

Getting Serious About Taiwan's Air Power Needs

Dean Cheng

Abstract: Under the clear terms of the Taiwan Relations Act, the U.S. is obligated to make available the hardware and services necessary for Taiwan's defense. This obligation is a critical component of U.S. policy in the Western Pacific, as it ensures that, in the event of a cross-Strait conflict, Taiwan will not be overwhelmed by a technologically superior People's Liberation Army. In order to meet this obligation, the U.S. should provide Taiwan with the equipment necessary to help it secure control of its own airspace. Failure to do so will only spark uncertainty about America's resolve to meet its global commitments, uncertainty that will only further embolden an already confident China.

The ongoing debate over the sale of F-16s to Taiwan is part of a larger question involving the obligation of the United States under the Taiwan Relations Act (TRA) to make available the hardware and services necessary for Taiwan's defense. The TRA and President Ronald Reagan's subsequent "Six Assurances" to Taiwan make clear that American arms sales to Taiwan would be based solely on Taiwan's defense needs—and would be made without consulting the People's Republic of China (PRC).¹

The provision of aircraft and other assets to ensure that Taiwan can control its own airspace is an essential part of Taiwan's self-defense capacity. In the event of a cross-Strait conflict, the People's Liberation Army (PLA) would seek to control the airspace over the Taiwan Strait and the island itself. The ability to impose

Talking Points

- U.S. defense assessments agree that the cross-Strait balance of airpower is steadily shifting against Taiwan as Taiwan's air force ages and becomes less competitive with the People's Liberation Army Air Force.
- The failure to sell Taiwan F-16 C/Ds exacerbates this situation, as 20 percent of Taiwan's aircraft will have to be retired with no prospect of replacement.
- Upgrading Taiwan's F-16 A/B fleet is just a partial solution, as only portions of the aircraft are improved. Moreover, it will result in five to 10 years of Taiwan fielding fewer aircraft as the aircraft being upgraded will be unavailable.
- Congress should authorize its own study of the balance of power in the Taiwan Strait, including the aerial balance of power, and whether the Administration is complying with the terms of the Taiwan Relations Act and the Six Assurances.

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such control, however, requires that the PLA, and especially the PLA Air Force (PLAAF), devote substantial resources to aerial hardware and technology.

Therefore, the United States, per its international commitments and domestic laws, should provide Taiwan with the equipment necessary to help it secure control of its own airspace. This equipment should include the sale of new advanced combat aircraft, such as the F-16 C/D, so that Taiwan's air force is not outclassed by the PLAAF.

PLA Capabilities

The PLAAF is composed of some 1,100 fighters of varying types, 283 fighter-bombers, and 82 bombers. While not all of these forces would be available to confront Taiwan's air force, the PLA's air force is substantial.²

In the Nanjing Military Region (MR) directly opposite Taiwan, there are at least five air divisions, each of which is typically composed of three regiments of approximately 24 aircraft. These forces field a variety of fighters and fighter-bombers, including:

- J-10s;
- Su-27 and Su-30MKKs;
- J-11s (Chinese-manufactured Su-27/Su-30 fighters);
- JH-7 strike aircraft; and
- Older aircraft such as J-7s, J-8s, and H-6 bombers.

The Nanjing MR would likely be reinforced by units drawn from other military regions, as the PLAAF has been exercising kuaqu, or cross–military region deployments. This reinforcement could be supplemented by the PLA Naval Air Force (PLANAF), which fields another 30 long-range bombers, 84 fighters, and 138 fighter-bombers.³

In addition, the PLAAF controls the PRC's surface-to-air missile (SAM) defenses, which the U.S. Department of Defense (DOD) regards as one of the largest such forces in the world. Equipped with the SA-10 Grumble/S-300, SA-20, and locally manufactured equivalent HQ-9, which are comparable to the U.S. MIM-104 Patriot SAM system, these forces are formidable and, if not neutralized, will make the air situation over the Strait perilous for Taiwan and American forces. As mobile systems, these SAM defenses will be hard to localize and target; meanwhile, the missiles are maneuverable and difficult to jam or otherwise deceive.

