Preparing for the Nightmare: Readiness and *Ad hoc* Coalition Operations in the Taiwan Strait

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Introduction

Taiwan, under its current Republic of China (ROC, Taiwan) Constitution, has existed as an independent sovereign state for 70 years. However, Taiwan's continued survival as an independent country is uncertain. On January 2, 2019, Xi Jinping, the General Secretary of the Chinese Communist Party (CCP), publicly reinforced the Party's long-standing policy for cross-Strait unification under a "One Country, Two Systems" formula, and stated that the CCP's collective vision for its future—something he refers to as the "China dream" and the "great rejuvenation" — requires Taiwan's capitulation. According to Xi, the People's Republic of China (PRC, China) cannot rise and become a successful great power until Taiwan submits to Beijing's "One China Principle."[1] Under this formulation, there is "One China," Taiwan is part of China, and the PRC is the sole representative of China in the international community. From the PRC's perspective, the ROC ceased to exist as an independent sovereign state in 1949.

Given the increasing likelihood of CCP use of force against Taiwan in the foreseeable future, it is in the interests of the United States and the ROC governments to improve defense readiness at the strategic and operational levels. Perhaps most urgent are the rapid improvement of unity of effort, latent interoperability, and combined logistics. Readiness has long been difficult to define with precision. Readiness begins with a basic question: Ready for what? For the United States and Taiwan, readiness is the ability to respond effectively to CCP use of force and other forms of coercion to maintain a free and open Indo-Pacific region.

Readiness can be viewed from both strategic and operational perspectives. For the purposes of this study, strategic readiness is the degree to which political leaders, their armed forces, and civil societies—individually and collectively—are prepared to counter CCP use of force. In addition to the unity of effort, strategic readiness includes national will, morale, and fiscal resources. Critical infrastructure protection and continuity of government are other facets of strategic readiness.[2]

Operational readiness is the degree to which a military can carry out its mission, assuming its size (including reserves) and weaponry are unchanged; it focuses on the training and status of current personnel, equipment, and the ability to mobilize in a crisis. According to the U.S. Department of Defense (DoD), operational readiness is the capability of a "unit, formation, ship, weapon system, or equipment to perform the missions or functions for which it is organized or designed."[3] For the purposes of this study, operational readiness is the degree to which defense establishments can do what the nation asks of them. Operational readiness depends upon indications and warnings (I&W) of PLA military action, command and control, financial resources, logistics, training, equipment, and mobilization speeds.

Since 1949, the ROC government and the people on Taiwan have faced an existential threat from the Chinese Communist Party. Although Taiwan has never been under PRC rule or control, Beijing has laid claim to the territory and its people, and the CCP has continually denied the existence of the ROC government. In March 2005, the CCP's 10th National People's Congress passed the Anti-State Splitism Law.[4] While it remains unclear under which conditions the CCP leadership would order use of force against Taiwan, the law records, somewhat ambiguously, the following:

> "The state must undertake non-peaceful actions and other necessary measures to safeguard state sovereignty and territorial completeness if 'Taiwan independence' splitist forces under any name, or in any way, should

> cause Taiwan to be actually split-off from China; or if a major incident should occur that leads Taiwan to be split-off from China; or if the possibility of peaceful unification is totally dead."[5]

On January 2, 2019, CCP Central Military Commission (CMC) Chairman Xi Jinping declared on Chinese state television that the annexation of Taiwan was necessary for the fulfillment of China's "great rejuvenation." He stated that he would not renounce the use of force and said that "Taiwan independence will lead to a dead end."[6] In July 2019, the CCP released a defense white paper that reiterated Chairman Xi's speech, stating:

> "Solving the Taiwan problem and achieving complete national unification is in the fundamental interest of the Chinese. It is obviously necessary for achieving the great Chinese rejuvenation… China must be unified and obviously will be… If anyone splits Taiwan off from China, China's military will pay any price to totally defeat them."[7]

The annexation or "liberation" of Taiwan remains foundational for People Liberation Army's (PLA) strategic and operational planning. PLA use of force against Taiwan could be coercive or annihilative. Both coercion and annihilation may pursue the same end goal. How each attains that goal is different. Unconstrained by political considerations, demands, or negotiations, annihilation entails physical occupation following a successful PLA invasion, and the imposition of the CCP's will on Taiwan's vanquished population. In this scenario, a defeated ROC government and armed forces would be neutralized and the population brought to a point where organized resistance is no longer able to impede PLA operations.

However, political and economic considerations may generate considerable resistance in Beijing to plans for an all-out Taiwan invasion and place pressure on the CMC to achieve the party's goals at minimal cost. Coercive courses of action could inflict sufficient pain and destruction to compel Taiwan's leadership to enter into political negotiations on unfavorable terms. PLA operations in this scenario would seek to convince Taipei to surrender short of an invasion. Military coercion entails the limited use of force to induce an adversary to behave differently than they would have otherwise.[8] PLA coercion would succeed if Taiwan's elected leadership conceded to Beijing's terms under armed duress, while still retaining the physical power to resist.

Limited use of force seeks to demonstrate the consequences of a political course of action. A notional list of triggers for Chinese use of force includes legal actions perceived as permanently separating Taiwan from an undefined China; sustained refusal to engage in cross-Strait negotiations; internal chaos on Taiwan; a drastic weakening of Taiwan's operational readiness; permanent basing of the U.S. or other foreign military forces on Taiwan; ROC development and deployment of nuclear weapons; or challenging the Communist Party's legitimacy through direct promotion of democracy or other measures deemed as subversive.[9]

Several coercive mechanisms are available to the PLA. Air, maritime, and/or electronic blockades are examples. Aerospace power – the integrated application of conventional air assets, missiles, and electronic attack – is among the most flexible and effective coercive and counter-coercive tools. In a coercive air campaign scenario, the CMC may opt to establish a no-fly zone over Taiwan; engage ROC Air Force (ROCAF) aircraft and suppress air defenses; and surveil, identify, and intercept foreign aircraft approaching or entering the no-fly zone. In a coercive maritime blockade scenario, the PLA would seek to limit Taiwan's cargo shipping capacity and cut off the

ROC Navy's (ROCN) access to international waters. The PLA Rocket Force (PLARF) could be a critical enabler for suppression of Taiwan's air defenses.

Some prominent PLA strategists have advocated a punishment strategy, such as targeting Taiwan's economy as the mechanism to force a political concession.[10] Others believe a blockade could deprive Taiwan of the "basic conditions for fighting a protracted war."[11] Other observers believe graduated escalation could permit Beijing to achieve its political objectives. Communist leaders may believe that Taiwan's political leadership has a low threshold for pain and would acquiesce shortly after initial strikes.[12] An author from Shanghai believes that coercive measures, such as a blockade or occupation of a few off-shore islands, leaves too much to "luck" since the Taiwan leadership's threshold is difficult to calculate.[13]

In fact, the outcome of coercive campaigns cannot be predicted with any degree of certainty. Should coercive military courses of action fail to achieve the desired political effect, the CMC may opt for a strategy of annihilation. The credibility of an invasion threat shores up the effectiveness of coercion. Due to economic interdependencies and intricate supply chains between the two sides of the Taiwan Strait, the consequences of any CCP use of force against the ROC would extend far beyond Taiwan.

The consequences of an annihilative strategy would be particularly significant. The Communist Party, its armed wing, and provincial governments in southeast China, would bear direct and exorbitant human and economic costs. Considering the CCP's one child policy, large-scale PLA loss of life would pose significant risks for domestic instability. Compounding problems associated with mass casualties, the PLA would bear a heavy burden in garrisoning and administering Taiwan. The CCP would likely face international political and economic isolation, and the destabilizing consequences of forcibly incorporating 23 million hostile Taiwanese people into the PRC.[14] However, it cannot be assumed that CCP decision-makers will always act in ways outsiders would consider rational, especially in times of acute internal crisis.

This report explores Taiwan's defense readiness in four areas: the threat environment, strategic readiness, operational readiness, and *ad hoc* coalitions. The threat environment that the ROC faces is primarily anchored across the Taiwan Strait. This section discusses the spectrum of PLA coercion and the structure of PLA command and control and readiness conditions. With specific attention paid to a Taiwan-focused joint operational command, the Eastern Theater Command's (ETC) role is examined in addition to PLA nuclear capabilities and liaison work as part of political-military operations.

Taiwan's strategic readiness can be evaluated through its government leaders, national security policies, civil society, public will, and the preparedness of the ROC armed forces. Taiwan's military readiness system and national mobilization system are vital components of strategic readiness. How central government budgets are appropriated also impacts overall strategic readiness.

Operational readiness is first assessed by the scope of Taiwan's fiscal resources dedicated to the armed forces' personnel, operation and maintenance, and military investments. Taiwan's capacity to respond during contingencies is determined by its command and control structure, operational

plans, defense strategy, and available capabilities, including those for space operations, electronic warfare (EW), and deep interdiction.

Finally, Taiwan's readiness is viewed in terms of *ad hoc* coalitions. The historical and existing apparatus for U.S.-Taiwan security relations is reviewed, including the transfer of defense articles and services, as well as ways to enhance overall readiness, such as latent interoperability and unity of effort.

(Figure 1: The Taiwan Strait Area. *Source: The "Project 2049 Institute.")*

The Threat Environment

Beijing has sought to dramatically alter the security situation in the Taiwan Strait. In the past decade, the PLA underwent a comprehensive structural reform that reorganized its force for a renewed focus on the Taiwan theater. The PLA maintains growing anti-access/area denial (A2/AD) and power projection capabilities that include increasingly accurate and lethal ballistic and land-attack cruise missiles, integrated air defense systems, advanced electronic countermeasures, anti-satellite (ASAT) and undersea warfare capabilities, and nuclear weapons. Thousands of air, ground, and sea-launched cruise and ballistic missiles are aimed at Taiwan.[15] This section describes the threat environment Taiwan faces, including the PLA's command structures, readiness levels, intelligence assets, political warfare, and strike capabilities most relevant to Taiwan.

The Central Taiwan Affairs Leading Small Group (TALSG) functions as the interlocking mechanism bridging party, state, and military organs to coordinate cross-Strait policy.[16] Ultimately, however, it is the CMC that holds the keys to China's ambitions across the Taiwan Strait. How would the CMC manage national-level joint command and control in the event of the use of force? The CMC Joint Staff Department (CMC/JSD) Operations Bureau most likely manages the CMC joint command and control system and operational duty procedures. Based on a limited number of authoritative sources, this function was carried out by the General Staff Department (GSD) Operations Department Joint Operations Bureau prior to the December 2015 reorganization.[17] The CMC/JSD Contingency Management Office may be the formal interface with State Council civilian command and control centers.

PLA Command and Control and Readiness Conditions

Information dominance is a critical enabler in any use of force. Recognizing the growing importance of information dominance, the PLA is investing heavily in command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), and in means to deny an adversary information on its capabilities, intentions, and disposition of forces. The PLA also is focused on disrupting, paralyzing, or exploiting vulnerabilities in an adversary's C4ISR structure, including their computer networks. The PRC has accelerated its force modernization to diversify options for the use of force against Taiwan. Central to PRC strategy is the exploitation of vulnerabilities in Taiwan's national- and operational-level command and control and associated information networks.

The PLA Strategic Support Force (PLASSF) and other CMC departments provide direct support to the CMC Joint Operations Command Center. The organizational grade of these units is unclear. But they could be as high as division leader grade.[18] These units are responsible for joint operational planning; survey, mapping, and navigation; network and electronic countermeasures (ECM); airspace management/air defense; spectrum management; integrated information services; and meteorology/oceanography.

CMC orders to Theater Commands, Services, and the PLASSF flow through the Joint Staff Department-managed command and control system, specifically through operational duty offices. This includes orders elevating the PLA's state of readiness, mobilizing reservists, and assigning

forces to a joint task force opposite Taiwan. Readiness levels are directed by the CMC.[19] The 2013 PRC Defense White Paper references an undefined three-level readiness system. PLA Air Force (PLAAF) reporting also notes a three-level system.[20] In the 2013 Defense White Paper, "readiness work" is described as preparatory activities, such as training and I&W, which are carried out during peacetime conditions and war.[21] Readiness work is outlined in formal regulations published in July 2012.[22] Unauthoritative sources, such as *Baidu*, offer some definitions:

- *Readiness Level Three* could be ordered in the event of *ambiguous* activities around China's periphery that *could* pose a direct military threat. Designated units ordered to Readiness Level Three would implement readiness mobilization, expand intelligence and surveillance, strengthen duty offices and units, cancel leaves, initiate logistical and equipment support activities;

- *Readiness Level Two* could be ordered in the event of *clear* direct military threats. Designated units ordered to Readiness Level Two would expand mobilization, hold duty personnel in place, track enemy activities, identify intent, distribute supplies, and adjust operational plans;

- *Readiness Level One* could be ordered in response to *unambiguous* war conditions. All personnel report for duty to prepare for struggle. The PLA allegedly has only entered the highest level six times in its history: 1950 after the founding of the PRC; 1958 during the Second Taiwan Strait Crisis; 1969 during the Sino-Soviet border conflict; September 1976 following the death of Chairman Mao Zedong; February 1979 during the Sino-Vietnamese War; and 1996 during Third Taiwan Strait Crisis.[23]

During higher readiness levels, joint operational duty offices could be augmented by duty officers from political, logistics, and equipment departments, as well as Service and PLASSF duty officers. Within Military Districts, references indicate a "Three Offices, One Depot" system, including the operations duty office, logistical operations office, readiness materiel office, and readiness component depot.[24]

Although speculative, the CMC could direct selected units to elevate to Readiness Level Three in the event of ambiguous activities on or around Taiwan that challenges perceived CCP interests. Designated units ordered to Readiness Level Three could partially implement mobilization plans, expand intelligence and surveillance, increase command post manning, cancel leaves, and implement logistical and equipment support plans. The CMC could elevate to Readiness Level Two in the event of perceived threats that are clear and direct. Designated units ordered to Readiness Level Two would expand mobilization, hold duty personnel in place, further intensify intelligence, surveillance, and reconnaissance (ISR) activities, distribute supplies, and adjust operational plans. Readiness Level One could be ordered in response to unambiguous war conditions, including an event on Taiwan that could trigger a CMC order for use of force.[25]

The Eastern Theater Command

A typical theater-level joint command center system may consist of at least four command posts: a basic command post; a forward command post, which supports the basic command post and

coordinates activities closer to the forward edge of battle; a reserve command post, which exists as back-up in case the basic command post is neutralized; and a rear command post, which is usually dedicated to logistics and equipment support.[26]

The Eastern Theater Command (ETC) would likely serve as the core of operational-level command and control. Mirroring the CMC Joint Staff Department, the ETC maintains a joint command center, which functions as the sole channel for command and control of Service component commands, and subordinate corps—or corps deputy leader grade—commands. Personnel assigned to operational duty offices must meet personnel qualification standards.[27] Officers from component commands—ETC Army, Air Force, and Navy—as well as PLARF, are assigned to joint command centers. It is unknown whether they are on duty at all times, or only during higher readiness conditions.[28] PLA regulations guide duty office manning and processes.[29]

The ETC leadership would rely on ISR assets and a supporting information and communications structure. The PLA maintains a large ISR infrastructure to support operations directed against Taiwan. The CMC Joint Staff Department is responsible for Taiwan-related contingency planning, real-time emergency management, and control of a wide range of national-level PLA assets.

The CMC/JSD would determine and assign forces to a Taiwan campaign command in the event of a crisis or conflict. The CMC/JSD Operations Bureau manages the national military command and control system. A PLA campaign against Taiwan would also involve significant cooperation from civilian authorities, including air traffic management, frequency management, mobilization, civil defense, public security, and militia. The CMC/JSD oversees a specialized contingency office responsible for coordination with civilian authorities during emergencies.[30]

The PLASSF provides the CMC and theater-level leaders with space-based imagery, signals intelligence (also referred to in PLA writings as "technical reconnaissance"), navigation and positioning data, meteorological and hydrological services, and other forms of strategic ISR support. The PLASSF appears responsible for the defense communications system linking the CMC with Theater Commands.[31] The PLA is enhancing the interoperability of the CMC's national-level backbone network and operational-level networks managed by the PLA Navy, Air Force, and the five Theater Commands. PLASSF communication units leverage fiber optic, microwave, and satellite networks, as well as airborne radio relay systems.

The Eastern Theater Command would comprise the core of a Taiwan-focused joint operational command.[32] During peacetime, the ETC Joint Staff Department (ETC/JSD) probably coordinates operations and training in and around the Taiwan area. During higher states of readiness, the CMC may assign PLARF, PLASSF, and other units to a Taiwan campaign command. A dedicated battlespace situational awareness group may be attached to an ETC joint command center to manage fused ISR support to ETC leaders.[33] PLA Army, Air Force, and Navy service components in the ETC also maintain independent ISR capabilities. ISR assets provide targeting and battle damage assessment (BDA). Based on a "system of systems" approach, ISR sensor data produced by ETC service components is presumably fed into the PLA Integrated Command Platform, a system intended to facilitate joint interoperability.[34]

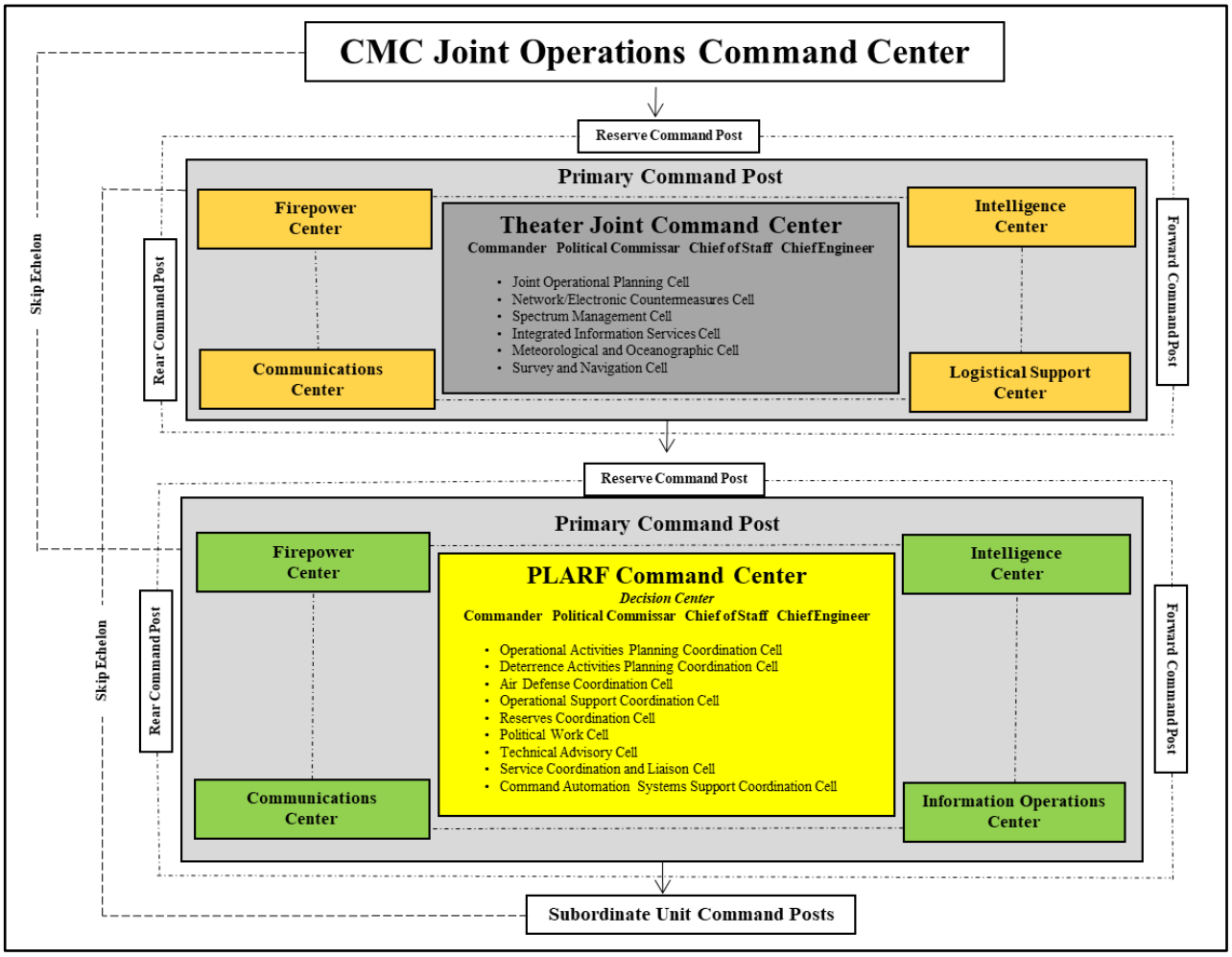
ETC Army leaders, headquartered in Fuzhou, oversee three corps leader grade group armies. The CMC likely would also assign selected units from group armies outside the ETC in a crisis. The ETC Army also manages the PLA's largest enterprise dedicated to monitoring Taiwanese C4ISR networks. A specialized ETC Army intelligence and reconnaissance brigade was established in 2016 that reportedly is equipped with unmanned aerial vehicles (UAVs). During higher states of readiness, coastal defense units in Fujian, Zhejiang, and Guangdong may be assigned to the ETC Army.[35]

ETC Air Force leaders, headquartered in Nanjing, oversee at least two corps leader grade commands, which include ground-based radar brigades that provide air surveillance over the Taiwan area and beyond. The CMC may assign PLAAF units from other Theater Commands in a crisis situation. At least two radar brigades are garrisoned opposite Taiwan and provide air surveillance within their respective sectors.[36] Other units provide airborne early-warning and electronic reconnaissance support. In addition to electronic warfare units, the ETC Air Force maintains a dedicated medium-altitude long-endurance (MALE) UAV brigade in the Fuzhou area with elements deployed in various locations in Southeast China.

