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During a recent [speech](#) delivered on US policy towards the Indo-Pacific in Washington, DC, the former secretary of state and director of the Central Intelligence Agency (CIA), Michael Pompeo, called on the US government to re-establish diplomatic relations with the government in Taiwan. In a speech on March 16 at the Heritage Foundation, a conservative policy think tank, the 70th secretary of state argued that the Indo-Pacific was “deeply connected” with the goal of preserving freedom and prosperity for the United States. To emphasize this point, Pompeo opened by underscoring how he had recently returned from Taiwan—a country that he was unable to visit in his official capacity—and stated:

“It became very clear to me that one of the central features of making sure that Taiwan has the capacity to defend itself is the world recognizing what we all know to be true [...] there’s a simple truth: it [Taiwan] is not part of China. That if it became part of China this wouldn’t be reunification, this would be an aggressive action that destroyed the sovereignty of an independent country. And for an awfully long time the West has moved away from this, under coercive threats from the Chinese Communist Party, and no leaders in the West have been prepared to say the simple fact—which is that this is an independent sovereign nation and we ought to help it protect its own sovereignty. I think it is time that the United States do so.”

Pompeo’s speech at the Heritage Foundation followed a detailed [statement](#) that the former secretary of state issued via social media that explained his rationale on the matter:

“It is my view that the US government should immediately take necessary, and long-over-

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due, steps to do the right and obvious thing, that is to offer the Republic of China (Taiwan) America's diplomatic recognition as a free and sovereign country.

This isn't about Taiwan's future independence, it's about recognizing an unmistakable already existent reality. That reality is, as many of your past & present leaders have made clear, there's no need for Taiwan to declare independence because it's already an independent country.

Its name is the Republic of China (Taiwan). The people and government of the United States should simply recognize this political, diplomatic, and sovereignty reality. The Taiwanese people deserve the world's respect for a free, democratic, and sovereign country."

[Debate](#) over Taiwan's sovereignty in US foreign policy discourse is commonplace, especially among Taiwan and China watchers, with opinions becoming increasingly entrenched among observers, primarily because of the country's complicated history following World War II, oversimplifications by the media and general pundits, and the implications of Beijing's claims over Taiwan and the former's continued refusal to renounce the use of force to settle its dispute with Taipei, among other factors. This is despite the fact that the US government has not taken an official position on Taiwan's sovereignty—as clearly displayed in its refusal to concede to Beijing's efforts in the United Nations to establish an institution-wide "One-China Principle" through its [deliberate misuse](#) of UN Resolution 2758. Despite this pushback from the United States, China's tactics have resulted in misleading interpretations of Resolution 2758 by many international bodies.

Following Reagan's Lead

While certainly significant, Pompeo's speech is not the first time that a senior former American official has called for re-establishing official relations with Taipei. During the presidential campaign of 1980—a year after the United States withdrew its diplomatic recognition of Taipei in favor of establishing official ties with Beijing during the height of the Cold War—then-former California Governor and Republican Presidential Candidate [Ronald Reagan](#) made clear

his desire to re-establish diplomatic relations with the Republic of China (Taiwan), much to the chagrin of some of his advisors. Reagan's personal affection for Taiwan was well known and on the campaign trail he [made pledges](#) to the effect that, if elected president, he would resume an "official governmental relationship" or have "government-to-government" ties with Taipei. Given that many [observers](#) now see the world as being "on the foothills of a new Cold War," it perhaps does not require a stretch of the imagination to understand why some US leaders are calling for a return to Reagan's approach.

American Public Opinion on Recognition of Taiwan

Despite the growing chorus of commentaries now focused on US policy towards Taiwan, what has been less clear within the overall US policy discussion on Taiwan is the American public's view on the matter. According to a revealing [survey](#) on American public opinion toward Taiwan conducted by the Chicago Council on Global Affairs in 2021, sizable majorities favor US recognition of Taiwan as an independent country (69 percent) and just over half of Americans (52 percent) favor using US troops to defend Taiwan if China were to invade the island (a remarkable increase from the 19 percent willing to use US troops in 1982). Similarly, the poll found that a plurality (46 percent) favor explicitly committing to defend Taiwan if China invades, with only 12 percent opposing.

While seemingly consistent with prevailing American public opinion, Pompeo's call for the US government to re-establish diplomatic relations with the government in Taiwan has obvious implications—most of all because of the implications for relations with the People's Republic of China. Yet, most critiques of Pompeo's position have largely left unexamined how Beijing's own actions have in many respect necessitated a change. A more [measured critique](#) is that such a radical change in the US stance would weaken Washington's ability to influence cross-strait developments. Ryan Hass, who served as director for China, Taiwan and Mongolia in the National Security Council during the Obama Administration, noted with concern that explicit US support for "Taiwan independence" would weaken US influence on cross-strait developments, which could then lead to insta-

bility. This is a fair concern given the success Washington has had in maintaining peace in the Taiwan Strait under the current approach, but it raises the question of whether this strategy will be sustainable in the mid-to-long term.