The combination of highly effective SAMs and advanced combat aircraft means that the PLAAF can mount a credible challenge against Taiwan forces across the breadth of the Strait.

Moreover, with a range of 150–195 km (93–121 miles), these systems can reach across much of the Taiwan Strait (which is 81–137 miles across), effectively denying much of Taiwan's airspace to its defenders. The combination of highly effective SAMs and advanced combat aircraft means that the PLAAF can mount a credible challenge against Taiwan forces across the breadth of the Strait.

Finally, by attacking key radar and air defense sites, air bases, command and control facilities, and communications nodes, the PLA Second Artillery would be expected to play an essential role in suppressing Taiwan's air defenses. This year's DOD report estimates that China has well over 1,000 short- and medium-range ballistic missiles within range of Taiwan.⁴ The PRC is also fielding a variety

^{1.} The six assurances are that the United States will (1) not set a date for ending arms sales to Taiwan; (2) not alter the Taiwan Relations Act; (3) not hold prior consultation with Beijing on arms sales to Taiwan; (4) not play any mediatory role between Beijing and Taipei; (5) not alter its position regarding Taiwan's sovereignty; and (6) not exert pressure on Taipei to enter negotiations with Beijing.

^{2.} Limitations on the available space at air bases that were within range of Taiwan would restrict how many aircraft could be based there at any one time.

^{3.} International Institute for Strategic Studies, *The Military Balance 2010*, February 3, 2010, pp. 398–404, at http://www.iiss. org/publications/military-balance/the-military-balance-2010/ (October 10, 2011).

^{4.} Office of the Secretary of Defense, Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2011, August 16, 2011, p. 30, at http://www.defense.gov/pubs/pdfs/2011_cmpr_final.pdf (October 10, 2011).

of air- and ground-launched land attack cruise missiles, further complicating Taiwan's defense.

Chinese Views on Air Warfare

The PLA has spent a considerable amount of time studying foreign wars—especially those involving the United States. Based on its observations of the 1991 Gulf War, as well as NATO operations in the Balkans and coalition operations in Iraq and Afghanistan, the PLA has concluded that air power will be a key component of any future war.

For example, one analysis of the Kosovo War demonstrated that there was a need to preferentially develop airpower, and especially aerial striking power; focus on the development of elite, specialized forces; increase networking; and improve information-sharing. This analysis also indicated the need to develop combat aircraft, precision munitions, and C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) structures with networked information capabilities, in addition to emphasizing the continued importance of ground-based air defenses.⁵

Since the early 1990s, the PLA has sought to incorporate these lessons into its own doctrine as well as its force modernization effort. In 1999, a series of military regulations and guidelines (gangyao) that revamped how the PLA would go to war were released. PLA writings suggest that these new guidelines focus on the operational level of war, where battles link together to form campaigns aimed at fulfilling overall strategy. These guidelines emphasize joint campaigns—operations involving forces operating on land, sea, and air, as well as in outer space and cyberspace, working together to achieve objectives such as imposing a blockade or supporting landing operations.

Supporting the joint campaign are individual service campaigns, such as the air force's aerial offensive campaigns (kongjun jingong zhanyi). In conducting the aerial offensive campaign, PLA writings suggest

that the PLA Air Force would take the offensive, striking deep behind enemy lines, and engage in high-intensity combat involving the heavy expenditure of munitions.⁶ It would try to attain surprise, strike at key targets, and secure a rapid victory.

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Essential parts of an aerial offensive campaign would include:

- Information combat. Such combat would begin with careful reconnaissance to understand the enemy's capabilities and deployment. Once conflict began, there would be electronic warfare operations aimed at jamming or otherwise interfering with the enemy's electronic support systems (e.g., early warning radars, air defense systems); cyber operations to disrupt their computer systems; and direct attacks against key early warning radars, air defense sites, and air bases.⁷
- Aerial breakthrough combat. This is the core of aerial offensive campaigns and involves disrupting and destroying enemy air defenses. It resembles the U.S. Air Force's description of operations aimed at the suppression of enemy air defenses (SEAD). As PLA writings from 2006 noted, Taiwan has already deployed layered air defenses, so this would be a difficult mission.