ETC Navy leaders, headquartered in Ningbo, oversee the East Sea Fleet, including at least one observation and communications (OBCOM) brigade that provides maritime surveillance data to Theater Command authorities. Maritime militia units reportedly augment PLA Navy (PLAN) OBCOM assets. The ETC Navy also manages a radar brigade that provides air surveillance data within its assigned sector off the Zhejiang coast.[37]

PLA Rocket Force leaders oversee a corps-grade command (Base 61) headquartered in the Anhui provincial city of Huangshan. Base 61 coordinates the operations and training of at least five conventionally capable launch brigades opposite Taiwan. These brigades, which are not controlled by ETC leaders during normal readiness conditions, are supported by separate regiments responsible for communications, mobility, and missile storage and handling. In higher states of readiness, the CMC may assign these and/or other units to the ETC. The PLARF is believed to oversee at least one dedicated UAV regiment that could be assigned to a Taiwan campaign command.[38]

The PLASSF, ETC Army, Air Force, and Navy provide the intelligence upon which the CMC and ETC would base operational decisions. CMC-directed changes to readiness levels would be transmitted through the CMC/JSD and would drive duty officer manning levels at command centers down the chain of command. The 2013 PRC Defense White Paper references an undefined, three-level readiness system and describes readiness work as preparatory activities, such as training and I&W, which are carried out during peacetime conditions and war.[39]



(Figure 2: CMC Joint Operations Command Center. *Source: The "Project 2049 Institute.")*

PLA Nuclear Capabilities

A Taiwan contingency could take place within a nuclear environment. The CCP claims a commitment to a "no first use at any time and under any circumstances" policy and to "not using or threatening to use nuclear weapons against non-nuclear-weapon states."[40] Despite alleging non-proliferation goals, the PLA has continued fielding new nuclear weapons capabilities. The Chinese nuclear arsenal is primarily composed of land-based capabilities with limited sea- and air-delivery platforms. While the exact number of nuclear warheads is unknown, the latest Defense Intelligence Agency (DIA) estimate is in the low hundreds.[41] The PLARF controls China's land-based nuclear missile forces. As an alternative form of annihilation, the PLA has never ruled out the use of nuclear weapons against Taiwan. Chinese intercontinental ballistic missiles (ICBM) able to strike the continental United States include the *Dong Feng* DF-5, DF-31A, and the DF-41. The CMC Political Work Department has blurred the line between PLARF nuclear and conventional forces, which could complicate U.S. interdiction operations in a conflict.[42]

The PLA does not rule out use of nuclear weapons in support of non-kinetic attacks, such as electromagnetic pulse (EMP) strikes. [43] Such suggestions appear to be mainly political/psychological in terms of their objective; even nuclear use that did not cause physical destruction would still cross the highly dangerous (and escalatory) nuclear threshold.

PLA Liaison Work

The use of force would rely heavily upon the CMC Political Work Department for military liaison work. According to the *Political Work Regulations*, "Taiwan work" is an integral part of PLA political-military operations.[44] If history is a guide, military liaison work likely will be a core component of a PLA campaign against Taiwan. Established in 2005, the PLASSF Base 311 likely supports the CMC Political Work Department Liaison Bureau during normal readiness conditions. During higher states of readiness, Base 311 may be assigned to the ETC Political Work Department to inject friction into Taiwanese society, or perhaps instigate the overthrow of the central ROC government through targeted abductions, assassinations, sabotage, and other subversion operations.[45]

ROC (Taiwan) Strategic Readiness

Taiwan places a premium on readiness at the strategic level. In addition to a system of readiness states, elements of strategic readiness include national will, psychological readiness, capacity for national mobilization, critical infrastructure protection, and economic resources. National will, dependent on a seemingly limitless number of factors, is amorphous and unpredictable. As Jeffery Record notes, the strong "lose to the weak when the latter brings to the test of war a stronger will and superior strategy reinforced by external assistance."[46]

Taiwan National Security Strategy

While Taiwan does not publicly release a written national security strategy document directly analogous to those of the U.S., a display of a similar type of strategic planning can be found most recently in the Ministry of National Defense's (MND) 2019 National Defense Report, the most comprehensive document on Taiwan's national security. The report clarifies the strategic environment Taiwan faces, the internal and external threats to Taiwan's national security, and the strategies Taiwan can adopt to achieve its objectives.[47]

Before the 2008 presidential election, then Kuomintang (KMT) presidential candidate Ma Ying-jeou proposed "A SMART National Security Strategy."[48] Nevertheless, the National Security Council (NSC) under Ma's administration did not publish another *National Security Report*. In 2013, The New Frontier Foundation, a think tank under the Democratic Progressive Party (DPP), published its *Defense Policy Blue Paper* and proposed that the NSC submit a *National Security Strategy* report to the Legislative Yuan (LY) six months after the inauguration of a new president.[49] Since the DPP's Tsai Ing-wen was inaugurated as president in 2016, the NSC published the *National Information and Communication Strategy Report* in 2018, and still has not published a *National Security Strategy* report as the 2013 *Defense Policy Blue Paper* suggests.[50]

National security policy may also be guided by the ROC National Security Act.[51] The legislation was recently amended to broaden the potential threat to Taiwan from "a foreign country or mainland China" to "a foreign country, mainland China, Hong Kong, Macau, or overseas hostile forces." The amendment lists prohibited activities including serving as an agent of the CCP by initiating, sponsoring, hosting, manipulating, commanding, or developing organizations for the entities mentioned above.[52] It also highlights national security threats posed by cyberspace and physical spaces within Taiwan's territory.[53]

Taiwan's principal strategic goal is assumed to ensure its continued existence as an independent and sovereign state under its current ROC Constitution. The development of a security strategy is complicated by divisions within society on Taiwan over its long-term relationship with Beijing, including issues such as unification, maintenance of the status quo, or formal independence, as well as the pace of current interactions. Taiwan's national security strategy relies on a variety of instruments—political, military, economic, and cultural—to guarantee its survival.

The National Security Council is a critical body providing advisory support to the President.[54] The NSC consists of 13 statutory members, including the President (chairperson), the Vice President, eight Cabinet members (Premier, Vice Premier, Minister of the Interior, Minister of Foreign

Affairs, Minister of National Defense, Minister of Treasury, Minister of Economic Affairs, chairman of the Mainland Affairs Council), Chief of the General Staff (CGS), NSC Secretary General, and director of the National Security Bureau (NSB).

National Will

Morale is related to an asymmetry of stakes. An asymmetry of stakes exists when a weaker defender's survival is threatened by a militarily stronger power. A greater stake in the outcome leads to a greater willingness to sacrifice. This, in turn, leads to a natural tendency to wage total war against an enemy for whom the war is limited. Many within Taiwan, in the U.S., and in China have doubted the will of the people on Taiwan to resist military coercion. In Taiwan, anyone with families and homes on the island, regardless of what precipitated a conflict, likely would respond with hostility against an aggressor.[55]

National will and morale are also related to perceived international support. The PLA expends significant resources on manipulating morale among the general population and particularly within the ROC armed forces. The degree of perceived international support is a critical yet intangible factor in morale, particularly during a crisis.

In a series of surveys conducted by the Election Study Center at Taiwan's National Chengchi University, morale was measured by the respondents' confidence in their fellow Taiwanese and confidence in allies like the U.S. and Japan. In general, surveys showed a complex picture of the respondents' confidence in Taiwanese resistance. While 59.38% of respondents had confidence in Taiwanese will to resist a Chinese invasion, 72.14% of the respondents did not believe that Taiwan's military could successfully defend Taiwan. Respondents that supported Taiwan independence exhibited higher confidence in Taiwanese will to resist a Chinese invasion, in the ROC military's capability to defend Taiwan, and in the U.S. commitment to defend Taiwan (if Taiwan declares independence). Such respondents were also more supportive of an alliance with the U.S. and Japan against China. Respondents who were more confident in the U.S. commitment and supportive of an alliance with the U.S. and Japan, were also more confident in Taiwanese willingness to resist a Chinese invasion, and more confident in the ROC military's capability to defend Taiwan.[56]

Regarding confidence in the commitment of allies, the respondents' ideology, partisanship, and confidence in Taiwanese resistance and U.S. support also correlated with their willingness to cooperate with the U.S. and Japan to resist a Chinese invasion. For instance, most of those who solely identified themselves as "Taiwanese" or supporters of Taiwan independence or the DPP, tended to support a U.S.-Japan-Taiwan trilateral alliance. Those who were more confident in the U.S. commitment to Taiwan's defense during war were also more supportive of a trilateral alliance.[57]

Taiwan Readiness System

Until 2003, Taiwan's national security establishment managed readiness on the basis of a system it referred to as *Five Conditions, Three Levels*.[58] Condition Five was a normal state of readiness. During ROC national elections, or in response to provocative Communist Party statements and/or

joint PLA exercises on the mainland, the ROC President could have directed elevation to Readiness Condition Four, which includes placing selected units on alert. Readiness Condition Three could be triggered by unusual PLA military activities outside of the normal training cycle, large-scale PLAAF or PLAN activity around Taiwan, or an assembly of units along the coast opposite Taiwan. Readiness Condition Two could have placed units in a combat readiness status in response to unambiguous I&W of hostilities, or military incidents at sea or in the air. Condition One could have been issued in the event of actual hostilities.[59]

The ROC had an Alert Readiness Phase that would be directed in the event of a maritime blockade or other coercive courses of action.[60]

<table>
<tr><th colspan="3">Notional National Readiness System[61]</th></tr>
<tr><td rowspan="3">Normal Readiness (經常戰備階段)
- No major changes in PRC political situation
- Normal PLA activities
- No abnormal PLA activities during crises</td><td>Normal Alert (一般戒備)
- Normal situation</td><td rowspan="3">Normal
↓
Contingency</td></tr>
<tr><td>Focused Alert (重點戒備)[62]
- Major holidays (National Day and Lunar New Year) or political events (elections)
- Commanding officers recalled</td></tr>
<tr><td>Enhanced Alert (加強戒備)
- Indications of heightened readiness level or unusual PLA activities</td></tr>
<tr><td colspan="2">Emergency Readiness (應急戰備階段)
- I&W of imminent use of force</td></tr>
</table>

The passage of the National Defense Act in 2000 and growing concerns over I&W caused Taiwan to adopt a system of two general states of readiness in 2003: normal and emergency. The President maintains tight control in any transition between the two states. While maintaining a normal state of readiness, Taiwanese command authorities could elevate to Phase One Alert in response to increased PLA activity opposite Taiwan or key events, which would entail increased ISR activities, cancellation of leave, and more vigilant security around critical facilities. A transition to Phase Two Alert would reportedly occur in response to PLA activity in known staging areas.[63]

Under normal readiness conditions, the bulk of Taiwan's armed forces carry out routine training activities and other tasks. However, three alert conditions exist within normal readiness conditions: normal alert, focused alert, and enhanced alert. Focused alerts coincide with major holidays or political events. Enhanced alerts are in response to PLA activities. An enhanced alert order could be in response to increased and threatening PLAAF flight activity over Taiwan airspace, PLAN surface or submarine operations in coastal waters, large scale maritime militia activities, and/or assembly of PLA ground forces along the Chinese coast.[64]

In the event of unambiguous I&W of use of force, Taiwan's elected authorities may declare a state of Emergency Readiness. In a state of Emergency Readiness, the President may impose martial law or issue an Emergency Order in accordance with the ROC Constitution.[65] According to the Constitution and Martial Law Act, the President may declare martial law, but it must be confirmed

by the Legislative Yuan.[66] When the legislature is in recess, the President may issue an Emergency Decree, but the validity must be confirmed by the LY.[67] During an extraordinary crisis, a regional military commander may declare temporary martial law within his or her area of responsibility. Such an action must be reported to the President and validated by the legislature.[68]

In a state of Emergency Readiness, ROC leaders would implement plans for continuity of government, mobilization, and military operations.[69] The President and core national security staff could be targeted by the PLA in a crisis. As such, ROC government defense plans place a premium on continuity of government in an armed crisis. The President, Executive Yuan (EY), and LY members would use covert transportation means, or armored vehicles, to relocate to underground or otherwise hidden and hardened facilities defended by ROC Marines, military police, and/or special service bodyguards. Senior leaders like the Vice President would disperse to locations outside Taipei under "designated survivor" rules for continuity of government purposes.[70] According to the ROC Constitution, the line of succession runs from the President, Vice President, Premier, and Vice Premier.[71] More than ten other officials after the Vice Premier are designated to assume the presidency if circumstances should require. The full line of succession is kept classified in order to protect those involved from a potential PLA decapitation strike.[72]

The National Political-Military Command Center is a hardened underground facility in Taipei's Dazhi District that houses the President and national security team in a crisis. The communications systems allow the President to address the nation despite probable PLA interference and disinformation. The NSC coordinates political-military exercises, which were first carried out in 2005. These have changed over time. During the Chen Shui-bian administration, the Yushan exercises simulated contingencies involving enemy use of force. During the Ma administration, Chunghsing exercises focused on domestic emergencies, such as situations involving a major power outage, nuclear meltdown, or oil shortage.[73] Political-military exercises under the Tsai administration have evaluated strategic readiness, including the efficient and effective establishment of the command center; simulating critical infrastructure protection; improving continuity of government; and crisis management. Participants include senior representatives from the Ministry of the Interior, Ministry of Foreign Affairs, Ministry of National Defense, Ministry of Transportation and Communications, Ministry of Finance, the Central Bank, and other government agencies.[74]

National Mobilization

During either normal or emergency states of readiness, the President of Taiwan may direct national mobilization.[75] The EY Mobilization Commission is Taiwan's principal mobilization planning authority. The Premier and Vice Premier serve as chairperson and deputy chairperson respectively. MND is responsible for the daily work of the EY Mobilization Taskforce and assignment of the subordinate authorities.[76]

The All-Out Defense Mobilization Readiness Act stipulates two phases: the Mobilization Preparation Phase and Mobilization Implementation Phase. The Mobilization Preparation Phase runs parallel to a normal state of readiness, however what actions would be taken within the three alert levels is unknown. Triggered by a Presidentially-declared emergency state of readiness, the Mobilization Implementation Phase includes reserve call-ups.[77] Beyond mobilization of reserves,

the EY is authorized to nationalize critical infrastructure, materials, and assign civilian workforce to civil defense units in support of military missions. According to the All-Out Defense Mobilization Readiness Act, the President may direct a transition to the Mobilization Implementation Phase.[78]

The President may order a full mobilization and assign critical infrastructure to MND. Mobilization plans also exist for public education and logistics-related material.[79] Training is carried out through "Material Self-Reliance Mobilization Exercises."[80] As a part of all-out defense education, MND collaborates with television stations in the production of programs like "All New Vision" on Chinese Television System (CTS) and "Fighting! All New Vision" on Sanlih E-Television News (SETN).[81]

Taiwan Mobilization Readiness System[82]	
Mobilization Readiness Program	*Responsible Agency*
Spiritual Mobilization (Morale)	Ministry of Education
Manpower Resources	Ministry of the Interior
Material & Economic Resources	Ministry of Economic Affairs
Financial Resources	Ministry of Finance
Transportation and Telecommunications	Ministry of Transportation and Communications
Public Health	Ministry of Health and Welfare
Technology	Ministry of Science and Technology
Military	Ministry of National Defense

Several ministries are responsible for mobilization planning. The EY's Mobilization Readiness Program encompasses eight mission areas: national will/morale, manpower resources, material and economic resources, financial instruments, transportation, public health, technological, and military. MND is responsible for military mobilization; the Mobilization Readiness Programs in other fields are carried out by other central authorities including the Ministry of Education (morale), the Interior (manpower resources), Economic Affairs (material and economic resources), Finance (financial resources), Transportation and Communications (transportation), Health and Welfare (public health), and Science and Technology (technology).

During the Implementation Phase, MND officials and other authorities coordinate with the Ministry of the Interior for civil defense support, with Ministry of Transportation and Communication and Ministry of the Interior for military mobile traffic and military supplies transportation, with the National Communications Commission (NCC) for communications support, and with the Ministry of Health for stockpiling medicine and medical equipment.

In addition to MND, other government departments and agencies are required to be able to execute readiness plans in a state of emergency. For instance, the NCC, along with the Ministry of Culture, maintain regulations that guide public media practices to boost morale. Radio and TV stations are likely key targets in most scenarios for PLA use of force. The Ministry of Economic Affairs (MOEA) is responsible for readiness issues associated with energy and water supply. The Ministry of Finance regulates financial resources, including funding of military operations in a crisis, maintaining budget balances, and foreign exchange controls.[83]

Paramilitary forces, such as the National Police and Coast Guard Administration (CGA), would be integrated into the national defense system during an emergency state of readiness.[84] The CGA communication system is interoperable with MND for purposes of command, control, intelligence, and broadcasting.[85] Furthermore, MND may mobilize selected personnel listed in a database of science and technology (S&T) personnel managed by the Ministry of Science and Technology.[86]

Critical Infrastructure

During a state of Emergency Readiness, MND may also nationalize and commandeer selected critical infrastructure and materials.[87] Imports or exports to specific governments would be suspended.[88] The procurement of weapons, ammunition, or militarily-relevant material would be exempt from applicable legal statutes, such as the Government Procurement Act.[89] Public and private hospitals would store medicine and medical equipment for distribution within two hours of mobilization.[90] Heavy equipment like bulldozers, excavators, or cranes may be requisitioned and transferred to agencies in need.[91] Local governments may organize civil defense groups to assist MND military or disaster response missions.[92]

Critical Infrastructure Protection (CIP)[93]		
Sector	*Coordinating Agency*	*CIP Area*
Energy	Ministry of Economic Affairs	Electricity, petrol, natural gas
Water		Reservoirs and water supply
Telecommunications	National Communications Commission	Communication, transmission
Transportation	Ministry of Transportation and Communications	Land, sea, and air transportation, meteorology
Finance	Financial Supervisory Commission	Banks, securities, financial payment
Emergency rescue & hospitals	Ministry of Health and Welfare	Medical care, disease control, emergency response system
Governmental agencies	Office of Homeland Security	Agency offices and facilities, information and telecommunications systems
Science & industrial parks	Ministry of Science and Technology	Science, biomedical, software, and industrial parks

The EY's Office of Homeland Security is responsible for critical infrastructure protection planning and coordination. MND serves as a supporting agency. The eight sectors listed above are designated as critical infrastructure. During peacetime, authorities can request MND support as needed. During contingencies, military task forces could provide security support or assume temporary control.[94] The Deputy CGS with the operations and planning portfolio is responsible for identifying militarily-relevant critical infrastructure so that military units can review protection capabilities and make assistance plans for potential threats.[95] In the event of a crisis, the Office of Homeland Security and MND have procedures in place for the police to guard airports and roads, manage traffic control, and guarantee public safety, while public health authorities would be responsible for planning for large-scale casualties.[96]

Transportation. The Ministry of Transportation and Communications (MOTC) plays a significant role in readiness planning and critical infrastructure protection.[97] In the Emergency Readiness Phase, the Joint Communications and Information Regulation Center regulates and uses public and private communication facilities, and also evaluates communication mobilization readiness. MND would coordinate with local authorities for the use of public and private communication facilities.[98] Censorship of publications and broadcasting, particularly regarding operational security and morale, is to be expected.[99] The NCC and related agencies would have the authority to manage programming of cable, radio, and television systems.[100]

The Military Rail Transportation Act defines military support requirements. Rail authorities may suspend routine operations to support mobilization of reserves and transport of supplies.[101] During the Mobilization Implementation Phase, MND, MOTC, and the Ministry of the Interior may establish a Joint Transportation Command to manage land (including roads and railroads), maritime, and air transportation, as well as the transfer and control of imports.[102] MND, MOTC, and local governments would coordinate to assess availability of vehicles, vessels, or aircraft for military missions.[103] Railway authorities could suspend parts of transportation operations to allow for mobilization of troops and supply of emergency military transportation.[104] Maritime pilots (ship and boat captains) would be assigned defense tasks by the pilot administration authority in times of war.[105] Such tasks would include transporting troops and equipment, laying sea mines, and assisting in obstacle placement around ports and invasion beaches.

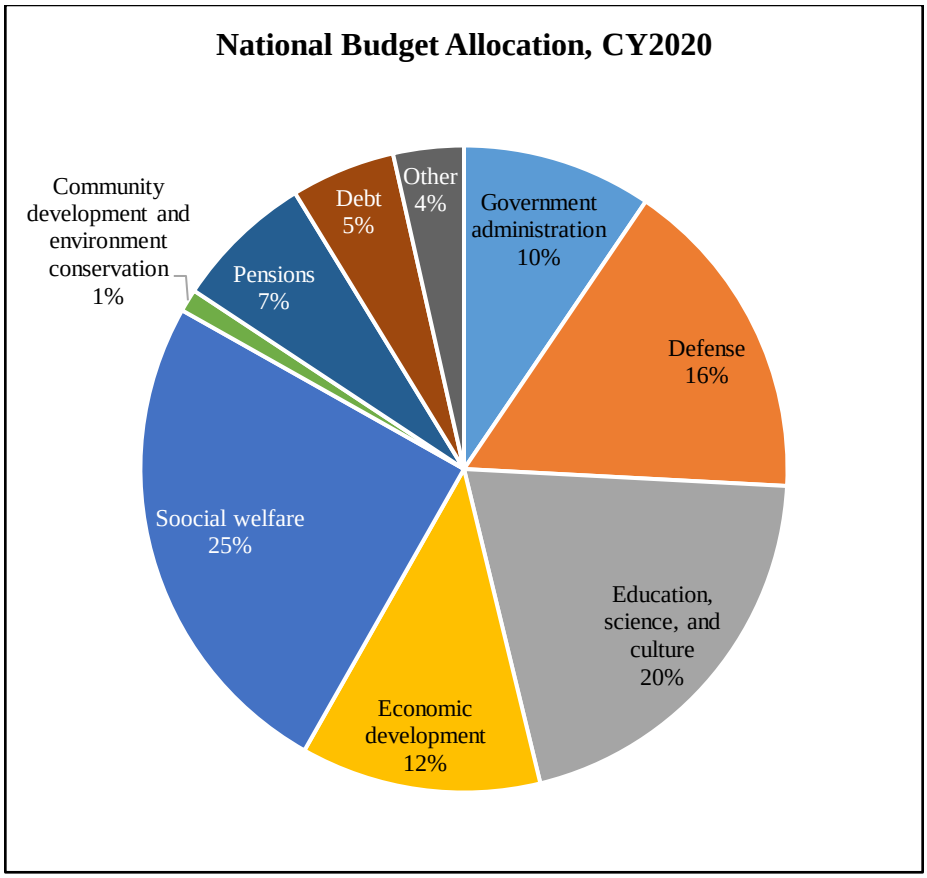
Telecommunications. The continuity of Taiwan's telecommunications infrastructure is critical. Taiwan has perhaps the densest radio frequency environment in the world, given the high concentration of radar systems, cell phones, wireless networks, and other emitters. As a result, frequency management is essential. Among the systems operating in Taiwan include amplitude modulation (AM) and frequency modulation (FM) radio, very high frequency (VHF), and ultra-high frequency (UHF) television channels, as well as hundreds of less familiar bands that serve cellular and cordless telephones, GPS trackers, air traffic control radars, security alarms, radio-controlled devices, and the like. The density in the Taipei and Tainan areas are said to be especially high.[106]

Taiwan's international telecommunication links are also vulnerable. The December 2006 earthquake off the coast of Kaohsiung, and the September 21, 1999 (921) earthquakes, both disrupted the internet and other services in the region for several days. Taiwan has a number of undersea fiber optic landing stations connecting the island to the outside world, making it a

vulnerable target. In a military crisis, the PLA has invested heavily into electronic countermeasures, including high powered microwave weapons and computer network attacks.