China's growing economic and military power, coupled with Chinese Communist Party (CCP) General Secretary Xi Jinping's (习近平) [stated desire](#) to avoid prolonging the cross-Strait impasse indefinitely, could create a situation wherein both Taipei and Washington's freedom of action could become increasingly limited. Indeed, as China grows militarily, a body of evidence is also growing of its more aggressive posture. Accordingly, a strategy of preserving the "status quo" by both Washington and Taipei may only be sustainable if two conditions continue to simultaneously exist: the US maintains overwhelming military capacity to deter Beijing, while at the same time being able to consistently demonstrate its support for Taiwan's international space in order to reassure the people of Taiwan that it will not abandon them as Beijing's pressure campaign increases. In the absence of these conditions, Taiwan would likely be subject to a coerced unification or be pushed into a corner wherein a military conflict would erupt. This raises a key question: assuming that the status quo cannot be sustained indefinitely, what alternatives are at hand?

Four Schools of Thought Guiding US Cross-Strait Policy

The question of what alternate approaches the United States could consider for its cross-Strait policy was put forward in a think tank study published by The Project 2049 Institute. The 2017 report, entitled "[The United States and Future Policy Options in the Taiwan Strait](#)," was co-authored by Lt. Col. (Ret.) Mark Stokes and Sabrina Tsai and laid out four schools of thought for guiding US policy towards cross-Strait relations:

"One school holds that the US should accommodate the CCP's position on Taiwan in order to advance US interests in stable and constructive US-China relations [...] [A] second school of thought has promoted the abandonment of the US One China policy altogether, and calls for the extension of formal diplomatic recognition of Taiwan. [...] [T]he third and arguably dominant school of thought promotes maintenance

of the status quo in US policy toward Taiwan. [...] [A] fourth school of thought advances a "soft balancing" strategy that gradually extends equal legitimacy to both sides within a broadened US One China policy framework."

As the means to thread the needle, the authors recommended the "soft balancing" strategy, as exemplified in the "One China, Two Governments policy" formula, which would essentially extend dual recognition of the ROC and the PRC under the US' "One-China Policy." Others concerned by what they perceive as the "hollowing out" of the US "One-China Policy" may disagree. [1] Even if the United States chooses not to terminate diplomatic relations with Beijing, the proposition of what essentially amounts to dual recognition does raise an interesting question as to what Beijing might do in the event of the United States extending diplomatic recognition of Taiwan. As the [report's authors](#) acknowledge themselves: "Beijing, however, would be unlikely to gracefully accept a US 'One China, Two Governments policy,' which in its view would be tantamount to an 'Independent Taiwan.'" Arguably, US recognition will not fundamentally change the status of Taiwan in the international community. Realistically, it would be unlikely to alter the status of China in the United Nations, and it would remain to be seen whether other countries might follow suit.

For its part, the Biden Administration has largely continued the policy of the previous administration, but has hewn more closely to the "status quo" school. In July 2021, US National Security Council Indo-Pacific Coordinator [Kurt Campbell](#) stated: "We support a strong unofficial relationship with Taiwan. We do not support Taiwan's independence." Indeed, [President Biden](#) has stated on a number of occasions that "[Taiwan is] independent. It makes its own decisions." Building on this, he later [clarified](#): "[T]hey have to decide—'they'—Taiwan. Not us. And we are not encouraging independence, we're encouraging that they do exactly what the Taiwan Act requires, and that's what we're doing. Let them make up their mind. Period."

On March 1, against the backdrop of Russia's unjustified invasion of Ukraine, the Biden Administration dispatched a presidentially authorized [delegation of former senior](#)

[officials](#)—led by former Chairman of the Joint Chief of Staff Michael Mullen—to reassure Taiwan. Again this past week, a senior [bipartisan](#) delegation of US senators and representatives led by Senator Lindsey Graham made an unannounced visit to Taiwan. During a press conference following their meeting with President Tsai Ing-wen (蔡英文), Graham [stated](#) that “We’re not here to change the ‘one China’ policy. We’re here to say that we stand with our friends in Taiwan.”

US cross-Strait policy has long operated on the premise that Washington only has an interest in the process as opposed to the outcome. Yet, the current cross-Strait “status quo”—for reasons earlier alluded to—may not serve US interests over the long-term. A [hyper-focused emphasis](#) on process—without the full scope of political and diplomatic means with which to credibly affect the outcome—could in fact lead to an inadvertent *fait accompli*. It is perhaps noteworthy that Pompeo opened his speech by remarking how he had traveled to Taiwan after leaving office, whereas he was unable to do so as secretary of state.

Instead, it is worth considering the political dimensions of deterrence. In other words, the political means to deter Beijing should be to lean on outcomes rather than focus entirely on process. This strategy would require credibly signaling the political and diplomatic consequences for Beijing if it were to take military action to settle cross-Strait differences. Specifically, one approach could be to convey at a senior government level that if the PRC were to use military force, it would inevitably result in international recognition of Taiwan’s *de jure* independence. Returning to the former secretary of state’s premise: “one of the central features of making sure that Taiwan has the capacity to defend itself is the world recognizing [...] it is not part of China.” While the elasticity of the US “One-China Policy” has withstood the test of the past several decades, it is not at all certain whether it can withstand the next few.

A proactive US policy should create conditions for the resolution of political differences between the two sides of the Taiwan Strait in a manner that best serves US interests. Against the backdrop of Beijing’s growing belligerence and Taipei’s importance as a reliable democratic and technolog-

ically advanced ally, a serious rethink of practice and policy are in order. Whether it involves reconsidering the US “One-China Policy” and re-establishing diplomatic relations with Taiwan or something else, it is in the interest of the United States to continue to gradually adjust the practice of its policy towards one that more accurately reflects the objective status quo in the Taiwan Strait.