A key to the PLA's success would therefore be to deceive an opponent, striking at the enemy with unexpected weapons at unsuspected times and places while exploiting advanced technology and deceptive tactics to secure surprise. Such surprise would then be complemented by electronic

^{7.} *Ibid.*, pp. 579–581.



^{5.} Liu Kejian and Wang Xiubo, *The First War Won Through Airpower: The Kosovo War* (Beijing, PRC: AMS Press, 2008), pp. 346–382, 363–372.

^{6.} Zhang Yuliang, chief ed., Science of Campaigns (Beijing, PRC: NDU Press, 2006), p. 576.

suppression of enemy air defenses and physical attacks against key air defense sites. Such observations suggest that there was extensive interest in stealth technologies and associated electronic warfare capabilities five years before the J-20 had its first test flight.

• Air strikes. The aerial breakthrough combat is intended not only to eliminate enemy resistance, but also to facilitate air strikes against key enemy targets. The initial attacks will involve repeated waves of air and missile strikes to wear down the enemy's integrated combat capabilities (*zhengti zuozhan nengli*) and paralyze their combat forces. Key targets would include air bases, early warning radars, SAM sites, and communications nodes.⁹

The confluence of PLA writings and known Chinese weapons developments suggests that, having devised a doctrine for air campaigns and joint campaigns, the PLA has since engaged in research and development, as well as acquisition, of weapons necessary to implement that doctrine.

Taiwan's Air Defenses

To counter the PLA's aerial onslaught, the air force on Taiwan can field four types of aircraft. The largest single block is the 146 F-16 A/B, which were purchased from the U.S. in the early 1990s. The next most numerous are 128 Ching-Kuo Indigenous Defense Fighters, developed by Taiwan's Aerospace Industrial Development Corporation (AIDC) in the late 1980s, and 89 F-5E fighters of 1960s vintage. Taiwan also fields 57 Mirage-2000s, which it also purchased in the early 1990s. 10

To help direct these forces and maintain situational awareness over the Taiwan Strait, there are six E2T Hawkeye airborne early warning aircraft, as well as six Patriot batteries and six Tien Kung/Sky Bow surface-to-air missile batteries, and a variety of other radars.

The 2010 unclassified, interim U.S. Defense Intelligence Agency (DIA) report on Taiwan air defense capabilities concluded that many of these aircraft are incapable of operating effectively. The Ching-Kuo fighters were assessed to be underpowered and of limited value. Only 30 F-5s were estimated to remain airworthy, and their effective lifespan was judged to be over—a point underscored by the recent crash of two of the aircraft. While the Mirage 2000-5s should be effective, their maintenance and fuel consumption costs have reduced their readiness. ¹¹

F-16 Sales and Upgrades

The proposed sale and upgrades of F-16s must therefore be considered in light of the current state of Taiwan's air force. The proposed sale of F-16 C/Ds would replace the 89 F-5s, and although this replacement would reduce Taiwan's overall number of aircraft, it would also improve Taiwan's ability to conduct precision air strikes against any invading force—a much-needed upgrade.

The F-16 C/D's avionics suite and ability to accommodate conformal fuel tanks would also provide improved survivability in the face of China's substantial SAM force while increasing overall mission endurance capabilities.

The F-16s currently in the Taiwan inventory are F-16 A/B Block 20 aircraft. As currently configured, the aircraft have an APG-66(V)3 mechanically scanned radar with an 83 km range. With this radar, Taiwan's F-16s can launch the AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM), which is the most advanced radar-guided air-to-air missile in Western inventories. The aircraft is powered by a Pratt & Whitney F100-PW-220 engine, which generates a maximum of 23,770 pounds of thrust.

According to the U.S. Defense Security Cooperation Agency, the upgrade program for these aircraft

^{11.} Wendell Minnick, "US Intel Report on Taiwan Air Power Released," *Defense News*, February 22, 2010, at http://www.defensenews.com/story.php?i=4508720 (October 10, 2011); Jens Kastner, "French Snub Costs Taiwan's Military," Asia Times Online, June 10, 2010, at http://www.atimes.com/atimes/China/LF10Ad02.html (October 10, 2011).



^{8.} Ibid., pp. 581–583.