Energy. Taiwan's national-level mobilization is intended to ensure material readiness. MOEA is responsible for material mobilization planning, including estimating future requirements, assessing important material resources and fixed facilities, and selecting some important material resources for strategic material stockpiles with support from the local governments. MOEA is responsible for critical infrastructure protection, including: petroleum, oil, and lubricants (POL), electrical power, and water.[107] Taiwan generally relies on reservoirs for its water supply, including Feitsui and Shimen. In a POL-related emergency, the EY may implement oil control measures, such as restricting oil exports, directing the adjustment of types and volume of imported POL, and prohibiting the private sector from stocking up on POL.[108]

Central Government Budget

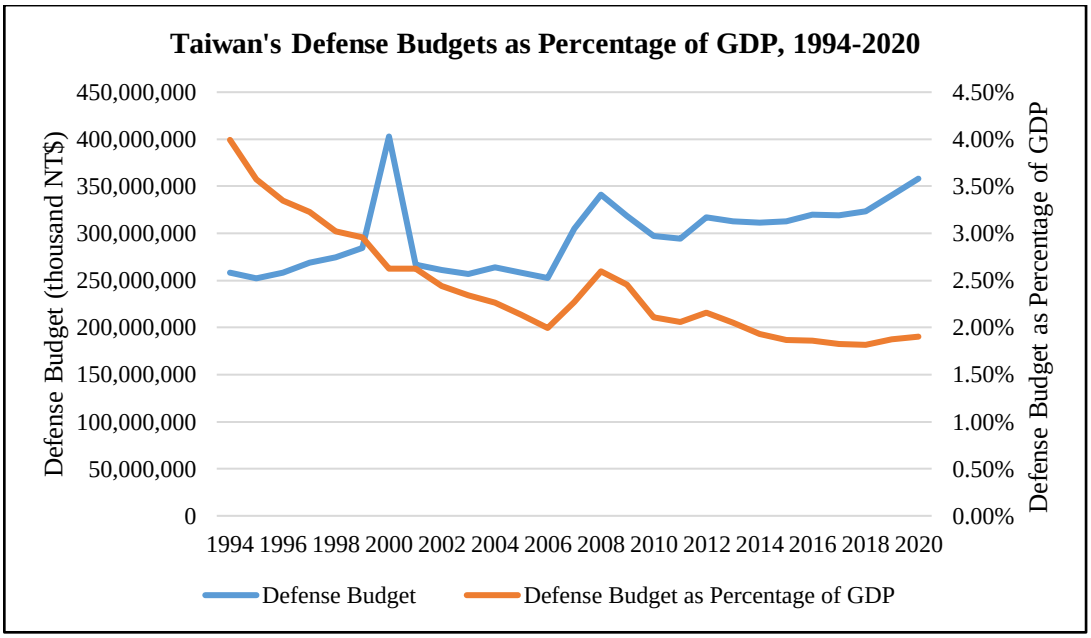


(Figure 3: Taiwan's National Budget Allocation (CY2020). *Source: "Directorate-General of Budget, Accounting and Statistics, Executive Yuan.")*

Resources are an important component of strategic readiness. Over the past 20 years, there has been a relative increase in S&T and education, as well as social welfare. The defense budget, as a percentage of central government expenditures, has not changed much.[109]

However, Taiwan's defense budget may not reflect the real level of its defense spending. Funding for military pensions, special budgets for defense equipment, and the budgets for defense infrastructure and paramilitary forces have been placed in other parts of the central government budget. Beyond this, several factors have contributed to the decline in the published defense budget over the past 15 years. Among these factors are a trend towards cheaper "software" over more expensive hardware, a product of the legislature's increased role in determining the budget. Additionally, a shrinking amount of tax revenue and a volatile economy have further contributed to conservative defense spending.[110]

In recent years, the decreasing percentage of the defense budgets of Taiwan's GDP has raised the concern of the military imbalance across the Strait, which may lower the costs of a PLA invasion of Taiwan.[111] What is noticeable is that Taiwan has steadily increased its defense budgets in recent years. Compared with the previous years, Taiwan's defense budget of FY 2020 increased by 5.16% while that of FY 2019 also increased by 5.36%.[112] The Tsai administration also strives to increase the defense budget over 2% of Taiwan's GDP.[113] The defense budget for FY2021 is over NT$ 366.8 billion (approx. US$ 12.2 billion) which accounts for 16.3% of the total national budgets and sees an increase by 4.4%, compared with that of the previous year. With the additional budgets of F-16V procurement and non-profit special funds, Taiwan's defense budgets in a broader sense will reach NT$ 453.4 billion (approx. US$ 15.1 billion) and account for around 2.4% of GDP.[114] Meanwhile, Taiwan keeps the level of total tax revenue as a percentage of GDP at around 13%, one of the lowest among developed countries.[115] The growth of Taiwan's defense budgets may be more the reflection of the Taiwanese government's tax policy rather than its commitment to its defense.



(Figure 4: Taiwan's Defense Budgets as Percentage of GDP (1994-2020). *Source: "Directorate-General of Budget, Accounting and Statistics, Executive Yuan.")*

The trade-off between expenditures on national defense, economic growth, and social welfare is often contested. However, defense spending, given the proper set of circumstances, can contribute to economic growth and development. The creation of jobs and income at the local level in Taiwan

could increase support for defense spending. If Taiwan's defense industry remains weak, public support for a larger defense budget is likely to be inadequate. This is especially true when faced with what is known as the "crowding out" effect. With legal caps on deficit spending, an increase in defense spending incurs opportunity costs, displacing spending in other sectors, such as education, social welfare, S&T, and investment into economic infrastructure. Along these lines, a consensus exists in favor of major indigenous programs, such as diesel-electric submarines.[116]

Operational Readiness of the ROC Armed Forces

Strategic readiness is intricately linked with operational readiness.[117] How a government allocates national resources has a direct impact on military operations. For example, strong morale and cohesive national will should produce more volunteers for military service. The loss of critical infrastructure, including water, power, transportation, and communications backbone networks would negatively affect military operations. Major defense investments have the potential to positively affect operational readiness.

Taiwan faces significant operational readiness challenges. However, Taiwan has made significant progress in transforming its armed forces over the last 20 years. Taiwan's defense establishment has weathered political storms, provided stability during the ROC's first democratic transition of political power from one party to another, and deterred Communist Chinese aggression. As the island's political establishment continues to consolidate its nascent democracy, its larger neighbor to the west, the PRC, is investing heavily in developing a force intended to impose its will onto the people of Taiwan and their democratically elected leadership.

This section first examines fiscal resources dedicated to Taiwan's defense. An evaluation of Taiwan's regulations and procedures for maintaining readiness follows, as well as a laydown of the mechanisms that can be leveraged when responding to crises. The section then offers an overview on what is publicly known regarding Taiwan's defense strategy and operational plan. Thereafter, it reviews the capabilities of Taiwan's C4ISR network, logistical readiness challenges, and major military investment programs for each service.

Fiscal Resources

Operational readiness relies on fiscal resources. The published ROC defense budget averages about US$ 10 billion (NT$ 294 billion) a year, with deviations year on year. As a fiscally conservative government, Taiwan has strict legal limits on deficit spending. As a result, a significant increase in the defense budget means a reduction in national health insurance, economic infrastructure, science and technology, and education. On average, its defense budget makes up between 15% to 20% of central government expenditures. As noted, Taiwan's official defense budget does not accurately reflect total military spending, which is much higher.

Taiwan's defense budget is divided into three general categories: personnel, operation and maintenance (O&M), and military investment (also known as force modernization).[118] These resources are divided between the ROC Army, Air Force, and Navy, as well as supporting units like logistics and military police, and MND and General Staff administration. The ROC Air Force, which operates relatively expensive equipment like advanced fighter jets and ballistic missile defense systems, often gets the largest share of military investment and O&M. The Army dominates personnel spending due to its relatively large size.

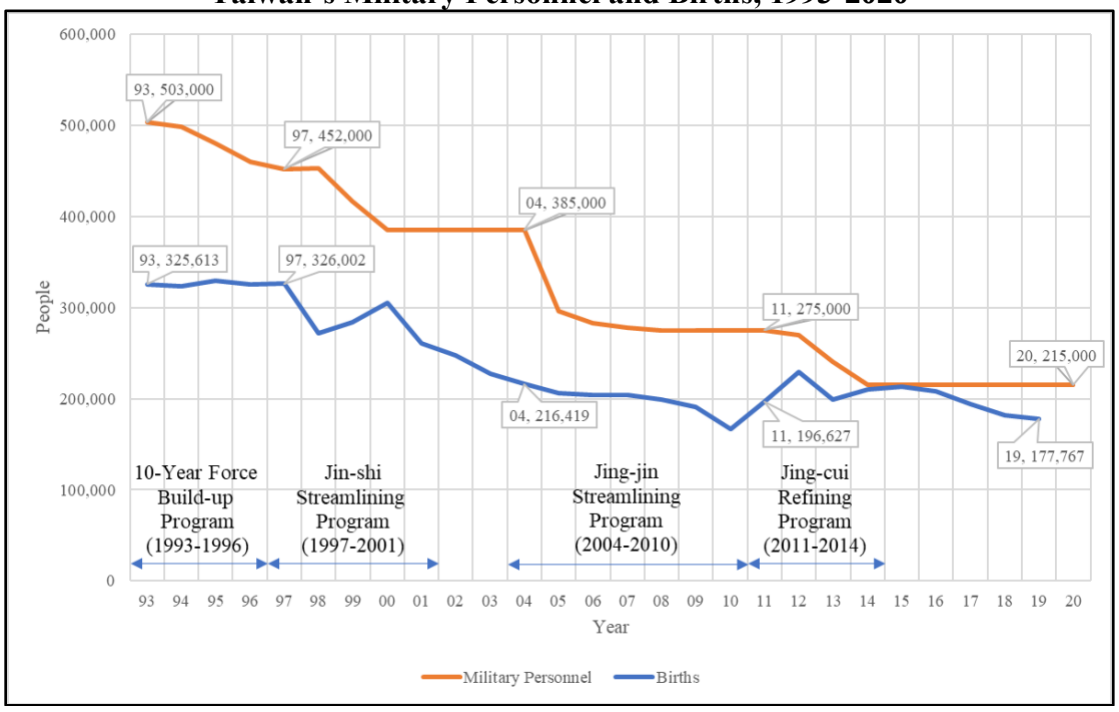
Personnel Costs. Over the last decade, personnel costs have accounted for around 45% to 50% of the defense budget. Personnel includes military pay, dependent services, and a small portion of retirement pensions. In 2019, personnel accounted for 46% of Taiwan's defense budget.[119] Taiwan's MND is seeking to reduce the personnel portion of the budget to 39% by 2029. With O&M spending staying at a consistent level, MND plans to increase military investment from 26%

to 37%.[120] As a side note, most military pensions are covered in the Veterans Affairs Council (VAC) budget. In 2020, the VAC listed pension budgets of over US$ 3.5 billion (NT$ 103 billion), while MND was only appropriated with US$ 41 million (NT$ 1.2 billion). When combined with extra-budgetary expenditures and purchasing power parity, Taiwan's actual defense spending is significantly higher than that of the defense budget.

The ROC's evolution toward democracy naturally increases pressures for an all-volunteer force. During President Chiang Ching-kuo's administration, the duration of mandatory military service was reduced. Since 2000, both the KMT and DPP have supported the military reforms pursuing personnel reductions and an all-volunteer force.[121] For recruitment, MND encourages higher education, improved working environments, increased compensation, and encouraging the employment of retirees by private corporations.[122] To provide these incentives for the all-volunteer force, the share of the personnel budget has increased from 26.7% in 1994 to 45.7% in 2020.[123] With the reduction of logistics personnel and the growing reliance on contract maintenance of equipment, the spending on logistics has increased.[124]

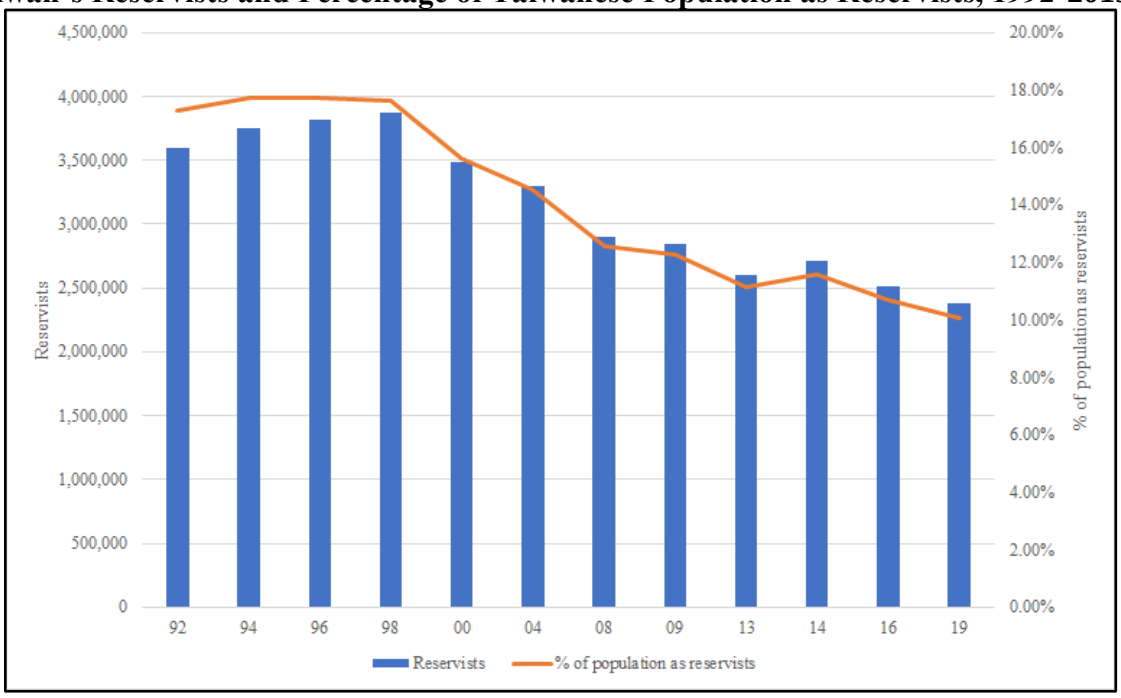
The shortage of manpower has been a critical issue to Taiwan's military. Since the 1990s, Taiwan has undergone a series of military reforms for simplifying its armed forces structure.[125] The transformation from the military primarily constituted of personnel of mandatory service to an all-volunteer force leads to the downsizing of Taiwan's armed forces from over 500,000 personnel in 1993 to around 200,000 in 2020. Such a trend coincides with the slowdown of Taiwan's population growth. Consequently, the number of reservists decreases from nearly 3.9 million to less than 2.4 million in 2019. The change of retirement age for reservists from 40 to 36 in 2007 directly contributed to a smaller base of reserve force.[126] Around 300,000 of these reservists can be mobilized for pre-combat training.[127]

Taiwan's Military Personnel and Births, 1993-2020



(Figure 5: Taiwan's Military Personnel and Births (1993-2020). *Source: Various.*[128])

Taiwan's Reservists and Percentage of Taiwanese Population as Reservists, 1992-2019[129]



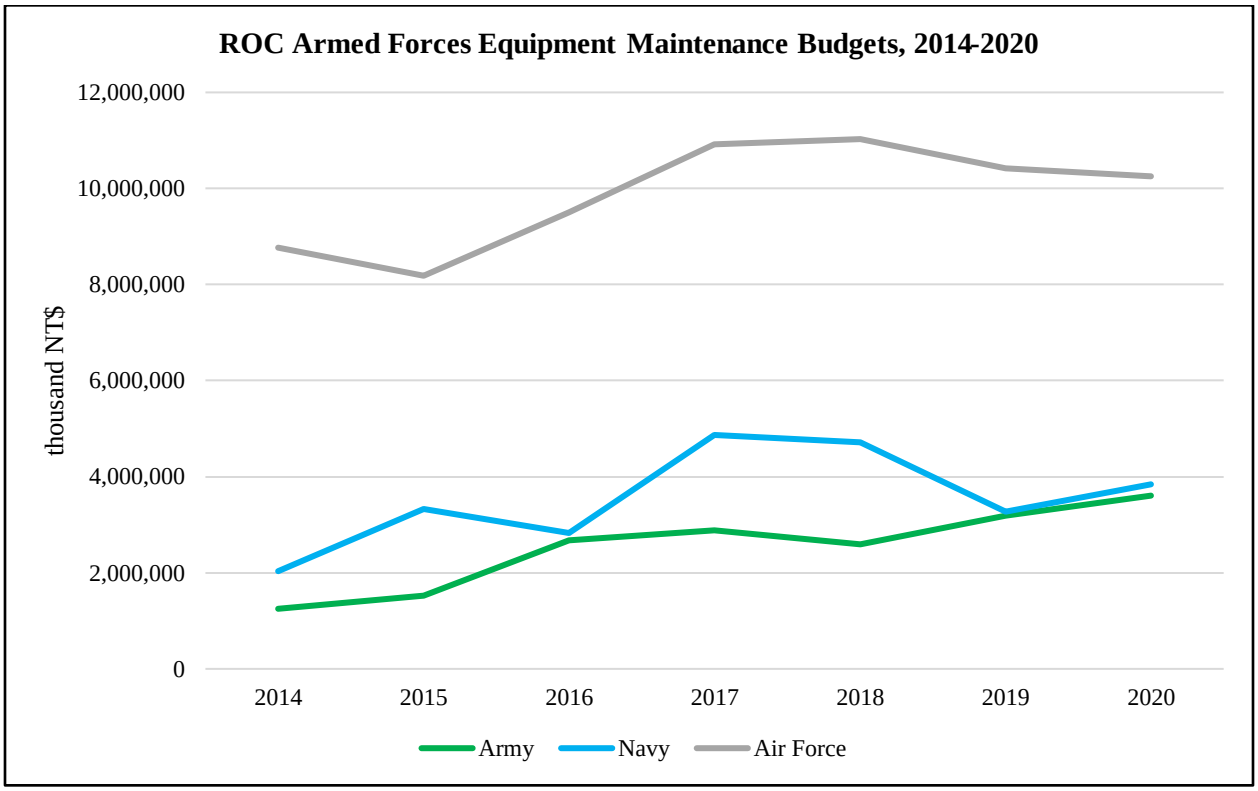
(Figure 6: Taiwan's Reservists and Percentage of Taiwanese Population as Reservists (1992-2019). *Source: Various.*[130])

The MND Reserve Command is responsible for implementing mobilization plans within 24 hours of an emergency decree. A *RAND* study notes that in one test case Taiwan was able to mobilize 97% of a full reserve brigade within 24 hours at emergency drills. However, it is anticipated that actual wartime mobilization results could be significantly less impressive.[131] While 30 days of yearly training were initially mandated for Taiwan's reservists, this requirement has been relaxed over time. During the normal state of readiness, reservists could receive between five and seven days of refresher training once every two years; however, many reservists receive no refresher training at all. Exercises like *Tonghsin* and *Tzuchiang* are designed to test mobilization readiness, but they occur on a relatively small scale.[132] U.S. DoD assessments of Taiwan's military capabilities reportedly have identified a number of weak points where improvements could be made.[133]

Operations & Maintenance. O&M constitutes around 28% of the defense budget. It funds logistics, including procurement and sustainment of spare parts, repair, equipment maintenance, and overhaul (RMO); training and education; and communications and information systems. 20% of the defense budget for 2020 is dedicated to logistics, communications, and information, which accounts for ammunition; maintenance; transportation; miscellaneous logistics services; facilities repair, maintenance, and management; unit properties management; water and electricity supply; operational facilities, communications; computer-assisted wargaming; procurement and maintenance of equipment parts in military units; and logistical supply and assistance. Two percent of the total defense budget is dedicated to education and training, which covers expenses for military book printing; educational administration; mobilization and preparedness; special grants for troops; and miscellaneous services for operations and training. A significant portion of

Taiwan's O&M budget is allocated to the procurement of spare parts. The growing costs of spare parts has resulted in diminishing equipment availability rates. To take Air Force equipment as an example, the F-16 upgrade program has been delayed and a quarter of the jets unavailable for combat as they sit waiting in maintenance depots. The combat readiness of both *Mirage* 2000-5 and F-5E/F fighters has suffered from aging issues that are compounded by a shortage of spare components.

Military Investment. Military investment includes the acquisition of weapon systems and accounts for roughly 25% percent of the defense budget.[134] Procurement of indigenous systems and military construction projects also fall into this category. A large portion of military investment funds procurement of U.S. weapon systems through Foreign Military Sales (FMS) channels.[135] The financing of major FMS programs is spread out over an average of five to ten years.



