explores possible countermeasures to preserve US and allied military options and access to the region.



Above: The First and Second Island Chains in the Western Pacific (American View).

Emerging Threats

The Chinese are developing and deploying systems, especially conventional ballistic and cruise missiles, that could, . . . give them the capability to stage a comprehensive integrated conventional surprise attack against American and allied air bases in the Western Pacific region.

The Chinese are developing and deploying systems, especially conventional ballistic and cruise missiles, that could, when deployed in sufficient numbers in the not-very-distant future, give them the capability to stage a comprehensive integrated conventional surprise attack against American and allied air bases in the Western Pacific region.⁴ Since those bases are close to China (which would allow only short warning times against missile attack), few in number, mostly unhardened (and even hardened facilities are not necessarily proof against modern precision guided munitions, or PGMs), and usually lightly defended against ballistic missile strikes, such an attack would all too plausibly neutralize most of the aircraft at those bases at the time of attack.⁵ A Chinese attack would use some combination of a barrage of ballistic and cruise missiles, along with air-to-surface missiles (ASMs), aircraft, and remote piloted aircraft (RPA), reinforced by cyberattacks and, in some cases, special operations forces, potentially using rockets and mortars.⁶ The analysis in this paper concentrates on the threats posed by missiles, aircraft, and RPAs.

The missile threat—a revolution in precision-guided attack

While estimated to have a modest force of nuclear ballistic missiles (75–100 intercontinental ballistic missiles, or ICBMs), China has deployed a large force of conventional tactical ballistic and cruise missiles, mostly under the People’s Liberation Army (PLA) Rocket Force, for use against land targets and, increasingly, ships.⁷ China has steadily expanded the capabilities of this force with precision-guided systems.⁸ The United States must expect this threat will only increase over time.

Land attack ballistic missiles

The Chinese have a force of at least 1,200 conventional short-range ballistic missiles

(SRBMs), although evidently their force of launchers is significantly smaller.⁹ (In 2012, the DOD estimated the number of launchers at 200–250.¹⁰ It is reasonable to assume China has deployed additional launchers since then.) Historically these missiles have been unguided and short ranged—most could reach Taiwan but not Okinawa—but China is now deploying upgraded missiles with longer range and precision guidance that from coastal launch sites can reach not only Okinawa but also most of Kyushu and much of Luzon.¹¹ Further, the Chinese are deploying a version of the longer range DF-26 intermediate-range ballistic missile, which can reach Guam.¹² China displayed 16 DF-26s in the September 3, 2015, Chinese V-Day parade, which presumably indicates at least some variants of the missile are in production.¹³ Recently, China has reportedly been practicing missile strikes against mockups of Pacific air and naval facilities.¹⁴

Additionally, although reports are ambiguous, the Chinese may have started deploying non-nuclear electromagnetic pulse warheads on some of their missiles.¹⁵ This would convert even non-PGM warheads into a much greater threat.

Long-range land attack cruise missiles

China is currently building and deploying “large numbers” (reportedly 200–500 in 2012, presumably more since; one study estimated as many as 1,250 by 2017) of CJ-10/DH-10 and DH-10A long-range (up to 2,000 km) ground-launched land attack cruise missiles (LACMs).^{16, 17} However, the number of launchers is considerably lower, according to US estimates; DOD estimated 40–55 launchers in 2012, although the launchers carry multiple missiles.¹⁸ Additional LACMs (as well as anti-ship cruise missiles) could presumably be launched from other aircraft, from PLA Navy (PLAN) submarines and surface ships, from forward island bases, and potentially from containers on civilian ships.

Recently, the Chinese have started deploying long-range air-launched CJ-20 cruise missiles (the air-launched version of the DH-10) on their H-6K bombers, the upgraded Chinese version of the Russian-designed Tu-16 Badger.¹⁹ They are reported to have 36 such bombers in their inventory, each of which can carry up to six CJ-20s.²⁰

China may also be developing a next-generation ground-launched cruise missile, the HN-2000, described as being stealthy, equipped with advanced sensors (millimeter-wave radar, imaging infrared, laser radar, and synthetic aperture radar), and using a guidance system based on the Chinese Beidou satellite navigation system.²¹ It is also reported to have a supersonic terminal flight phase and an expected range of 4,000 km.²² China is apparently starting to deploy a large new cruise missile, but so far it is unknown if this is the HN-2000.

Improvements in combat aviation

Until fairly recently, the People's Liberation Army Air Force (PLAAF) and the PLA Navy Air Force (PLANAF) were largely equipped with Chinese-built variants of unsophisticated, short-range, single-role second or third generation Soviet designs, such as the F-6 (MiG-19) and the F-7 (MiG-21), mostly intended for air defense. This started changing in the 1990s when China acquired Russian fourth generation Su-27 Flanker-family fighters. Since then this change has accelerated with China's development and production of large numbers of its own versions of Su-27/Su-30/Su-33 designs and its own fourth generation designs. China has gone beyond cloning foreign (especially Russian)

aircraft, and now designs and builds modified or new military aircraft and systems with limited or no foreign assistance. Examples include:

- J-11 Flanker family, based on the Russian Su-27 (and its Su-30 and Su-33 derivatives). When combined with Su-27s and Su-30s acquired and Su-35s being acquired from Russia the force totals about 400 aircraft.²³ The Chinese are producing several redesigned versions that carry Chinese weapons, most significantly the KD-88 air-to-surface land attack missile

(ASM), which has a range of 180–200 km (108–120 miles).²⁴ With a reported combat radius of approximately 1,400 km, these aircraft can potentially reach all bases on Taiwan, the ROK, Okinawa, much of mainland Japan, and Luzon from Chinese coastal bases, and most of Japan from Manchurian bases even without aerial refueling or using the KD-88.²⁵ While many of these aircraft are not necessarily well equipped or their crews trained for ground attack, they could still pose a threat by serving as launch platforms for ASMs.