^{9.} Ibid., p. 585.

^{10.} International Institute for Strategic Studies, The Military Balance 2010, pp. 428–429.

will focus on improving their aerial detection capability as well as some aspects of their survivability. The most reported aspect of the upgrade is the incorporation of an active, electronically scanned array (AESA) radar system.

Through manipulation of their electronic transmissions, AESA radars not only "steer" the beam without requiring a mechanical change of facing, but also can modify their beams to scan a volume of airspace while tracking several individual targets. This "track while scan" capability allows an aircraft to engage more enemy forces while maintaining good situational awareness. Moreover, by spreading their transmissions across a spectrum of frequencies, these radars can better avoid detection and can operate even in the face of heavy jamming. Theoretically, AESA radars should also have a better chance of detecting stealthy targets. Coupled with the provision of Joint Helmet Mounted Cueing Systems, the upgraded F-16 A/Bs will feature improved dogfighting capabilities by allowing the pilot to respond more rapidly to enemy threats or targets of opportunity.

Another element of the proposed upgrade program is a range of new or improved electronic warfare systems. In the face of China's modern SAMs, these systems are essential if the aircraft are to survive long enough to intercept PLAAF aircraft.

Upgrading the F-16 A/Bs will improve the survivability and some aspects of the combat effectiveness of Taipei's air force.

Such upgrading of the F-16 A/Bs will improve the survivability and some aspects of the combat effectiveness of Taipei's air force. Despite these substantial changes to the F-16 A/Bs, however, the Administration has refused to upgrade the aircrafts' engines. More recent versions of the F-16, such as the F-16 C/D Block 50/52, are equipped with the Pratt & Whitney F100-PW-229 engine, which generates over 29,000 pounds of thrust, substantially improving the performance of the aircraft. Moreover, it is the power plant that provides the electrical energy to run the various electronic systems. Perhaps even

more troubling, there have been no indications that the Administration will provide the Ching-Kuo with improved engines, an upgrade that would address one of that aircraft's glaring deficiencies.

While helpful, these F-16 A/B upgrades still cannot overcome several salient facts:

- The F-16 A/B airframes are nearly 20 years old. The F-16 A/Bs sold to Taiwan were manufactured in the early 1990s. While recent upgrades will improve their electronics, they will not rejuvenate the planes. Having endured 20 years of air combat training and the stresses associated with such activities, these planes will eventually show metal fatigue, which in turn will affect their flight operations.
- The number of aircraft available for duty will **be reduced.** From a technical perspective, the upgrading of F-16 A/Bs is extremely complicated and will require an unprecedented effort. As of 2011, for example, no F-16 A/B has had its radar and avionics as thoroughly modified as currently proposed. Consequently, it is likely that these upgrades will involve a difficult, protracted process. The first upgrades will not be complete for more than five years, and the retrofit of the entire fleet will probably take at least 10. For at least a half-decade and probably longer, then, the total number of F-16s available to patrol the skies over Taiwan will be reduced—during which time it is unlikely that the PLAAF's modernization will slow.
- Obsolete aircraft will not be replaced. The F-16 A/B upgrade will not affect the other three parts of Taiwan's air fleet: the Ching-Kuo fighters, the Mirage 2000-5s, or the F-5Es. The F-16 C/Ds, after all, are intended not to augment the F-16 A/Bs, but to replace the F-5Es, which at this point are outmatched. With no replacement from any other source, it remains to be seen how the Administration will address the evaporation of nearly 20 percent of Taiwan's combat aircraft inventory. Similarly, the Administration does not appear to have any interest in replacing the obsolescent Ching-Kuo fighters or even improving their performance with better engines.



Given these realities, serious questions remain about whether upgrades alone can satisfy America's obligations to Taiwan.

What Needs to Be Done

In light of the aforementioned issues, America's refusal to sell Taipei F-16 C/Ds cannot be reconciled with the requirements of the TRA: to make available to Taiwan the equipment and technology necessary for self-defense. Although the Administration may have hoped that upgrades—rather than outright sales—would mollify Beijing, Chinese officials have made clear that the upgrades are also problematic.

