

Adversaries are sharpening the skills needed to keep the US military away in times of war. But USAF has also been working to ensure the US doesn't get locked out of a war zone.

WHILE America was militarily preoccupied with Iraq and Afghanistan for the last 12 years, its rivals and adversaries studied American strengths, decided never to be another notch on the US belt, and are now fielding vastly improved weapons designed to keep US forces at bay.

These and nonkinetic means of preventing the US from using its full range of military power are collectively dubbed anti-access, area-denial capabilities and are driving urgent strategic discussions in the Pentagon. The advent of A2/AD directly challenges America's ability to fight in a place, time, and method of its choosing and is forcing nothing less than a broad rethink of the US way of war.

While experts agree the US ability to prevail in a modern war remains intact—for now—a rapid shift to fully integrated joint operations, the inclusion of “all of government” approaches, and the fine-

tuning of force structure and weapon inventories will be essential to preserve the nation's military options in the next 20 years.

The A2/AD problem “is not new,” said Col. Jordan Thomas, Air Force lead for AirSea Battle operations. Enemies, he noted, have always tried to erect barriers to US forces and in recent conflicts have worked to counter the United States with asymmetric strategies.

“What has changed is the character” of the A2/AD problem, Thomas said. “We have seen an increase in the capabilities of our adversaries or potential adversaries,” and these are causing the US “to operate [from] farther away and with greater risk.” Potential foes are “using longer-range systems; they are using more precise capabilities; and ... their effects are even more lethal.”

In short, the American military edge, long based on having higher quality but

smaller forces to offset an enemy's greater numbers, is eroding. Soon, enemies will field forces favored by both quantity *and* quality.

“Twenty years ago,” Thomas noted, airmen and marines at US bases on Okinawa, Japan, or US sailors in Bahrain “were not under a ballistic missile threat—or at least not a credible ballistic missile threat. Today they are.”

While China is not the sole focus of the A2/AD discussion—Russia, North Korea, and Iran are among the most frequently mentioned other potential adversaries—China's military rise has been the swiftest and most dramatic in recent years and represents the toughest challenge in the event of armed conflict.

According to the Pentagon's annual assessment of Chinese military power, China has been adding hundreds of tactical ballistic missiles to its arsenal each year. Most have been located in the coastal

FIGHTING FOR ACCESS

By John A. Tirpak, Executive Editor



Opposition forces TSgt. Christopher Clark (l) and A1C Destry Swadowski “attack” a convoy of Humvees at Osan AB, South Korea, during a drill. Prime BEEF (base engineer emergency force) teams train to support the response to chemical and biological weapons, among other nontraditional attacks likely “in the mix” of threats from North Korea.

USAF photo by SSgt. Chad Thompson

Photo via chinesemilitaryreview.blogspot.com



Sukhoi photo

region of the Taiwan Strait and have been oriented toward a possible armed conflict over Taiwan.

As their range expands, however—now out to 1,000 miles or more—these missiles can be based deeper within China’s territory, making them harder to pre-emptively destroy.

Newer Chinese missiles also can reach Okinawa and Guam, the two key operating locations for the US in the Pacific. Salvos of such missiles would pose a stiff problem for US forces trying to maintain combat operations at those locations.

Not only is the number of missiles daunting, but China has sharpened its aim, giving those missiles increasingly accurate guidance systems, abetted by satellite-based, cyber, and other intelligence, surveillance, and reconnaissance systems.

Most Chinese innovations in land-based missiles also are being adapted for China’s growing navy. A newly operational Chinese land-based ballistic missile, the DF-21D, is capable of flying more than 1,000 miles and adjusting its aim point in the terminal phase. It has been dubbed “the carrier killer.”

“China is pursuing an air and space revolution,” said Thomas R. McCabe, a Defense Department civilian analyst, in an April address to the Mitchell Institute for Airpower Studies.

McCabe, presenting a paper on China’s aerospace goals and achievements, said the communist nation is advancing its military aerospace power on a broad front. It is taking dramatic steps forward in “combat aircraft, support aircraft, unmanned aerial systems, precision guided munitions, and anti-ship missiles, air defenses and radars, anti-satellite systems, ... an aircraft carrier,” and ostensibly, a civilian manned space program, which will develop technologies applicable to military systems as well.