- J-10 Firebird family. The Chinese have produced multiple versions of this dual-role aircraft, often compared to the F-16. As of late 2015 China was estimated to have produced over 400 J-10s.²⁶ They have a reported combat radius of up to 1,000 km, which would put bases in Taiwan, Okinawa, the ROK, and much of Luzon in range from Chinese coastal bases; most of Japan potentially in range if they could overfly North Korea from Manchurian bases; and more of Japan and the Philippines in range if they served as launch platforms for KD-88 ASMs.

China is also continuing to design, upgrade, and produce other combat aircraft, such as the JH-7/7A Flounder fighter-bomber. As of 2017 China had at least 210 JH-7/7As, divided between the PLAAF (30–40 aircraft) and the PLANAF, with 180.²⁷ With a reported combat radius of over 1,600 kilometers, the JH-7/7A can potentially reach all bases in the ROK, southern Japan, and Luzon from Chinese coastal bases even without aerial refueling or ASMs.²⁸

Finally, the Chinese are working on combat aircraft with stealth characteristics. They may have recently started initial production of the J-20, an aircraft larger than the F-22 with at least limited stealth.²⁹ Reports on its performance are fragmentary, but some estimate its combat radius as over 1,800 km.³⁰ In addition, the Chinese are testing (and offering for foreign sale) a smaller stealth fighter, the J-31, reported to have a similar combat radius.^{31,32} They may also be developing a stealth strategic bomber, variously reported as the H-8, H-20, or H-X.³³

Until fairly recently, the People's Liberation Army Air Force (PLAAF) and the PLA Navy Air Force (PLANAF) were largely equipped with Chinese-built variants of unsophisticated, short-range, single-role second or third generation Soviet designs... This started changing in the 1990s when China acquired Russian fourth generation Su-27 Flanker-family fighters.

The next threat: a revolution in RPAs and unmanned combat air vehicles (UCAVs)

The Chinese have instituted a major effort to develop new and more capable RPAs, and have established a potentially impressive technology and production base.³⁴ China has even sold RPAs to US allies such as Jordan, Saudi Arabia, and the United Arab Emirates, and have provided armed drones to Iraq.³⁵ The US-China Economic and Security Review Commission's *2015 Annual Report to Congress* indicates that China possibly plans to produce upwards of 41,800 land- and sea-based unmanned systems, worth about \$10.5 billion, between 2014 and 2023, although it did not provide specifics as to their possible role and capability.³⁶

Much of China's RPA effort centers on intelligence, surveillance, and reconnaissance (ISR)-related systems, including at least two reported analogs to the American high-altitude

Much of China's RPA effort centers on intelligence, surveillance, and reconnaissance (ISR)-related systems, including at least two reported analogs to the American high-altitude long-endurance RQ-4 Global Hawk...

long-endurance RQ-4 Global Hawk (the Divine Eagle and the Xianglong/Soaring Dragon), as well as a large unmanned airship and several medium-altitude, long-endurance (MALE) RPAs.^{37,38} The most widely reported MALE systems include the Yilong/Wing-loong, roughly similar to the American MQ-1 Predator, and the CH-5, roughly equivalent to the MQ-9 Reaper.³⁹

The MALE systems, like their American counterparts, can carry bombs and missiles.⁴⁰ Some reports indicate that in the "near [timeframe unspecified] future," the PLAAF could have at least five RPA regiments, each with at least 100 attack unmanned combat air vehicles, or UCAVs.⁴¹

The Chinese are also reportedly working on at least two stealthy UCAVs, including the supersonic Anjian (Dark Sword), which, according to unconfirmed reports, may have started testing in 2014.⁴² At least one other UCAV design, the Li Jian (Sharp Sword), may have started testing in 2013.⁴³ In addition, China is working on the WJ-600, supposedly with stealth features, which may be a target drone but has been advertised as filling an ocean-reconnaissance role to hunt US aircraft

carriers.⁴⁴ Finally, China may have converted at least 200 of its retired F-6 (Chinese-manufactured MiG-19) and some J-7 (Chinese-manufactured MiG-21) fighters into drones or UAVs, which have the obvious potential of being used as decoys to drain supplies of defensive systems.⁴⁵

Publicly available information about the number of Chinese military RPAs and UCAVs deployed is very limited and varies widely.^{46,47} But China can evidently draw on a large resource, potentially rapidly.

The "beetle bomb" threat—small RPAs

The so-called "beetle bomb" threat—more correctly the low, slow, and small (LSS) threat—is also rapidly emerging. Most attention has focused on the possibility of drone collisions with aircraft, and civil authorities acknowledge the danger that small, cheap drones ("hobby drones") pose to airport operations (for example, the Federal Aviation Administration has established a 30-mile-radius no-drone zone around Washington, D.C.'s National Airport).⁴⁸ Yet the far more comprehensive threats that swarms of such drones pose to air operations at military air bases are only gradually being recognized. They include:

- LSS drones could, literally, be beetle bombs: small flying bombs sent against air base facilities, aircraft, and personnel. The bombs could fly directly into targets, or drop undetonated explosives and then crash. The explosives would have to be removed or disarmed, while the crashed mini-UAVs would have to be removed to prevent pieces from being sucked into aircraft engines.
- LSS drones carrying weapons and cameras could be used to target personnel and aircraft.
- Even if LSS drones are not used as bombs, by crashing or just scattering scrap on runways they could disrupt operations until they are cleared. Further, because this tactic does not directly cause casualties, it could be used against reinforcing bases (and even civilian airfields) in the United States while minimizing the risk of conflict escalation.

LSS drones are not necessarily one-time threats. An enemy could release individual beetle bombs or swarms of them at intervals (from garages in a nearby town, from prepositioned containers, or from a ship in a nearby harbor) as a harassment tactic. More ambitiously, small drones might be produced locally using three-dimensional printing. Finally, drones with significant range and flight time could be released from one or multiple points and programmed with a variety of courses as a multidirectional threat.