Chinese Foreign Minister Yang Jiechi has warned U.S. Secretary of State Hillary Clinton that the proposed sale would harm the "trust and confidence" that exists between the U.S. and the People's Republic of China. Additionally, the Chinese Vice Foreign Minister summoned U.S. Ambassador Gary Locke to personally protest this sale. Chinese military officials have also warned that such upgrades could result in a downgrading of military-to-military relations with the United States. ¹² Thus, if the Administration had hoped that by providing Taiwan only with upgrades it could somehow curry favor with Beijing, it has failed.

Some in the Administration have claimed that the upgrades would be completed sooner than new aircraft could be delivered. But in contrast to the long lead-times required for the F-16 upgrades approved by the Administration, the delivery of new F-16C/Ds could begin in approximately three years and be completed in approximately five—long before the upgrades even begin. Placing orders for new aircraft would also allow the F-16 line to remain open, thereby providing additional options for future arms sales to Taiwan and other U.S. allies.

There are also reports indicating that the Administration may be considering yet another alternative to the F-16: Vertical/Short Takeoff and Landing (V/STOL) aircraft, either the AV-8B Harrier or the F-35B Joint Strike Fighter, presumably out of concern for the security of Taiwan's runways. 13 Such an approach would not address Taiwan's immediate defense needs, as neither aircraft is in production. In either case, there would also have to be substantial retraining of pilots to handle a fundamentally different aircraft. Providing V/STOL aircraft would also raise real questions of cost: The Harrier would entail logistical support for an aircraft no longer in production, while the F-35's acquisition costs have been skyrocketing, and maintenance costs are unknown.

America's refusal to sell Taipei F-16 C/Ds cannot be reconciled with the requirements of the Taiwan Relations Act: to make available to Taiwan the equipment and technology necessary for self-defense.

Indeed, there is no guarantee that the F-35B, the short-take-off variant, will even enter production; then-Secretary of Defense Robert Gates warned in January 2011 that the aircraft might be cancelled due to cost concerns. ¹⁴ This, of course, begs the question of whether the Administration is likely to sell F-35s to Taiwan, even if they were available. After all, if China opposes the F-16 C/D sale, it is unlikely to countenance the sale of the even more modern F-35.

For the United States to meet its obligations to Taiwan as mandated by the TRA, the Administration and Congress should take the following actions:

^{14.} Bill Sweetman, "F-35B on Probation, New Bomber to Go Forward," *Aviation Week & Space Technology*, January 7, 2011, at http://www.aviationweek.com/aw/generic/story_channel.jsp?channel=defense&id=news/awx/2011/01/06/awx_01_06_2011_p0-280761.xml&headline=F-35B%20On%20Probation;%20New%20Bomber%20To%20Go%20Forward (October 10, 2011).



^{12.} Reuters, "China Foreign Minister Warns Clinton on F-16 Deal," *The Star*, September 26, 2011, at http://thestar.com.my/news/story.asp?file=/2011/9/27/worldupdates/2011-09-26T230717Z_01_NOOTR_RTRMDNC_0_-595590-1&-sec=Worldupdates (October 10, 2011); UPI, "China Slams US \$5.9 Billion F-16 Upgrade," September 22, 2011, at http://www.upi.com/Top_News/World-News/2011/09/22/China-slams-US-59B-Taiwan-F-16-upgrade/UPI-14001316674800/ (October 10, 2011); and Claire Cozens, "China Strongly Condemns US—Taiwan F-16 Deal," *Defense News*, September 22, 2011, at http://www.defensenews.com/story.php?i=7753485 (October 10, 2011).

^{13.} William Lowther, "Pentagon Report Backs US Refusal to Sell F-16 Jets," *Taipei Times*, October 2, 2011, at http://www.taipeitimes.com/News/front/archives/2011/10/02/2003514709 (October 10, 2011).

Backgrounder

• The Administration should reconsider its decision not to sell F-16 C/Ds to Taiwan. Other than a desire not to offend Beijing, the reasons behind the Administration's refusal to provide F-16 C/Ds to Taipei—a refusal arguably in contravention of the TRA—remain unclear. Many of the justifications offered thus far—that upgrades would be completed more quickly or that V/STOL aircraft would be more appropriate—do not withstand close scrutiny. Certainly, these reasons do not address the widening gap in capabilities between Taiwan and the PRC.

