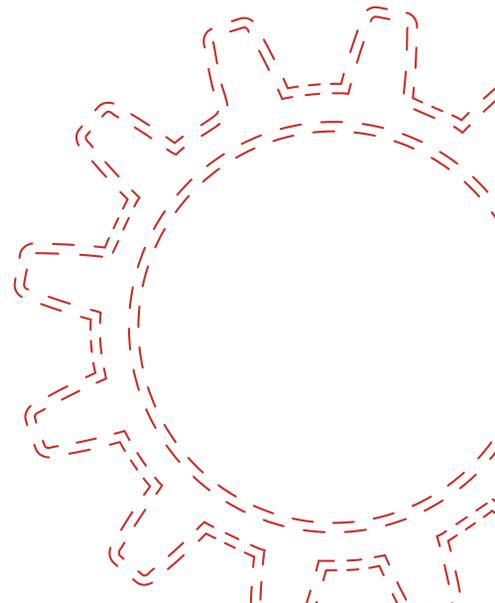
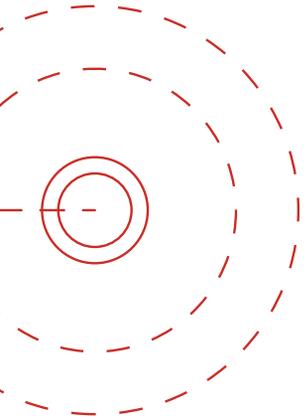




**A LARGE NUMBER
OF SMALL THINGS:
A PORCUPINE
STRATEGY FOR TAIWAN**

James Timbie
Adm. James O. Ellis Jr.



As China's rhetoric about "reunification" with Taiwan and the military's gray-zone activities intensify, Taiwan should adopt a strategy that includes a large number of small things in order to leverage Taiwan's geographic and technological advantages, exploit the People's Liberation Army's vulnerabilities, and help to deter an attempt to take the island by force.

In his July 1, 2021 speech at Tiananmen Square to mark the 100th anniversary of the founding of the Chinese Communist Party, General Secretary Xi Jinping reiterated the party's commitment to what it calls "reunification" with Taiwan.¹ To that end, the People's Liberation Army has upped the range and intensity of its gray-zone activities, including frequent intrusions into airspace and waters in close proximity to Taiwan. Xi has also made explicit that "We make no promise to abandon the use of force, and retain the option of taking all necessary measures."² The high end of the range of such measures would be an attempt to take Taiwan by force.

Distributed, survivable, and affordable defenses could greatly complicate an attempt to invade Taiwan by the People's Liberation Army. Taiwan's expensive conventional platforms are useful to counter gray-zone incursions and they have political and industrial benefits as well. But they are unlikely to survive the initial strikes of any cross-strait invasion. Implementation of a strategy that includes a large number of small things could leverage Taiwan's geographic and technological advantages, exploit the People's Liberation Army's vulnerabilities, and help to deter an attempt to take the island by force.

An airborne or amphibious invasion across the Taiwan strait would be an extraordinarily complex and difficult task.³ Following up on a suggestion by Robert Blackwill and Philip Zelikow in their Council on Foreign Relations report that advanced technology could provide advantages for the defense

of Taiwan,⁴ we have undertaken an assessment of the potential for distributed, survivable, affordable defenses to further complicate that difficult task and make Taiwan a harder target against invasion. This work is part of a broader effort by the National Security Task Force at the Hoover Institution to examine the emerging Indo-Pacific security landscape.⁵ This analysis is based in part on interviews with current and former officials of the United States and Taiwan, and in part on publicly available information.

Adopting an asymmetric defense that would leverage Taiwan's natural advantages and exploit the vulnerabilities of the People's Liberation Army is not a new or novel concept. Observers have suggested that Taiwan adopt this kind of "porcupine strategy" since at least 2008.⁶ Adm. (ret.) Lee Hsi-min, chief of staff of Taiwan's armed forces from 2017 to 2019, developed and advocated an overall defense concept, the principal innovation of which was to supplement legacy aircraft and ships with asymmetric capabilities based on "a large number of small things."⁷ Lee supported the continued acquisition of small quantities of advanced F-16 fighters and indigenous submarines for missions such as responding to gray-zone incursions, but he argued that those expensive but potentially vulnerable legacy systems should be complemented with large quantities of small, mobile, affordable, and resilient anti-air and anti-ship systems that could survive initial strikes and effectively resist airborne or amphibious invasion.

Effective short-range anti-air and anti-ship

1 "Full Text of Xi Jinping's Speech on the CCP's 100th Anniversary," *Nikkei Asia*, July 1, 2021, <https://asia.nikkei.com/Politics/Full-text-of-Xi-Jinping-s-speech-on-the-CCP-s-100th-anniversary>.

2 Chris Buckley and Chris Horton, "Xi Jinping Warns Taiwan that Unification Is the Goal and Force Is an Option," *New York Times*, Jan. 1, 2019, <https://www.nytimes.com/2019/01/01/world/asia/xi-jinping-taiwan-china.html>.

3 Michael Beckley, "The Emerging Military Balance in East Asia: How China's Neighbors Can Check Chinese Naval Expansion," *International Security*, 42 no. 2 (Fall 2017): 87–90, https://doi.org/10.1162/ISEC_a_00294. Also see Michael Beckley, "China Keeps Inching Closer to Taiwan," *Foreign Policy*, Oct. 19, 2020, <https://foreignpolicy.com/2020/10/19/china-keeps-inching-closer-to-taiwan/>.