In fact, China is “modeling” its airpower on the US Air Force, which it sees as highly successful, McCabe said. Until it matches USAF in capability, it is focusing on those systems most able to frustrate American operating models and pose asymmetric problems the United States can’t easily ignore.

Speculating on the US Navy’s reaction to the DF-21, McCabe remarked, “I think they’re scared to death of it.”

Top left photo: Chinese J-15 fighters aboard the aircraft carrier Liaoning. Center photo: Russia’s latest fighter, the T-50, during a demonstration flight. Right photo: Iranian SAMs on display in 2010. Iran is a frequently mentioned adversary of the US, and Russia is marketing air defense systems to the regional hotspot.

China also has highly credible fourth generation fighters in the form of the indigenous J-10, considered an analog of the American F-16. It fields license-built Su-27 Flankers of Russian design and has reverse engineered and improved the design to produce several new knockoff types, such as the J-11, with improved systems. A folding-wing carrier version also is flying.

Moreover, China has acquired Russian S-300 air defense systems and has copied variants of it and other surface-to-air systems and is also developing new mobile SAM systems.

One of these, the HQ-9, has an anti-radar seeker meant to locate and destroy electronic warfare aircraft. Like the American Patriot missile system, China’s air defenses also have some capability against ballistic missiles. A series of very high frequency passive radars are being built nationwide in hopes of detecting stealth aircraft, McCabe said.

Copy Cats or Thieves

China has unveiled and test-flown two types of combat aircraft prototypes, which appear to be based on US stealth designs. While physics often drives engineers to similar-looking solutions in aviation, “they’re stealing us blind,” McCabe said of China’s aerospace-related cyber espionage activities.

Evidence of the leakage can be seen in the seemingly stealthy J-20 and the J-31—the latter of which is a ringer for Lockheed Martin’s F-35 strike fighter.

Russia continues to be a world leader in air defense systems and has marketed those systems to Iran and Syria, among other customers. Russia will soon field a stealth fighter of its own: the T-50, expected to be a marked improvement over Russia’s successful Flanker series.

Cyber operations also are a centerpiece of adversary capabilities. Russia has used cyber attacks against Estonia and Georgia—in the latter case, to disrupt the organization of that country’s defenses when Russia made its 2008 armored incursion there.

Cyber is not simply the domain of nation-states; nonstate actors are using it for espionage, for denial-of-service campaigns, for criminal purposes, and to inflict physical damage by fooling industrial control systems, for example, or air traffic control.

Several nations—most publicly, China and Russia—have, or are pursuing, anti-satellite systems, while other adversaries



Photo via uskowioniran.com

have tried, with varying degrees of success, to jam American ISR or GPS satellite signals.

Collectively, these advances threaten “our expeditionary operations: how we get into a theater and how we operate once we get there,” Thomas explained.

The A2/AD problem comes on many fronts, however, and experts within and outside the Pentagon cautioned that an approach focused solely on military platform solutions will almost surely fail.

“Access” means not only an ability to penetrate an enemy’s defenses, but also the ability to win the consent of regional friends and allies to allow overflight of their territory or the use of staging areas or bases. Enemies will try to coerce these friends to deny such privileges to US forces, according to retired Lt. Gen. Robert J. Elder Jr., former head of 8th Air Force and now a professor at George Mason University in Fairfax, Va.

A big part of engaging a distant, well-fortified enemy will be affecting that enemy’s “decision calculus,” said Elder, forcing the adversary to hesitate and worry about the consequences of, for example, destroying a satellite or bombing a host-nation island and the retaliation that would come from such actions.

The future proliferation among adversaries of double-digit SAMs, stealth aircraft, and more lethal, longer-ranged ballistic missiles was a prominent theme in defense studies before the 9/11 attacks. After that, everything was focused on counterinsurgency effort, and US military thinkers put A2/AD on the back burner.

“We were not contested in airspace or information during the Afghanistan or Iraq ops,” said Elder, who is also president of the Association of Old Crows, an electronic warfare group.

That lack of threat drove some complacency and, at worst, a sense among some elements of the US military that “we’re not going to do manned aircraft anymore. Everything’s going to be uninhabited, remotely piloted,” Elder observed.

Thomas said he understands the criticism that the US took its eye off the A2/AD threat during the Iraq and Afghan wars. However, he insisted, it was always there, but the services were compelled to put counterinsurgency as a higher priority.