(Figure 7: ROC Armed Forces Equipment Maintenance Budget (2014-2020). *Source: "Directorate-General of Budget, Accounting and Statistics.")*

Economic Development & Weapons Acquisition

Taiwan has long struggled with the need to bolster national security with weapons acquisition and simultaneously support domestic economic development. Fiscal policy and defense needs have clashed over the decades. For example, selected acquisition programs have been funded through extra-budgetary appropriations (e.g. "special budgets"). While cases have been rare, corruption surrounding defense acquisitions and appropriations have been revealed through legislative oversight and legal investigation. The 1993 procurement of French *Lafayette*-class frigates and

Mirage-2000-5 fighters resulted in a major controversy and public outcry after details emerged of an alleged US$ 400 million in kickbacks through the special budget.[136]

The debt ceiling imposes limits on defense spending when Taiwan encounters an economic downturn or its obligations become too large. The 2004 special budget for diesel submarines, PAC-3 missile defense interceptors, and P-3C maritime patrol aircraft amounted to over US$ 600 million (NT$ 18 billion). Taiwan's GDP growth, however, fell from 5.7% in 2004 to 3.53% in 2005. In addition to the political causes, the opposition legislators boycotted the special budget to avoid the swelling of the public debt to the budget ceiling of 40.6% of the average of GDP for the previous three fiscal years.[137]

Taiwan seeks to transform current competition between defense and economic sectors into a mutually beneficial relationship. The Executive Yuan implemented the Defense Industry Development Act for the purpose of "combining abilities from the government and the private sectors to achieve the prior goal of domestic weapons and equipment research and development (R&D), production, manufacture, and logistic support."[138] The law categorized tiers of military material suppliers and created a three-level certification system. With the support of MOEA, this would provide qualified Taiwanese suppliers with industrial support such as assistance in pursuing certification by foreign original manufacturers, guidance in expanding into foreign markets, and applying for subsidies.[139]

The Defense Industry Development Act could positively impact how Taiwan engages in offset agreements and industrial cooperation, as the U.S. government has noted that Taiwan's force modernization expenditures are accompanied by industrial cooperation requirements, which are viewed as "economically inefficient and market distorting."[140] Taiwan requires offset programs for any significant FMS acquisition. Yet it is longstanding policy that "all U.S. Government agencies are prohibited from encouraging, entering directly into, or committing U.S. firms to any offset arrangement," meaning that Taiwan is billed for the real cost of these programs in the original FMS contract.[141] Roughly five to ten percent of the price tag for defense procurements can be attributed to the funding Taiwan has for its own offset programs.[142] The fact that offsets are not free — along with credible economic concerns about the efficiency of offset programs — raises the issue of the value of their use as a development strategy. It may well be that Taiwan's offset policy needs an overhaul. However, given the economic potential, and average five to ten-year lifespan of each program, offsets are a strategic opportunity to broaden U.S.-Taiwan relations and contribute to a more normal, stable, and constructive relationship. Looking at offset fulfillment as a tool for achieving strategic national objectives, rather than a standard business agreement, could be highly advantageous for Taiwan's future security outlook.

For a contextual example, Taiwan's recent US$ 1.3 billion (NT$ 38 billion) acquisition of 108 M1A2 *Abrams* main battle tank (MBT) is being financed over the next nine years. Deliveries are scheduled to take place between 2022 and 2026. Direct offsets provide additional value to military investments. Known offset agreements attached to the M1A2 procurement include the technology transfer of 120mm main guns and tank shells, as well as depot-level maintenance that covers production, assembly, and testing of turrets, guns, chassis, power systems, thermal imagers, and fire control systems.[143] To satisfy offset credits, Taiwan is seeking a co-development program with Lockheed Martin.[144]

Taiwan's M1A2T Delivery & Budgets[145]				
Year	*Delivery*	*Procurement Cost*	*Program Management Fees*	*Total Budget*
2019	—	US$ 24,471,830 (NT$ 713,800,000)	US$ 23,107 (NT$ 674,000)	US$ 24,494,938 (NT$ 714,456,000)
2020	—	US$ 144,577,788 (NT$ 4,200,000,000)	US$ 103,814 (NT$ 3,028,000)	US$ 144,681,602 (NT$ 4,220,000,000)
2021	—	US$ 246,498,195 (NT$ 7,200,000,000)	US$ 65,072 (NT$ 1,898,000)	US$ 246,563,267 (NT$ 7,191,633,000)
2022	18	US$ 235,248,446 (NT$ 6,900,000,000)	US$ 791,634 (NT$ 23,090,000)	US$ 236,040,080 (NT$ 6,884,698,000)
2023	18	US$ 241,735,187 (NT$ 7,100,000,000)	US$ 883,894 (NT$ 25,781,000)	US$ 242,619,082 (NT$ 7,076,591,000)
2024	28	US$ 169,228,310 (NT$ 4,900,000,000)	US$ 839,770 (NT$ 24,494,000)	US$ 170,068,081 (NT$ 4,960,460,000)
2025	30	US$ 149,708,602 (NT$ 4,400,000,000)	US$ 839,770 (NT$ 24,494,000)	US$ 150,548,373 (NT$ 4,391,119,000)
2026	14	US$ 61,535,108 (NT$ 1,800,000,000)	US$ 825,096 (NT$ 24,066,000)	US$ 62,360,205 (NT$ 1,818,891,000)
2027	—	US$ 111,910,911 (NT$ 3,300,000,000)	US$ 73,712 (NT$ 2,150,000)	US$ 11,1984,623 (NT$ 3,266,311,000)
Total	**108**	—	—	**US$ 1.4 billion (NT$ 40.6 billion)**

Command and Control

The President of Taiwan commands the ROC armed forces through the Minister of Defense, who transmits instructions to operational forces. MND has principal responsibility for ensuring the country's defense against PRC use of military force. MND defines its strategic ends as preventing war, ensuring homeland defense, responding rapidly to a crisis, avoiding confrontation, and supporting regional stability.[146] In this light, Taiwan can be classified as a "status quo" state because it is content with its existing territorial borders and concerned only with preserving its security and maintaining its democratically elected government.[147] Taipei advances its strategy by convincing Beijing that the costs of any conflict would outweigh the desired benefits.[148]

While details are unknown, MND's war plan, the Gu'an Operational Plan, does not assume U.S. intervention to defend Taiwan in the event of an invasion. Taiwan's basic concept of independent defense – the need to prepare for a contingency in absence of assured outside assistance – has its roots in former Chief of the General Staff Hau Pei-tsun's strategy articulated after the abrogation of the U.S.-ROC Mutual Defense Treaty in 1979. Independent defense, rather than assuming U.S. intervention in a crisis, appears to remain at the core of Taiwan's strategic and operational planning until today. At the same time, however, U.S. and Taiwan defense establishments are increasingly capable of *ad hoc* coalition operations in the event of a crisis.[149]

Legal Statutes & Regulations

Legal statutes and regulations help to guide ROC military responses to PLA use of force. The two most relevant legal statutes are the National Defense Act and MND Organization Act.[150] MND also has the Contingency Management Regulations, the Combat Readiness Regulations, and Gu'an Operational Plan (OPLAN) for responses to crises during peacetime, transitional period, and wartime.[151] The Contingency Management Regulations address mechanisms for responding to crises, including those related to humanitarian aid and disaster relief.[152] These regulations define military accidents (incidents) as situations in which crafts such as PLA aircraft and naval ships, Chinese large iron fishing boats, and mobile fishing boats violate the code of conduct or cause accidents.[153] According to the Contingency Management Regulations, MND identifies and monitors all the foreign aircraft and vessels, including those of the U.S. military.[154] They also establish rules of engagement for ROCAF responses to PLAAF flight activities in the Taiwan Strait and around the island.[155] MND maintains a task force for crisis management during normal and emergency states of readiness.[156] During elections and holidays such as the Lunar New Year, the Combat Readiness Regulations and Regulations for Managing Contingencies are often referred to as the legal sources for regulating the stationing and rotation of military personnel. For example, during the 2020 national elections, around 5,000 military personnel remained on duty and could not vote.[157]

The Combat Readiness Regulations address the responsibilities of ROC armed forces during various readiness and alert states. The National Defense Act triggered a modification to Combat Readiness Regulations in order to establish the Minister of Defense as the senior authority during peacetime, rather than the Chief of the General Staff.[158] Among other issues, these regulations guide unit staffing levels during various periods from high alert to holidays and elections.[159] The Office of the Deputy Chief of General Staff for Operations and Plans (J-3) plays a central role.

Operational Plan

In addition to legal statutes and regulations, ROC military responses are guided by an operational plan which serves to implement Taiwan's current defense concept (discussed later in this section). Maintaining an operational plan is central for operational readiness.[160] Contents of the *Gu'an* OPLAN are classified and reviewed on an annual basis.[161] The OPLAN implements Taiwan's defense strategy and is premised on selected assumptions regarding enemy intent and military capabilities. The plan is allegedly centered around a worst-case amphibious invasion scenario, and prioritizes deterrence over defense. This could mean that, during an impending invasion, interdiction would be a first course of action. The OPLAN purportedly details Taiwan's communications infrastructure in each level of readiness.[162] It also addresses military operations other than war, such as humanitarian affairs and disaster relief.[163] The OPLAN reportedly does not assume U.S. military intervention in an invasion scenario, with the exception of ISR support, and is focused on "annihilating the enemy at the landing beach."[164]

- *Yingyuan Branch Plan*. The *Yingyuan* branch plan reportedly addresses the broad defense of all offshore islands under ROC jurisdiction, including features in the East China Sea and South China Sea.[165] The plan features Marine amphibious landing operations, Army airborne and special operations, and air operations involving army aviation helicopters and

ROCAF fighter assets.[166] *Yingyuan* covers all offshore islands under ROC jurisdiction, including features in the South China Sea.[167] Exercises have demonstrated an ability to defend nearer islands, like Penghu, and relatively less capacity to defend assets in the South China Sea.[168]

- *Tienchu Branch Plan*. The ROCAF's *Tienchu* branch plan addresses rapid dispersal of air assets, such as the deployment of Indigenous Defense Fighters (IDFs) from Tainan and Taichung to Penghu to interdict amphibious assault ships. *Tienchu*-related exercises are carried out annually between April and September. IDFs reportedly have a lower reaction time as compared to F-16s and *Mirage* 2000-5s.[169]

- *Weichiang Branch Plan*. The *Weichiang* branch plan is tailored specifically to the defense of territories in the South China Sea. The plan involves Marine Corps assets, transported by C-130s, which would re-occupy territory within four hours.[170] In 2014, the ROCN conducted *Weichiang*-related training on Taiping Island involving *Perry* and *Lafayette*-class frigates and a landing ship tank (LST). In coordination with the Coast Guard, a Marine Corps task force consisting of two companies conducted amphibious warfare drills with over 20 AAV-7 amphibious assault vehicles. Heavy mortars and anti-tank rockets were involved, and UAVs provided situational awareness to commanders throughout the exercise.[171]

The OPLAN (which manifests Taiwan's defense concept) and operational readiness are validated during annual Hankuang (HK) exercises, which have taken place since 1984.[172] Hankuang exercises consist of a command post exercise (CPX) and field training exercise (FTX).[173] Taiwan leverages tools such as the Joint Theater Level Simulation (JTLS) system to simulate joint and combined civil-military operations. JTLS is also used by the U.S. and its Indo-Pacific allies like Japan, South Korea, and Australia.[174] Hankuang is augmented by other exercises, such as *Tonghsin* and *Tzuchiang*, which evaluate the readiness of the reserve force and logistical mobilization.[175] Other components include fighter landings and rearming on the highway.[176]

Taiwan's Contingency Runways[177]

Name	*Location*	*Use in Exercises*	*Aircraft*
Chungli	Chungli-Yangmei, Taoyuan, National Freeway 1	First used in 1975; canceled in 2006	F-5E, T-33A
Changhua	Yuanlin, Changhua, National Freeway 1	May 15, 2007 (HK-23), May 28, 2019 (HK-35)[178]	F-16, Mirage 2000-5, IDF, E-2K
Minhsiung	Minhsiung, Chiayi, National Freeway 1	September 16, 2014 (HK-30)	F-16, Mirage 2000-5, IDF, E-2K
Matou	Matou, Tainan, National Freeway 1	April 12, 2011 (HK-27)	F-16, Mirage 2000-5, IDF
Rende	Rende, Tainan, National Freeway 1	July 22, 2004 (HK-20)	Mirage 2000-5
Chiatung	Chiatung, Pingtung, Provincial Highway 1	November 17, 2011 (Changching-12)	CH-47

In 2019, Hankuang was reportedly integrated within a year-long readiness training schedule.[179] Quarterly readiness training has emphasized force protection, joint counter landing operations, and air defense/counter-airborne operations. Other training has focused on field reconnaissance, tabletop simulations, and tactical field training.[180]

Defense Leadership

The Defense Minister is responsible for initial responses to an invasion and exercises command authority over the Chief of the General Staff. For instance, the CGS can command the Air Force Air Defense and Artillery Command to launch air-defense missiles only with the authorization from the Defense Minister.[181] The CGS would be authorized to assume military command after the President issues an emergency decree, with the Defense Minister in charge of personnel and material mobilization.[182] During war, the CGS would assume a role similar to a Joint Task Force Commander and exercise supreme command of the ROC armed forces. Taiwan's national command authorities determine readiness phases through I&W of PLA activities on the coast of southeast China. Should the use of force appear imminent, the national command authority could implement emergency readiness plans.[183] The listing of indicators is expansive, but could include:

- Leadership meetings and establishment of leading small group/joint command for Taiwan;
- Changes in PLA readiness levels;
- Augmentation of national and theater command centers;
- Surge in ISR activities;
- Launch of tactical satellites;
- Unusual field deployments, including PLA Army (PLAA), PLARF, PLAAF, PLAN, and PLASSF;
- Mobilization of reserves and/or militia in Fujian, Zhejiang, and Guangdong;
- Spectrum management policy/frequency changes;
- Unusual training and exercises;
- Air and maritime closure areas;
- Changes in civil air defense posture;
- Unusual logistical support activities;
- Unusual propaganda and social media activities;
- Fifth column activities.[184]

The Overall Defense Concept

Taiwan's public approach to defending against an amphibious invasion is embodied in the Overall Defense Concept (ODC).[185] The ODC was formally introduced in MND's 2017 *National Defense Report* and further detailed in the report's groundbreaking 2019 iteration.[186] In April 2019, President Tsai expressed her support for the concept.[187] In August 2020, President Tsai declared, "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."[188] The ODC seeks to achieve Taiwan's strategic goal of "resolute defense and multi-domain deterrence" in a resource-constrained environment. The ODC guides military force development and joint operations, emphasizing Taiwan's natural advantages, civilian

infrastructure, and asymmetrical capabilities to deter or, if necessary, defeat PLA use of force, including an amphibious invasion.[189]

While many aspects of the ODC are classified, it is known to be premised on two basic assumptions: (1) the CCP aspires to annex Taiwan; and (2) the worsening resource imbalance across the Taiwan Strait can be offset by seizing upon Taiwan's capacity for innovation. According to estimates by the U.S. Department of Defense, PLA expenditure last year topped US$ 250 billion (NT$ 7 trillion), dwarfing Taiwan's latest defense budget of US$ 11 billion (NT$ 323 billion).[190] To mitigate budgetary constraints, the ODC stresses the effective allocation and management of Taiwan's resources. The objective of ODC is to deny the PLA the ability to successfully invade and exert political control over Taiwan. The ODC envisions Taiwan adopting an asymmetric defense posture and fielding forces capable of overcoming a stronger enemy. The ODC aims to shape Taiwan's force buildup and concept of operations. Force buildup outlines the elements and capabilities that maximize the ODC's advantages, whereas the concept of operations delineates how the strategy will be executed during an invasion.

The ODC's three tenets for force buildup are force preservation, traditional capabilities, and asymmetric capabilities. Taiwan's military must retain the ability to defend itself and strike back after a PLA air and missile campaign and cyber operations. Force preservation relies on mobility, camouflage, concealment, deception, electronic warfare, redundancy, rapid repair, and blast mitigation. Traditional weapon systems are effective at countering the PRC's grey-zone tactics during peacetime and periods of high tension. They are needed for patrolling Taiwan's territorial skies and waters while maintaining the capacity for deep interdiction. The high visibility of traditional systems positively impacts Taiwanese morale and improves public confidence in the military, while at the same time countering PLA coercion and complicating political warfare operations and decision making in Beijing. The essence of Taiwan's traditional capabilities is a low quantity of large, high-quality platforms such as advanced fighters, destroyers and submarines, and tanks. They are strategic in nature: focused not only on defense but also achieving political effects.

Asymmetric weapon systems, on the other hand, are less visible during peacetime, but essential during combat. They provide non-conventional warfighting capabilities that are aimed at exploiting Taiwan's natural defensive advantages and the enemy's vulnerabilities during an invasion while delivering maximum tactical impact with minimal effort. Taiwan's asymmetric systems are envisioned as small, mobile, lethal, numerous, and capable of being widely dispersed. They must be cost-effective and easy to develop and maintain, yet resilient and sustainable. They must complicate enemy operations by being difficult to target and counter. The essence of Taiwan's asymmetric capabilities is a large number of small things.[191]

The ODC's objective is to enhance deterrence and, if deterrence fails, defeat a full-scale PLA invasion. The three pillars of its concept of operations are force protection, decisive battle in the littoral zone, and destruction of the enemy at the landing beaches.[192] Force protection enables Taiwan's military to survive and recover from the opening phase of a massive PLA strike campaign so that units can strike back as soon as the enemy is within range. The ODC seeks to bolster the military's ability to withstand pre-invasion bombardment using tactics similar to those

of force preservation. Elements of force protection include mobility, camouflage, concealment, deception, dispersion, rapid repair, and blast mitigation.

According to the ODC, ROC military forces would be at their most lethal when the enemy is crossing the Strait and moving through prepared kill-boxes in Taiwan's littoral areas. At this stage in conflict, Taiwan's surviving warships and fighters will attack the enemy in joint actions with coastal defense cruise missiles (CDCMs), UAVs, and air defense units. The ODC seeks to make Taiwan's military ready to conduct joint fire strikes against the PLA with air, sea, and shore assets protected by a layered air defense system.[193] In addition, the ODC envisions blocking the enemy's advance using a layered defense of sea mines, pre-deployed obstacles, swarming fast-attack craft, and missile assault boats. As the enemy approaches Taiwan's shoreline, land-based precision guided munitions and ground forces would provide additional firepower.

The ODC emphasizes asymmetric capabilities since the strategy primarily targets an amphibious invasion scenario, where traditional systems may not be as immediately effective. With this in mind, the asymmetric focus of the ODC compliments Taiwan's other defense strategies that primarily employ traditional systems. Traditional capabilities could be more effective in other critical missions, such as fighter jets to repel PLA warplanes and anti-submarine warfare (ASW) submarines for protecting sea lines of communication. Services may resist the shift towards increased asymmetric capabilities for their own budgetary and policy priorities. However, it is important to note that the ODC should not be viewed as mutually exclusive or competing with other programs and instead as complimentary.

MND reportedly is engaging DoD in a joint assessment of Taiwan's defense. The focus is on counter-landing operations and the ODC, and involves special operations, army aviation, UAVs, and naval mining. The program is covered under the defense budget's education and training line item.[194]

Key Command and Control Capabilities

Taiwan has made significant investments into C4ISR, counter-landing forces, air defense, and naval force modernization. In general, the most critical capabilities include ensuring situational awareness and the ability to communicate in the most stressing scenarios. The capacity to deny the PLA command of the skies in the Taiwan area of operations is critical, as is ensuring that sea lines of communication remain open.

The key to survival in a potential armed conflict, or any emergency for that matter, is sustaining a cognitive advantage. This includes survivable, persistent, and pervasive sensors; survivable and effective communications; and a survivable command and control system able to respond to a range of contingencies. A diverse network of ground-based, airborne, and space-based sensors would be critical for I&W and defense should deterrence fail. Taiwan has the potential to field one of the world's most advanced, and cost-effective C4ISR infrastructures in the world. Furthermore, technological breakthroughs in nanotechnology and micro-electro-mechanical systems are reducing costs, due in large part to civilian market demand. However, many sensors must operate in a harsh military environment.

C4ISR is a critical enabler that enhances the ability of Taiwan's armed forces to respond to contingencies and adds value to existing weapon systems. As noted by DoD's Chief Information Officer, "the two truly transforming things might be in information technology and information operation and networking… connecting things in ways that they function totally differently than they had previously. And if that's possible… then possibly the single most transforming thing in our force will not be a weapon system, but a set of interconnections and a substantially enhanced capability because of that awareness."

The ROCAF operates one of the most advanced air and missile surveillance systems in the world. This system hinges upon a modern air command and control network and supporting ground-based air surveillance radar system. A large UHF long-range early warning radar functions as the core of Taiwan's air and ballistic missile surveillance system. Unlike the Precision Acquisition Vehicle Entry Phased Array Warning System (PAVE PAWS), this system is capable of not only tracking large numbers of ballistic threats out to 3,000 kilometers, but also tracking air-breathing threats with low radar cross sections. The radar has a latent space tracking capability to assist in monitoring space debris, tracking PRC satellites to facilitate a concealment, camouflage, and deception, and augment Taiwan's own space control, tracking, and telemetry network. As a strategic early warning system, the large phased array radar is not expected to survive past initial strikes in a full-scale assault. Other air surveillance assets include radar systems operating in the L- and S-Band portions of the frequency spectrum. It is unknown if Taiwan has a system to augment its traditional air surveillance network.

More futuristic capabilities may include passive coherent location (PCL) and infra-red search and track systems that can detect and track aircraft and helicopters. Such systems are passive, meaning they do not emit any radiation of their own, unlike radar. This makes them difficult to detect. One problem, however, is the atmosphere that attenuates infrared light to some extent and adverse weather can attenuate it also, so its range compared to a radar is limited.