4 Robert D. Blackwill and Philip Zelikow, "The United States, China, and Taiwan: A Strategy to Prevent War," Council on Foreign Relations Special Report No. 90, February 2021, <https://www.cfr.org/report/united-states-china-and-taiwan-strategy-prevent-war>.

5 We would like to thank participants of the National Security Task Force for their valuable comments and suggestions, particularly the contributions of Gen. Jim Mattis, Adm. Gary Roughead, and David Fedor.

6 William S. Murray, "Revisiting Taiwan's Defense Strategy," *Naval War College Review* 61, no. 3 (2008), <https://digital-commons.usnwc.edu/nwc-review/vol61/iss3/3/>.

7 Lee His-min and Eric Lee, "Taiwan's Overall Defense Concept, Explained," *The Diplomat*, Nov. 3, 2020, <https://thediplomat.com/2020/11/taiwans-overall-defense-concept-explained/>.



defenses could increase the risk that an invasion attempt would fail or be substantially delayed either in the water or on the island. The prospect of failure, or the economic, international, and domestic political costs of a protracted conflict, could deter China from initiating an invasion that could be thrown back or that could drag on with adverse domestic and international consequences.

This concept of investing in a large number of small things has support in both Taiwan and the United States. Gen. Chang Guan-chung, vice minister of defense for armaments, elaborated in his October 2020 address to the U.S.-Taiwan Defense Industry Conference that

the development of innovative and asymmetric capabilities is aimed at deterring the enemy from invading Taiwan. We are developing systems that are small, numerous, smart, stealthy, fast, mobile, low-cost, survivable, effective, easy to develop, maintain and preserve, and difficult to detect and counter.⁸

Acting Assistant Secretary of Defense for Indo-Pacific Security Affairs David Helvey, addressing the same conference, used similar language to encourage Taiwan to invest in “large numbers of small things – capabilities that can signal to an adversary that an invasion or attack would not come without significant cost.”⁹ George Mason University Professor Michael Hunzeker, in his statement before the U.S.-China Economic & Security Review Commission in February 2021, supported the same emphasis on asymmetric defenses to counter an invasion attempt and encouraged Taiwan to invest in “large numbers of low-cost weapons.”¹⁰

Notwithstanding such high-level expressions of support in Taiwan and in the United States for asymmetric defenses based on a large number of small things, actual implementation of this concept has been slow and grudging, at best.

Some analysts believe that there is no way that Taiwan could defend itself against a concerted

assault by the People’s Liberation Army.¹¹ An amphibious invasion, however, is an inherently complex and difficult operation, and others assess that the People’s Liberation Army “is not unbeatable.”¹² An attempt to take Taiwan would be one of the most challenging military operations in history, requiring large numbers of ships and aircraft to traverse 100 miles of water, where they would be exposed to anti-ship and anti-air defense forces. Taiwan has favorable defensive geography — the majority of the island is mountainous, the wind and waves in the strait are treacherous for much of the year, and there are few beaches suitable for large landing operations.¹³ China has invested heavily for many years in acquiring modern ships and aircraft and training personnel for this mission, but many observers, including the authors of the 2020 report to Congress of the U.S.-China Economic & Security Review Commission, assess that the People’s Liberation Army “still lacks the capability to execute a full-scale invasion of Taiwan.”¹⁴

China’s military continues to invest heavily in this mission as part of a broad range of challenges to Taiwan, from ongoing information operations and gray-zone intrusions to acquiring military capabilities to strike, blockade, or invade the island, with the stated objective of achieving “reunification.” The resources available to Taiwan’s military establishment are growing but finite, and they are small compared to the resources available to China. It is therefore important for Taiwan and the United States, as its principal supplier, to find the right balance between investing in costly and potentially vulnerable legacy systems and investing in distributed, affordable, and resilient defenses that could survive initial strikes and counter the ships and aircraft of an invasion force, in order to lead China to question its ability to successfully take Taiwan by force. In the words of Helvey, such a “balanced approach entails funding indigenous development, foreign acquisitions and sustaining or, in some cases, divesting legacy systems to support an effective and constant military deterrent.”¹⁵

8 Chang Guan-chung, “Strengthening Self-defense Capabilities, Defending Freedom and Democracy,” 2020 US-Taiwan Defense Industry Conference, Oct. 5, 2020, https://www.us-taiwan.org/wp-content/uploads/2020/10/2020_october05_vice_minister_chang_mnd_keynote.pdf.

9 David Helvey, “Closing Keynote Remarks,” 2020 US-Taiwan Defense Industry Conference, Oct. 6, 2020, 3, https://www.us-taiwan.org/wp-content/uploads/2020/02/2020_october06_david_helvey_dod_keynote.pdf.

10 Michael Hunzeker, “Statement Before the U.S.-China Economic & Security Review Commission,” Feb. 18, 2021, 2, https://www.uscc.gov/sites/default/files/2021-02/Michael_Hunzeker_Testimony.pdf.

11 A. Trevor Thrall and Jordan Cohen, “Time to Rethink Arms Sales to Taiwan,” *Defense One*, Nov. 2, 2020, <https://www.cato.org/commentary/time-rethink-arms-sales-taiwan>.

