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**Can China Sink A U.S. Aircraft Carrier?**



Image via Wikipedia

On January 3, President Obama and his defense team unveiled a new global military posture focused on the Western Pacific.  Although the president was circumspect in explaining why the Pentagon is pivoting to the Pacific, it’s pretty clear the main concern is [China](http://www.forbes.com/places/china/)‘s rising influence in East Asia — the industrial heartland of the new global economy.  A document released at the January 3 event stressed that America must maintain its economic and military access to the region.

For America, access to the area around China is mainly about sea power.  The U.S. can use satellites and long-range aircraft to overcome the tyranny of distance, but it has relatively few bases in the region and virtually no ground-force presence outside [South Korea](http://www.forbes.com/places/south-korea/) and Okinawa.  Since bases near China would probably be targeted early in any future war, U.S. military presence depends mainly on warships at sea.

That raises the question of how vulnerable U.S. aircraft carriers might be to attack by the Chinese air force and navy.  The [United States](http://www.forbes.com/places/united-states/) has built its maritime force structure around a handful of giant supercarriers, which have been deployed repeatedly to deter Chinese military action against [Taiwan](http://www.forbes.com/places/taiwan/).  But with China’s double-digit economic growth fueling a rapid buildup of long-range weapons, many experts have begun to doubt the wisdom of deploying U.S. carriers anywhere near the Middle Kingdom in wartime.

Obviously, there are many reasons why China would want to avoid a war, especially one involving use of nuclear weapons.  But accidents happen, and the credibility of U.S. security guarantees to regional allies hinge on how effective naval forces might be in a future conflict.  Since all the geographical advantages lie with China, it is crucial to know whether the six or seven carriers that America could deploy quickly to the Western Pacific would survive a Chinese onslaught.  If they are vulnerable, the war might be over very soon.

The first thing to understand about U.S. aircraft carriers is that they are very big and very well defended.  They displace 100,000 tons of water, making them the biggest warships ever constructed, and their four-acre decks hold dozens of multi-role fighters superior to anything operated by China’s air force or navy.  They typically are escorted by cruisers or destroyers carrying the Aegis combat system — the world’s most sophisticated air defense system — and nuclear-powered attack submarines.  Since the carriers themselves are nuclear-powered, they are always moving and unconstrained by logistical needs.

However, it is precisely because the carriers are so big and capable that they constitute such “lucrative” targets.  Loss of a single carrier would reduce U.S. naval air power by nearly ten percent, and might entail thousands of U.S. casualties (over 5,000 personnel are typically on board).  It’s a lot easier to see a metal vessel that is twenty stories high and three football fields long in the middle of an ocean than it is to find a ground force hiding in the Ardennes.  And if one actually were destroyed, the psychological impact would be profound: the United States hasn’t lost a carrier since the *Hornet* was sunk by Japanese dive bombers in 1942.

Carriers are much easier to disable than sink, since they have thousands of watertight compartments and a typical bomb or torpedo lacks the punch to send such a big ship to the bottom.  But it is the complete loss of a carrier that would devastate military capability and morale, so that’s where the question of vulnerability is most critical.  With China gradually pushing its maritime defensive perimeter out into the Pacific and deploying everything from nuclear-powered attack subs to anti-ship ballistic missiles, isn’t it just a matter of time before U.S. carriers have to retreat to a distance where their planes can no longer reach China?

The answer to that question, it appears, is “no,” for at least four reasons.  First, whatever weapons China may be buying, it lacks the sensors and command system to track and promptly target a carrier.  Second, U.S. forces have multiple options for actively and passively impeding the effectiveness of any attack, including targeting forces ashore.  Third, if a carrier actually were hit by anything less powerful than a nuclear weapon, it could absorb the damage and continue operating in some diminished capacity; it almost certainly would not be sunk.  Finally, the U.S. Navy is taking numerous steps to enhance the flexibility and effectiveness of its aircraft carriers, enabling them to cope with whatever new capabilities the Chinese field.

With regard to tracking and targeting a carrier, it is important to understand what a big place the Western Pacific is.  The hotly contested South China Sea measures over a million square miles, and it constitutes only a small portion of the waters adjacent to Chinese territory.  While it might be possible for Chinese satellites, aircraft, warships or land-based radars to detect a carrier there, it is quite another thing to continuously track and precisely target the constantly moving vessel.  Satellites close enough to distinguish the carrier will quickly disappear over the horizon, planes will run out of fuel or be scared off by the carrier’s fighters, and other approaches produce similarly spotty results.  China will need to invest billions of dollars over a period of many years before it has the assured capacity to find and track U.S. carriers.