Air Base Vulnerability

In the Western Pacific, the US and its allies depend on a small number of air bases. Aside from bases in South Korea, a significant number on Taiwan, and some in Japan (especially the USAF base at Misawa AB, Japan), few bases in the region are hardened, and those that have shelters for aircraft may have only a small number.^{49,50} For example, Kadena AB on Okinawa has only 15 shelters; US bases in Japan at Futenma on Okinawa, and Iwakuni, Yokota, and Atsugi on the main Japanese islands have none. Japanese Air Self Defense Force (JASDF) bases at Nyuabaru and Tsuika, where the US has contingency access, have a “handful” of shelters. JASDF bases at Komatsu have 14, while Chitose, on Hokkaido, has 28.⁵¹ Of note, Philippine facilities the US may be allowed to access in a crisis are likely not hardened.⁵² While the Air Force has made efforts to harden at least some of its facilities, especially fuel supplies, at Andersen AB on Guam, the recently constructed parking area for Marine aircraft there evidently does not include shelters, and the bombers, tankers, and ISR aircraft based there are probably impossible to shelter.⁵³

Thus, while the situation may vary somewhat depending on the particular scenario, the US and its allies cannot count on automatic air superiority in the Western Pacific over the long term.⁵⁴ Making the reasonable assumption that China will fairly soon deploy the number of missile launchers and advanced missiles necessary to stage a comprehensive attack, we must expect

that American and Allied bases would potentially be vulnerable to a series of missile barrages that could overwhelm available and projected missile defenses, and cause massive destruction to unsheltered aircraft and personnel. Damage from ballistic missile attacks would be compounded by damage from LACMs, ASMs, air attacks, and beetle bomb attacks. This means we can no longer count on most US and allied bases in the First Island Chain as survivable sanctuaries, and we must expect that more distant bases, such as those on Guam and the eastern Philippines, will become vulnerable over time if they are not already vulnerable today. At a minimum, the US and its allies must assume that many or most friendly aircraft based in Okinawa or mainland Japan or the Philippines will not survive long enough to get into the war. At worst, the US—and our Japanese and Filipino allies in particular—face the literal prospect of a Pearl Harbor-like attack (or, perhaps more relevant, a Clark Field, where much of the airpower America had in the Philippines in December 1941 was caught on the ground) caused by a Chinese surprise attack. If they are daring, or desperate enough, the Chinese could largely neutralize what has historically been one of the United States’ most critical assets and advantages: our ability to securely project airpower into the region, and seize air superiority over the Western Pacific. If we cannot count on their survival, our forward bases and the aircraft located there will become liabilities rather than assets in a crisis.

Compounding this would be the continuing vulnerability of any replacement and reinforcing aircraft we send into the theater, and the emerging potential vulnerability of our aircraft carriers to attack by anti-ship ballistic missiles (ASBMs).⁵⁵ Further, reinforcing air bases (or civilian airports) in Hawaii, Alaska, and on the west coast of the US could potentially be vulnerable to attack from LSS aircraft.

Countering the Threat

If the US and its allies want to continue to operate effectively they must act immediately to ensure the survivability of their Pacific air bases. At the very least, this would reduce the potential effectiveness, and therefore the attractiveness, of Chinese preemption.

If they are daring, or desperate enough, the Chinese could largely neutralize what has historically been one of the United States’ most critical assets and advantages: our ability to securely project airpower into the region, and seize air superiority over the Western Pacific.

The obvious first step in such an attack on US and allied installations would be to degrade or destroy the hostile launch bases and platforms, but this would encounter major difficulties.

- Presumably the US would not be allowed to preempt, so it could only target adversary assets as part of a counterattack. That means the Chinese would have the initiative, and we would likely be forced to fight a “come-as-you-are” war with little or no preparation.

- Depending on the circumstances, for political reasons we might (as in the Korean War in particular) permit the enemy a geographic sanctuary, or we might not be allowed to attack some categories of targets. The PLA Rocket Force controls both China’s conventional tactical missiles and its strategic nuclear missiles.⁵⁶ If this force stores both types of missiles at the same facilities, attacking those facilities would be potentially escalatory. The same concern would apply to suppressing the Chinese integrated air defense system (IADS) to enable attacks on other targets, or attacking Chinese ISR-related targets to prevent them from tracking our own systems. In particular, attacks on command and control targets,

especially systematic attacks on the Chinese national command structure, would carry grave risks of escalation to an even larger war—perhaps nuclear.

- While air bases are fixed targets, cruise missile and ballistic missile launchers are mobile, which makes them much harder to target, especially if they are protected by an IADS, hardened dispersal facilities (most known ballistic missile deployment sites have underground facilities nearby), and denial and deception measures.⁵⁷

Since US forces must expect to be on the receiving end of the first salvo of any attack, we must be able to defeat or at least survive it.

Countermeasures to help in this goal include dispersal, passive defense, and active defense tools and strategies.

Dispersal strategies

Initially the US and its allies could disperse forces to additional bases and within individual bases, in the event intelligence indicated the likelihood of an attack. To a degree the US intends to do this with its recent agreement to again access Philippine bases (but this will likely not be as robust an agreement as those with other allies in the region). Unfortunately, the geography of the Western Pacific region means that dispersal bases may be very distant from contingency areas (for instance, for a South China Sea scenario, bases in the ROK and the main Japanese islands may be as far or farther away than Guam). Even more important, most or all additional bases are also vulnerable and likely to be within range of the missile and air threat, so the Chinese could defeat dispersal by continuing to deploy missiles and launchers. More distant bases (in the southern Philippines, Guam, Tinian, and Palau, east of the southern Philippines) would face the same problems over time.

The US and its allies could also use highways as airfields, as has occasionally been done in places such as Cold War-era Western Europe.⁵⁸ The US could also disperse aircraft within an airfield to enlarge the area the Chinese would have to attack. However, these measures would place additional burdens on security forces, maintenance, and fueling personnel. Further, the US and its allies could use civilian airfields, but would face the same vulnerabilities as other unhardened facilities, and could represent a significant security challenge.