12 Helvey, “Closing Keynote Remarks,” 2.

13 Ian Easton, *The Chinese Invasion Threat: Taiwan's Defense and America's Strategy in Asia* (Manchester: Eastbridge Books, 2017), 125–52.

14 2020 Report to Congress of the U.S.-China Economic and Security Review Commission, United States-China Economic and Security Review Commission, December 2020, 395, https://www.uscc.gov/sites/default/files/2020-12/2020_Annual_Report_to_Congress.pdf.

15 Helvey, “Closing Keynote Remarks,” 3.

Taiwan's Ongoing Investments

Despite the support that a porcupine strategy has in Taiwan and in the United States, Taiwan has continued to invest in expensive, high-profile conventional systems, as the following summary of ongoing procurements of military systems by Taiwan and Foreign Military Sales from the United States illustrates. Of all the programs listed below, the minelayer ship, the Harpoon coastal defense cruise missile, the Stinger man-portable air defense missile, and possibly the missile corvettes can be considered “small things” that can be fielded in “large numbers.” Most of Taiwan's defense funding, however, remains devoted to big-ticket conventional systems.

Indigenous Defense Submarine

Taiwan has embarked on a \$16 billion program to produce eight diesel submarines. Construction of the first unit began in November 2020, following several years in which the domestic defense industry designed the submarines, built the facility where they will be constructed, and secured America's agreement to supply certain technologies. At the ceremony commemorating the beginning of construction, President Tsai Ing-wen called the Indigenous Defense Submarine “an important part of allowing our navy to develop asymmetric warfare.”¹⁶ Others argue that the limited number of ships, only a few of which would be available on a day-to-day basis, are unlikely to change China's perceptions of whether an invasion would be successful and would more likely become “priority targets.”¹⁷

F-16

Taiwan is investing \$4 billion to upgrade its 141 existing F-16 fighters, which were purchased in the 1990s, to the latest F-16v specifications, including new radar and electronics.¹⁸ The first of

the upgraded aircraft entered service in the spring of 2021. In addition, Taiwan is purchasing 66 new F-16v aircraft to replace its oldest fighters, at a reported cost of \$8 billion.¹⁹ Taiwan's fighters have seen extensive use in responding to China's gray-zone intrusions, but their ability to survive missile strikes on their bases and operate continuously in a conflict is subject to question.

Tien Kung [Sky Bow] III (TK III) and Patriot PAC-3

The TK III is an indigenous air defense system with trailer-mounted missile launchers and radars for use against aircraft, cruise missiles, short-range ballistic missiles, and anti-radiation missiles, with performance characteristics roughly comparable to the Patriot PAC-3.²⁰ Both the indigenous TK III and the imported Patriot PAC-3 systems are extensively deployed in Taiwan. The TK III is in serial production, and procurement of additional Patriot PAC-3 interceptors is planned. The TK III, built in part with licensed U.S. technology, is popular in Taiwan. Tsai has visited the National Chung-Shan Institute of Science and Technology, which developed the system, and has publicly called for production of the system to be accelerated.²¹ The TK III is much less expensive to produce and maintain than the Patriot PAC-3, although its effectiveness in an engagement with the People's Liberation Army has not been demonstrated.

Hsiung Feng [Brave Wind] II and III (HF II and HF III)

Taiwan is producing and deploying two anti-ship cruise missiles that could pose a significant threat to the ships of an invasion force. The HF III is an indigenous supersonic cruise missile capable of striking ships or land targets, with a range sufficient to strike targets on the Chinese mainland.²² The HF III is deployed on frigates and smaller ships and can be launched from land-based trailers as well. Tsai also asked for production of the HF III

16 Huizhong Wu, “Taiwan's Leader Launches Production of Domestically Made Sub,” *AP News*, Nov. 24, 2020, <https://www.wjhl.com/news/international/taiwans-leader-launches-production-of-domestically-made-sub/>.

17 Michael A. Hunzeker and Joseph Petrucelli, “Time for Taiwan to Scrap Indigenous Diesel Submarine,” *The Diplomat*, Nov. 30, 2019, <https://thediplomat.com/2019/11/time-for-taiwan-to-scrap-the-indigenous-diesel-submarine/>.

18 Mike Yeo, “Taiwan to Deploy Upgraded F-16 Jets, Says Air Chief,” *Defense News*, March 22, 2021, <https://www.defensenews.com/air/2021/03/22/taiwan-to-deploy-upgraded-f-16-jets-says-air-chief/>.

19 James Holmes, “F-16V Fighters for Taiwan: Worth the Price Tag?” *National Interest*, May 24, 2021, <https://nationalinterest.org/blog/reboot/f-16v-fighters-taiwan-worth-price-tag-185978?page=0,1>.

20 “Taiwan to Buy Upgraded PAC-3 Missiles, to Be Deployed by 2026,” *Focus Taiwan*, March 31, 2021, <https://focustaiwan.tw/politics/202103310007>.

21 “Tsai Orders Faster Missile Production,” *Taipei Times*, Jan. 26, 2019, <https://www.taipetimes.com/News/taiwan/archives/2019/01/26/2003708664>.