The main point: A recent speech by former US Secretary of State Mike Pompeo, in which he advocated for the United States to re-establish formal diplomatic relations with Taipei, should prompt further consideration as to whether the United States should reconsider the “One-China Policy” that limits its engagement with Taiwan.

[1] Daniel Russel of the Asia Society Policy Institute, that the United States is “edging closer and closer to the line that separates unofficial relations with official relations, which, in effect, could hollow out America’s One-China policy.” (<https://asiasociety.org/policy-institute/kurt-campbell-us-and-china-can-co-exist-peacefully>)

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Lessons for Taiwan from the Russia-Ukraine War, Part 2: The Importance of Airpower and Initiative

By: Eric Chan

Eric Chan is a non-resident fellow at the Global Taiwan Institute and a senior airpower strategist for the US Air Force. This is the second of a two-part series on military lessons for Taiwan from the ongoing Russia-Ukraine war. The views in this article are the author’s own, and are not intended to represent those of his affiliate organizations.

In [Part 1](#) of this article series, I discussed how the early days of the ongoing Russia-Ukraine war have demonstrated the

importance of rapid mobilization and logistical stockpiling—both for deterring conflict, as well as maximizing defender advantages should war break out.

At the time of this writing on April 15, the tenor of the Russia-Ukraine War has changed significantly from the opening two weeks. Russia's initial operational plan, a "shock-and-awe" campaign to seize the Ukrainian political leadership and cow the populace into accepting a puppet government, comprehensively failed. Initial strikes were too small to paralyze the Ukrainian military, while the populace, instead of being shocked and awed, rallied to the defense of their nation.

The second Russian plan to surround the Ukrainian capital, Kyiv, and to capture major cities like Chernihiv, Kharkiv, and Odesa has failed as well. Russian casualties and equipment attrition have been severe. An already-weak Russian logistics chain under constant Ukrainian attack has contributed to frequent operational pauses, which have allowed the Ukrainians to outmaneuver their adversary and counterattack. Strategically, sanctions are beginning to have severe effects on both the Russian economy as well as the military's ability to reconstitute forces. This is at least in part due to [Taiwan Semiconductor Manufacturing Company \(TSMC, 台積電\) cutting off Russian access to chips](#), thereby disrupting the country's ability to produce military systems like tanks.

The third Russian plan is now underway, consisting of a [much more limited objective of taking eastern Ukraine](#) via an envelopment or direct attack on Ukrainian forces defending the "Joint Forces Operation" (JFO) area. The Russians have retreated from most other areas of combat to consolidate their forces, while settling into firepower strikes to break the will of the Ukrainian people. However, even these more limited efforts have been set back by the inability of the Russians to fix in place the nimbler Ukrainian defenders, and to secure air dominance over Ukraine. This has multiple implications for Taiwan military planners: first, the importance of mission command methodology in the high likelihood that command and control is cut off; second, the vast difference between *air dominance* and *air superiority*, and the importance of airpower on the defense even when the other side has a modicum of superiority.

Mission Command

Just prior to the beginning of the war on February 24, Ukrainian President Volodymyr Zelenskyy [repeatedly pushed back against Western intelligence assessments](#) that the Russian military was ready to invade Ukraine. Zelenskyy had good reason to do so: he was concerned that war fears would lead to societal panic and economic disruption, both of which would have played into an ongoing Russian gray zone warfare campaign. However, this meant the Ukrainian military was exposed to severe risk: units were caught out of position at the time of attack; mobilization had not occurred; and there was insufficient defensive infrastructure in place, such as mines, anti-tank barriers, and trenches. In fact, the lack of Ukrainian preparation probably contributed to the Russians developing their initial, highly optimistic operational plan.

The Ukrainian military's practice of mission command, however, proved to be a saving grace. Mission command can be defined as [subordinates being able to independently execute the commander's intent](#). This requires significant training—and most importantly, trust. The adjustment for Ukrainian forces from the Soviet model of centralized decision-making to the Western model of mission command has proven to be [one of the most impactful effects of US and NATO training](#). The effects of mission command, too, are magnified on the defensive. For instance, the [initial Russian southern offensive caught the Ukrainian Army's 59th Brigade off-guard](#), with units only half-assembled. The brigade was outnumbered five to one, cut off from lines of communication, and fighting against an enemy with air superiority. However, by relying on mission command training, the 59th Brigade was not only able to break contact from numerically superior forces attempting to outflank them, but also destroyed Russian airborne assault units that had been dropped in their rear to envelop the brigade. Afterwards, the brigade rallied territorial defense and other regular army units to stop the Russian advance to Mykolaiv, thereby saving the crucial Ukrainian port city of Odessa. The effectiveness of the 59th Brigade was in part due to their adversary's belief that knocking out the Ukrainian lines of communication would paralyze them; instead, the Ukrainian defenders used their initiative and

superior knowledge of the local terrain to [repeatedly bait](#) advancing Russian troops into accurate artillery fire.