(Figure 8: General Atomics MQ-9B. *Source: "Wikimedia Commons.")*

The ROCAF flies a number of airborne platforms equipped with sensors, including the C-130, E-2T, and P-3C. UAVs offer some of the most promising opportunities for persistent surveillance of Taiwan's operational environment to meet a range of non-traditional and military requirements UAVs could be mounted with many different types of sensor packages, including electro-optical, infrared, synthetic aperture radar (SAR) imaging payloads as well as and signals intelligence receivers. Able to launch from a variety of modes, UAVs could operate day and night to monitor maritime activity and provide targeting data for strike assets. Other missions could include border control, traffic monitoring, resource exploitation, and support for law enforcement. Systems integration of the various sub-systems, ranging from the engine, airframe, control system, sensors, jam-resistant high-speed data links, and ground stations, may be the greatest challenges in fielding a low-cost, multi-purpose system. Airspace management could be another consideration. The most prominent NCSIST indigenous MALE UAV under development is the *Teng Yun* program.[195]

Indigenous programs will be augmented by the acquisition of at least four MQ-9B MALE remotely piloted aircraft systems (RPAS).[196] The MQ-9B has a maximum altitude of 40,000 feet, the endurance of more than 30 hours, speed of 210 knots, more than a half dozen external hard points for air-surface weapons and additional sensors. The system also includes mobile ground control stations that can connect into fiber optic communication and control networks, satellite communications, over the horizon tactical data links, 360º long-range maritime radar with SAR and inverse synthetic aperture radar (ISAR), advanced electro-optics, signals intelligence (SIGINT) and other sensors and anti-jam Global Positioning System (GPS). Future upgrades to the MQ-9B include the capability to perform ASW by carrying, deploying, and monitoring sonobuoys.

Equipped with Link-16 terminals, secure voice communications and the ability to stream full motion video, the MQ-9B will be interoperable with F-16s, P-3s and other airborne platforms, ROC Navy surface ships, and ground forces. UAVs will provide the persistent surveillance needed for I&W of the use of force, provide critical targeting data for coastal defense cruise missiles, enable BDA for systems such as naval sea mines, and ultimately be able to self-deploy weapons. In addition, MALE UAVs, such as the MQ-9B, have the potential to relieve some of the wear and tear on Taiwan's current fighter and maritime patrol inventory and thus enhance readiness.][197]

Taiwan's military has fallen behind its peers in the operational employment of unmanned aerial systems (UAS), in terms of the breadth of their use, the level of sophistication and capabilities of the UAVs, operational experience and doctrinal development. As such, it is imperative that Taiwan takes measures to greatly improve its capability and extent of readiness in this respect.

While Taiwan is clearly capable of indigenously producing small to medium-sized drones for tactical ISR applications, the development of larger, long-endurance, multi-mission UAVs of greater sophistication would require a much longer effort involving greater technical risks. Moreover, advanced UAS with precision intelligence, surveillance, target-acquisition, reconnaissance (ISTAR), and attack capabilities would require high-precision components (including, but not limited to, servos and gyros) that may not be readily obtainable on the international market.[198]

Space Systems. On the space side, Taiwan currently has indigenous remote sensing satellites. Taiwan's FORMOSAT-5 was launched in 2017, the first satellite with an indigenously developed sensor. Taiwan also procures foreign commercial imagery. Among foreign sources, GeoEye (acquired by DigitalGlobe in 2013) operates three remote-sensing satellites including OrbView-3, IKONOS, and OrbView-2.[199] WorldView-3, the most recent commercial imagery satellite currently in orbit, offers 0.31-meter panchromatic (black and white) and eight-meter multispectral (color) digital imagery, which can be downlinked to customer ground stations around the world. Under current licensing constraints, only U.S. government customers and specifically designated allies have access to imagery at this highest resolution while commercial customers receive imagery at the highest resolution allowed by U.S. regulations, currently 0.5-meter ground resolution.

The PLA's proven ASAT capability could pose a challenge to Taiwan's space assets in low earth orbit. A small satellite architecture could enhance the survivability of a space-based sensor system. For an affordable and tailored small satellite architecture, a domestic space launch capability could be helpful. Taiwan has had a program to launch mission-specific 100-kilogram satellites into an orbit of between 600 to 800 kilometers.[200]

Taiwan, with U.S. assistance, may seek participation in the United Nations Global Earth Observation System of Systems (GEOSS) project. The purpose of GEOSS is to pool space-based remote sensing assets for scientific and economic purposes, as well as to respond effectively to environmental shifts and natural disasters. The U.S. component of GEOSS, known as the Integrated Earth Observation System (IEOS), links U.S. efforts to those of its international partners.

As time goes on, affordable situational awareness for a wide array of emergencies will become increasingly important. Taiwan's emergency responders, military and otherwise, could derive significant benefits from cost-effective data correlation and visualization systems. Such a capability depends in large part upon a user-friendly and affordable software package able to fuse or correlate a wide variety of sensors. Tactical Display Framework (TDF) and Multi-Source Correlator Tracker (MSCT) software allows satellite imagery, three-dimensional terrain maps, and live video and radar feeds to be displayed on a bank of linked high-resolution monitors. The screens can be used in a transportable map table arrangement or in a large display and a static facility. Creating a common operational picture (COP) for medical responses, disaster warning, response, and recovery, and military operations is both the goal and challenge of network-centric operations. To operate efficiently, all emergency response commanders – civilian and military – should have a single, shared picture of the environment. Existing systems tend to break up this image. A capability of unifying various data and sensor feeds into a consistent format that can be displayed on a monitor could greatly enhance a commanders' situational awareness. Technology is advancing to the point to where a common operational picture could be used on a personal display assistant (PDA).[201]

A multi-dimensional awareness capability could integrate existing and future radar systems, including over the horizon systems; advanced information systems; still images and video; acoustic data; beacons for tagging, tracking, and locating; and access to global databases, such as Lloyd's ship registry and other assets for data mining and access to watch lists.

Systems capable of simultaneous tracking hundreds or even thousands of targets are being developed and fielded. The problem may become less of what's being seen on a screen but more understanding of what is being observed and perhaps even having a staff able to man the terminals on a 24/7 basis. There is a requirement to integrate multi-sensor and intelligence information to provide 'beyond the horizon' understanding across all domains – sea, air, space, land. Situational awareness can be achieved by fusing existing sensors. The fusion of various forms of data could produce a combined operations center and user-defined operating picture that enhances situational understanding and provides actionable intelligence to military, disaster relief, Coast Guard, customs, police, and other emergency response forces.

Effective and efficient command and control (C2) depends upon reliable, secure, and high bandwidth telecommunications. Taiwan's fixed network includes fiber optics, including undersea fiber optic cables linking Taiwan with the outside world. Communications appear to move toward an internet protocol (IP) standard, specifically IP version 6 (IPv6) that expands the number of users/addresses that the network could accommodate. Each service maintains its own communications network including Army Improved Mobile Subscriber Equipment (IMSE).

Interdiction. Taiwan has invested in integrated deep interdiction operations in a denied environment. Taiwan's familiarity with single points of failure in the PLA's air and missile defense system could someday save many lives. Maintaining Taiwan's capacity to interdict single points of failure in the PLA's operational system could relieve the United States of part of its heavy operational burden and reduce risks of escalation. For Taiwan, sufficient self-defense requires an ability to interdict and neutralize critical nodes in the PLA Rocket Force and other increasingly integrated operational systems opposite Taiwan.[202]

Interdiction operations would seek to destroy, divert, disrupt, and delay PLA theater-level operations. Taiwan has long maintained some capacity to interdict PLA targets in southeast China. However, the ROCAF has struggled to keep pace with an increasingly modern PLAAF integrated air defense system opposite Taiwan. Among the more capable deep interdiction systems is the *Hsiung Fung* HF-2E, which allegedly has a 1200-kilometer (746 miles) range.[203] A new system, the *Yun Feng* land attack cruise missile allegedly can reach supersonic speed and has a design range of 1,500 km (932 miles).[204] An initial 20 rounds and 10 launchers are expected to enter the inventory in 2021.[205] NCSIST-developed *Wan Chien* air-delivered standoff munition cluster munition, capable of striking targets within a 500 kilometer (311 miles) radius. The munition reportedly passed its operational test and evaluation in 2020 and over 150 will be produced.[206] The main shortcoming in Taiwan's interdiction capability is precise targeting data and reliable geo navigation.

For maritime interdiction, land-based anti-ship cruise missile (ASCM) systems include the existing indigenous HF-3 with the maximum range of over 300 km (186 miles), Taiwan also is reportedly acquiring *Harpoon* ASCMs as part of a broader mobile CDCM system.[207]

Electronic Warfare. Another area where Taiwan urgently needs help is EW, particularly integrated EW, where disparate systems and capabilities (such as SIGINT, communications intelligence [COMINT], electronic intelligence [ELINT], and Electronic Attack) are brought together to conduct precise, targeted operations to ensure the dominance of the electromagnetic spectrum.

NCSIST has developed a wide range of EW systems, but their performance has yet to win the confidence of Taiwan's military services. In fact, reports indicate that many indigenous EW systems have fared poorly during major exercises. Moreover, Taiwan's military could greatly benefit from mentoring in the conduct of integrated electronic warfare. As such, one very important area of readiness could be addressed by engaging U.S. experts to help plan Taiwan's EW programs and to train Taiwanese EW specialists in advanced operational concepts, doctrine, and tactics.

Command Centers

The MND Joint Operations Command Center (Hengshan Command Center) is Taiwan's most prominent command and control facility[208] The center is housed in a hardened underground facility north of Dazhi. The facility is designed to withstand missile or even nuclear attacks and accommodate multiple government agencies in war.[209] Hengshan allegedly is connected through tunnels to the President's Yuanshan Command Center. Completed in 2008, Yuanshan houses the President and cabinet with the communication systems and similar fortification like Hengshan Command Center.[210]

Hengshan is linked to backbone communications networks through fiber optic cables, line of sight microwave, and satellite communications systems to maintain the command and control system in the face of an electronic countermeasure (ECM) or submarine cable disruption due to natural or man-made causes. Hengshan reportedly consists of an Intelligence and Operations Coordination Center, Political Coordination Center, and Combat Resources Coordination Center. Adjacent to Hengshan is the Dazhi strategic district, which houses the MND, Air Force, and Navy headquarters.[211] Hengshan integrates Army, Navy, and Air Force operational command centers. The Hsun'an joint C2 system integrates sensor data from multiple sources to form a common operational picture for civilian and military leaders. The COP consists of data from ground-based, airborne, and space-based sensors.[212] Hengshan is equipped with the JTLS system, which was acquired from the United States in 2003. JTLS allows the potential for joint exercises between the commands from the U.S. and Taiwan.[213]

Hengshan is linked with service command centers responsible for directing air, naval, and ground force operations. Ground operations are coordinated by the ROCA Tactical Operations Center (TOC) and associated Army Automated Situational Information System (also known as the *Lu'tse* system).[214] Since 2016, around US$ 76.7 million (NT$ 2.3 billion) has been appropriated to the National Chung-Shan Institute of Science and Technology (NCSIST) for research and development of the next-generation C2 system for the ROCA, known as *Hsunho*. With planned deployment to the ROCA Sixth Army, *Hsunho* adopts U.S. military standards with three modular systems (man-portable system, vehicle-based system, and headquarters system) and is interoperable with Navy and Air Force C2 systems.[215]

ROC Navy operations are centered upon the Naval Operations Center. In 1994, the Navy introduced the *Dacheng* system as its command, control, communications, and intelligence (C3I) system for processing and displaying information.[216] Today the ROC Navy uses the *Liencheng* system for incorporating anti-ship missiles.[217]

The ROCAF Air Operations Center (AOC) is housed within an underground facility in Taipei's Da'an District.[218] It reportedly includes at least four Regional Operations Control Centers (ROCC), each of which could assume overall control of Taiwan's national air defense.[219] The ROCC program improved the survivability of the formerly highly centralized integrated air defense system by creating duplicate air defense operations centers throughout the island. In 2012, the ROCAF introduced the *Huanwang* system, which provides a single integrated air picture to aircraft, ground force systems, and naval vessels.[220] Repair and maintenance of the systems have presented challenges and have been undergoing an update of its operational interface.[221]

Service systems are linked with the Hengshan. The interface allegedly displays all ground, sea, and air intelligence to the commanders.[222] However, there is still the issue of low interconnectivity between the Hengshan system and other command and control systems.[223]

The ROCAF has invested more than the US$ 250 million in upgrades to its air defense command and control system that would be responsible for threat assessment and weapons allocation.[224] A follow-on system, *Huanwang*, was introduced in 2012. Repair and maintenance of the system have presented challenges and have been undergoing an update of its operational interface.[225]

Logistical Readiness Issues

Taiwan's military faces logistical readiness issues that could delay and/or inhibit an effective response to forms of coercion. Each service experiences key challenges with logistical readiness including shortages of spare parts, environmental issues, obsolescence, and upgrade program delays.

ROC Army

The ROC Army armored force also has experienced logistical challenges due to obsolescence. In 2018, media reporting suggested Taiwan may upgrade fire control systems on Taiwan's M60A3 *Abrams* MBT, as well as turret drives, sighting systems, nuclear, biological, and chemical (NBC) protection, environmental control systems, and possibly its automatic loading system. Taiwan's M60A3 tanks have a record of brake failure.[226] Around 100 CM-12 MBTs were mothballed due to obsolescence.[227] CM-11 MBTs, which entered the inventory in 1990, have cracked barrels.[228]

To address obsolescence, the ROCA is acquiring 108 M1A2T MBTs from the United States, with initial deliveries expected in 2023. However, the program, as currently configured, does not include a C2 system that would offer a near-real-time common tactical picture. NCSIST has reportedly been tasked with developing an indigenous C2 system for the M1A2T, although its status remains unclear. The alternative could be using the same system that is used in the U.S. Army for M1A2 SEP tanks, known as Mounted Family of Computer Systems (MFoCS). MFoCS is software-agnostic, meaning it could be integrated with tactical C2 software if the ROCA or NCSIST wishes to employ in the future. MFoCS also ensures interoperability with the U.S. and enables access to its logistical support.

Army aviation assets also have presented logistical challenges. The OH-58Ds are becoming obsolete and suffer a shortage of spare parts in the wake of the U.S. retirement of these airframes.[229]

Selected Military Investment Programs Greater Than NT$ 10 billion, 2017-2030[230]			
Branch	*System*	*Period*	*Budget*
Army	New main battle tanks	2019-27	US$ 1,350,805 (NT$ 40,524,159)
	Anti-tank missiles	2018-25	US$ 393,839 (NT$ 11,815,164)
	Field air defense weapon system	2019-26	US$ 477,390 (NT$ 14,321,690)
	Smart installation monitoring system for critical military units (Phase 2)	2020-25	US$ 426,734 (NT$ 12,802,025)
	Total	**2018-27**	**US$ 2,648,768 (NT$ 79,463,038)**
Navy	Phalanx MK-15 Block 1B	2017-25	US$ 338,645 (NT$ 10,159,362)
	Missile launch vehicle	2017-23	US$ 456,117 (NT$ 13,683,505)
	Indigenous Defense Submarine (Phase 2) prototype construction	2019-25	US$ 1,645,390 (NT$ 49,361,709)
	New missile frigate (Phase 2 prototype construction)	2019-26	US$ 818,305 (NT$ 24,549,162)
	Micro-class missile assault boat	2019-29	US$ 1,054,615 (NT$ 31,638,443)
	Total	**2017-29**	**US$ 4,313,073 (NT$ 129,392,181)**
Air Force	New advanced jet trainer	2017-28	US$ 1,350,805 (NT$ 40,524,159)
	F-16 retrofit	2012-23	US$ 393,839 (NT$ 11,815,164)
	Total	**2012-28**	**US$ 477,390 (NT$ 14,321,690)**

In 2015, the ROC Army began receiving deliveries of 60 UH-60M *Blackhawk* helicopters. 15 were transferred to National Airborne Service Corps (NASC) and another 15 to the ROCAF for search and rescue missions.[231] Shortly after initial deliveries, media reporting cited issues with spare parts.[232] NASC stations its *Blackhawks* in Taipei, Kaohsiung, Taichung, Hualien, and Taitung.

Aerospace Industrial Development Corporation (AIDC) maintains a portion of NASC helicopters.[233] Six are currently under the upgrading program and are scheduled to be transferred to Taiwan in August 2020. In January 2020, ROCAF and ROCA *Blackhawk* fleets were grounded after a deadly crash at the beginning of the year took the lives of the CGS at the time and seven other officers and airmen. Upon investigation, no mechanical problems were found.[234]

AH-1W. Beginning in 1992, the ROCA maintains more than 60 AH-1W *SuperCobra*.[235] Since 2013, the Army has contracted repair and maintenance responsibilities to Air Asia and, more recently, AIDC.[236] In 2008, an AH-1W crashed due to a flaw in the engine electronic control unit (EECU).[237] Airframes were upgraded around 2010, however, there was no upgrade in the avionics system.[238] Problems have been identified with tube-launched, optically tracked, wire-guided (TOW) missiles due to concerns over tail rotors being entangled with missile wires.[239] In 2019, the ROCA procured spare parts valued around US$ 50 million (NT$ 1.46 billion) for an estimated usage of three and a half years.[240]

CH-47. In 2003, nine CH-47SD *Chinook* helicopters were introduced into the ROCA inventory.[241] In 2008, one *Chinook* reportedly experienced an engine failure that caused a forced landing, resulting in five minor injuries to personnel.[242] In 2011, only five of eight *Chinooks* were available as the fleet suffered from damaged electronics in the dashboard and a shortage of spare parts. Contractor maintenance for CH-47SDs is performed by Air Asia.[243]

OH-58D. Since the U.S. military is retiring this airframe, MND has purchased around US$ 16.7 million (NT$ 490 million) worth of spare parts for additional 12 years of operation.[244] In the past three years, three accidents occurred with the most recent crash during HK-36 that killed two pilots.[245]

AH-64. In 2015, the fleet of AH-64 *Apache* attack helicopters reportedly had low availability at 27%. Only eight out of 30 helicopters were available, since nine had rust corrosion in tail rotor gearboxes, and 12 lacked spare parts.[246]

Taiwan's *Apache*, *Chinook*, and *Blackhawk* fleets require maintenance, engine test cells, installation of aircraft modifications, and corrosion control support. In fact, the U.S. Army provides a simple process for directing and funding contractor logistics support for deployed forces and international allies. Taiwan could consider U.S. Army contract support for its Army helicopter fleets.

ROC Air Force

The ROCAF maintains 15 aircraft variants and faces obsolescence challenges such as limited material availability for return materials authorization (RMA) of combat aircraft. 12 out of the 15 variants have been in operation for over 18 years. Taiwan's F-5E/F fighters have historically had low availability until the recent procurement of spare parts.[247] Obsolescence challenges are apparent in availability rates for critical aircraft like F-16 and Mirage fighters.[248] Airframes procured from the U.S. and France have encountered problems with Taiwan's humid environment when introduced in Taiwan.[249]

F-16. First introduced in 1997, the ROCAF F-16 fleet encountered several maintenance issues like rust corrosion in the interior, wing-body fairing, and other parts.[250] The failure rate of Taiwan's F-16 A/B Block 20s rose from 10,711 in 2015 to 13,936 in 2018.[251] While operational-level maintenance is managed by designated personnel on Chiayi and Hualien airbases, it is AIDC in Taichung that carries out the intermediate- and partial depot-level maintenance of F-16s (Air Asia also handles parts maintenance).[252] To address these issues, MND initiated the *Phoenix Rising* retrofit program for 142 serving F-16A/B Block 20 jets and the *Phoenix Soaring* procurement program of 66 new F-16C/D Block 70 jets.[253] Scheduled for completion by 2023, the *Phoenix Rising* project has had its budget increased from approximately US$ 3.7 billion (NT$ 110 billion) to US$ 4.7 billion (NT$ 140.2 billion) and has experienced delays in aircraft upgrades.[254] With a US$ 8.2 billion (NT$ 241 billion) budget, the *Phoenix Soaring* project is scheduled to deliver all new F-16Vs by 2026.[255] On July 15, MOEA selected AIDC to manage the F-16 Sustainment Support Center in Taichung.[256]

MIRAGE-2000. The *Mirage* fleet has been a significant budgetary strain for the ROCAF. High costs of procuring and maintaining spare parts, refurbishment, and flight hour requirements have resulted in a higher O&M budget compared to other airframes. Taiwan's *Mirage* pilots have a requirement of at least 15 flight hours and two night sorties a month.[257] However, repair and maintenance issues have reduced average flight hours to less than ten.[258] The operating cost per hour for a single *Mirage* is estimated at US$ 27,000 (NT$ 800,000) which is much higher than for an IDF (US$ 8,500; NT$ 250,000) and an F-16 (US$ 5,400; NT$ 160,000).[259] It is likely that due to such high per unit operating costs, the Mirage only accounts for 0.46% of the ROCAF training budget as opposed to 79.38% for the F-16s. Maintenance budgets have risen with delayed transfers of spare parts.[260] Due in part to environmental factors in Taiwan, the *Mirage* 2000-5 has encountered operational issues such as cockpit fogging and internal electrical system failures.[261] The number of failures has risen annually from 9,447 in 2015 to 13,452 in 2018.[262]

F-5E/F. First introduced in 1974, the ROACAF's F-5E/F had an availability rate of 19.8% in 2010.[263] The contracts for parts delivery were announced on February 10, 2020, and will continue through to October 22, 2022.[264]

Airborne Early Warning (AEW), Transports, and Maritime Patrol Aircraft (MPA). ROCAF E-2 early warning aircraft, C-130 transports, and P-3C also have experienced logistical challenges.[265] In 2018, low availability rates of E-2s reportedly constrained patrol missions in the South China Sea.[266] A refurbishment program for ROCAF C-130 transport aircraft is scheduled to begin in 2021.[267] In 2017, the P-3Cs reportedly had low availability due to obsolescence and circuit board incompatibilities.[268] In 2019, reports surfaced regarding fires on the P-3Cs.[269]

Munitions. The ROCAF maintains a number of munitions for its aircraft. The F-16 inventory includes Advanced Medium-Range Air-to-Air Missile (AMRAAM), *Maverick*, *Sparrow*, *Sidewinder*, air-launched *Harpoon*, Joint Direct Attack Munition (JDAM), Joint Standoff Weapon (JSOW), and AGM-84 High-speed Anti-Radiation Missile (HARM).[270] In 2019, the ROC Army procured 250 FIM-92 *Stinger* missiles for approximately US$ 216.7 million (NT$ 6.5 billion).[271] The wire-guided TOW-2A anti-tank missiles the ROC Army procured from 1997 to 2002 encountered issues like insulation failure, range limitation, and environment interference. In 2019, the ROC Army purchased between 1,240 and 1,700 wireless TOW-2B anti-tank missiles for approximately US$ 373 million (NT$ 11.4 billion).[272]

Taiwan's missile defense includes the indigenously developed *Tien Kung* ("Sky Bow") III and the U.S. Patriot Advanced Capability (PAC)-2 and PAC-3 systems.[273] The procurement of Terminal High Altitude Area Defense (THAAD), however, would likely face budget limitations.[274] In July 2020, the U.S. Department of State approved Taiwan's request for the recertification of PAC-3 air defense missiles for US$ 620 million (NT$ 18 billion).[275] A significant number of PAC-3 rounds were included in the package.[276]

ROC Navy

The ROCN also has faced logistical challenges. For example, the ROCN's four submarines have been in service for over 30 years. Two U.S.-made *Guppy*-class submarines have been in commission since 1974; and two Netherlands-built *Sea Dragons* have been in commission since 1987.[277] A major refurbishment program for the *Guppy*-class submarines, produced in 1944, commenced in 2015 and was completed in 2018.[278] Relying heavily on NCSIST and China Shipbuilding Corporation (CSBC), the ROCN's ability to maintain obsolete submarines has been commendable in light of the unavailability of spare parts. The *Sea Dragons* are also undergoing the life-extension project with the assistance of Lockheed Martin and an Israel-Italian provision of equipment.[279] Over the next two years, the ROCN may procure MH-60R to replace obsolete ASW platforms, such as the S-70C.[280] Repair and maintenance of major combatants are often delayed by as much as a year.[281] As a final note, major surface combatants (FFGs and DDGs) have deferred a mid-life upgrade. As such, logistical troubles for the ROCN take on a special path and would, therefore, require a more comprehensive solution.