The Air Force, he said, had to be “all in” in terms of its commitment to the Southwest Asia campaigns. The upcoming disengagement from Afghanistan has freed up resources and given time for USAF thinkers to plan a way forward in A2/AD, he said.

Given the potential rain of tactical ballistic missiles on forward operating bases, increasing adversary capabilities in electronic warfare, space, and air-breathing ISR, and increasing numbers of fourth and even fifth generation fighters and networked modern long range air defenses, how does the Air Force, together with the other services, prevail in such conflicts?

“I hear about those nightmares every day,” Thomas said. “Unfortunately, there’s no single silver bullet.”

For starters, Thomas said, the Air Force is pursuing the Pacific Airpower Resiliency Initiative. This is a program meant to add just that—resiliency—to American operating bases in the Pacific theater. It will include hardened aircraft shelters, “dispersal, ... concealment, deception,” and runway repair capabilities.

Kathleen I. Ferguson, USAF’s acting assistant secretary for installations, told members of Congress in early April that USAF will harden “select hangars” at Pacific bases and is investing in greater firefighting and RED HORSE engineer units throughout the region to maintain and “recover” operating capability if necessary.

Air Force Secretary Michael B. Donley told the House Armed Services Committee the initiative is meant to make US bases “resilient in any number of threat scenarios.” Hardened facilities will be “mandatory” in the face of the regional ballistic missile threat, Air Force Chief of Staff Gen. Mark A. Welsh III said at the same hearing.

Thomas noted that an enemy “may think they have the map coordinates for a precise strike. However, [with] camouflage, concealment, deception, you may convince them that there’s nothing there, so they shouldn’t shoot. Or they may think something’s there and they shoot, but it goes to the wrong spot.” These techniques would be undertaken as part of an overall command, control, communications, computers, and ISR campaign, he said.

Elder noted that in Vietnam, the Air Force built revetments to protect its fighters, so that in case of a mortar or rocket attack, “if you hit one plane, you got one, not multiple planes.”

The Army already fields Patriot batteries on Okinawa and will soon start to deploy the Terminal High-Altitude Air Defense, or THAAD, system, Thomas noted.

But shooting missiles down is “difficult because the cost of the technology to shoot the missile down is greater than the cost of the missile” being shot down, Elder pointed out.

“You have to start looking at different ways to affect that,” he said, so the cost to defend is less than the cost of attack.



Photo via North Korean News Agency

It's not all grim, Elder said. The Air Force has technologies and techniques that can "cause the missiles to explode prematurely" by "defeating the sensors." Directed energy has been linked with shooting missiles down, but it is better used to "defeat the sensor, the guidance system," Elder asserted.

However, "the bottom line is, we have to realize that the bases are going to be targets." The job now is to "minimize the effect. ... It's not going to come for free."

Chemical and biological weapons also are likely in the mix, but Elder said these don't spell certain doom.

Fifteen to 20 years ago, "we were really worried about the effect of chemical weapons on our air bases," Elder said. The Air Force studied the problem and determined the result would be "inconvenient, but there were a lot of things we could do" to reduce the impact on operations, especially at Osan and Kunsan air bases in Korea. Regular drills are run there, simulating chemical attacks and requiring civilians to take shelter while operators don chem-bio protective gear.

The fact that these procedures are practiced regularly—and don't make much of a dent in the pace of generating aircraft—helps deter any possible North Korean use of chemical or biological weapons. Not only does the US show it can fight through such an assault, but an adversary making such an attack would have to expect swift and powerful retaliation.

On the offensive side of the equation, however, penetrating a modern integrated air defense system is a much thornier problem than it used to be.

"Our enemy has learned to network," Thomas said, so "it's not just defeating the one system, but defeating their networks" that will be required to give the US a "decision advantage."

Step 1 is to "disrupt their ISR systems" and be able to act and react faster than the enemy, Thomas said. Various studies of A2/AD have called this opening phase the "blinding campaign," in which each side attempts to disrupt the other's awareness of what's going on.

The Air Force has thought about this and has taken a variety of steps to diversify its ISR assets, whether they're in space, air breathing, or networked to sensors in the other services. The goal, Elder said, is to build an ISR network so robust that

Above: North Korean dictator Kim Jong Un (center) strikes a pose beside a Russian-built MiG-29 during a visit to an air base. Above right: An artist's concept of the Boeing cruise missile CHAMP, designed to overfly a target and fry the computer systems within it. USAF tested the counterelectronics missile successfully.

it no longer focuses on the platforms but on the intelligence product. The loss of any piece, therefore, will be less onerous.