22 “The HF-III Supersonic Anti-Ship Missile,” https://www.ncsist.org.tw/eng/csisdup/products/product.aspx?product_id=10&catalog=30.

to be accelerated during her visit to the National Chung-Shan Institute of Science and Technology.

The HF II is an indigenous earlier generation shorter-range, subsonic anti-ship cruise missile that is currently deployed on a variety of ships and on land, and continues to be produced and upgraded. The relatively small HF II could arm small fast-attack missile boats, which Taiwan is not pursuing, and could be deployed in large numbers on mobile launchers on land as well.

Yun Feng

The National Chung-Shan Institute of Science and Technology also reportedly began production at the end of 2020 of a supersonic land-attack cruise missile with a range sufficient to strike targets as far into the Chinese mainland as Beijing and Shanghai.²³

Tuo Chiang-Class Corvette

While relatively small at 600 tons displacement, compared to the Taiwan navy's 26 frigates and destroyers with displacement ranging from 3,000 to 10,000 tons, the domestically produced Tuo Chiang-class ships carry HF II (subsonic) and HF III (supersonic) anti-ship cruise missiles, torpedoes, and air-defense missile systems.²⁴ Tuo Chiang-class ships have catamaran hulls and can move at high speeds (up to 43 knots). These vessels are designed to be stealthy with a low radar cross-section, but maritime domain awareness and targeting would be a challenge in a hostile electromagnetic environment. Two of these ships are currently in service, with nine more planned by 2026. A version is also being produced for Taiwan's Coast Guard.²⁵ In addition, Taiwan has 31 170-ton Kuang Hua-class stealthy missile boats that carry HF II anti-ship missiles.²⁶

Taiwan has decided, however, not to proceed with the production of small, fast-attack missile boats

armed with HF II anti-ship missiles that would be much smaller (50 tons) than the corvettes, would be stealthier and similar in size to fishing boats, could be produced and deployed in much larger numbers than the 11 planned corvettes, and could sally from the coast in a swarm to pose a serious challenge to Chinese ships approaching Taiwan.²⁷ Failure to pursue small, fast-attack missile boats indicates lack of commitment to a strategy of a large number of small things.

Yu Shan-Class Amphibious Assault and Transport Ship

Taiwan launched the first of four large (10,000 tons displacement) domestically produced amphibious transport docks in the spring of 2021.²⁸ These multi-mission ships are designed to carry troops and equipment to Taiwan's off-shore islands as well as its islands in the South China Sea and are armed with anti-ship and anti-aircraft missiles as well.

Min Jiang-Class Minelayer

In 2020, the Taiwanese navy received the first of four new 350-ton domestically produced minelaying ships.²⁹ Naval mines could pose a major challenge to ships approaching Taiwan, and attempts to clear them could delay invasion forces. The minelayer program makes a positive contribution to a strategy based on a large number of small things.

Systems Currently Being Acquired from the United States as Foreign Military Sales

In addition to these systems, Congress has been notified of a number of Foreign Military Sales from the United States to Taiwan that are in the process of being implemented.³⁰ These include the following:

M1A2 Abrams tank: Taiwan is acquiring 108 M1A2 tanks, the first of which will be delivered in 2023

23 2020 Report to Congress of the U.S.-China Economic and Security Review Commission, 467.

24 "Navy to Take Delivery of New Tuo Chiang-Class Corvette in July," *Focus Taiwan*, June 30, 2021, <https://focustaiwan.tw/politics/202106300023>.

25 Tso-Juei Hsu, "Taiwan's First Upgraded and Modified Catamaran Corvette Started Sea Trial," *Naval News*, May 9, 2021, <https://www.navalnews.com/naval-news/2021/05/taiwans-first-upgraded-and-modified-catamaran-corvette-started-sea-trial>.

26 J. Michael Cole, "China Pans Navy's New Attack Boat," *Taipei Times*, Jan. 12, 2012, <http://www.taipeitimes.com/News/taiwan/archives/2012/01/12/2003523049>.

27 "Taiwan Navy Proposes NT\$31.6 Billion for Fast Attack Missile Boats," *Taiwan Times*, Aug. 31, 2018, <https://www.taiwannews.com.tw/en/news/3519644>.

28 Mike Yeo, "Taiwan Launches New Amphibious Vessel with Anti-Ship Missiles," *Defense News*, April 13, 2021, <https://www.yahoo.com/news/taiwan-launches-amphibious-vessel-anti-161239156.html>.

29 Xavier Vavasseur, "Taiwan Launches 1st Mine Laying Ship For ROC Navy," *Naval News*, Aug. 5, 2020, <https://www.navalnews.com/naval-news/2020/08/taiwan-launches-1st-mine-laying-ship-for-roc-navy/>.

30 "U.S. Arms Sales to Taiwan," Forum on the Arms Trade, accessed Dec. 6, 2021, <https://www.forumarmstrade.org/ustaiwan.html>.



(\$2 billion).³¹

M109 Paladin howitzer: The Biden administration has approved Taiwan's request for 40 Vietnam-era M109 self-propelled howitzers and related equipment for delivery by 2025 (\$750 million).³²

High Mobility Artillery Rocket Systems: 11 mobile launchers and 64 associated missiles will be delivered by 2027 (\$430 million).