Munitions. In 2020, the ROC Navy procured 18 Mk-48 Mod6 AT torpedoes.[282] Considering the shortage of anti-ship missiles, the ROC Navy spent approximately US$ 1.7 billion (NT$ 51 billion) on AGM-84 *Harpoon* missiles that are scheduled to be transferred in 2023.[283]

Case Study: Using HED technology to Reduce O&M Costs

One means of improving readiness is reducing life-cycle costs through the introduction of advanced, forward-looking technology. Hybrid electric drive (HED) technology is a prime example. The marine power system that marries an electric motor to the ship's main propulsion plant to enable the ship to draw power from the ship's electric generators and shut down main propulsion engines for use at lower speeds, significantly improves overall fuel efficiency and lowers costs. HED technology is being widely adopted on new-generation warships by most major modern navies, including the Royal Navy (Type 26 Frigate, Type 45 Destroyer, Queen Elizabeth-class aircraft carrier), France/Italy (FREMM, also operated by Egypt, Greece, and Morocco), Spain (F110 frigate), Germany (F125 frigate), South Korea (FFX-II frigate), Japan (new destroyers).

HED systems enjoy lower operations and maintenance costs than traditional diesel and gas turbine power plants. One recent analysis suggested that hybrid diesel-electric propulsion can reduce fuel consumption and CO2 emissions by 10% to 25% compared to gas-turbine-electric propulsion. Frigates with HED power plants have significantly greater cruising range. HED causes less wear-and-tear on the main propulsion system. Studies have shown that long-term savings associated with HED would more than pay for any higher upfront procurement costs associated with such a system.

Because HED is decoupled from the gearbox and main propulsion engines, there is no gearbox noise and vibration during slow speeds. This is particularly well-suited for anti-submarine warfare and anti-air warfare missions, which tend to involve long periods of cruising at relatively low speeds. Quiet operation also contributes to improved survivability, especially against threats such as advanced Chinese submarines with improved acoustic sensors.

The ROC Navy is in the process of building a new generation of surface combatants (as well as submarines), which could greatly benefit from the life cycle cost savings and operational capabilities afforded by this new HED propulsion technology. Since it is prohibitively expensive to retrofit such a system after a ship has been completed, it would be advisable to incorporate a HED power plant into the original design specifications.

Section Summary

While there is a good reason for senior authorities on Taiwan to hope and plan for potential *ad hoc* coalition operations with intervening U.S. forces, the Taiwan Relations Act (TRA) is no substitute for a mutual defense treaty. The susceptibility of Taiwan's leadership to coercion is dependent upon several factors. Perhaps most important is Taiwan's ability to survive initial strikes, reconstitute an operational capability, deny or reduce the PLA's capacity for offensive operations, and increase the PRC's willingness to negotiate on terms more favorable to Taipei. This would include undercutting the PLA's ability to project force through passive means, striking directly at PLA power projection at its source, and/or raising the costs of PLA action through attrition. Such an effort, combined with other instruments of national power, would be intended to raise the costs of PLA military action and force a negotiated settlement on favorable terms as soon as possible, and before the escalation of conflict. The PLA guiding strategy of "rapid war, rapid resolution" increases Taiwan's requirement to conduct operations without the help of the international community.

Debates over relative levels of defense spending continue to complicate Taiwan's strategic planning. The internal debate over increased spending does not symbolize a lack of commitment

to Taiwan's defense. There is a basic consensus that Taiwan needs an adequate self-defense. But debates surround what constitutes "adequate" within the context of Taiwan's broader national security strategy. Differences exist over how to best manage limited economic resources to ensure the long-term survival of Taiwan's democracy in a difficult environment. In this environment, the perception that the United States views the value of Taiwan in terms of its defense expenditures rather than its overall security runs the risk of diminished U.S. relevance in Taiwan. A segment of Taiwan's population already sees its future linked with the mainland rather than with the U.S.-led community of democracies.[284]

One of the more cost-effective and time-efficient ways for Taiwan to enhance its operational readiness is to modify its near-term military investment and logistics support policy to allow for direct procurement of off-the-shelf or U.S. military standard equipment to meet select requirements, instead of an insistence on indigenous development and production across the board. While local sourcing could benefit Taiwan's domestic industrial base and promote a degree of self-sufficiency, programs requiring significant research, development, testing, and evaluation (RDT&E) have often suffered from significant schedule delays, budget overruns, and even performance shortfalls. Therefore, for systems that are intended to meet near-term requirements and/or are readily available on the international market, it would make more sense for the Taiwan military to competitively source such equipment directly.

Readiness and *Ad Hoc* Coalition Operations in the Taiwan Strait

Is the United States ready for a future crisis in the Taiwan Strait? In its 2019 Indo-Pacific Strategy Report, DoD noted a vital interest in "upholding the rules-based international order, which includes a strong, prosperous, and democratic Taiwan."[285] According to the Taiwan Relations Act, which essentially replaced the U.S.-ROC Mutual Defense Treaty as a commitment, "it is in U.S. interests to maintain the capacity to resist the use of force and other forms of coercion."[286] Taiwan has long been the front line of defense against Chinese use of force. However, the degree to which American planners have focused on such a contingency has ebbed and flowed over the decades.

A coalition is "an *ad hoc* arrangement between two or more nations for common action."[287] Since 1954, the United States has carried out contingency planning to guide possible U.S. military responses to a Taiwan Strait crisis. The U.S.-ROC Mutual Defense Treaty was signed on December 2, 1954, and entered into force on March 3, 1955. The treaty was limited in territorial scope to the defense of Taiwan and the Penghu Islands. Article 2 of the U.S.-ROC Mutual Defense Treaty stated:

> *In order more effectively to achieve the objective of this Treaty, the Parties separately and jointly by self-help and mutual aid will maintain and develop their individual and collective capacity to resist armed attack and communist subversive activities directed from without against their territorial integrity and political stability.*[288]

The operational manifestation of the U.S.-ROC Mutual Defense Treaty was a combined OPLAN for the defense of Taiwan, known as *Rochester*.[289] *Rochester* was a combined OPLAN until 1979. An OPLAN drives budgets, training and exercises, tests assumptions, shapes doctrine, creates intelligence requirements, energizes logisticians, and informs command and control.[290]

The U.S. Taiwan Defense Command (USTDC) was responsible for *Rochester* alongside the ROC Chief of the General Staff and his J-3 planners.[291] The initial combined plan was drafted in March 1955.[292] *Rochester* and combined readiness was evaluated through a series of command post exercises known as *Food Chain.* In 1975, the CPX highlighted vulnerabilities of logistics in a blockade scenario.[293] Other plans included the USAF contingency named *Commando Domino*, and a combined plan for the "return to the mainland" was codenamed *Blue Lion*.[294] The United States maintained nuclear weapons on Taiwan until 1974. After 1979, a concept plan (CONPLAN) guided thinking about U.S. intervention.[295]

The U.S. Taiwan Defense Command was formed in 1954 based on the Formosa Liaison Center (Task Force 74). Until 1979, USTDC was responsible for operational coordination with ROC military counterparts as well as combined operations. Reporting to the U.S. Pacific Command (USPACOM), USTDC was a sub-unified command under a three-star Navy admiral. U.S. personnel were assigned to the USTDC headquarters, which were located on Taipei's Chungshan North Road around Taipei Air Station (not far from today's AOC).[296]

The Military Assistance and Advisory Group (MAAG) was responsible for ensuring readiness. MAAG was under a U.S. Air Force (USAF) major general with multiple chains of command.[297] Its headquarters were located where the old American Institute in Taiwan (AIT) Taipei building

used to be.[298] U.S. military personnel were assigned to USTDC and MAAG. U.S. military personnel on Taiwan numbered around 19,000 in 1958, then dropped to under 10,000 by the 1970s.[299] Some officers were assigned to USTDC and MAAG. Others were stationed at Shu Linkou Air Station to the northwest; Tsoying Naval Base near Kaohsiung; and Hsinchu, Chiayi, Tainan, and Ching Chuan Kang airbases. U.S. Navy ships often carried out port calls in Kaohsiung and Keelung. USTDC formally lowered its flag on April 26, 1979.

One year after the break in diplomatic relations, the Carter administration terminated the U.S.-ROC Mutual Defense Treaty. In 1979, ship visits and combined training were deemed consistent with the unofficial nature of U.S.-ROC relations. Between 1979 and 2001, few operationally focused U.S. active-duty military personnel stepped foot on the island.[300] The TRA in effect supplanted the treaty as the legal basis for continued U.S. support. Like the Mutual Defense Treaty, the TRA includes the provision of necessary defense articles and services and maintenance of the capacity to resist the use of force and other forms of coercion.[301]

U.S.-Taiwan defense relations have evolved since the signing of the U.S.-ROC Mutual Defense Treaty. Today, the TRA serves as the legal basis and guide for U.S. relations with Taiwan. The TRA enshrines the U.S. commitment to assist Taiwan in its self-defense. It stipulates that U.S. policy is to provide Taiwan with arms of a defensive character.[302] Subsequent to the TRA, the Reagan administration negotiated a joint communiqué with the PRC that sought to limit the quality and quantity of U.S. arms sales to Taiwan. However, curbing arms sales was contingent upon the nature of the threat posed to Taiwan and a peaceful approach to resolving cross-Strait differences. Despite all these limitations, the Six Assurances that President Reagan made to Taiwan after the conclusion of the 1982 Communiqué (and later passed as a resolution in the Congress in 2016) also stipulated that there is no certain end date of the U.S. arms sales to Taiwan, and that the U.S. does not engage in prior consultations with Beijing on arms sales to Taiwan. A declassified memo in 2019 confirmed that former President Reagan directed that "the quality and quantity of the arms provided to Taiwan depend entirely on the threat posed by China."[303]

The TRA has no clause legislating U.S. intervention in a cross-Strait conflict, only to "maintain the capacity to resist the use of force and other forces of coercion."[304] The TRA stipulates that the President informs Congress and consults on the appropriate action, should there be "any threat to the security or the social or economic system of the people on Taiwan."[305] Under the 1973 War Powers Resolution, the President could encounter legal restraints in responding to PLA use of force. Limiting the President's introduction of U.S. armed forces in a foreign conflict, the War Powers Act allows for intervention under certain circumstances. Without a declaration of war, U.S. armed forces can be introduced into hostilities. The act requires a report outlining the actions necessitating the intervention, the constitutional and legislative authorities for the intervention, and the estimated scope and duration of the military involvement, 48 hours after the introduction. The President is authorized to use U.S. armed forces for 60 days, with a potential 30-day extension, without Congressional authorization. Successful U.S. intervention in a cross-Strait crisis must consider the delay required for Congressional authorization of the U.S. military deployment and the speed for the modernized PLA troops to defeat Taiwanese resistance.[306]

In 1955 and 1958, Congress passed resolutions authorizing the President to send armed forces to the Taiwan Strait to deter further Chinese military actions against Taiwan.[307] Tensions during this

period took place in the context of the U.S.-ROC Mutual Defense Treaty and before the enactment of TRA in 1979. In 1996, the President approved the deployment of U.S. Navy carrier battle groups off the coast of Taiwan.[308]

Congress has made attempts to smooth the process for a situation in which the United States decided to intervene in a Taiwan contingency. On July 29, 2020, Representative Ted Yoho introduced the *Taiwan Invasion Act* (H.R.7855), which would clarify and strengthen the commitment of the United States to defend Taiwan in the event of an armed attack.[309] The bill calls upon the President to declare that it is the policy of the United States to protect Taiwan from coercive actions of the PRC, and that "it is the policy of the United States to demand that the PRC renounce the use or threat of military force in any attempt to unify Taiwan."[310] It would establish a specific statutory authorization for the President under the War Powers Act to use military force to protect Taiwan under the following conditions: 1.) the PLA attacks the ROC armed forces; 2.) the PLA takes territory that is under the ROC's jurisdiction; and 3.) the lives of military forces or civilians within the ROC's jurisdiction that have been killed or are in imminent danger of being killed.[311]

The form of a U.S. response to the use of force would depend upon multiple factors. These include the specific trigger for Chinese military action, U.S. military capabilities and commitments in other parts of the world, PLA capabilities and warning time, and ROC strategic and operational readiness.[312] Maintaining the capacity to resist the use of force requires deliberate planning, latent interoperability, deep interdiction capabilities, and prepositioned stocks that could be made available for use by the U.S., allies, and *ad hoc* coalition partners in a crisis.[313]

PLA coercive air and missile campaigns carried out between 1995 and 1999 triggered a fundamental restructuring of U.S. defense relations with Taiwan. Understanding disconnects that happened since the break in diplomatic relations, the Clinton administration opened a new channel of security dialogue known as the Monterey Talks. With the first round in late 1997, the talks were initially between the two defense establishments. By 2001, the talks elevated to an Assistant Secretary of Defense-level on the U.S. side and NSC Deputy Secretary General on the Taiwan side. Further restructuring took place between 2001 and 2004 with the suspension of the annual U.S.-Taiwan Arms Sales Talks and introduction of the Defense Review Talks, Security Cooperation Talks, General Officer Steering Group (GOSG), and institutionalized Service-level meetings. In 2002, Office of the Secretary of Defense (OSD) Policy and MND counterparts also developed and coordinated a Joint Work Plan (JWP) to guide the overall defense and security relationship through a common long-term vision, focus areas, goals, objectives, and actions.[314]

The Monterey Talks reinvigorated operational-level dialogue with Taiwan that had been suspended since 1979. By 2001, conceptual planning reportedly evolved into a U.S.-only OPLAN.[315] A standing joint task force (JTF-519) was stood up, giving PACOM a fully deployable force capable of planning and executing responses to regional contingencies, including PLA use of force against Taiwan. JTF-519 was mobilized for its first exercise aboard the USS Blue Ridge in October 2002. CPX *Terminal Fury* tested the abilities of JTF-519 to respond quickly to emergencies.[316] FTX *Valiant Shield* tested U.S. readiness to respond to a wide range of regional contingencies. The first exercise in 2006 involved three U.S. carrier strike groups, the 13th Air Force—augmented by elements of continental U.S. (CONUS)-based U.S. Air Force commands—

the III Marine Expeditionary Force (MEF), and the U.S. Coast Guard.[317] In 2010, indications existed of a change in deliberate planning.[318]

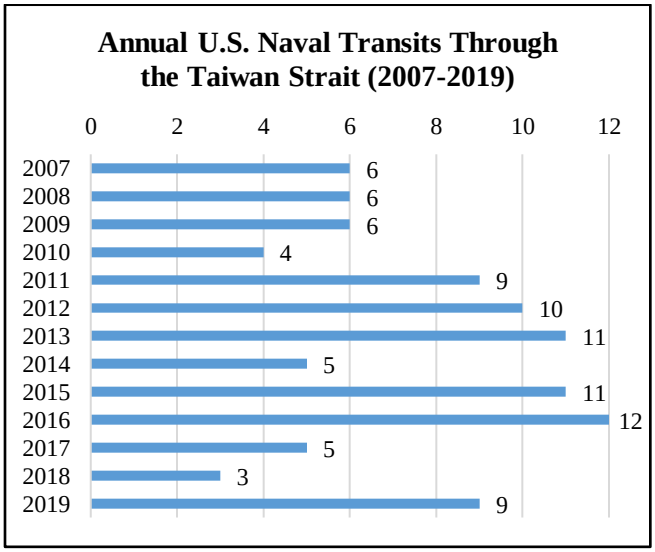
In an invasion scenario, gravity and the tyranny of distance complicate U.S. ability to respond. Unencumbered by gravity, U.S. airpower functions as a rapid reaction force. Theoretically speaking, a combination of U.S. air and sea power alone should be able to degrade PLA theater-level command and control and interdict 40% of the PLA's amphibious ships. Even if presented with a *fait accompli*, the U.S. must be able to rally an international coalition for a protracted political, economic, and military struggle with a nuclear-armed China.[319]

In the absence of a Mutual Defense Treaty, latent interoperability ensures assigned U.S. forces can operate with ROC counterparts efficiently and effectively as *ad hoc* coalition partners. Key elements of latent interoperability include unity of effort, combined doctrine, pre-established command and control arrangements, language qualified personnel, a common operational picture, and secure communications.

In a high-intensity invasion scenario, defense requires the ability to interdict single points of failure in the PLA's joint operational system. Key targets in a PLA kill chain include theater-level command, control, and communications system, ISR hubs, and logistics centers. Due to escalation control concerns, deep interdiction operations would likely require Presidential-level approval.

Persistent ISR and Regional Presence. Readiness for *ad hoc* coalition operations requires persistent presence. U.S. Navy transits through the Taiwan Strait have been consistent over the last 10 years. However, their publicity has not.[320] Since 2018, U.S. Navy transits have received greater media coverage. Worth noting are reports of deliberate activation of the ship automatic identification system (AIS) to make their passage more traceable.[321] In addition, U.S. allies including Australia, Canada, France, the Philippines, and the United Kingdom have also joined FONOPs through the Taiwan Strait in a more visible manner.

Annual Publicized U.S. Naval Transits Through the Taiwan Strait (2007-2019)[322]



(Figure 9: Annual Publicized U.S. Naval Transits Through the Taiwan Strait (2007-2019). *Source: Various.*[323])

As a final note, pre-positioned stocks on Taiwan would be critical not only for possible transfer to the ROC armed forces, but also for other regional contingencies. The War Reserve Stocks for Allies (WRSA) program was created through Section 514 of the Foreign Assistance Act of 1961. This legislation allows the United States to store war reserve stocks abroad then, as needed, transfer to a foreign government through FMS.[324] Under a WRSA program, the U.S. maintains title to munitions and other stocks. That title must be transferred to the foreign country. Every fiscal year, Congress determines the value of assets transferred into WRSA stockpiled in foreign countries by authorizing legislation.[325]

In the case of Taiwan, the Indo-Pacific Command (INDOPACOM), in partnership with the host, would recommend specific munitions, critical spare parts, and other equipment to be stored. U.S. Services, such as Headquarters, and the U.S. Army or Air Force, also provide guidance and policy for inclusions in the WRSA cache.[326] DoD would not necessarily order new munitions or spare parts for WRSA programs, instead using existing stocks of the U.S. armed forces. Congress authorizes stockpile value levels and transfers, but not the specific contents.[327] Potential transfers of ownership of WRSA assets are decided by DoD and do not need Presidential or Congressional approval.[328]

WRSA storage and maintenance responsibilities are negotiated with the host country. For example, an U.S.-Israeli bilateral agreement outlines responsibilities related to storage, maintenance, in-country transit, and other WRSA-related costs. Israel is responsible for constructing and maintaining WRSA storage facilities, using a combination of its own resources and U.S. Foreign Military Financing. The Israeli government also funds the packaging, shipping, and transportation of arms supplies to WRSA facilities. U.S. European Command (EUCOM) would manage future reserve stocks for Israel and would be responsible for safeguarding materiel. In the case of a transfer to the Israeli military in a crisis, U.S. policymakers would retroactively create an FMS case.[329] WRSA stocks in Israel are stored at six sites, the locations of which are classified.[330]

Defense Articles and Services

Arms sales and technical assistance have been another form of assistance. In recent years, the U.S. has become more responsive to Taiwan's requests for defense articles and services. In the past decade, there were 20 U.S.-Taiwan arms deals in the latter half when there were only eight in the first half. There is no such scale of an increase of arms sales in other customers of U.S. arms deals. The increasing frequency of arms sales shows the change in U.S. arms sales policy toward Taiwan. In the past, arms deals between the U.S. and Taiwan were mostly large packages, which would include many articles and services at a time, yet lack the flexibility of negotiation. Bundled packages deals also shrank Taiwan's defense budget space.