Passive defense: hardening and decoys

The next step would involve hardening US and allied bases and providing them with rapid repair and reconstitution capability, as we have done with bases in the ROK and some other bases for decades. Unfortunately, aside from the bases in the ROK, a significant number on Taiwan, and some in Japan, few bases in the Western Pacific region are hardened, and even those may have only a small number of shelters for aircraft. Moreover, while hardened “hangarettes” could protect

While air bases are fixed targets, cruise missile and ballistic missile launchers are mobile, which makes them much harder to target, especially if they are protected by an IADS, hardened dispersal facilities,... and denial and deception measures.

fighter and attack aircraft, it would be much more difficult to protect large aircraft such as bombers, transports, and tankers (although open-topped revetments may provide at least partial protection). Unfortunately, the US still confronts an ongoing downturn in defense spending, and hardening bases will be expensive. An aircraft shelter can cost up to \$10 million.⁵⁹

Use of decoys might provide some protection by forcing the attacker to waste effort on false targets, or using fake damage to convince an adversary that additional attacks are unnecessary. However, the decoys would have to be sophisticated, given the likely increasing sophistication of Chinese ISR.

Active defenses: electronic warfare, missile defense, and more

Against an increasingly comprehensive threat, the US and its allies will need comprehensive defenses that integrate electronic warfare (EW), ballistic missile defense (BMD), anti-cruise missile/

anti-aircraft defense, anti-UAV systems, and, depending on the location, anti-rocket, artillery, mortar defenses, and ground defenses. Unfortunately, to do this, the US must massively upgrade its defensive capabilities, which would include deploying unprecedented types of defenses. Compounding the difficulty will be that such defenses, as a rule, would be provided by more than one military service (for example, the Army has primary responsibility for air and missile defense of ground bases, using such systems as the Terminal High Altitude Area Defense (THAAD)

missiles on Guam) or by allied governments.⁶⁰ Fortunately, most of the systems deployed are American designed, which at least would reduce if not largely eliminate integration problems with allies equipped with compatible systems. It becomes clear when examining the range of threats facing bases that the US (and its allies, who would need access to US defensive technologies) needs to build an integrated aerospace defense system – not just for air defense alone.

Defense against ballistic missiles will prove especially difficult. Currently, the primary defense employs interceptor missiles (such as the Navy's Aegis system or THAAD), which, unfortunately, are expensive. Therefore, cost would limit the supply of such missiles, and the cost-exchange ratio would likely favor the attacker. A large salvo or a series of salvos would exhaust the supply of defensive missiles no matter how effective the interceptors, and any use by the attacker of penetration aids such as decoys would compound the difficulty for the interceptors. The US could also use EW, at the very least to jam or spoof Chinese navigation satellite signals in the vicinity of its bases. Furthermore, future technology might change the cost-exchange ratio; by enabling interceptors to destroy more than one warhead, for example.⁶¹

Another option would involve deploying advanced guns for BMD use. One possibility would be to use railguns—guns whose projectiles are electromagnetically launched rather than fired by chemical propellants—to defend land bases. The US Navy is experimenting with railguns for shipboard use, and the US Army is considering them for BMD use.⁶² Since railgun rounds would be comparatively cheap and have long range and high speed, they have the potential to drastically change the BMD cost-exchange ratio, especially if the rounds are maneuverable. Hypervelocity rounds fired by conventional guns would reportedly have similar effects at much less cost.⁶³

Defense against cruise missiles, ASMs, and aircraft would require a mix of defensive aircraft, defensive missiles, and likely anti-aircraft artillery for terminal defenses (Some sources claim regular artillery can perform this role).⁶⁴ The US and its allies already have many of these systems in place, although they will undoubtedly need more of them to buttress defenses, and would need to tie them together into an integrated system capable of operating with capabilities such as Aegis and the US Air Force's E-3 Airborne Warning and Control System (AWACS) aircraft. In particular, cruise missile defense would require long-range sensors to detect incoming threats. This could require a system such as the Tethered Aerostat Radar System or the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor, which includes an aerostat-mounted radar.

Defense against ballistic missiles will prove especially difficult... A large salvo or a series of salvos would exhaust the supply of defensive missiles no matter how effective the interceptors, and any use by the attacker of penetration aids such as decoys would compound the difficulty for the interceptors.

The next layer of defense would consist of systems to detect and defend against the aforementioned beetle bomb threat. While the US should expect that such defenses will soon be deployed at every major airfield and airport, as small RPAs proliferate around the world, defenses at military airfields will undoubtedly require a hard kill capability against a likely greater threat. A variety of such systems, with varying levels of sophistication, are starting to appear already.⁶⁵ The US and its allies should systematically evaluate the capabilities of these systems, and deploy the most effective defenses. Over time, reinforcement of these defenses will be required, such as utilizing increasingly powerful directed energy weapons for defensive purposes.⁶⁶

Conclusion

The possibility of a war in the Western Pacific is, at present, low. However, so were the threats of a Soviet attack on Western Europe and a nuclear attack on the US during the Cold War. Prudence led the US and its allies to invest immense resources in preparing against those possibilities.

During the Cold War, Air Force bases in the Federal Republic of Germany in particular faced a threat from Soviet forces in Eastern Europe and

the western Soviet Union. Since the armistice that ended the Korean War, US bases in the ROK have functioned under the assumption they could be subject to attack on short notice. Past American efforts to counteract these threats have relied on a combination of active and passive defenses and rapid repair and reconstitution. The US and its allies need to duplicate these measures at its Western Pacific bases and, more selectively, at other facilities in the Pacific region (or those that support the Pacific region). All personnel at other bases and on US ships in the region should think of themselves as being in a forward area. The front line is no longer just Korea, and our air bases in the region are no longer peacetime airbases.