The Administration should immediately make the F-16C/Ds available to Taiwan. Alternatively, if the Administration is serious about being willing to sell Taiwan the F-16C/Ds at some future date, then it should explicitly state what would be required to complete the sale. Should the Administration refuse to sell Taiwan the F-16 C/Ds, then the U.S. should take at least some ameliorative steps to address Taiwan's defense needs.

• Congress should authorize a separate, independent assessment of Taiwan's defense requirements. Under the TRA, the President and Congress are obligated to assess arms sales "solely based upon their judgment of the needs of Taiwan, in accordance with procedures established by law." The recent DOD report on China indicates that the balance of power between China and Taiwan is shifting against the island, yet the Administration appears intent on ignoring these trends.

In light of this shift, as well as questions regarding the Administration's rationale in delaying the sale of arms to Taiwan, Congress should authorize a separate assessment of Taiwan's defense requirements akin to the independent review of the Quadrennial Defense Review.

• The Administration should authorize a more complete upgrade of Taiwan's current fighter inventory. The provision of new radars and electronic suites for the F-16 A/Bs satisfies only the most minimal requirements necessary to improve Taiwan's air defenses. The aircraft's engines remain underpowered (compared with later versions of the F-16), affecting their maneuverability and performance.

The Administration should, at a minimum, allow the export of improved engines, not only for the 146 F-16 A/Bs, but also the 128 Ching-Kuo fighters. This would improve the combat utility of the latter aircraft (a substantial part of the Taiwan inventory) while extending their life. Such an extension is especially pressing, since the failure to sell F-16 C/Ds means that nearly 20 percent of Taiwan's air force will likely be retired without replacement in the coming several years.

• The U.S. should press Taiwan to undertake additional measures to improve the survivability of its forces. One of the objections often raised about the sale of aircraft to Taiwan is that Taipei has not done all that it can to ensure that its air force will survive the initial blows of a cross-Strait conflict. While this is an insufficient reason to withhold arms, it does suggest that there are measures that Taiwan could, and should, take to improve the survivability of its forces.

For example, Taipei should review the survivability of its airbases and work to ensure that runways and aircraft shelters can survive and operate under intense PLA attack. Similarly, Taiwan's air defense infrastructure, including SAM sites, command and control centers, and communications links, should also be scrutinized for potential vulnerabilities. The Taiwan military and civilian authorities should not only be advised of any weaknesses covered by such a review, but also pressed to address them as part of an integrated effort to improve Taiwan's air defense capabilities.

• The United States needs to ensure that its own capabilities are sufficient to uphold its commitments. Ongoing debates over spending in Washington suggest that some Members of Congress will attempt to impose substantial cuts in the 2012 defense budget. Meanwhile, former Secretary of Defense Robert Gates and other military officials have made decisions that will adversely affect U.S. capabilities in the Western Pacific, such as ending production of the F-22 Raptor fighter aircraft (optimized for establishing air superiority).

The TRA makes it U.S. policy "to maintain the capacity...to resist any resort to force or other



forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan." Congress should investigate the extent to which current and future cuts in the defense budget will affect the ability of the United States to meet its legal obligations under the TRA. Such hearings should include assessments of the military capabilities of the PRC as well as other potential adversaries in the region.

Conclusion

Under the clear terms of the Taiwan Relations Act, the U.S. is obligated to provide Taiwan with the hardware and services necessary for its defense. This obligation is a critical component of U.S. pol-

icy in the Western Pacific because it ensures that, in the event of a cross-Strait conflict, Taiwan will not be overwhelmed by a technologically superior People's Liberation Army.

Despite this obligation, the current Administration has not yet agreed to sell Taiwan new advanced combat aircraft, such as the F-16 C/D, or even offer ameliorative steps to address Taiwan's defense needs. Such delay will only spark uncertainty about America's resolve to meet its global commitments—uncertainty that will only further embolden an already confident China.

—Dean Cheng is Research Fellow in Chinese Political and Security Affairs in the Asian Studies Center at The Heritage Foundation.