But as congressional naval expert Ronald O’Rourke pointed out in an April, 2011 study, detection and tracking are just the initial steps in a complex “kill chain” that Chinese forces must execute in order to actually strike the carrier.  Information must be conveyed, command decisions must be made, weapons must be launched, and flight paths must be traversed.  Meanwhile, the carrier is moving, moving, moving — probably in an evasive pattern that cannot be predicted in advance.  So Chinese weapons may end up arriving many miles from where the carrier has moved to; or they may end up not arriving at all, because to get anywhere near the ship, they must penetrate the densest point defenses in the history of warfare.

These defenses begin with overhead surveillance and interception by the Aegis combat system on escort vessels, by the carrier’s constantly patrolling fighters that have their own highly sensitive radar plane called the Hawkeye, and by a variety of other weapons scattered across the fleet.  The weapon systems are netted together so that a Standard anti-aircraft missile launched by one U.S. warship can be guided by the radar on another warship.  The overhead defenses are complemented by a similarly dense array of undersea defenses that include nuclear-powered attack subs, ship-towed sonar arrays, and antisubmarine helicopters.  Collectively, these defenses will intercept the vast majority of Chinese aerial and undersea weapons, most of which are not stealthy by U.S. standards.

In addition to such active measures, the U.S. Navy has a variety of passive measures for blunting any attack.  For instance, China operates satellites that, like their U.S. counterparts, can track surface vessels by monitoring their electronic emissions.  Items like radars and communications antennas generate numerous signals that are helpful in finding and identifying particular warships.  However, the Navy has numerous techniques for concealing or complicating these transmissions so that they cease to be useful beacons in any attack.  That facet of defense is known as electronic warfare, and the U.S. Navy has long been the global leader in exploiting the electromagnetic spectrum for both offensive and defensive advantage.

However, no defense is perfect, so if China launches a large barrage of missiles against a precisely targeted carrier, some may get through.  One Chinese weapon that has sparked much discussion in professional journals recently is a new anti-ship ballistic missile with a maneuvering warhead; the warhead’s combination of unpredictable movement and high speed would be tough to intercept.  It is not clear how accurate such a warhead would be after maneuvering to avoid defenders, but if it actually hit a supercarrier it would definitely impair flight operations.  Whether its kinetic punch is powerful enough to actually sink a carrier is classified, but the fact the Navy hasn’t funded development of systems to test possible defenses against it suggests that the threat is not urgent.

Other new Chinese weapons like wake-homing torpedoes and sea-skimming cruise missiles cause considerably less destruction, and probably would not be able to sink the massive carriers.  The warships are equipped with heavy side armor, and their internal layout of numerous bulkheads and watertight compartments would tend to keep damage localized.  Crews are trained continuously in firefighting and other emergency skills relevant to limiting the effects of attacks.

Navy leaders tend to dismiss the most alarming reports about China’s growing anti-access capabilities, pointing out that the country trails the United States in almost every measure of naval power.  For example, China’s 60 attack subs seldom venture far from port, and tend to be noisier — easier to detect — than those operated by the U.S.  In any event, the Navy is not sitting still waiting to see how the China challenge evolves.  It is funding numerous programs to stay ahead of the threat, including the first all-new class of aircraft carriers in 40 years, more capable aircraft to be deployed on the carriers, major upgrades in Aegis missile-defense capabilities, and increased production of the very stealthy [Virginia](http://www.forbes.com/places/va/)-class attack sub.

Such investments will give carrier captains additional options for protecting their warships in the future.  For instance, the carrier version of the F-35 joint strike fighter will be able to fly 200-300 nautical miles farther with a heavier bomb load than the plane it replaces, and in a straighter line because it is stealthy; that means the carriers can operate at much greater distances from Chinese shores while still accomplishing missions.  The latest version of the carrier-based Hawkeye radar plane will provide improved sensitivity against threats like cruise missiles, and a new electronic jamming aircraft called the Growler will degrade the effectiveness of enemy radars and communications.  The Navy has literally dozens of such programs under way, complemented by a training system that far exceeds the rigor achieved in competing maritime forces.

None of this means that U.S. aircraft carriers in the Western Pacific are invulnerable.  As China’s military buildup proceeds, the U.S. Navy will have to continually adjust its operating concepts and deployment plans to keep up with the threat.  But large-deck aircraft carriers are likely to remain a potent contributor to U.S. power in the region, and they will be joined in the future by Marine amphibious assault vessels sporting their own improved aviation capabilities courtesy of the F-35 program.  If military commanders avoid taking unnecessary risks, U.S. aircraft carriers should retain their relevance to the balance of power in the Western Pacific through mid-century.