In March 1941, US Army Air Forces Maj Gen F.L. Martin, commander of the Hawaiian Air Force, and Rear Adm P.N.L. Bellinger, commander of the Hawaiian Naval Base Defense Air Force, warned of the danger of a surprise attack against Pearl Harbor.⁶⁷ Tragically, the commanders whom they advised (Army Gen Walter Short and Navy Adm Husband Kimmel) ignored the warning—leading to disastrous results on December 7, 1941. As threats grow more potent and potential adversaries grow stronger, the US cannot afford to have this happen again in the Pacific. ★

Endnotes

- 1 Andrew Krepinevich, *Maritime Warfare in a Mature Precision-Strike Regime* (Washington, DC: Center for Strategic and Budgetary Assessments, 2014, <http://csbaonline.org/publications/2015/04/maritime-competition-in-a-mature-precision-strike-regime/>) (All web links accessed in January, 2018).
- 2 Author's note: So far China has primarily used its coast guard and its fishing fleet maritime militia for its activities in the South China Sea. See Ryan D. Martinson, "China's Second Navy," *Naval Institute Proceedings*, April 2015, Vol. 141, No. 4, <http://www.usni.org/magazines/proceedings/2015-04-04/chinas-second-navy>, for information on the Chinese coast guard, and Megha Rajagopalan, "China Trains 'Fishing Militia' to Sail into Disputed Waters," *Reuters*, April 30, 2015, <http://www.reuters.com/article/us-southchinesea-china-fishingboats-idUSKCN0XSORS>, for information on China's use of its fishing fleet as a maritime militia.
- 3 Author's note: This refers to the line of offshore islands represented by the Japanese mainland, Okinawa, and the rest of the Ryukyu Islands chain, Taiwan, and the Philippines. It encloses the Yellow Sea, the East China Sea, the Taiwan Strait, and the South China Sea. China includes the Korean Peninsula as part of the First Island Chain. Christopher P. Cavas, "Powers Jockey for Pacific Island Chain Influence," *Defense News*, February 1, 2016, <http://www.defensenews.com/story/defense/international/asia-pacific/2016/02/01/powers-jockey-pacific-island-chain-influence-erickson-china-japan-philippines-taiwan-sea/79493736/>.
- 4 Roger Cliff, *China's Military Power* (New York: Cambridge, 2015). In Chapter 9 Cliff assesses that it would take a barrage of 45 missiles with sub munitions to destroy more than 80 percent of the aircraft at an unhardened base (using MCAS Iwakuni in Japan as the example). See Cliff, 197.
- 5 Eric Heginbotham et al., *The US-China Military Scorecard* (Santa Monica, CA: RAND, 2016), 63, footnote 59, https://www.rand.org/content/dam/rand/pubs/research_reports/RR300/RR392/RAND_RR392.pdf.
- 6 Author's note: In terms of Chinese military thinking, such an attack would be a combination and expansion of an air offensive campaign and a conventional missile attack campaign. See Michael S. Chase et al., *China's Incomplete Military Transformation* (Santa Monica, CA: RAND, 2015), 32–33.
- 7 Office of the Secretary of Defense, *Annual Report to Congress; Military and Security Developments Involving the People's Republic of China 2016*, April 26, 2016, <http://www.defense.gov/Portals/1/Documents/pubs/2016%20China%20Military%20Power%20Report.pdf>.
- 8 Author's note: As early as 2011 the DF-15C reportedly had a terminally guided warhead for use against fixed targets. See Ron Christman, "Conventional Missions for China's Second Artillery Corp.," in *Chinese Aerospace Power*, ed. Andrew Erickson and Lyle Goldstein (Annapolis, MD: Naval Institute Press, 2011), 309.
- 9 US-China Economic and Security Review Commission, *2015 Report to Congress of the US-China Economic and Security Review Commission* [hereafter *2015 Report to Congress*,] November 2015, http://news.usni.org/2015/11/23/document-2015-u-s-china-economic-and-security-review-commission-report?utm_source=USNI+News&utm_campaign=d3bf6d3320-USNI-NEWS_DAILY&utm_medium=email&utm_term=0_0dd4a1450b-d3bf6d3320-230371641&mc_cid=d3bf6d3320&mc_eid=71a47f41c0, 351.