U.S. Major Arms Sales to Taiwan (2010-2020)[331]		
Time	*Details*	*Cost (US$)*
January 29, 2010	Multifunctional Information Distribution Systems (MIDS) / RTM-84L and ATM-84L HARPOON Block II Telemetry Missiles / UH-60M BLACK HAWK Helicopters / PATRIOT Advanced Capability-3 (PAC-3) Firing Units, Training Unit, and Missiles / Two OSPREY Class Mine Hunting Ships Including Refurbishment and Upgrade	$6,392,000,000
September 21, 2011	Pilot Training Program / Retrofit of F-16A/B Aircraft / Foreign Military Sales Order II (FMSO II)	$5,852,000,000
December 16, 2015	Javelin Missile / Assault Amphibious Vehicles (AAVs) / Advanced Tactical Data Link System (TATDLS) and Link-11 Integration / Follow-On Support / Oliver Hazard Perry Class Frigates / MK 15 Phalanx Block 1B Baseline 2 CIWS Guns, Upgrade Kits, Ammunition, and Support / TOW 2B Aero Radio Frequency (RF) Missile (BGM-71F-Series), Support and Training / Block I-92F MANPAD Stinger Missiles and Related Equipment and Support	$1,718,000,000
June 29, 2017	Surveillance Radar Program (SRP) Operation and Maintenance Support / AGM-88B High-Speed Anti-Radiation Missiles (HARM) / SM-2 Block IIIA Standard Missiles and Components / MK 48 Mod 6AT Heavyweight Torpedo (HWT) / MK 54 Lightweight Torpedo (LWT) Conversion Kits / AGM-154C Joint Standoff Weapon (JSOW) Missiles / AN/SLQ-32(V)3 Upgrade	$1,363,000,000
September 24, 2018	Foreign Military Sales Order (FMSO) II Case	$330,000,000
April 15, 2019	CONUS Based F-16 Training	$500,000,000
July 8, 2019	M1A2T Abrams Tanks and Related Equipment and Support / Stinger Missiles and Related Equipment and Support	$2,223,560,000
August 20, 2019	F-16C/D Block 70 Aircraft and Related Equipment and Support	$8,000,000,000
May 20, 2020	MK 48 Mod 6 Advanced Technology (AT) Heavy Weight Torpedo (HWT)	$180,000,000
July 9, 2020	Repair and Recertification of Patriot Advanced Capability-3 Missiles	$620,000,000

For 20 years after the break in diplomatic relations with the ROC, U.S.-Taiwan defense cooperation was mostly limited to the provision of defense articles and services.[332] From Beijing's perspective, U.S. arms sales to Taiwan are the thorniest issue in U.S.-China relations. U.S. arms sales to Taiwan, according to authorities in Beijing, infringe upon China's sovereignty and

territorial integrity, contradict perceived agreements reached in the three Sino-American Joint Communiqués, and undermine efforts to resolve political differences on its own terms. Since the abrogation of the Mutual Defense Treaty, Beijing's responses to U.S. arms sales announcements have ranged from diplomatic protests to implicit threats of imposing monetary damages on U.S. interests and on U.S. companies.[333]

The PRC may be increasingly able to inflict costs against U.S. arms sales to Taiwan, which long have been a symbol of Taiwan's unresolved international status. Strident PRC protests regarding U.S. arms sales to Taiwan, and public diplomacy campaigns designed to garner international support for Beijing's cross-Strait policy are intended to undermine support for arms sales in Washington. While calls for the abrogation or amendment of the TRA continue to be employed by the PRC, the U.S. has reiterated a policy guided by the Three Communiqués, the TRA, and the Six Assurances.

Arms sales by themselves do not assure peace and stability. Security ties between Washington and Taipei are part of a broader effort to allow Taiwan to engage counterparts with confidence and hedge against military and economic coercion from Beijing.[334] As then-Deputy Assistant Secretary of State David Shear explained before the U.S. Economic and Security Commission in 2010, "Taiwan must be confident that it has the physical capacity to resist intimidation and coercion in order to engage fully with the mainland."[335]

Section Summary

In the absence of a U.S.-ROC Mutual Defense Treaty and U.S. military presence on Taiwan, such as USTDC and MAAG, the TRA remains the bedrock of U.S.-Taiwan relations. The U.S. commitment to Taiwan's defense comes in two forms: to help Taiwan defend itself from within, and to help defend Taiwan from without. The former has been upheld by continued and unbundled arms packages as well as bilateral defense dialogues. The latter has been shrouded by strategic ambiguity. Although there are both clear procedures for which the President of the United States would direct the military to intervene in a cross-Strait conflict, as well as a renewed Congressional movement to solidify the commitment to defend Taiwan, the uncertain nature of a potential *ad hoc* coalition has obscured meaningful joint and unilateral operational planning for both the U.S. and Taiwan.

The ROC armed forces will not assume that the United States will intervene in support of Taiwan if the PLA initiates an amphibious invasion. Should the U.S. choose to intervene, however, in the current state of U.S.-Taiwan security cooperation there would be a plethora of operational challenges. Deepened bilateral military engagements could alleviate challenges to a potential *ad hoc* coalition, including latent interoperability, pre-positioned stocks, and a joint mechanism to specifically enhance Taiwan's defense strategy and augment situational awareness. A joint statement could direct a clear, bilateral unity of effort.

Conclusion and Recommendations

Taiwan continues to face an existential threat from across the Strait. An amphibious invasion by the PLA is only one possible course of annihilation for Beijing. Below the threshold of military conflict, there remains a plethora of coercive options the CCP could take that have less defined responses within Taiwan's security apparatus. Beijing could instead opt for a blockade, decapitation, or mass attacks on Taiwan's communications network and power grid. Taiwan's government must render their leadership, ROC armed forces, and civil society capable of mustering a decisive response to any Chinese action on the spectrum of coercion.

Publicly available documents evaluated in this report indicate that there exists a robust infrastructure and set of procedures that the ROC government would initiate prior to, and during, a crisis. Taiwan has increasingly shown a willingness to address current challenges to operational readiness. However, of all the factors why Beijing has not elected to use force against Taiwan, the strength of Taiwan's military and resiliency of its government are unlikely the primary deterrents. The TRA remains not only the bedrock of U.S.-Taiwan security relations but also the paramount variable in the strategic calculus on both sides of the Taiwan Strait. Taiwan's operational plan does not assume the U.S. will intervene, but it is in the interest of both the U.S. and Taiwan to enhance overall readiness for a possible *ad hoc* coalition. Strategic and operational readiness could be enhanced through improving unity of effort, latent interoperability, and combined logistics. We offer five recommendations for the consideration of policymakers in Washington and Taipei:

(1) **U.S.-ROC (Taiwan) Joint Statement.** Unity of effort requires a negotiated joint statement that is communicated publicly to domestic audiences in the U.S. and Taiwan. In January 2021, an incoming U.S. administration should initiate negotiations for a U.S.-Taiwan Joint Statement. Worth noting is that the 1972 U.S.-PRC Joint Communiqué was considered consistent with the nature of a U.S. One China policy.

(2) **U.S.-Taiwan Joint Working Group.** Bilateral mechanism, including both policy-level and working-level, provides guidance and assistance for Taiwan to fully implement and institutionalize the ODC, particularly in regard to restructuring Taiwan's force, systems acquisition process, joint doctrine, joint operational planning, and joint training. It can plan for assumptions with or without U.S. support, and for successful PLA beach landings. scenarios if the PLA successfully lands on the beach.

(3) **WRSA on Taiwan.** After attaining interagency approval and consultation with Taiwan, the Department of Defense should seek Congressional appropriation of funding for a WRSA program in Taiwan (WRSA-T), including justification, site plan, and level of funding needed. U.S. INDOPACOM would recommend priorities for munitions, spare parts, and other items to be stored on Taiwan.

(4) **UAVs.** Taiwan may consider a parallel program to acquire advanced, long-endurance UAVs, such as MQ-9Bs, through direct procurement of off-the-shelf solutions that can be delivered quickly and brought into operational service with the full support and experience of the U.S. military and U.S. industrial base.

(5) **Helicopter Repair and Maintenance.** Taiwan should consider U.S. Army contract support for its Army helicopter fleets. The U.S. Army provides a simple process for directing and funding contractor logistics support for deployed forces and international allies. Taiwan's *Apache* (AH-64), *Chinook* (CH-47), and *Blackhawk* (UH-60) helicopters require maintenance, engine test cell, installation of aircraft modifications, and corrosion control support.

Appendix: ROC Joint Exercises

ROC Joint Exercises	
Exercise	*Description*
Sino-American Joint Military Exercises	Initiated after the establishment of the U.S.-ROC alliance, the Sino-American Joint Military Exercises Terminated after the expiration of the Sino-American Mutual Defense Treaty in 1979.[336]
Hanyang (漢陽演習)	Hanyang exercises were first conducted in August 1979 as the national military exercises for the ROC Army.[337] In December 1981, then-Chief of the General Staff Hau Pei-tsun (郝柏村) incorporated all three services in the Hanyang Exercises.[338] The objective of Hanyang exercises was to simulate offensive operations to "Reclaim the Mainland."[339]
HK-1 (1984)	Presided over by CGS Hau, HK-1 was held on Penghu Island on June 23, 1984, and focused on firepower demonstrations.[340] Unlike Hanyang exercises, Hankuang exercises focused on defensive operations.[341]
HK-2 (1985)	HK-2 was held in Pingtung and focused on anti-amphibious landing operations.[342]
HK-3 (1986)	HK-3 was held in Yilan and focused on anti-amphibious landing operations.[343]
HK-4 (1987)	HK-4 was held in Taichung and focused on annihilation operations.[344]
HK-5 (1988)	HK-5 was held in Yilan and Tainan, and focused on anti-amphibious landing operations.[345]
HK-6 (1989)	HK-6 focused on defensive operations.[346]
HK-7 (1991)	-
HK-8 (1992)	HK-8 focused on anti-blockade operations.[347]
HK-9 (1993)	HK-9 focused on anti-amphibious landing operations.[348]
HK-10 (1994)	HK-10 primarily was held in Taitung in May. During the exercises, Taiwan's S-2T tracker spotted a PLA submarine near Penghu.[349]
HK-11 (1994)	In September, a target-towing Learjet was mistakenly shot with four onboard killed.[350]
HK-12 (1996)	Postponed from 1995 to 1996 because of PLA exercises in the Taiwan Strait, FTX cancelled.[351]
HK-13 (1997)	U.S. expressed concern over HK-13 in late June before transfer of Hong Kong.[352]
HK-14 (1998)	One U.S. submarine and two PLA submarines reportedly appeared in waters southeast of Taiwan.[353]
HK-15 (1999)	HK-15 featured the first exercises of offshore operations and information warfare simulation that included logic bombs.[354]
HK-16 (2000)	HK-16 postponed due to the Presidential election.[355] Exercise simulated PLA DF-15 missile attacks on non-political-economic centers in Taiwan.[356]
HK-17 (2001)	F-16 first successfully fired AGM-84 Harpoon missile.[357]

HK-18 (2002)	FTX held from June 3 to 7.[358] President Chen Shui-bian confirmed the U.S. observers during Hankuang Exercises.[359]
HK-19 (2003)	Joint operation exercises postponed until September due to SARS.[360] Live fire exercises postponed due to typhoon.[361] MND confirmed U.S. military observers.[362]
HK-20 (2004)	HK-20 debuted the JTLS during the CPX.[363] Live fire exercises were canceled in respond to PLA's suspension of exercise on Dongshan Island.[364]
HK-21 (2005)	FTX held in June, focused on anti-terrorism and anti-unrestricted warfare. Anti-unrestricted warfare was featured for the first time.[365]
HK-22 (2006)	CPX held from April 17 to 22, FTX in July, primarily in Yilan.[366] HK-22 featured focused exercises including anti-amphibious landing operations, anti-airborne, anti-assault, and urban warfare.[367] HK-22 featured the first anti-hacker drill.[368] During a live fire exercise, two TOW missiles missed the targets and exploded near President Chen.[369]
HK-23 (2007)	CPX held from April 16 to 18, FTX from May 14 to 18.[370] An F-5F crashed during a preparatory exercise that killed two pilots and two Singaporean trainees.[371]
HK-24 (2008)	CPX held from June 23 to 27, FTX held from September 22 to 26.[372] Many exercises cancelled due to typhoon.[373]
HK-25 (2009)	HK-25 was the first exercise that only held CPX with FTX planned to be conducted every two years.[374]
HK-26 (2010)	FTX held from April 26 to 30, CPX from 19 to 23.[375] HK-26 was the first time that both FTX and CPX were conducted during the Ma administration.[376]
HK-27 (2011)	FTX held from April 11 to15, CPX from July 18 to 22.[377] Since 2011, FTX have been conducted every year.[378]
HK-28 (2012)	FTX held from April 16 to 20, CPX from July 16 to 20.[379]
HK-29 (2013)	FTX held from April 15 to 19, CPX from July 15 to 19. HK-29 featured the first live-fire exercise since 2008.[380]
HK-30 (2014)	CPX held from May 19 to 23, FTX from September 15 to 19.[381] HK-30 featured systems including E-2K, AH-64, LT-2000, P-3C, and civilian aircraft.[382]
HK-31 (2015)	CPX held from May 4 to 8, FTX from September 7 to 11.[383] FTX featured new weapon systems including P-3C, Tuo Jiang stealth missile corvette, Pan Shi supply vessel, Cloud Leopard armored vehicles, UAVs.[384]
HK-32 (2016)	CPX held from April 25 to 29, FTX from August 22 to 26.[385] Highlights of HK-32 include first intraservice confrontations like the Army's Changtai (長泰) Exercises, the Navy's Haichiang (海強) Exercises, and the Air Force's Tienlung (天龍) Exercises.[386] HK-32 also featured the first inclusion of the National Airborne Service Corps.[387]
HK-33 (2017)	CPX held from May 1 to 5, FTX from May 22 to 26.[388]
HK-34 (2018)	CPX held from April 30 to May 4, FTX from June 4 to 8.[389]

HK-35 (2019)	CPX held from April 22 to 26, FTX from May 27 to 31.[390] HK-35 featured the debut of CM-34 Clouded Leopard armored vehicles and fighter jets landing, refueling, and rearming on highways.[391]
HK-36 (2020)	The exercises were postponed because of COVID-19.[392] FTX held from July 13 to 17, CPX scheduled for September 14 to 18.[393] HK-36 features the first appearance of combined arms battalions.[394] Major accidents include the death of two pilots in a OH-58D crash, and two Marines after a dinghy capsized.[395]

List of Acronyms

A2/AD	Anti-Access/Area Denial
AAV	Assault Amphibious Vehicle
ADIZ	Air Defense Identification Zone
AEW	Airborne Early Warning
AIDC	Aerospace Industrial Development Corporation
AIS	Automatic Identification System
AIT	American Institute in Taiwan
AM	Amplitude modulation
AMRAAM	Advanced Medium-Range Air-to-Air Missile
AOC	Air Operations Center
ASAT	Anti-satellite
ASCM	Anti-ship Cruise Missile
ASW	Anti-submarine Warfare
AT	Advanced Technology
BDA	Battle Damage Assessment
C-UAS	Counter-UAS
C2	Command and Control
C3I	Command, Control, Communications, and Intelligence
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CCP	Chinese Communist Party
CDCM	Coastal Defense Cruise Missile

CGA	Coast Guard Administration
CGS	Chief of the General Staff
CIWS	Close-in Weapon System
CMC	Central Military Commission
CMC/JSD	Central Military Commission Joint Staff Department
COGCON	Continuity of Government Readiness Condition
COMINT	Communications Intelligence
CONPLAN	Concept Plan
CONUS	Continental United States
COP	Common Operational Picture
CPX	Command Post Exercise
CSBC	China Shipbuilding Corporation
CTS	Chinese Television System
DF	Dongfeng
DGBAS	Directorate General of Budget, Accounting and Statistics
DHS	Department of Homeland Security
DIA	Defense Intelligence Agency
DoD	Department of Defense
DPP	Democratic Progressive Party
DRRS	Defense, and Readiness Reporting Systems
ECM	Electronic Countermeasure
EECU	Engine Electronic Control Unit

ELINT	Electronic Intelligence
EMP	Electromagnetic Pulse
ETC	Eastern Theater Command
ETC/JSD	Eastern Theater Command Joint Staff Department
EUCOM	European Command
EW	Electronic Warfare
EY	Executive Yuan
FM	Frequency Modulation
FMS	Foreign Military Sales
FMSO	Foreign Military Sales Order
FONOP	Freedom of Navigation Operation
FTX	Field Training Exercise
GDP	Gross Domestic Product
GEOSS	Global Earth Observation System of Systems
GOSG	General Officer Steering Group
GPS	Global Positioning System
GSD	General Staff Department
HARM	High-speed Anti-Radiation Missile
HED	Hybrid Electric Drive
HF	Hsiungfeng
HK	Hankuang
HWT	Heavyweight Torpedo

I&W	Indications and Warning
IADB	Inter-American Development Bank
ICBM	Intercontinental Ballistic Missile
IDF	Indigenous Defense Fighter
IEOS	Integrated Earth Observation System
IMSE	Improved Mobile Subscriber Equipment
IP	Internet Protocol
IPv6	IP version 6
INDOPACOM	Indo-Pacific Command
ISAR	Inverse Synthetic Aperture Radar
ISR	Intelligence, Surveillance, and Reconnaissance
ISTAR	intelligence, Surveillance, Target-acquisition, Reconnaissance
J-3	Operations and Plans
JDAM	Joint Direct Attack Munition
JSOW	Joint Standoff Weapon
JTF	Joint Task Force
JTLS	Joint Theater Level Simulation
JWP	Joint Work Plan
KMT	Kuomintang
LST	Landing Ship, Tank
LWT	Lightweight Torpedo
LY	Legislative Yuan

MAAG	Military Assistance and Advisory Group
MALE	Medium-altitude long-endurance
MANPAD	Man-portable Air-defense
MBT	Main Battle Tank
MEF	Marine Expeditionary Force
MFoCS	Mounted Family of Computer Systems
MIDS	Multifunctional Information Distribution Systems
MLA	Martial Law Act
MND	Ministry of National Defense
MOEA	Ministry of Economic Affairs
MOTC	Ministry of Transportation and Communications
MPA	Maritime Patrol Aircraft
MRAP	Mine-Resistant Ambush Protected
MSCT	Multi-Source Correlator Tracker
MUCD	Military Unit Cover Designation
NASC	National Airborne Service Corps
NATO	North Atlantic Treaty Organization
NBC	Nuclear, Biological, and Chemical
NCC	National Communications Commission
NCSIST	National Chung-Shan Institute of Science and Technology
NSB	National Security Bureau
NSC	National Security Council

NT$	New Taiwan Dollar
O&M	Operation and Maintenance
OBCOM	Observation and Communications
ODC	Overall Defense Concept
OPLAN	Operational Plan
OSD	Office of the Secretary of Defense
PAC	Patriot Advanced Capability
PACAF	Pacific Air Force
PACFLT	Pacific Fleet
PAVE PAWS	Precision Acquisition Vehicle Entry Phased Array Warning System
PCL	Passive Coherent Location
PDA	Personal Display Assistant
PLA	People's Liberation Army
PLAA	People's Liberation Army Army
PLAAF	People's Liberation Army Air Force
PLARF	People's Liberation Army Rocket Force
PLAN	People's Liberation Army Navy
PLASSF	People's Liberation Army Strategic Support Force
POL	Petroleum, Oil, and Lubricants
PRC	People's Republic of China
QRRC	Quarterly Readiness Report to Congress
R&D	Research and Development

RDT&E	Research, Development, Test, and Evaluation
RF	Radio Frequency
RIwP	Reconfigurable Integrated Weapons Platform
RMA	Return Materials Authorization
RMO	Repair, Maintenance, and Overhaul
ROC	Republic of China
ROCA	Republic of China Army
ROCAF	Republic of China Air Force
ROCC	Regional Operations Control Centers
ROCN	Republic of China Navy
RPAS	Remotely Piloted Aircraft Systems
S&T	Science and Technology
SABRE	Surveillance and Battlefield Reconnaissance Equipment
SAR	Synthetic Aperture Radar
SEP	System Enhancement Package
SETN	Sanlih E-Television News
SIGINT	Signals Intelligence
SM	Standard Missile
SOFA-ROC	The U.S. Status of Forces Agreement with the Republic of China
SRP	Surveillance Radar Program
TAISAC	Taiwan Security Analysis Center
TALSG	Central Taiwan Affairs Leading Small Group

TAO	Taiwan Affairs Office
TATDLS	Taiwan Advanced Tactical Data Link System
TDF	Tactical Display Framework
THAAD	Terminal High Altitude Area Defense
TOC	Tactical Operations Center
TOW	Tube-launched, Optically tracked, Wire-guided
TPFDD	Time Phased Force Deployment Data
TRA	Taiwan Relations Act
U.S.	United States
UAS	Unmanned Aerial System
UAV	Unmanned Aerial Vehicle
UHF	Ultra-High Frequency
USARPAC	United States Army Pacific
USPACOM	United States Pacific Command
USTDC	United States Taiwan Defense Command
VAC	Veterans Affairs Council
VHF	Very High Frequency
WPR	War Powers Resolution
WRSA	War Reserve Stocks for Allies
WRSA-T	WRSA Program in Taiwan

Endnotes

1 Xi Jinping, "Speech at the 40th Anniversary Conference on 'Message to Taiwan Compatriots' (在《告台湾同胞书》发表 40 周年纪念会上的讲话)," *Xinhua News*, January 2, 2019, at http://www.xinhuanet.com/tw/2019-01/02/c_1210028622.htm. The China Central Television (CCTV) recording of Xi Jinping's speech is available online at https://www.youtube.com/watch?v=hHc8xstP0Hs.

2 The Department of Homeland Security (DHS) defines critical infrastructure as "the physical and cyber systems and assets that are so vital to the United States that their incapacity or destruction would have a debilitating impact on our physical or economic security or public health or safety." The U.S. has a detailed succession line and a government readiness level system called "continuity of government readiness condition" or COGCON. COGCON has four levels, with four being normal levels of readiness and 1 being the highest level. The focus of DHS on protecting critical infrastructure and the continuity of the United States government falls under the definition of strategic readiness.