Mark 48 torpedo: 18 Mark 48 heavy torpedoes will be acquired from the U.S. Navy (\$180 million). The Tsai administration cites the sale of heavy torpedoes as evidence of U.S. support for the indigenous submarine program.³³

Harpoon: 100 Harpoon land-based coastal defense cruise missile launchers, 400 missiles, and 25 associated radars will be produced and sold to Taiwan, the first of which will arrive in 2025 (\$2.3 billion). The Harpoon is a good example of a proven anti-ship missile small enough to be deployed in large numbers on mobile launchers.

MQ-9 Reaper: The United States has approved

the sale of four MQ-9 high-altitude, long-endurance surveillance drones and associated fixed and mobile ground control equipment to enhance Taiwan's situational awareness (\$600 million).

FIM-92 Stinger: The United States has agreed to sell Taiwan 250 additional Stinger man-portable, shoulder-fired, surface-to-air missiles and associated launchers and training equipment, for use against aircraft, helicopters, and drones, to be delivered by 2026 (\$220 million). The Stinger is another good example of a proven weapon small enough to deploy in large numbers.

Patriot PAC-3 life extension: Taiwan has invested more than \$6 billion to procure and deploy 350 Patriot PAC-3 air defense missiles, which are now in place. The United States agreed in 2020 to an upgrade and life-extension program for these missiles (\$620 million). Taiwan is reportedly seeking to purchase 300 of the latest version of the Patriot interceptor missile, which would bring the total number deployed in Taiwan to 650.³⁴

31 Jen Judson, "US State Dept. OKs Possible \$2 Billion Abrams Tank Sale to Taiwan," *Defense News*, July 8, 2019, <https://www.defensenews.com/land/2019/07/08/state-okays-possible-2-billion-abrams-tank-sale-to-taiwan/>.

32 Kelvin Chen, "Biden Administration Approves Its 1st Taiwan Weapons Package," *Taiwan News*, Aug. 5, 2021, <https://www.taiwannews.com.tw/en/news/4264497>.

33 Hunzeker, "Statement Before the U.S.-China Economic & Security Review Commission," 11.

34 Matthew Strong, "Taiwan to Station Patriot PAC-3 MSE Interceptors by 2025," *Taiwan News*, March 31, 2021, <https://www.taiwannews.com.tw/en/news/4165073>.



Potential Scenarios

Taiwan faces a broad range of potential threats as Beijing pursues its goal of “reunification.” A campaign of disinformation, economic pressure, and military intrusion is already underway. Beijing could decide to follow Russian President Vladimir Putin’s playbook of incremental hostile escalation, intended to weaken Taiwan’s economy and social institutions while avoiding a sharp international backlash. It could also choose from a range of military operations that would fall short of an invasion, including seizing Taiwan’s offshore islands, imposing an air and maritime blockade of Taiwan, or launching air and missile strikes against the island, all of which the U.S. Department of Defense assesses the People’s Liberation Army has the capability to carry out.³⁵

Taiwan’s legacy big-ticket investments have useful roles to play in the defense of the island, particularly with regard to gray-zone provocations. The ability to scramble F-16s in response to Chinese aerial incursions, for example, demonstrates Taiwan’s ability and resolve to defend itself both to Beijing and to the people on Taiwan. However, actions short of invasion, while intended to pressure Taiwan into submission, would not directly achieve Beijing’s goal of gaining control of Taiwan and could, in fact, have the opposite effect of stimulating international and regional support for Taiwan and sharpening the resolve of the people on Taiwan. It therefore makes sense for Taiwan to devote a portion of its growing defense budget to incremental resources to prepare for an invasion and to help to deter such an action.

What would a full-scale invasion attempt look like? And why would a posture based on expensive things be vulnerable in such a scenario? In the opening hours of an invasion attempt, the People’s Liberation Army would have sufficient missiles and aircraft to strike Taiwan’s air bases and runways (and highway segments that could be used as runways), which would render Taiwan’s expensive aircraft incapable of operating. Additional targets would include Taiwan’s air-defense missile sites and radars as well as its large ships and submarines. Cyber attacks and electronic warfare would degrade situational awareness, while special operations forces would be deployed to target leadership and infrastructure.³⁶ Taiwan’s costly conventional systems would not be available to counter

the subsequent Chinese ships, aircraft, helicopters, and drones as they cross the strait.

Adding a large number of small things to Taiwan’s defense posture could lead to a different outcome. Distributed, mobile, and affordable anti-air and anti-ship defenses could be deployed in sufficiently large numbers that most would survive the initial air and missile strikes and therefore be available to engage Chinese forces crossing the strait and approaching the island. Small missile boats could similarly survive and swarm out to engage China’s ships. Mines could be laid in the approaches to beaches and harbors, and small drones could provide situational awareness. Such distributed defenses could greatly complicate the planning and execution of an invasion. The prospect of failure — or of a protracted conflict — could deter the People’s Liberation Army from making an attempt to take Taiwan by force.

While this analysis deals primarily with distributed, survivable, and affordable short-range anti-air and anti-ship defenses, a strategy to deter an invasion would also include ground forces that could survive initial strikes and be capable of engaging any amphibious forces that successfully reach the beaches, as well as airborne and special operations forces deployed by helicopter and parachute. In the same spirit, Taiwan would develop a plan for distributed ground units that are equipped with small, lethal systems (e.g., Javelin, Stinger, drones for surveillance and strike, and autonomous weapons) that could effectively engage Chinese ground forces on the island.³⁷ The prospect of a protracted fight on the ground could contribute to the deterrence of an invasion.