- 10 Office of the Secretary of Defense, *Annual Report to Congress, Military and Security Developments Involving the People's Republic of China 2012* [hereafter *Annual Report to Congress*, 2012], http://www.defense.gov/Portals/1/Documents/pubs/2012_CMPR_Final.pdf, 29.
- 11 Author's note: The DF-11 is being replaced by the DF-16, with a range of up to 1,000 km, which would put Okinawa and most of Kyushu potentially within range. The DF-15/15As are being replaced by the DF-15B, with a range of up to 800 km, which would put Okinawa within range. See David Xia, "A Comprehensive Analysis of Chinese Ballistic Missile Systems Displayed on Victory Day Parade," *Missile Threat*, September 20, 2015, <http://missilethreat.com/a-comprehensive-analysis-of-chinese-ballistic-missile-systems-displayed-on-victory-day-parade/>. Some variants of the DF-16 may have a range greater than 1,000 km; see *2015 Report to Congress*, 352.
- 12 Wendell Minnick, "China's Parade Puts US Navy on Notice," *Defense News*, September 3, 2015, <http://www.defensenews.com/story/defense/naval/2015/09/03/chinas-parade-puts-us-navy-notice/71632918/>, and Jordan Wilson, "China's Expanding Ability to Conduct Conventional Missile Strikes on Guam," US-China Economic and Security Review Commission, May 10, 2016, http://origin.www.uscc.gov/sites/default/files/Research/Staff%20Report_China's%20Expanding%20Ability%20to%20Conduct%20Conventional%20Missile%20Strikes%20on%20Guam.pdf.
- 13 Andrew S. Erickson, "Showtime: China Reveals Two 'Carrier-Killer' Missiles," *National Interest*, September 3, 2015, <http://nationalinterest.org/feature/showtime-china-reveals-two-carrier-killer-missiles-13769>.
- 14 Thomas Shugart, "Has China Been Practicing Preemptive Missile Strikes Against US Bases?," *War on the Rocks*, February 6, 2017, <https://warontherocks.com/2017/02/has-china-been-practicing-preemptive-missile-strikes-against-u-s-bases/>.
- 15 Author's note: This depends on the interpretation of the phrasing in the source. See Bill Gertz, "Beijing Develops Pulse Weapons," *Washington Times*, July 22, 2011, 1.
- 16 Author's note: see the *Annual Report to Congress, 2012*, 29. The 2015 Annual Report said that the PLA is continuing to field them but did not provide a specific number. See Office of the Secretary of Defense, *Annual Report to Congress, Military and Security Developments Involving the People's Republic of China 2015*, April 17, 2015 [hereafter *Annual Report to Congress, 2015*], http://www.defense.gov/Portals/1/Documents/pubs/2015_China_Military_Power_Report.pdf, 46.
- 17 Heginbotham, 53.
- 18 Jeffrey Lin and P.W. Singer, "China's New Mystery Missile and Launcher," *Popular Science*, August 11, 2015, <http://www.popsci.com/chinas-new-mystery-missile-and-launcher>. Author's note: It is reasonable to assume China has deployed additional launchers since then.
- 19 Dennis M. Gormley, Andrew S. Erickson, and Jingdong Yuan, "A Potent Vector: Assessing Chinese Cruise Missile Developments," *Joint Force Quarterly*, Vol. 75, September 30, 2014, <http://ndupress.ndu.edu/Media/News/NewsArticleView/tabid/7849/Article/577568/jfq-75-a-potent-vector-assessing-chinese-cruise-missile-developments.aspx>, 104.
- 20 *Annual Report to Congress, 2015*, 12. Author's note: Some sources say they can carry up to seven missiles each. See also Jeffrey Lin and P.W. Singer, "China Shows Off Its Deadly New Cruise Missiles," *Popular Science*, March 10, 2015, <http://www.popsci.com/china-shows-its-deadly-new-cruise-missiles>.
- 21 Author's note: There is some uncertainty as to the status of the program. See "HN-2000 or DH-2000," *Missile Threat*, April 9, 2013, <http://missilethreat.com/missiles/hn-1-2-3/#fn-6995-3>. Gormley, Erickson, and Yuan did not mention an HN-2000, although they did describe a "possible DH-2000," a submarine-launched 500 km-range LACM. See Gormley, Erickson, and Yuan, 102.