Image: A Ukrainian T-64 tank ambushing a Russian armored convoy, early April 2022. In this case, the Ukrainian tank took advantage of rigid Russian small unit tactics to hit multiple Russian armored personnel carriers, fixing the convoy in place until Ukrainian artillery fire hit the remainder of the convoy. The Ukrainians have effectively used initiative, flexible tactics, and knowledge of the terrain to repeatedly bait and destroy larger Russian formations. (Image Source: [Ukrainian Armed Forces / Daily Mail](#))

In a Taiwan invasion scenario, Taiwanese military planners would need to work under the assumption that command and control will be cut at almost every level. One of the obvious lessons for the PRC is that [cutting off Taiwanese political command and control is a necessity](#): the Russian inability to kill/capture/incapacitate President Zelenskyy has not only heartened the Ukrainians, but has [given Ukraine an enormous edge](#) in the global information war. At an operational level, the PRC will likely redouble efforts to emulate the initial successes of the Russians on the southern front; thus, Taiwanese demonstration of mission command and the ability to synchronize regular army, reserve, and territorial defense combat power would vastly complicate adversary targeting. Demonstrating decentralized small unit tactics in striking at logistics targets, either in the littoral or on the beach, would also force the PLA to focus more on force protection, at the expense of offensive capability.

Finally, it is worth noting that the war has demonstrated the value of tank units when combined with mission command. The 59th Brigade mentioned above was able to repeatedly outmaneuver the enemy as a motorized infantry

brigade, even in the face of enemy air superiority. Similarly, Ukraine's 1st Tank Brigade was [able to do the same in the north at Chernihiv](#), halting the advance of the far larger Russian 41st Combined Arms Army. Even more importantly, the 1st Tank Brigade was then able to transition to the counter-offensive; this would be far harder to do with the territorial defense forces who have so captured the imagination of the public. On a broader level, one of the most important lessons here is that *platforms* traditionally seen as "symmetric" can be imaginatively used in *asymmetrical* ways.

Use of Airpower Under Enemy Air Superiority

The other major Ukrainian demonstration of that precept has been in the use of airpower. On the first day of the war, the Russian Air Force [attempted to blind/destroy the Ukrainian Air Force through a large salvo of cruise and ballistic missiles](#), targeting land-based radar installations, runways, and air defense batteries. This effort was unsuccessful, in part due to targeting errors, insufficient use of munitions, and poor intelligence. The end result is that the Russian Air Force has only been able to achieve limited air superiority. The difference between this type of limited air superiority versus air dominance has been startling for Western observers. The Russian Air Force can use its air superiority to conduct sorties—but only for limited periods and in certain areas. A lack of precision munitions has meant that the Russians have been forced to undertake low-altitude "dumb bomb" drops, leaving them vulnerable to anti-air systems ranging from air defense vehicles to man-portable air defense systems (MANPADS). Without both precise targeting data and munitions, this makes the Russian strikes largely predictable and ineffective.

Meanwhile, the Ukrainian Air Force continues to operate a limited number of sorties. While the Ukrainians cannot sortie as often as the Russians, [Ukrainian training](#) has made the strikes more tactically effective and survivable for the Ukrainian pilots. Operationally, this has had ripple effects for ground force operations: without air dominance, the Russians have not been able to gain an observational advantage over the battlefield. This, in turn, has allowed Ukraine to better mask its ground movements, as well as enabling

the use of unmanned combat aerial vehicles (UCAVs) like the famed Bayraktar TB-2, which would not be survivable under Russian air dominance. As both this war and the previous Armenia-Azerbaijan War have shown, these UCAVs allow for the [cheap replication of elements of a larger, more sophisticated air force](#), such as ground attack and artillery targeting. The survival of Ukrainian Su-27 and MiG-29 fighters and their ability to [continually bait Russian aircraft into air defense traps](#) have been key to limiting the use of Russian airpower and allowing the operationally more lethal—but more vulnerable—TB-2s and other UCAVs to continue strikes or direct artillery fire against Russian ground forces.



Image: A Russian tank explodes following a strike by a Ukrainian drone, mid-March 2022. The Ukrainian integration of manned aircraft operations into air defense has limited the Russian Air Force to only episodic air superiority, despite a vast disparity in strength. As a result, the Ukrainians are still able to effectively operate drones against ground targets—a potentially valuable lesson for Taiwan in the light of the PLA’s materiel superiority. (Image Source: [Ukrainian Armed Forces/The Independent](#))

Thus, the ability of Taiwan’s air force to survive the initial onslaught of cruise/ballistic missiles would have an outsized effect on the battlefield. Even if Taiwan’s manned aircraft by themselves cannot win air superiority, by working in concert with a [sophisticated Taiwanese integrated air defense system](#), they could prevent the PLA Air Force from being able to achieve air dominance, again by complicating enemy targeting. By forcing the adversary to expend outsized attention and resources on suppression, this would give more space for Taiwanese UCAVs and [loitering munitions](#) to operate.

Conclusion

In thinking through lessons from the Russia-Ukraine War for the Taiwan military, it is also important to consider and adjust for the lessons that the PRC will take from the conflict as well. The PLA will likely prioritize striking even harder at Taiwanese command, control, and communications, with the goal of preventing both Taiwan’s strategic communications with the outside world and paralyzing Taiwanese military coordination. The PLA will likely fixate on ensuring a better logistics chain, with a focus on ensuring corruption doesn’t eat away at this vital aspect of military operations like [it did with the Russians](#). Similarly, the PLA will also note the importance of the [huge flood of Western military aid in increasing Ukrainian combat power](#) and seek to target any US/allied attempt to resupply Taiwanese forces.