Not Yet a Porcupine Strategy

In her May 2020 inaugural address opening her second term in office, Tsai stated that her first national defense objective was “accelerating the development of our asymmetrical capabilities.”³⁸ In a subsequent interview, she elaborated that

we unveiled our largest ever defense budget, reaching 2.3% of our GDP. I fully expect that this number will continue to grow, but what will be equally important is ensuring that these resources are being spent on the right

35 2020 Report to Congress of the U.S.-China Economic and Security Review Commission, 464.

36 Michael A. Hunzeker and Alexander Lanoszka, “A Question of Time: Enhancing Taiwan’s Conventional Deterrence Posture,” Center for Security Policy Studies at George Mason University, November 2018, 50, <https://cspss.gmu.edu/wp-content/uploads/2018/11/A-Question-of-Time.pdf>; and Easton, *The Chinese Invasion Threat*, 82–84.

37 Hunzeker and Lanoszka, “A Question of Time,” 88–94.

38 “Inaugural Address of ROC 15th-term President Tsai Ing-wen,” News Release, Office of the President, Republic of China (Taiwan), May 20, 2020, <https://english.president.gov.tw/News/6004>.

capabilities. This is why I am committed to accelerating the development of asymmetric capabilities under the overall defense concept. As I mentioned in my inauguration speech, this will be our number one priority.³⁹

In the view of Taiwan's political and military leadership, however, "asymmetrical" is not synonymous with "a large number of small things." To begin with, most of the procurements outlined above are said to be asymmetrical, including the indigenous submarine program, the F-16s, and the tanks, notwithstanding their cost and vulnerability. Moreover, the *Quadrennial Defense Review*, which was published by Taiwan's Ministry of Defense in March 2021, explicitly describes quite different force buildup goals, including long-range strike capabilities, air superiority, and sea control.⁴⁰ Long-range missiles capable of striking mainland China are popular in Taiwan. They are included, for example, in the \$8.6 billion special budget for additional defense spending put forward in October 2021.⁴¹ Given Taiwan's limited ability to damage distant targets, however, long-range strikes are not likely to materially affect the People's Liberation Army's ability to mount an invasion across the strait or threaten enough damage to contribute to deterring such an invasion.

There are a number of reasons why Taiwan's political and military leadership continue to devote the majority of defense resources to a small number of expensive legacy systems. First, fighters and ships are genuinely useful in the current gray-zone conflict. Jets and ships can respond to China's intrusions in visible ways that stand up to the People's Liberation Army.

Second, Taiwan's leadership sees substantial political benefits in developing domestic industrial capabilities in the shipbuilding, aviation, defense, and electronics sectors, and in becoming self-sufficient in manufacturing high-tech systems, such as jet trainers, submarines, air defenses, missiles, and electronic countermeasures.

Third, Tsai's personal appearances at the commencement of construction of the first Indigenous Defense Submarine, the launch of the first minelaying ship, the inauguration of an F-16 maintenance center, and many other such milestones make clear the political benefits she perceives from

associating herself with visible big-ticket procurement programs. Doing so helps to demonstrate her commitment to maintaining Taiwan's defenses and sovereignty, supporting Taiwan's economic development and self-sufficiency, and meeting the cross-strait challenge.

Finally, in developing the defense budget, the Taiwanese government is guided by the procurement preferences of the military services, and the services continue to seek the most up-to-date versions of traditional hardware rather than devoting resources to a large number of small things. Taiwan's air force wants modern fighter aircraft, the navy is seeking to acquire large ships and submarines, and the army wants modern tanks. Moreover, there are few military and defense experts in Taiwan's government who could help to translate Tsai's high-level guidance into an actionable plan.⁴²

It is therefore not surprising that despite broad support for an "asymmetric" response to the challenge posed by the People's Liberation Army, the great majority of Taiwan's defense resources continue to be devoted to expensive aircraft, ships, and air defenses that are likely to be overwhelmed in the opening hours of a major conflict. As noted previously, the Harpoon coastal defense missile, the Stinger air defense missile, the minelaying ship, and perhaps the corvette stand out as steps in the direction of a posture of "a large number of small things." Nevertheless, considerable work remains in order to realize such a porcupine strategy.

How to Proceed

Taiwan faces a number of challenges from China, including information operations, economic and political coercion, and a range of military threats from gray-zone activities to kinetic attacks to invasion. Effectively responding to these challenges requires a whole-of-government approach that includes securing the country's energy, information, food, infrastructure, supply chains, and other aspects of a modern society, as well as military preparations. This analysis focuses on one narrow but important segment of the broader challenge — effectively deterring an attempt by China's military to invade Taiwan from across the strait. To this end, we offer

39 "Transcript: President Tsai Ing-wen Discusses the Diplomatic, Security, and Economic Challenges Facing Taiwan," Hudson Institute, Aug. 12, 2020, <https://www.hudson.org/research/16300-transcript-president-tsai-ing-wen-discusses-the-diplomatic-security-and-economic-challenges-facing-taiwan>.