3 "Dictionary of Military and Associated Terms: (incorporating the NATO and IADB Dictionaries)," *U.S. Joint Chiefs of Staff*, 1987, p. 264.

4 Note that this law is generally translating into English as "Anti-Secession Law" (反分裂国家法). However, a more accurate translation of the word "*fenlie* (分裂)" is "split" or "separate." Moreover, Taiwan (ROC) cannot, by definition, commit an act of secession from the PRC because it was never part of the People's Republic of China. On the other hand, Taiwan could opt to legally change its name and constitution, ending its historic relationship with greater China, or the ROC, and thereby split-off from a broadly defined "one China."

5 "The Anti-State Splitism Law (反分裂国家法)," *PRC National People's Representative General Assembly*, March 14, 2005, at http://www.npc.gov.cn/wxzl/gongbao/2005-05/08/content_5341734.htm.

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8 The most prominent works on coercion theory include Thomas Schelling, *Arms and Influence*, (New Haven, CT: Yale University Press); Alexander L. George and William E. Simons, ed., *The Limits of Coercive Diplomacy*, (Boulder: Westview Press, 1994); Robert A. Pape, *Bombing to Win: Air Power and Coercion in War*, (Ithaca: Cornell University Press, 1996); Daniel L. Byman, Matthew C. Waxman, Eric Larsen, *Air Power as a Coercive Instrument*, (Santa Monica, CA: RAND Corporation, 1999); Stephen J. Cimbala, *Coercive Military Strategy*, (College Station, TX: Texas A&M University Press, 1998); and Daniel Byman and Matthew Waxman, *The Dynamics of Coercion: American Foreign Policy and the Limits of Military Might*, (Cambridge, United Kingdom: Cambridge University Press, 2002).

9 "National Defense Report," *ROC Ministry of National Defense*, at https://www.mnd.gov.tw/PublishForReport.aspx.

[10] "General Says Massive Forces Are Not Necessary for Attacking Taiwan," *Ming pao* (Hong Kong), March 12, 2000, p. B7.

[11] Qing Zhi, Xiao Chun, and Qu Kai, "First Option for Military Offensive Against Taiwan: Armed Blockade," *Ta kung pao*, September 10, 1999, p. A6.

[12] Willy Wo-Lap Lam, "PRC Thinking on Military Force Against Taiwan Viewed," *South China Morning Post*, March 29, 2000, p. 17.

[13] Zhang Zuqian, "National Defense Modernization and the Taiwan Problem," *Zhanlüe yu guanli*, December 30, 1999, p. 45-49.

[14] Wang Mouzhou, "What Happens After China Invades Taiwan?," *The Diplomat*, March 24, 2017, at https://thediplomat.com/2017/03/what-happens-after-china-invades-taiwan/.

[15] "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2019," *Office of the Secretary of Defense*, May 2, 2019, at https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf.

[16] The State Council Taiwan Affairs Office (TAO, 国务院台湾事务办公室) is the administrative agency that implements the policy made by the Central Leading Group for Taiwan Affairs and coordinates the work on Taiwan at the local level. For background on the TALSG (中央对台工作领导小组), see: "Summary of the evolution of the CCP Central Committee (中共中央机构沿革概要)," *ReformData.org*, May 30, 2016, at http://www.reformdata.org/2011/0630/21144.shtml.

[17] Mark A. Stokes and Ian Easton, "The Chinese People's Liberation Army General Staff Department: Evolving Organizations and Missions," *The PLA as Organization v2.0*, (Vienna, VA: DGI, Inc., 2015), p. 142–145.

[18] For a detailed explanation of the PLA's grade and rank systems, see Kevin Pollpeter and Kenneth W. Allen, *The PLA as Organization v2.0* (Vienna, VA: Defense Group Inc., 2015), p. 6-21, at https://www.airuniversity.af.edu/Portals/10/CASI/Books/PLA_as_Organization_v2.pdf. Note that this was published prior to the 2015 military reforms so some of the grade names have changed, namely the transition from Military Regions to Theater Commands. The Division Leader-grade (正师职) remains the same.

[19] "Readiness levels" is 战备等级 in Chinese. "Readiness Level Three" is 三级战备; "Readiness Level Two" is 二级战备; and "Readiness Level One" is 一级战备.

[20] "On New Year's Eve, You and the 'Flying Leopards' For the Motherland (除夕夜，他们和"飞豹"一起为祖国守岁)," *China Military Network*, January 29, 2017, at http://www.xinhuanet.com//politics/2017-01/29/c_129462931.htm.

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[22] For background on Readiness Work regulations (战备工作条例), among other sources, see "Regulations on the Information and Communication Warfare of the Chinese People's Liberation Army (

总参发布《中国人民解放军信息通信战备工作规定》)," *PLA Daily*, May 30, 2014, at http://www.gfdy.gov.cn/info_m/2014-05/30/content_6860387.htm.

23 See "The PRC has gone to the first level of combat readiness six times, most notably in 1976, and most recently in 1996 (新中国历史上有过 6 次一级战备，76 年最特殊，最近一次是 96 年)," *QQ.com*, accessed August 6, 2020, at https://new.qq.com/omn/20190214/20190214A0TK33.html.

24 "Three Offices, One Depot" is 三室一库 in Chniese; "logistical operations office" is 后勤作战室; "readiness materiel office" is 战备资料室; and "readiness component depot" is 战备器材库. For background, see "Chenzhou Military Division scientifically advances the construction of logistics support (把每一分钱都用在刀刃上 ——郴州军分区科学推进后勤保障建设)," *PLA Daily*, September 27, 2009, at http://mil.news.sina.com.cn/2009-09-27/0624567400.html.

25 Among various sources describing actions taken at each readiness level, see "Navy Coastal Defense Combat Preparation Levels (海军岸防兵战斗准备等级)," *PLA Navy Encyclopedia*, June 1, 2017, at https://www.pmume.com/hjbk/nnolw.shtml.

26 A "basic command post" is 基本指挥所 in Chinese; a "forward command post" is 前进指挥所; a "reserve command post" is 预备指挥所; and a "rear command post" is 后方指挥所.

27 For background on the Eastern Theater Command duty office, and personnel qualifications: Dai Feng (代烽) and Cheng Yongliang (程永亮), "The first batch of certification for the personnel on duty of the Eastern Theater (东部战区组织联指中心人员值班资格首批认证)," *PLA Daily*, February 17, 2017, at http://www.mod.gov.cn/power/2017-02/17/content_4772768.htm.

28 For background on the Eastern Theater Command Joint Command Center, and duty presence of Army, Navy, Air Force, and Rocket Force, see Dai Feng (代烽), Cheng Yongliang (程永亮), and Zhang Xilian (张希庆), "How are joint command platforms established? Find out here (联合作战指挥平台咋搭建？到这里看看)," *PLA Daily*, September 21, 2017, at http://www.81.cn/jmywyl/2017-09/21/content_7763934.htm.

29 For reference to Central Theater Command and Joint Operations Command Center Duty Regulations (Provisional) (战区联合作战指挥中心值班暂行规定) and Commanding Duty Officer (总值班员), see Zhao Guotao (赵国涛) and Mei Shixiong (梅世雄), "Establishment of Central Theater Command Joint Operations Operational Duty Office and Staff Department Guidelines (中部战区出台联合作战值班和参谋部建设规定 年内共将制定 4 类 34 件规章)," *Xinhua News*, April 6, 2016 at http://news.xinhuanet.com/mil/2016-04/06/c_128868066.htm. The article suggests that the General Duty Officer of the Joint Command Center is dual hatted as a UI bureau director (联合作战指挥中心总值班员、联合参谋部某局局长).

30 CMC Joint Staff Department Contingency Office is 中央军委联合参谋部应急办公室 in Chinese. See "Invitation letter to the 10th Beijing International Disaster Prevention and Mitigation Emergency Industry Expo, 2018 (2018 年第十届北京国际防灾减灾应急产业博览会邀请函)," *China Emergency Services Platform*, October 18, 2017, at http://www.52safety.com/yjzhhd/7034.jhtml.

31 Rachel Burton and Mark Stokes, "The People's Liberation Army Strategic Support Force: Leadership and Structure," *Project 2049 Institute*, September 25, 2018, at https://project2049.net/2018/09/25/the-peoples-liberation-army-strategic-support-force-leadership-and-structure/.

[32] GEN He Weidong (何卫东; b. 1957) was assigned as commander of the Eastern Theater Command in 2020. Before his current assignment, he commanded the Western Theater Command Army (2016-2019) and was dual-hatted as deputy commander of the Western Theater Command. He previously commanded the Shanghai Garrison, commanded the Jiangsu Military District, and served as deputy chief of staff of the Nanjing Military Region. He was promoted to MG in 2008 and GEN in December 2019. LTG He Ping (何平; b. 1957) was assigned as political commissar of the Eastern Theater Command in 2017. He directed the Western Theater Command Political Work Department (dual-hatted as deputy political commissar), and served as political commissar of the General Staff Department (now Joint Staff Department) Second Department.

[33] At the central level, the Battlespace Awareness Support Group (战场态势大队) may be assigned an MUCD of 31004. For references, see Zhu Yuping (朱玉萍), Wang Hai (王海), and Lu Zheng (路征), "Electromagnetic Situation Fuses into Battlefield Situation, The Operational Situation can be Forecasted to Determine Enemy Intent (电磁态势融入战场态势 可预测作战态势判断敌方企图)," *PLA Daily*, February 8, 2018, at http://military.people.com.cn/n1/2018/0208/c1011-29812995.html. The precise mission of the Battlespace Awareness Group (possibly Unit 31004) remains unclear. However, it appears related to intelligence/reconnaissance.

[34] Among various sources, see Kimberly Hsu, "China's Military Unmanned Aerial Vehicle Industry," *U.S.-China Economic and Security Review Commission*, June 13, 2013, at https://www.uscc.gov/sites/default/files/Research/China's Military UAV Industry_14 June 2013.pdf; Kevin Pollpeter, Eric Anderson, and Joe McReynolds, "Enabling Information-Based System of System Operations: The Research, Development, and Acquisition Process for the Integrated Command Platform," *SITC Policy Briefs*, 2014, at https://escholarship.org/uc/item/6f26w11m; Brandon Hughes, "Chinese UAV Development and Implications for Joint Operations," *Center for International Maritime Security*, August 22, 2017, at http://cimsec.org/chinese-uav-development-and-implications-for-joint-operations/33474; Elsa Kania, "The PLA's Unmanned Aerial Systems," *China Aerospace Studies Institute*, December 21, 2018, at https://www.airuniversity.af.edu/Portals/10/CASI/Books/PLAs_Unmanned_Aerial_Systems.pdf?ver=2018-12-21-112308-767; and Rick Joe, "China's Growing High-End Military Drone Force," *The Diplomat*, November 27, 2019, at https://thediplomat.com/2019/11/chinas-growing-high-end-military-drone-force/.

[35] For explicit reference to an ETC Army Intelligence and Reconnaissance Brigade (东部战区情报侦察某旅), see "Army's 'Blade-2017 Queshan' Special Force Exercise: Examination of Comprehensive Combat Capabilities Through Day and Night Confrontation Exercise (陆军 "利刃-2017 确山"特种部队演习：跨昼夜对抗 检验综合侦察作战能力)," *CCTV Network*, September 19, 2017, at http://wap.china.com/act/toutiao/13000655/20170919/31470899.html.

[36] For general background on PLAAF and PLA Navy radar brigades, see Mark Stokes, "China's Air Defense Identification System: The Role of PLA Air Surveillance," *Project 2049 Institute*, May 9, 2014, at https://project2049.net/wp-content/uploads/2018/06/Stokes_China_Air_Defense_Identification_System_PLA_Air_Surveillance.pdf.

[37] For a general discussion of OBCOM operations, see Yu Shufeng (余署峰), Yang Haifeng (杨海峰), and Zhang Rongrong (张容琼), "Keep Fighting All Year Round! Exercising 'Fire Eyes' on the Screen (常年保持战斗状态！他们在方寸荧屏上练就'火眼金睛')," *China Military Network*, August 18, 2017, at http://www.81.cn/jwgz/2017-08/18/content_7722204.htm. For reference to an Eastern Theater Command OBCOM brigade, see: Ju Zhenhua (琚振华), "Reform Acceleration of OBCOM Station in the

East China Sea (东海孤岛观通站的'改革加速度')," *PLA Daily*, March 1, 2019, at http://military.people.com.cn/n1/2019/0301/c1011-30951601.html. The ETC Navy OBCOM brigade probably carries an MUCD of 92985 and is headquartered in Xiamen City.

38 While unclear, a PLARF UAV regiment may be headquartered in the Jinhua area.

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44 "Chinese People's Liberation Army Political Work Regulations 2010 (中国人民解放军政治工作条例)," *Xuexi Qiangguo*, August 9, 2010, at https://www.xuexi.cn/0b342166214ff4c7c68eca0b5cc13fc9/e43e220633a65f9b6d8b53712cba9caa.html; and Peter Mattis, "China's Espionage Against Taiwan (Part II): Chinese Intelligence Collectors," *China Brief*, December 5, 2014, at https://jamestown.org/program/chinas-espionage-against-taiwan-part-ii-chinese-intelligence-collectors/.

45 Stokes and Hsiao; and Elsa B. Kania, "The Role of PLA Base 311 in Political Warfare against Taiwan," *Global Taiwan Brief*, February 15, 2017, at http://globaltaiwan.org/2017/02/15-gtb-2-7/#ElsaKania021517.

46 Jeffrey Record, "Why the Strong Lose," *U.S. Army War College*, 2005, p. 30, at https://apps.dtic.mil/dtic/tr/fulltext/u2/a490798.pdf.

47 *2019 National Defense Report (108 年國防報告書)*, (Taipei, Taiwan: Ministry of National Defense, R.O.C., September 2019), p. 29-68.

48 On February 26, 2008, Ma Ying-jeou delivered a speech titled "A SMART National Security Strategy" in a roundtable forum of the ROC National Security Promotion Association (中華民國國家安全促進協會). As Ma elaborated, the SMART concepts are "soft power" (軟實力), "military deterrence" (軍事嚇阻), "assuring the status quo" (保證現狀), and "restoring mutual trust," (修補互信) which Taiwan's national security is based on. For more, see: Ming-hsien Wong, "The Paradigm Shift of National Security Strategy Studies: The Construction of Tamkang School of Strategic Studies (國家安全戰略研究典範的移轉－建構淡江戰略學派之芻議)," *Taiwan International Studies Quarterly*, 2010, p. 65-106, at http://www.tisanet.org/quarterly/6-3-3.pdf.

[49] New Frontier Foundation Defense Policy Advisory Committee, "Defense Policy Blue Paper No. 3: An Accountable National Security Council," *New Frontier Foundation*, June 2013, at http://www.dppnff.tw/uploads/20140305230133_2899.pdf.
[50] "National Information and Communication Security Strategy Report (國家資通安全戰略報告)," *National Security Council*, September 2018, at https://www.president.gov.tw/File/Doc/588f1a08-5ea7-41df-b0d0-482a00b45322.

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[53] George Liao, "Amendment Bill Allowing National Security Act to Cover Online Spies Passed in Taiwan's Legislature," *Taiwan News*, June 19, 2019, at https://www.taiwannews.com.tw/en/news/3727612.

[54] York W. Chen, "The Modernization of Taiwan's National Security Council," *China Brief*, November 5, 2010, at https://jamestown.org/program/the-modernization-of-taiwans-national-security-council/. The NSC permanent staff consists of the Secretary General, three Deputy Secretaries General, and between five and eight Senior Advisors. All are president-appointed or invited. The Secretary General and the three deputies carry grades equal to Premier and Vice Premier respectively. Senior Advisors carry ministerial-level grades.

[55] See Andrew Mack, "Why Big Nations Lose Small Wars: The Politics of Asymmetric Conflict," *World Politics*, January 1975, p. 181-182.

[56] Data has been compiled from surveys conducted from 2002 to 2019 by the Election Study Center of National Chengchi University in Taiwan, and the Program in Asian Security Studies (PASS) at Duke University. See "Taiwan National Security Survey," *Duke University*, accessed July 24, 2020, at https://sites.duke.edu/pass/taiwan-national-security-survey/.

[57] Ibid.

[58] Under *Five Conditions, Three Levels* (五狀況、三等級), levels were Readiness Condition Five/Condition Normal (戰備狀況五 / 經常戰備狀態); Readiness Condition Four / Alert Readiness Condition (戰備狀況四 / 警戒戰備狀態); Readiness Condition Three (戰備狀況三); Readiness Condition Two (戰備狀況二); and Readiness Condition One (戰備狀況一).

[59] 戰鬥待命狀態 is the combat readiness status in response to unambiguous I&W of hostilities, or military incidents at sea or in the air; 準戰鬥戰備狀態 is combat readiness status issued in the event of actual hostilities. See: Lin Hung-chan (林弘展), "Escalation in the South China Sea: ROC Readiness States Delineated (南海風雲急！國軍戰備狀況是怎麼區分的！)," *TVBS*, July 7, 2016, at https://news.tvbs.com.tw/ttalk/detail/life/4243.

[60] For background on Alert Readiness Phase (警戒戰備階段), see "Regulations on Military Control and Uses of Public-Private Communication Facilities in Preparedness Phases (戰備各階段公民營通信設施支援軍事管制運用辦法)," *ROC Ministry of National Defense*, amended July 17, 2002, at https://law.moj.gov.tw/LawClass/LawOldVer.aspx?pcode=F0070015&lnndate=20020717&lser=001.

[61] Hsieh Ju-chin (謝如欽), "Studies of National Crisis Management: Discussion of Taiwan Strait Crises from 1954 to 1999 (國家危機管理之研究_1954-1999 台海危機探討)," *National Chengchi University*, January 7, 2005, at https://ah.nccu.edu.tw/item?item_id=35098.

[62] Hsu Shao-hsuan (許紹軒), "MND Denied Making Additional Recall to Duty (國防部否認增派輪值官兵)," *Liberty Times*, March 24, 2004, at http://old.ltn.com.tw/2004/new/mar/24/today-fo10.htm.

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[65] Emergency Readiness is 應急戰備 in Chinese and Emergency Order is 緊急命令. For more on martial law, see Article 39 of the "Constitution of the Republic of China," *ROC Office of the President*, January 1, 1949, at https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=A0000001. See Article 43 for details on emergency order. As a side note, the ROC has the longest recorded history of martial law, with the Temporary Provisions Effective During the Period of Communist Rebellion (動員戡亂時期臨時條款) lasting from 1948 to 1987.

[66] Article 39 of the "Constitution of the Republic of China"; and Article 1 and 12 of the "Martial Law Act (戒嚴法)," *ROC Ministry of National Defense*, January 14, 1949, at https://law.moj.gov.tw/LawClass/LawAll.aspx?pcode=F0070002.

[67] Article 43 of the "Constitution of the Republic of China"; and Article 1 of the "Martial Law Act (戒嚴法)."

[68] Article 3 and 4 of the "Martial Law Act (戒嚴法)."

[69] Hsieh Ju-chin (謝如欽), "Studies of National Crisis Management: Discussion of Taiwan Strait Crises from 1954 to 1999 (國家危機管理之研究_1954-1999 台海危機探討)," *National Chengchi University*, January 7, 2005, at https://ah.nccu.edu.tw/item?item_id=35098.

[70] Easton, *Chinese Invasion Threat*, p. 201-2.

[71] "Constitution of the Republic of China"; and "Additional Articles," *ROC Office of the President*, accessed August 7, 2020, at https://english.president.gov.tw/Page/95.

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[73] For background on the Yuanshan Command Center and associated Yushan exercises (玉山政軍兵推演) and Chunghsing exercises (中興兵推), see: "Know that the Yuanshan Command Post Can Stop a Nuclear Weapon (話你知 圓山指揮所可擋核彈)," *Apple Daily*, September 13, 2006, at https://hk.news.appledaily.com/international/daily/article/20060913/6308513; Tai Chih-yang (戴志揚), "Hengshan Command Center Can Withstand Nuclear Attack and Would Be the Highest Military Operational Command Center in Wartime (衡山指揮所防核攻 戰時最高軍事作戰指揮中心)," *China Times*, January 3, 2020, https://www.chinatimes.com/realtimenews/20200103002668-260407?chdtv; "Yushan Phase Two Brings Presidential Command (玉山兵推第二階段 總統坐鎮指揮)," *China Television System*, April 15, 2007, at https://news.cts.com.tw/cts/politics/200704/200704150220363.html; Yin Shun-he (尹順和) and Peng Chih-hua (彭志華), "Ma Administration's Chunghsing Exercises Simulate Major Domestic Unrest (馬政府中興兵推 模擬國內大變動)," *China Television System*, March 26, 2009, at http://news.cts.com.tw/cts/politics/200903/200903260263649.html; and Wu Ming-chieh (吳明杰), "Tsai Government Sets Political Military Exercise for August, To Decouple from Hankuang (蔡政府政軍兵推固定 8 月實施 首度與漢光演習脫鉤)," *Storm Media*, July 3, 2017, at https://www.storm.mg/article/292369.

[74] Lu Hsin-hui (呂欣憓), "Pol-Mil Exercise: ROC Will Not Surrender by Force, Said President (政軍兵推 總統：武力不會讓中華民國屈服)," *Central News Agency*, August 9, 2017, at https://www.cna.com.tw/news/firstnews/201708090295.aspx.

[75] For background on the National Defense Law, see: "National Defense Law (國防法)," *ROC Ministry of National Defense*, January 29, 2000, at https://law.moj.gov.tw/LawClass/LawAll.aspx?PCode=F0010030.

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[81] CTS production "All New Vision" is 全民新視界 in Chinese, and SETN "Fighting! All New Vision" is 能戰！全民新視界. See: Huang Ting (黃庭) and Chou Yu-hsun (周毓洵), "MND and CTS Co-Produce 'All New Vision' (國防部、華視聯手打造「全民新視界」)," *Youth Daily News*, July 24, 2018, at

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