Thus, simply seeking to blindly replicate Ukrainian successes in a Taiwan scenario will not work. Taiwan and the United States cannot assume that the PLA will repeatedly blunder under the national-led political constraints of a “special military operation” versus a war. Taiwan does not have the geographical depth of Ukraine, nor the easy rail-links to Europe.

By practicing rapid mobilization and [improving reserve combat capability](#), Taiwan can both gain the strategic high ground of showing the world the resiliency of the Taiwanese people in defending their democracy, as well as the operational benefits of having a deep, local knowledge of terrain.

By stockpiling *en masse*, Taiwan can demonstrate the capability to both wage high-intensity war and resist a blockade, reducing the effects of PLA strikes on Taiwanese logistics.

By practicing effective mission command, Taiwan can demonstrate resistance to decapitation/paralysis-style strikes; and enhance its own ability to strike at PLA logistics in the littoral or on the beach, where they are hideously vulnerable.

By practicing agile maneuver and coordination with an integrated air defense system, Taiwan’s air force can badly complicate adversary targeting and ensure that the PLAAF

cannot achieve air dominance over the skies of Taiwan.

The Russia-Ukraine war has taught, and in many cases re-taught, many lessons. Chief among them is Napoleon's dictum: "In war, the moral is to the physical as three is to one." Ukraine's military has cleverly leveraged its own strengths against Russian weaknesses, exponentially degrading Russian morale and operations. Taiwan must be prepared to do the same against its adversary.

The main point: The Russia-Ukraine War has provided many lessons on how a smaller power can offset and outlast a stronger power. These methods include the use of mission command and the role of airpower under conditions of enemy air superiority.

Amid Growing Chinese Threats, Taiwan Seeks to Bolster Its Air Defense Capabilities

By: John Dotson

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Among the multifaceted military threats directed at Taiwan by the People's Republic of China (PRC), none is more immediate and pressing than the provocative military flight activity around Taiwan by People's Liberation Army Air Force (PLAAF) aircraft. This activity—which includes not only [near-daily incursions into Taiwan's Air Defense Identification Zone](#) (ADIZ), but also flights [around the island](#) and [across the Taiwan Strait centerline](#)—began to ramp up dramatically beginning in 2019 and 2020 (see [here](#) and [here](#)). In the first week of October 2020, Taiwan's then-Minister of National Defense Yen Teh-fa (嚴德發) [stated](#) that, in the year up to that time, the PLA had conducted over 1,700 sorties into the ADIZ and crossed the Taiwan Strait centerline 49 times. The Republic of China Air Force (ROCAF) has faced mounting pressures on aircraft maintenance and budgets as a result of the need to respond to these PLAAF incursions: in September 2021, a Ministry of National De-

fense (MND) report indicated that the ROCAF's facilities and equipment costs were projected to [reach a record NTD \\$29.2 billion](#) (USD \$1.05 billion) in fiscal year 2022—including NTD \$17.2 billion for maintenance and NTD \$11.9 billion for equipment purchases (up 56 percent from fiscal year 2016).

Policy discussions surrounding Taiwan's air defense were also given a jolt by an [incident on February 5](#), in which a Chinese civilian Y-12 turboprop aircraft—reportedly flying low to the ground, possibly with intent to fly under radar coverage and thereby test Taiwan's air defense network—flew near Dongyin Island in the Matsu archipelago. In the wake of the incident, an MND spokesman stated that "we cannot rule out that [China is] using civilian aircraft to test the responses of our military." Some commentators in Taiwan called the incident a "[wake-up call](#)," emphasizing the need to upgrade Taiwan's air defenses.

In addition to the constant pressure posed by PRC flights—in terms of both quotidian ROCAF responses such as scrambles by escort fighters, as well as what the PLAAF flights might portend for further coercive PRC military activity—Russia's invasion of Ukraine has prompted further discussion of the obvious [parallels between Taiwan and Ukraine](#), as well how Taiwan's air defense capacity connects to its overall capability for self-defense. Some observers have drawn a direct line between the experiences of the Russo-Ukrainian War and the threat faced by Taiwan. For example, Harry Halem and Eyck Freymann have [written](#) that "Taiwan could benefit from a similar asymmetric defense strategy to deter or defeat a Chinese invasion [...] But this strategy will fail if Taiwan cannot disrupt Chinese air control. [...] [I]nitial analysis suggests that Ukrainian air defenses have been critical in ensuring the country's survival and allowing its military to operate effectively."

In 2021 and early 2022, Taiwan's MND has taken a series of steps to boost the island's air defense capacity in the face of steadily mounting PRC pressure. These measures consist of both foreign equipment purchases and ramped-up indigenous defense production, as well as new equipment deployments and a review of procedures for the tracking of PLAAF sorties. These measures in turn bear direct relation

to Taiwan's ability to defend itself against still more aggressive coercive actions by the PRC.