40 2021 *Quadrennial Defense Review*, Ministry of Defense, Republic of China, March 2021, 23, <https://www.ustaiwandefense.com/tdnswp/wp-content/uploads/2021/03/2021-Taiwan-Quadrennial-Defense-Review-QDR.pdf>

41 Mike Yeo, "Taiwan Is Spending an Extra \$9B on Its Defense. Here's What the Money Will Buy," *Defense News*, Oct. 7, 2021, <https://www.defensenews.com/global/asia-pacific/2021/10/07/taiwan-is-spending-an-extra-9b-on-its-defense-heres-what-the-money-will-buy/>.

42 Hunzeker, "Statement Before the U.S.-China Economic & Security Review Commission," 8.



the following recommendations for government and industry officials in the United States and Taiwan:

Support a “Porcupine Strategy” Going Forward

Taiwan’s defense planning should give priority to distributed, affordable defenses with sufficient numbers to survive initial strikes and enough lethality to effectively counter (and thereby deter) invasion across the strait. The United States should support this approach in a variety of ways outlined below. We note that the U.S. Department of Defense has come to the same conclusion, following an analysis that takes into account classified information not publicly available. As Helvey argued in his address to the U.S.-Taiwan Defense Industry Conference on Oct. 7, 2019,

Americans should refrain from using the term “asymmetric,” which can be stretched to include any proposed system.

In the face of an adversary that spends more, fields capabilities faster, and expresses a willingness to use force, Taiwan must employ a force that leverages its strengths in terms of geography, advanced technology, highly skilled workforce, and innovative and patriotic society, all while exploiting its adversary’s vulnerabilities. This means a distributed, maneuverable, and decentralized force — large numbers of small things — that can operate in a degraded electromagnetic environment and under a barrage of missile and air attacks ... These include highly mobile coastal defense cruise missiles, short-range air defense, naval mines, small fast-attack craft, mobile artillery, and advanced surveillance assets, all of which are particularly well suited for Taiwan’s geography and to the mission of island defense Such systems are far less expensive to operate and maintain, and are more survivable, compared to more conventional platforms such as fighter aircraft or large naval vessels.⁴³

To move to a force posture that emphasizes such distributed defenses, Taiwan’s future budgets should include funding for the acquisition of systems so numerous, distributed, and mobile that they could not all be targeted by Chinese missile strikes, along with the associated training and support needed to enable effective combat operations. These defenses would be able to survive and engage Chinese military ships, aircraft, helicopters, and drones attempting to cross the strait and land on Taiwan. Examples of specific ground-based systems that should be considered include the Phalanx close-in weapon system, the Hellfire missile, the Advanced Precision Kill Weapon System rocket, the Israeli Spike missile, and additional Javelin and Stinger missiles, all of which are low-cost, proven short-range weapons that could be adapted and deployed in large numbers to make

Taiwan more difficult to approach by sea or air. Small fast-attack missile boats, additional naval mines and minelaying capabilities, and additional land-based coastal defense cruise missiles could further threaten approaching ships. Drones could provide reconnaissance and targeting information.

Some short-range defenses could be produced by Taiwan, possibly with American technical assistance, while others could be procured from the United States. Other defense systems might be developed and produced in cooperation with other states in the region,

beginning with Japan. For some systems produced in the United States, issues concerning the transfer of sensitive technologies may need to be addressed. Some countries have policies restricting arms sales to Taiwan, which could lead to allied resistance to sales of systems co-produced by the United States in partnership with those allies. There are enough possible short-range defenses that effective and affordable solutions would be available.

In order to prepare for the evolving capabilities of the People’s Liberation Army, Taiwan should pursue a longer-term development program in addition to near-term plans based on existing systems. Looking to the future, and recognizing Taiwan’s advanced technical capabilities, the large number of small things could include land-based coastal defenses employing advanced technologies against ships, aircraft, and swarms of drones; networks of small, fast, manned and unmanned surface craft and unmanned underwater systems to complicate Chinese naval operations; and drones to increase situational awareness.⁴⁴ Such systems could be

43 Helvey, “Keynote Remarks, 2019 US-Taiwan Defense Industry Conference,” 3.

44 Gary Roughead, “Taiwan: Time For A Real Discussion,” *Strategika*, no. 73, June 30, 2021, <https://www.hoover.org/research/taiwan-time-real-discussion>.

developed and produced in Taiwan with technical assistance from the United States and perhaps other states as well.

Support Legacy Programs

Taiwan should continue its legacy programs for conventional systems, but at a level that would free up resources for developing and acquiring distributed, survivable, and affordable defenses. Taiwan's conventional systems, particularly its F-16s, are important for countering gray-zone provocations that fall below the threshold of armed conflict, have economic and industrial benefits, and enjoy military and political support. However, the opportunity cost of acquiring and operating conventional platforms is high. Taiwan's leaders should make space in the defense budget to provide for the procurement of affordable short-range defenses and the personnel, training, communications, and situational awareness necessary to operate effectively and contribute to the deterrence of an invasion.

Avoid the Term "Asymmetric"

Americans should refrain from using the term "asymmetric," which can be stretched to include any proposed system. Since Taiwan's indigenous submarine, F-16s, and tanks have all been called asymmetric by Taiwan government officials, use of that term by Americans could be said to imply support for such legacy systems. Nevertheless, the underlying concept of an asymmetric response remains sound: Rather than attempt to match China's air and sea capabilities, Taiwan should leverage its strengths (especially its geography and technology) and exploit the People's Liberation Army's vulnerabilities (especially the need to move large amounts of men and equipment across 100 miles of contested water and airspace). The shorthand for this concept should be "a large number of small things."