- 22 “Key Element in the Taiwan Straits Military Situation” (*Taihai junshi taishi de guanjian*), 36. Quoted in Ian Easton, “The Assassin Under the Radar,” undated, http://project2049.net/documents/assassin_under_radar_china_cruise_missile.pdf.
- 23 Author’s note: This estimate for the combined total of PLAAF and PLANAF aircraft, derived from *Military Technology Special Issue—World Defense Almanac 2017*, 297, and Bradley Perrett, “Flanker Fixation,” *Aviation Week*, Vol 179, No. 4, February 20–March 5, 2017, 50.
- 24 Gormley, Erickson, and Yuan, 102.
- 25 Author’s note: This approximates to 750 nautical miles. Reported in Kelley Saylor, *RED ALERT: The Growing Threat to US Aircraft Carriers* (Washington, DC: Center for a New American Security, February 2015), <http://www.cnas.org/sites/default/files/publications-pdf/CNASReport-CarrierThreat-160217.pdf>, 6. No specifics were provided as to the flight profile used in the calculation.
- 26 Richard D. Fisher Jr, “PLANAF J-10 Lost in Crash,” *IHS Janes Defense Weekly*, December 20, 2015, <http://www.janes.com/article/56791/planaf-j-10-lost-in-crash>.
- 27 *Military Technology Special Issue—World Defense Almanac 2016*, 297.
- 28 Greg Goebel, “Chinese Jet Fighters: JH-7, J-10, & J-20,” *AirVectors.net*, v. 1.1.0, August 1, 2017, <http://www.airvectors.net/avcnft.html>.
- 29 Jeffrey Lin and P.W. Singer, “Chinese Stealth Fighter J-20 Starts Production,” *Popular Science*, 27 December 2015, http://www.popsci.com/chinese-stealth-fighter-j-20-starts-production?utm_source=Mailthru&utm_medium=email&utm_campaign=New%20Campaign&utm_term=%2ASituation%20Report, and Cavin Dsouza, “Comparing Chengdu J-20 with F-22, F-35 and Su-PAK FA or T-50,” *Defence Aviation*, January 4, 2011, <http://www.defenceaviation.com/2011/01/comparing-chengdu-j-20-with-f-22-f-35-and-su-pak-fa-or-t-50.html>.
- 30 “...Expected to have a combat radius of over 1,000 nm.” Saylor, 6.
- 31 Richard D. Fisher and Gabriel Dominguez, “China’s Second FC-31 Fighter Prototype Makes Maiden Flight,” *IHS Jane’s Defence Weekly*, December 28, 2016, http://www.janes.com/article/66559/china-s-second-fc-31-fighter-prototype-makes-maiden-flight?utm_source=Mailthru&utm_medium=email&utm_campaign=EBB%2012.29.16&utm_term=Editorial%20-%20Early%20Bird%20Brief.
- 32 Saylor, 6.
- 33 For the H-8, see Larkins Dsouza, “Xian H-8 Chinese Stealth Bomber,” *Defence Aviation*, November 10, 2007, <http://www.defenceaviation.com/2007/11/xian-h-8-chinese-stealth-bomber.html>. For the H-20 or the H-X, see Franz-Stefan Gady, “China Wants to Develop a New Long-Range Strategic Bomber,” *The Diplomat*, July 13, 2015, <http://thediplomat.com/2015/07/china-wants-to-develop-a-new-long-range-strategic-bomber/>.
- 34 See Jeffrey Lin and P.W. Singer, “China Shows Off Its Growing Drone Fleet,” *Popular Science*, November 14, 2014, <http://www.popsci.com/china-shows-its-growing-drone-fleet>.
- 35 Author’s note: For information on RPA sales to Jordan, see Rep. Duncan Hunter, “Hunter: Why Is Obama Letting China Beat the US at Global Drone Sales?” press release, December 7, 2015, <https://hunter.house.gov/hunter-why-obama-letting-china-beat-us-global-drone-sales>. For sales to the Saudis and the UAE, see Jeremy Binnie, “UAE, Saudi Arabia Operating Chinese UAVs over Yemen,” *IHS Jane’s Defence Weekly*, December 17, 2015, http://www.janes.com/article/56742/uae-saudi-arabia-operating-chinese-uavs-over-yemen?utm_source=Mailthru&utm_medium=email&utm_campaign=New%20Campaign&utm_term=%2ASituation%20Report. For sales to the Iraqis, see “Iraq Receives Chinese Armed Drone,” *Combat Aircraft*, Vol. 16, No. 12, December 2015, 18.
- 36 *Annual Report to Congress, 2015*, 36.
- 37 Bill Sweetman, “New Chinese UAVs Could Support Anti-Carrier Missile,” *Aviation Week*, September 28, 2015, <http://aviationweek.com/technology/new-chinese-uavs-could-support-anti-carrier-missile>.
- 38 Ibid.
- 39 “China’s Biggest UAV Makes Maiden Flight,” *China’s Military*, September 2, 2015, http://english.chinamil.com.cn/news-channels/china-military-news/2015-09/02/content_6660961.htm.
- 40 Author’s note: For information on armament on the Yilong, see Wong. For armament on the CH-5, see Adam Rawnsley, “Meet China’s Killer Drones,” *Foreign Policy*, January 14, 2016, <http://foreignpolicy.com/2016/01/14/meet-chinas-killer-drones/>.
- 41 Elsa Kania and Kenneth Allen, “The Human and Organizational Dimensions of the PLA’s Unmanned Aerial Vehicle Systems,” *Jamestown Foundation China Brief*, Vol. 16, No. 8, May 11, 2016, http://www.jamestown.org/single/?ttnews%5Btt_news%5D=45423&no_cache=1#vzitOol8Okw.
- 42 Sarah Griffiths and Mark Prigg, “Does China Have a SUPERSONIC Drone? Claims Secret ‘Dark Sword’ Project May Already Have Flown,” *Daily Mail* [UK], November 24, 2014, <http://www.dailymail.co.uk/sciencetech/article-2847902/Does-China-SUPERSONIC-drone-Claims-secret-Dark-Sword-project-flown.html>.
- 43 David Axe, “China’s First Stealthy Killer Drone Takes Flight,” *War is Boring*, November 21, 2013, <https://medium.com/war-is-boring/chinas-first-stealthy-killer-drone-takes-flight-1766036badc0#f5nqj1oma>.
- 44 Wendell Minnick, “Zhuhai Airshow Goes Unmanned,” *Defense News*, November 16, 2010.
- 45 Richard Fisher, *Chinese Military Modernization* (Stanford, CA: Stanford University Press, 2010), 85.
- 46 Author’s note: One of the best available sources admits that most reports on operational use of Chinese RPAs are unconfirmed. See Ian M. Easton and L.C. Russell Hsiao, *The Chinese People’s Liberation Army’s Unmanned Aerial Vehicle Project: Organizational Capacities and Operational Capabilities*, March 11, 2013, https://project2049.net/documents/uav_easton_hsiao.pdf. Much of the information in Kania and Allen is similarly hedged.
- 47 Author’s note: While the PLA was reported to have 280 UAVs in service in mid-2011, a 2014 estimate gave them at least 1,000 medium and large UAVs, which, if true, would have indicated a massive buildup. For the 280 figure see Easton and Hsiao, 11. For the 1,000 figure, see Kania and Allen.
- 48 Mathew Cox, “Army Testing New Weapons to Combat Weaponized Drones,” *Military.com*, January 29, 2016, <http://www.military.com/daily-news/2016/01/29/army-testing-new-weapons-to-combat-weaponized-drones.html>.
- 49 Author’s note: This information is from 1997, but there is no reason to expect that the situation has changed substantially since then. See Christopher Bowie, *The Anti-Access Threat and Theater Air Bases* (Washington, DC: Center for Strategic and Budgetary Assessments, 2002), http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CB0QFjAAahUKewiQzsfU-1JDJAhWEkh4KHUqOC9s&url=http%3A%2F%2Fwww.csbaonline.org%2F4Publications%2F2FPubLibrary%2FR.20020924.CSBA_AirBases%2FR.20020924.CSBA_AirBases.pdf&usq=AFQjCNHmVOVs23BpcwftjRf2Uq1-r_ib5A, 26, Table 2.
- 50 Cliff, 197–8.
- 51 Ibid.