The Air Force also can exploit ways to actually use the IADS against itself, manipulating it with jamming and the revealing of some targets while blanketing an area with many false ones and decoys. Elder said there will have to be attacks on some "key targets ... [to] drive them to nonoptimum operations," however.

Because enemies have become so dependent on electronics to network their systems—like the US—Elder said he expects there will be use of electromagnetic pulse, or EMP, weapons on both sides. The Air Force has tested a Boeing-developed cruise missile called CHAMP—Counterelectronics High-powered Microwave Advanced Missile Project—which demonstrated that it could overfly a target building and fry the computer systems in that building.

No Cookbook Approach

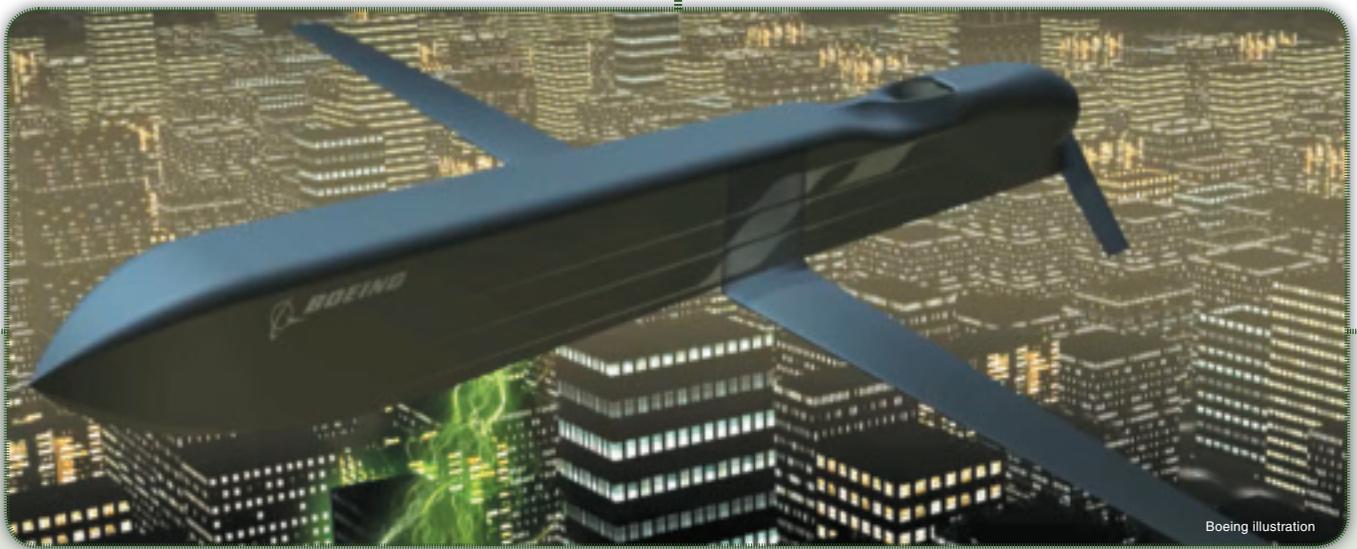
In April, David E. Walker, deputy assistant secretary of the Air Force for science, technology, and engineering, told the House Armed Services subcommittee on emerging threats and capabilities the service also is working on other high-powered microwave weapons.

"I'm a B-1 guy by trade," Thomas said. "In the '90s, there was a cookbook approach" to taking down an enemy IADS. But the rapid improvement in adversary SAMs and radars means "there's not necessarily a cookbook approach anymore. We have to leverage all the service capabilities in order to defeat an IADS or to gain an advantage in one domain by leveraging the effects that we can do in another."

It's called networked, integrated, attack-in-depth, he said. "Integration means that forces come together to act as one ... across all of the domains." That's why the Air Force and Navy partnered several years ago to explore AirSea Battle and why the Army is now also looking at how it can enable access as part of the joint effort.

There is already a governing document for these ideas: the Joint Operational Access Concept, or JOAC, the first version of which came out in January 2012. The document defined terms the joint community will use to discuss A2/AD and laid out broad contributions from each service.

In defeating an IADS today and the near future, Thomas said, the Air Force must recognize that cueing can be provided by radars and other sensors all the way down to "observers in the water ... that would provide information via cell phone."