Image: A truck-mounted radar system, believed to be an indigenously designed passive radar for detecting stealth aircraft, being off-loaded on Taiwan's Penghu Island in March 2021. (Image source: [Alert 5](#))

Taiwan's Air Defense Doctrine and Platforms Requirements

The pressure from the PRC is likely responsible, at least in part, for institutional changes in the ways that Taiwan's military handles the tracking and interception of potentially hostile aircraft. Although primary responsibility for air defense rests with the ROCAF, Taiwan's MND has indicated that it has adopted a joint approach to air defense management. As indicated in the [ROC National Defense Report 2021](#) (中華民國110年國防報告書) issued in November 2021:

"To enhance the [command-and-control, C2] efficacy for joint operations and the protection for short-range air defense forces, the MND has completed the "integrated air defense concept" to combine short-range air defense forces from 3 service branches and [to] give the headquarters of each theater of operations C2 authority to employ [common operational

pictures] and a communications mechanism with air and naval assets to increase the reaction time for forces on alert and the efficacy of our joint operations. By this token, we may flatten our command hierarchy, and achieve cross-domain integration for these forces."

The increase in PRC flight activity in 2019-2020 led to a corresponding increase in scrambles by ROCAF fighters to monitor and escort the PLAAF aircraft. This has led Taiwanese defense officials to reportedly [request expedited delivery](#) (currently scheduled by 2026) of the [66 F-16 C/D Block 70 fighters approved for sale](#) by the United States in 2019. While airborne scrambles have continued, however, by March 2021 the stress on ROCAF pilots and maintenance requirements had led Deputy Defense Minister Chang Cheping (張哲平) to comment that that "[land-based missile forces](#)" had become the primary means to track and monitor PLAAF flights.

Upgrades to Air Defense Radar Networks

The past year has also seen discussion regarding further upgrades of radar facilities to bolster Taiwan's early-warning and tracking capabilities. The current jewel in the crown of Taiwan's early-warning network is the "Precision Acquisition Vehicle Entry Phased Array Warning System" (PAVE PAWS) radar facility located atop Leshan Mountain in northwestern Taiwan. The [PAVE PAWS system](#), built by US defense contractor Raytheon for a reported USD \$1.4 billion, entered service in 2013 and allows for 240 degree tracking of targets out to an estimated range of 3,000 miles. [Press reporting](#) in April 2021 indicated that MND officials were giving serious consideration to the construction of another major early-warning radar facility in the south of Taiwan, in order to better facilitate tracking of PLAAF aircraft flying into Taiwan's ADIZ or through the Bashi Channel south of Taiwan. However, further specifics on this potential new facility have not been made public.

There have also been recent deployments of smaller, mobile platforms to outlying islands around Taiwan. For example, in March 2021 Taiwan's *Youth Daily News* (青年日報) published [photos of a vehicle-mounted radar system](#), reportedly a [passive radar system intended to track stealth](#)

[aircraft](#), being deployed to Penghu Island—a key location in the Taiwan Strait for monitoring flights into Taiwan’s ADIZ. Increased PLAAF activity has also prompted similar actions by Japan: in early April, a [TPS-102](#) (a vehicle-mounted, three-dimensional air surveillance radar) and 20 accompanying Japanese Air Self-Defense Force (JASDF) personnel were [deployed to Yonaguni Island](#), approximately 70 miles to the east of Taiwan. A Japanese military spokesman commented that the move was intended to “strengthen the defense of our country at a time when neighboring countries are increasing their activities [in the region].”

Upgrades and Further Acquisitions of Air Defense Missile Systems

In recent years, Taiwan has been pursuing [upgrades to its air defense missile systems](#), in terms of both foreign purchases and indigenous production. An additional foreign purchase was revealed on April 5, when the US Defense Security Cooperation Agency (DSCA) [announced](#) an approved arms sale to Taiwan relating to the Patriot Advanced Capability (PAC-3) system, a surface-to-air missile (SAM) designed for both anti-aircraft and anti-ballistic missile roles. The new sale consisted of a USD \$95 million package of contractor support for “training, planning, fielding, deployment, operation, maintenance, and sustainment of the Patriot Air Defense System.” This in turn followed from the July 2020 [announcement](#) of an estimated USD \$620 million package of services and equipment for Taiwan’s PAC-3 missile recertification program.

In November 2021, Taiwan’s Legislative Yuan (LY, 立法院) [approved](#) a large [supplemental defense budget allocation](#) of NTD \$240 billion (roughly USD \$8.6 billion), with much of the budget oriented towards additional acquisitions of indigenously built anti-ship and anti-aircraft missile systems. In that special budget, approximately NTD \$43.2 billion (18 percent) of the total was allocated for the delivery of additional air defense assets:

- NTD \$33.6 billion (USD \$1.2 billion, 14 percent of the budget) was provided for additional units of the [Tien Kung-III](#) (TK-3, 天弓三型) surface-to-air missile (SAM) systems. The TK-3, or “Skybow-3,” is a land-based SAM employed in tandem with the US-produced PAC-3 to

perform both anti-aircraft and anti-ballistic missile roles. [1]

- NTD \$9.6 billion (USD \$340 million, 4 percent) was allocated for further acquisitions of the “[Battlefield Air Defense System](#)” (野戰防空系統), a truck-mounted SAM intended for shorter-range, point air defense.

The [MND reported to the LY in early March](#) that it was moving up projected timetables and ramping up production capacity for selected missile systems—a move made possible in part by expansion of the facilities of the Chungshan Institute of Science and Technology (國家中山科學研究院), Taiwan’s leading institution for indigenous weapons design. These measures reportedly include doubling the annual production capacity of Tien Kung-III SAMs from 48 to 96 units annually; and nearly quadrupling (from 40 to 150) the annual production of the [Hai Chien-II](#) (HC-2, 海劍二型), or “Sea Sword-2,” a medium-range, active-guidance SAM intended for deployment on ROC Navy vessels.