52 Armando J. Heredia, "Analysis: New US-Philippine Basing Deal Heavy on Air Power, Light on Naval Support," *USNI News*, March 22, 2016, <https://news.usni.org/2016/03/22/analysis-new-u-s-philippine-basing-deal-heavy-on-air-pow-er-light-on-naval-support>. This analysis assumes that in case of an emergency American forces will continue to have access.

53 For Andersen, see "Fortifying Guam's Infrastructure," *Air Force Magazine Daily Report*, April 11, 2011, <http://www.airforcemag.com/DRArchive/Pages/2011/April%202011/April%2011%202011/FortifyingGuam%27sInfrastructure.aspx>. For the Marine facilities, see Gina Harkins, "Marines Identify Units That Will Move from Japan to Guam," *Marine Corps Times*, October 1, 2015, <http://www.marinecorpstimes.com/story/military/2015/10/01/marines-identify-units-move-japan-guam/73046768/>.

54 Author's note: Some factors to consider are whether the conflict is about Taiwan or Korea; whether the ROK will allow the US to operate from bases in that country if the conflict is over Taiwan, between Japan and China, or in the South China Sea; and whether North Korea will join China in the war if it starts somewhere other than on the Korean Peninsula. In any case, US bases in Korea are nearly a thousand miles from the northern edge of the Taiwan Strait and even farther from the South China Sea.

55 The Chinese are also reportedly deploying ASBMs, displaying 16 DF-21D ASBMs during their September 3, 2015, V-Day parade; see Erickson. Further, very recently the Chinese have reported that the longer-range DF-26, which can reach Guam, has an anti-ship variant. See Wendell Minnick, "China's Parade Puts US Navy on Notice," *Defense News*, September 3, 2015, <http://www.defensenews.com/story/defense/naval/2015/09/03/chinas-parade-puts-us-navy-notice/71632918/>. The overall threat to US aircraft carriers is reviewed in Saylor. Even if this is not currently a major threat, we must expect the danger to increase over time.

56 Author's note: this force became the PLA Rocket Force on January 1, 2016. See "China Inaugurates PLA Rocket Force as Military Reform Deepens," *Xinhuanet*, January 1, 2016, http://news.xinhuanet.com/english/2016-01/01/c_134970564.htm.

57 Sean O'Connor, *PLA Second Artillery Corps Air Power Australia Technical Report, APA-TR-2009-1204*, April 2012, <http://www.ausairpower.net/APA-PLA-Second-Artillery-Corps.html>.

58 "Ahlhorn Highway Strip," *Abandoned, Forgotten, & Little Known Airfields in Europe*, September 9, 2011, <http://www.forgottenairfields.com/germany/lower-saxony/oldenburg/ahlhorn-highway-strip-s356.html>.

59 Ian Easton, *China's Evolving Reconnaissance-Strike Capabilities*, Project 2049 Institute and the Japan Institute of International Affairs, February 2014, http://www.project2049.net/documents/Chinas_Evolving_Reconnaissance_Strike_Capabilities_Easton.pdf, 29, footnote 55.

60 "THAAD Battery to Be Permanently Deployed in Guam," *Mostly Missile Defense*, July 16, 2015, <http://mostlymissiledefense.com/2015/07/16/thaad-battery-to-be-permanently-deployed-in-guam-july-16-2015/>.

61 Kris Osborn, "Get Ready Russia, China, Iran and North Korea: America's Missile Defense Program Is Going 'Star Wars'," *The National Interest*, November 30, 2016, http://nationalinterest.org/blog/the-buzz/get-ready-russia-china-iran-north-korea-americas-missile-18538?utm_source=Sailthru&utm_medium=email&utm_campaign=Early%20Bird%20Brief%2011.30.2016&utm_term=Editorial%20-%20Military%20-%20Early%20Bird%20Brief.

62 Megan Eckstein, "Navy Pursuing Upgraded Railgun, Higher-Power Laser Gun By 2020," *USNI News*, July 28, 2015, <http://news.usni.org/2015/07/28/navy-pursuing-upgraded-railgun-higher-power-laser-gun-by-2020>.

63 Aaron Mehta, "Pentagon No. 2: How to Keep Third Offset Going in the Next Administration," *Defense News*, May 3, 2016, <http://www.defensenews.com/story/defense-news/2016/05/02/pentagon-no-2-how-keep-third-offset-going-next-administration/83851204/>.

64 Kris Osborn, "US May Put Weapons in South China Sea," *Scout Warrior*, February 22, 2016, <http://www.scout.com/military/warrior/story/1644822-u-s-may-put-weapons-in-south-china-sea>.

65 Tony Osborne, "Terror by Drone," *Aviation Week*, Vol 178, No. 2, January 18–31, 2016, 28–9.

66 Michael Peck, "High-energy Laser Weapons Target UAVs," *C4ISR & Networks*, February 19, 2016, <http://www.c4isrnet.com/story/military-tech/uas/2016/02/19/high-energy-laser-weapons-target-uavs/80553744/>.

67 "Addendum I to Naval Base Defense Air Force Operation Plan No. A141. Joint Estimate Covering Joint Army and Navy Air Action in the Event of Sudden Hostile Action, against Oahu or Fleet Units in the Hawaiian Area." March 31, 1941, in Congressional Investigation Pearl Harbor Attack ... Annex Baker to Commander Naval Base Defense Force Operation Plan No. 141 dated February 27, 1941, http://www.ibiblio.org/pha/pha/misc/martin_2.html.

About The Mitchell Institute

The Mitchell Institute educates the general public about aerospace power's contribution to America's global interests, informs policy and budget deliberations, and cultivates the next generation of thought leaders to exploit the advantages of operating in air, space, and cyberspace.

About the Forum

The Mitchell Forum series is produced and edited by Marc V. Schanz, Mitchell Institute's director of publications. Copies may be reproduced for personal use. Single copies may be downloaded from the Mitchell Institute's website. For more information, author guidelines, and submission inquiries, contact Mr. Schanz at mschanz@afa.org or at (703) 247-5837.

About the Author

Lt Col Thomas R. McCabe, USAF (Ret.) is a retired aerospace analyst for the Department of Defense (DOD). His active duty service included three years with tactical air forces, and his reserve and civilian careers included extensive work on command, control, communications, and computers (C4) and Middle East military analysis, concluding with work as a Russian aerospace analyst for DOD. His writings have appeared in *Air and Space Power Journal*, *Strategic Review*, *Air Chronicles*, and the *RAF Air Power Review*. McCabe received a bachelor's degree from West Chester State College in Pennsylvania and master's degrees from Georgetown University and the Defense Intelligence College. He is a graduate of Squadron Officer School and the Air Command and Staff College. This paper represents the author's views and should not be considered the opinion of any US government agency or the Department of Defense.