The new reality requires the Air Force to return to the days of the “package,” which would include not only suppression of enemy air defenses aircraft—enabled “by national technical means”—but also fighter sweepers, Rivet Joints, and other aircraft.

“It’s going to take a lot more assets,” he said.

The Air Force, however, has sharply reduced its combat inventory in recent years, by some 500 aircraft. This simply means the services must focus that much more on integration, Thomas said.

The idea behind AirSea Battle is “greater cooperation ... with the systems that we have that give us that asymmetric advantage,” Thomas said.

Army Secretary John M. McHugh told defense reporters in Washington in early May that his service is also struggling with A2/AD. He reported being a “full partner” in AirSea Battle discussions and noted that the Army and Marine Corps will open an Office of Strategic Land Policy as a result. That office will seek to refine ideas about forcible entry, power projection, and the role of ground forces in A2/AD.

The OSLP, he insisted, will be “a complement to the other ongoing efforts, not a competition to, not in any way trying to slow down” AirSea Battle. McHugh acknowledged the appearance that the Army is playing a me-too card or trying to blunt the rise of ASB out of fear that ground forces would be reduced in stature in the A2/AD fight.

“I recognize that some have tried to characterize it in that way, but then I guess that’s understandable,” he said.

No amount of cooperation will remedy a shortage of hardware, however, and that’s a fact that gives Air Force strategists some heartburn, Thomas said.

USAF has said for years that only the B-2 is capable of penetrating increasingly lethal IADS and that the B-1 and B-52 are relegated to less dangerous or standoff operations outside the range of enemy weapons. In a major campaign, however, the United States would require large numbers of standoff weapons.

“That’s ... really a big concern that all of us have,” Thomas said. “The determination whether we have enough depends on the circumstances. ... It really depends on what we’re trying to achieve.”

Depending on the scenario, an air campaign “could last a day or it could last four years,” Thomas observed. “I don’t feel comfortable saying, yeah, we’ve got enough or not.”

The principal USAF weapon for stealthy, standoff attack that isn’t released from a stealth aircraft is Lockheed Martin’s

Joint Air-to-Surface Standoff Missile, or JASSM. It and other direct attack or penetrating weapons are “short of inventory objectives,” senior USAF leaders acknowledged in prepared testimony for the House Armed Services tactical air and land forces subcommittee in April.

Lt. Gen. Burton M. Field and Lt. Gen. Charles R. Davis, respectively the deputy chief of staff for operations, plans, and requirements and top military deputy to the assistant secretary of the Air Force for acquisition, said weapons such as JASSM and the Small Diameter Bomb “are force multipliers” in an A2/AD environment. “Their shortage could increase friendly force attrition and drive a much higher level of effort enabling the attack of other critical targets.” Specifically, “the shortage of penetrator weapons will result in some inability to target adversary critical capabilities and increase risk,” according to the two generals’ prepared testimony.

Field and Davis reported that the JASSM program has delivered more than 1,000 missiles. The second lot of JASSM-Extended Range weapons is under contract, and USAF intends to buy a mix of 182 units in Fiscal 2014 with plans to ramp up to 360 a year later. The JASSM has a range of more than 200 miles; JASSM-ER can strike from greater than 500 miles.

While the US needs its forward bases in the Pacific for deterrence and “engagement” with allies there, “I just don’t think presence matters” in an A2/AD fight, said retired Lt. Gen. Stephen G. Wood, former head of US air units in South Korea and deputy commander of United Nations forces there.

“I think that we can adequately field a combat force from greater distances,” he said. The term “short range fighter” is meaningless in the context of air refueling, he said, and the advent of the A2/AD era doesn’t bring about the end of the fighter as a meaningful element in war plans.

During the early stages of Operation Enduring Freedom in Afghanistan, he noted, fighters from carriers and land bases in the Middle East flew up to 11-hour missions.

With air refueling—and Wood said there are “technologies that have been developed that will allow refueling tankers to penetrate farther than we would think”—there’s “no such thing as ‘short range’ anymore.”

Asked flatly if the United States is adequately prepared for the A2/AD fight, Thomas said, “If you asked me this question in 2010, I would have said we are ‘not adequately prepared.’ However, there has been more emphasis placed on overcoming the A2/AD environment since then and we are making progress. The pace of this progress is really a subjective matter.” ■