Cooperate on Strategy and Procurements

The governments of the United States and Taiwan should work together to assess the broad range of challenges posed by the People's Liberation Army and the military capabilities that Taiwan needs to meet those challenges. Simulations and wargames could provide a shared appreciation of the benefits of adopting distributed, affordable defenses and a basis for changes in policies of the governments of

Taiwan and the United States. Such a cooperative approach would avoid the appearance that the United States is dictating policy to Taiwan.

The Department of Defense provided much of the analysis that led to Taiwan's procurement of Harpoon coastal defense cruise missiles. Going forward, American analysis can contribute to a cooperative process that identifies a range of capabilities that Taiwan should possess.

Support Deployment and Training

The United States should support Taiwan in fielding effective defenses. Acquiring a large number of small things alone will not be sufficient to cause the People's Liberation Army to hesitate to invade Taiwan. In order to have a deterrent effect, these systems would need to be deployed in a distributed manner that is resilient to attack; personnel would need to be trained to maintain and operate the systems; communications networks resilient to cyber attack would need to be established to connect operators with commanders and reconnaissance information; procedures would have to be put in place for operations in a hostile electromagnetic environment; and resilient infrastructure would need to be established to repair and replenish equipment.

Taiwan's active-duty forces would need to be organized and trained to effectively employ the systems involved in a porcupine strategy and participate in military exercises. However, shortfalls have been identified in the training and exercising of Taiwan's active-duty and reserve forces.⁴⁵ In addition, in the event of an invasion, Taiwan's active-duty forces would need to be backed up by reserves to counter any assault units that get ashore and to lead a resistance to occupation. Effective implementation of a porcupine strategy could encourage new thinking on how Taiwan meets the personnel requirements of its active-duty, reserve, and civil defense forces, taking into account its technical prowess and the demographic challenges of an aging population.

The United States could help Taiwan to deploy large numbers of small things in a distributed and survivable way and assist it with training and conducting military exercises that lead to readiness for combat. Such assistance would be consistent with providing "defense services in such quantity as may be necessary to enable Taiwan to maintain a sufficient self-defense capability,"⁴⁶ as permitted

45 Hunzeker, "Statement Before the U.S.-China Economic & Security Review Commission," 6.

46 PUBLIC LAW 96-8—Apr. 10, 1979, <https://www.congress.gov/96/statute/STATUTE-93/STATUTE-93-Pg14.pdf>.

by the Taiwan Relations Act. Provision of such assistance could encourage Taiwan to devote more resources to a porcupine strategy.

Support Situational Awareness

Distributed and mobile defenses would require support from a resilient information network to collect information from distributed sensors and provide situational awareness and coordination to distributed shooters. This would be a challenge both technically and in terms of affordability, because an invasion would be accompanied by intense attacks on command and information networks that would be designed to disrupt communications and introduce misinformation and confusion. The United States should help to provide communications equipment, train personnel for operations in a hostile environment, assist Taiwan in the acquisition of survivable sensors and resilient networks for situational awareness, and plan to provide Taiwan with information from U.S. surveillance networks in the event of a conflict. The ability to operate effectively in the face of intense cyber, electronic warfare, and kinetic operations against information networks is a major challenge — one the United States can help Taiwan to meet.

Support Stockpiling

The effective defense of Taiwan will require creating stockpiles of ammunition, spares, supplies, and fuel in advance because resupplying Taiwan in a time of tension or conflict would be a challenge. Some stockpiles could be built by Taiwan, and the United States could pre-position war reserve stocks in Taiwan as it does in other countries. A model could be Israel, which has its own stocks as well as U.S. war reserve stocks to draw upon as needed. Strategic reserves of energy and food would also add to Taiwan's resilience.

Support Maintaining Effectiveness and Lethality

Countermeasures that the People's Liberation Army could adopt in response to Taiwan's anti-air and anti-ship missiles, particularly electronic warfare countermeasures, will continue to evolve. Taiwan's large number of small things would need to evolve as well if they are to retain their effectiveness and their deterrent value. The United States can work with Taiwan to maintain the ability of Tai-

wan's defensive systems to function effectively in an increasingly hostile electronic warfare environment.

Conclusion

The People's Liberation Army poses a formidable threat to Taiwan. Devoting more of Taiwan's finite defense resources to distributed, mobile, affordable, and lethal anti-air and anti-ship systems could leverage Taiwan's advantages and exploit the vulnerabilities of China's military. This porcupine strategy makes sense independent of whether one favors clarity or ambiguity in America's defense commitment to Taiwan or considers invasion a near-term threat or a long-term possibility. The U.S. government and expert community favor this approach and there is high-level support in Taiwan as well. But resistance remains in Taiwan's senior military, which favors continuing to maintain a more traditional emphasis on expensive aircraft, ships, and tanks. While this resistance will be difficult to overcome, we suggest that analytically based and scenario-focused U.S. cooperation and support could encourage the government of Taiwan to give more priority to resilient and effective defenses that could cause the People's Liberation Army to question its ability to take Taiwan by force. 🦔

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Image: Wang Yu Ching, CC BY 2.0⁴⁷

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