Conclusion

Taiwan’s geography and resources place it at a significant disadvantage relative to the PRC in terms of air power—with, for example, the PLAAF enjoying a four-to-one advantage over the ROCAF in terms of active fighter aircraft. [2] Moreover, Taiwan’s air defense personnel must not only monitor the airspace around Taiwan itself, but also the archipelago of small islands under Taiwan’s administration in the Taiwan Strait and closer to the PRC’s southeastern coastline. This presents a daunting challenge.

Yet, Taiwan’s Ministry of National Defense appears to be engaged in an active effort to bolster Taiwan’s air defenses in an asymmetric fashion that will not exhaust its own resources. Although the ROCAF continues to respond to PLAAF flights with scrambles of escort fighter aircraft, its efforts are increasingly focused on improved capabilities to track and monitor potentially hostile aircraft via ground-based radar networks, as well as building up an enhanced inventory of both purchased and indigenously produced surface-to-air missiles for use in the event of actual hostilities. Taiwan’s air defense forces remain a David to the PLAAF’s Goliath, but the MND appears to be taking steps in

the right direction.

The main point: Amid steadily mounting pressure from provocative Chinese military flight activity, Taiwan’s Ministry of National Defense is placing greater emphasis on air defense forces—to include enhanced radar networks and increased inventories of anti-air missile systems—intended to better position Taiwan to better resist Chinese pressure.

[1] The Tien-Kung (TK, 天弓), or “Sky Bow,” series of surface-to-air missile (SAM) systems represent Taiwan’s leading indigenous air defense platforms. The variants in active service are the [TK-II](#), a medium-range anti-aircraft missile with an active seeker for terminal guidance; and the [TK-III](#), a solid fuel, hypersonic surface-to-air missile with a terminal microwave seeker, which is designed to serve both anti-aircraft and anti-ballistic missile roles.

[2] See: US Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2021*, “Taiwan Strait Military Balance, Air Forces” (p. 162). <https://media.defense.gov/2021/Nov/03/2002885874/-1/-1/0/2021-CMPR-FINAL.PDF>.

Taiwan-US Science and Technology Cooperation Continues with Satellite Program

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In February 2022, the American Institute in Taiwan (AIT) [announced](#) that AIT and the Taipei Economic and Cultural Representative Office in the United States (TECRO) had [agreed to a new memorandum of understanding \(MOU\)](#) that extends existing cooperation between the United States and Taiwan on the “Development, Launch, and Operation Constellation Observing System for Meteorology,

Ionosphere, and Climate Follow-On Mission” satellite program—known as FORMOSAT-7 in Taiwan and COSMIC-2 in the United States—which began in 2010.

The FORMOSAT-7/COSMIC-2 program, in which the US was responsible for the launch of a [constellation of weather observation satellites](#) and Taiwan was responsible for system integration and design, is the [largest-ever](#) US-Taiwan space-based collaboration and [represented a “major milestone”](#) for both Taiwan-US science and technology (S&T) cooperation and Taiwan’s aerospace development.

Taiwan and the US have built their space-related collaborations on the relationships between Taiwan’s National Space Organization (NSPO), the US National Aeronautics and Space Administration (NASA), and the Department of Commerce’s National Oceanic and Atmospheric Administration (NOAA). These ties between Taiwan and the US [remain strong](#)—as evidenced by President Tsai Ing-wen’s (蔡英文) [visit to Johnson Space Center in 2018](#)—as do broader S&T relations. In fact, there have been at least [270 bilateral agreements](#) and MOUs signed to promote Taiwan-US S&T cooperation, including a new [Science and Technology Agreement](#) that was signed in 2020.

Understanding the FORMOSAT-7/COSMIC-2 Program

The FORMOSAT-7/COSMIC-2 program represents the next step in Taiwan-US space cooperation and S&T cooperation, which [began in 1994](#) with the design and manufacture of the FORMOSAT-1 experimental scientific satellite. Since then, the relationship has grown to include the development of the Alpha Magnetic Spectrometer (AMS) on the International Space Station (ISS) in 1995, the launch of the Submillimeter Array in Hawaii in 2003, the Greenland Telescope in 2016, and the SpaceX launch of FORMOSAT-5, which was Taiwan’s first domestically developed remote sensing satellite.

The six-satellite FORMOSAT-3/COSMIC-1 constellation launched from Vandenberg Air Force Base in 2006 was the [first major collaboration on weather satellites between Taiwan and the US](#). Following the success of this program, Taiwan and the US signed another agreement in May 2010 to jumpstart the FORMOSAT-7/COSMIC-2 program at the

agency level between the National Space Organization (NSPO) and NOAA.

[FORMOSAT-5](#) was launched by SpaceX and was Taiwan's first domestically produced satellite, in collaboration with the National Space Organization of the National Applied Research Laboratories and Taiwan's industrial and research sectors.

The FORMOSAT-7/COSMIC-2 satellite program relevant to the most recent MOU is a jointly administered program of six kitchen oven-sized satellites that will play an [important role for weather forecasters and scientists](#) seeking data on topics including weather prediction, space weather observation, and climate research. In the initial program, the US was responsible for the launch of the satellites while Taiwan was responsible for the design and integration of systems and mission operations, according to the NSPO.



Image: Personnel of the National Space Organization in Hsinchu pose with a FORMOSAT-7 satellite (undated photograph). (Image source: [Liberty Times](#))

The FORMOSAT-7/COSMIC-2 satellites [use radio occultation](#) (RO) to measure how global navigation satellite systems (GNSS)—including global positioning system (GPS)—signals are distorted as they pass through the earth's ionosphere and atmosphere. Analysis of these signals gives distinct measurements for important weather categories including temperature, air pressure, and water vapor content, allowing researchers to better understand the development process of tropical storms and other weather systems. The [satellites](#) are also used to measure the impact of space

weather on communications, navigation, cellular, and aircraft systems in the ionosphere. These capabilities include the ability to produce real-time conditions for weather prediction and space weather observation.

The new MOU governing the continuation of this program addresses key issues for continued use of the FORMOSAT-7/COSMIC-2 satellites, such as the design, construction, launch, and establishment of control centers. In the revised agreement, TECRO and AIT will, through the NSPO and NOAA, continue existing coordination efforts on the project until May 27, 2030, or until the FORMOSAT-7/COSMIC-2's final satellite reaches end-of-life, whichever comes first.

According to NOAA, NSPO, and others, the COSMIC-2 satellites [reached full operational capacity](#) in October 2021. The announcement comes after the satellites' successful June 2019 launch on a SpaceX Falcon Heavy rocket, establishment of communications 173 minutes after launch, [successful completion of operations tests](#) in July 2019, an initial [release of atmospheric data in March 2020](#), and [attainment of mission orbits](#) in February 2021. To reach their full operational capacity, the satellites have undergone a seven-month instrument and data evaluation period which was followed by software updates. [Additional reviews](#) on the satellites certified that:

- All six satellites were properly located in orbit;
- Ground stations were functioning properly;
- Satellite data was validated and correct;
- Taiwan- and US-based operations centers were operational;
- Backup ground stations with commanding capabilities will work; and
- Data from the satellites can be properly archived.

Given the shared responsibilities by both Taiwanese and American actors on this project, the successful deployment at all levels represents a success for bilateral space cooperation and a sign of the promise for future Taiwanese space capabilities.

Taiwan's Space Industry Enters its Third Phase

Taiwan's goals of having an indigenous satellite program trace back to the early 1990s when the government entered the first phase of its Long-term National Space Technology Development Program. From 1991 to 2006, Taiwan focused on building aerospace talent and put its first weather satellite constellation, the FORMOSAT-3, into orbit. As Taiwan entered the second phase of its development program, it turned its focus to the [FORMOSAT-5](#) and [FORMOSAT-7 projects](#). The third phase of Taiwan's satellite program (2019-2028) is primarily focused on launching one satellite a year to support national security and environmental monitoring.

Next Steps for Taiwan's Space Program

Taiwan's space industry has been identified as one key element of President Tsai's Six Core Strategic Industries, and in 2021 [the cabinet approved a draft bill](#) from the Ministry of Science and Technology to develop the Taiwanese space industry. This proposed law would promote space-related businesses in Taiwan and [reserve approximately NTD \\$25 billion](#) for Taiwanese space projects. Premier Su Tseng-chang (蘇貞昌) has identified Taiwan's leading role in semiconductor manufacturing as an [opportunity for Taiwan to shape developments in the global space industry](#), and the government has taken steps to grow the nation's existing space and space technology agreements in recent years.

In pursuit of its satellite and space objectives and in line with the third phase of its National Space Technology Long-Term Development Plan, Taiwan plans to launch the [first of six FORMOSAT-8 satellites](#) in 2023. This plan also calls for additional launches in each year between 2024 and 2028 to form a constellation that will provide dynamic monitoring information and real-time satellite resource requirements. The next iteration of the FORMOSAT line of satellites presents a strong opportunity for the US to partner with Taiwan at the governmental level. It will also build off the successes of the FORMOSAT-7 program to find more ways for the US and Taiwan to cooperate on future space issues—by leveraging Taiwanese technical expertise with US commercial strength across the sector in critical areas such as [space debris identification](#).

In addition to its new agreement with the US, Taiwan has taken other measures to advance its space program. In 2021, Taipei entered into new space-related MOUs with [Lithuania](#) and the [Czech Republic](#), showing a penchant to forge new agreements and identify new partnership opportunities. The current trend of deepening ties between Taipei and Tokyo should also bode well for longer-term satellite and broader S&T cooperation between Taiwan and Japan. In the past, Taiwan [has relied on Japan for satellite services](#), and Taiwan's new satellite plans represent a strong opportunity for Taiwan to leverage the capabilities of the Japan Aerospace Exploration Agency (JAXA) to [forge deeper semiconductor-related supply chain security ties](#)—which will simultaneously bolster satellite launch and deployment capabilities, and address potential satellite supply chain challenges for both sides. Ongoing cooperation with the US and other friendly nations will be an essential component of Taiwan's ongoing space ambitions.

The main point: Cooperative agreements between the United States and Taiwan on satellite development and launches—such as the FORMOSAT-7/COSMIC-2 constellation of weather satellites—have opened up a significant avenue of US-Taiwan scientific collaboration in the space industry.