

UAV ISR: Regaining Taiwan after Partially Successful Chinese Invasion

Capt Gregory Search
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Virtual In-Residence Squadron Officer School Maxwell AFB, Alabama

Abstract:

This paper presents a scenario where an initial attack of Chinese forces against Taiwan succeeds and the intelligence response must adjust to the new reality. It assumes China executed a partially successful “quick-knockout” by a preemptive cyber, Electronic Warfare, and amphibious assault that seized beachheads but failed to knock out Taiwan's government or occupy the island in total. As the Taiwanese prepare for a second wave, it offers US decision makers options for solving key military problems. It shows how UAV ISR in concert with submarine ISR can provide size, composition and location of PLA forces staging amphibious assaults in order for Taiwanese to allocate ground troops effectively. It demonstrates how UAV ISR in the maritime domain can give decision makers ID, hull number and weapons of vessels harassing supply routes allowing Taiwanese decision makers can scale response and conserve as many resources as possible. It shows that Taiwanese SAM efficiency increases drastically when PLAAF launches are detected early, made possible by UAV ISR. Finally, it concludes with a methodology for UAV ISR to correlate high threat targets in the space and cyber domain to help mitigate China’s powerful A2/AD systems. Overall, this paper recommends commanders at all echelons use UAV as a major player in ISR when combatting a partially successful hostile invasion.

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In the past 3 years, China took over Hong Kong while the West watched, immobilized by COVID-19, internal strife, and China’s economic power. The Taiwanese are wondering if they are next. This paper explores the options for the US and its allies should the Chinese Communist Party (CCP) have a partial successful invasion. Specifically, it looks at the critical role of USAF Intelligence, Surveillance and Reconnaissance (ISR) provided by Unmanned Aerial Vehicles (UAVs) in defeating a follow-on attack. UAV ISR is required in this Taiwan scenario due to limited US economic resources, the US’s strategic desire to avoid escalating conflict and China’s robust anti-access area denial (A2/AD) system in all domains.

On April 5th, 2021, China’s Liaoning aircraft carrier and at least 10 warplanes entered Taiwan’s self-declared air defense identification zone (ADIZ). China’s military claimed “it was a routine training exercise organized according to the annual work plan” [1]. This paper explores what would happen if Beijing’s actions on April 5th were not an exercise. In this hypothetical scenario, the People's Liberation Army (PLA) expanded this provocation into a quick knockout strike attempt [2]. Beijing executed Distributed Denial of Service (DDOS) attacks on US satellites and Taiwanese infrastructure. This severely hindered US and Taiwanese detection capabilities. Taiwan’s lack of readiness caused disproportionate civilian and military losses

to China. PLA Air Force (PLAAF) conducted effective airstrikes against key political leaders. PLA amphibious beach assaults were defeated but caused heavy losses to the Taiwanese. The current

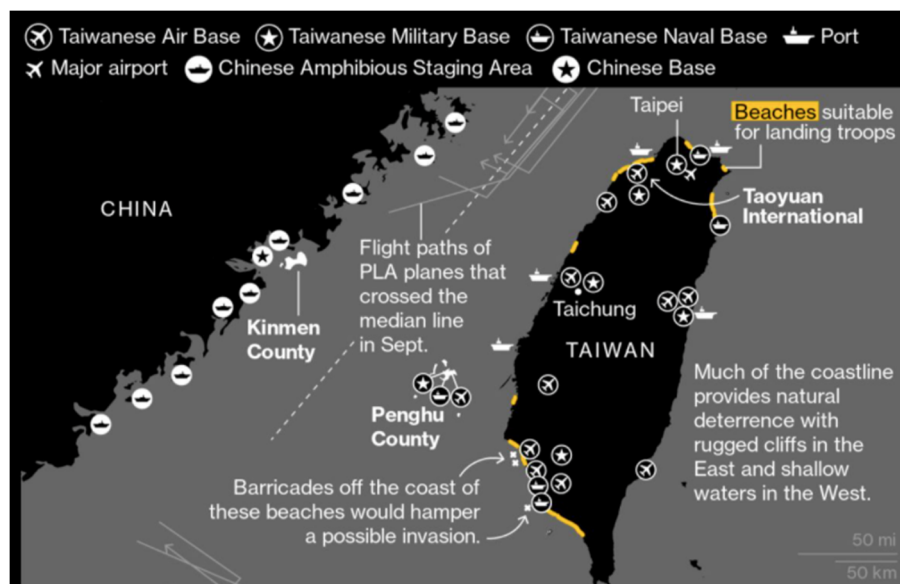


Figure 1: Strategic Areas in China and Taiwan

PLA posture is forward deployed troops at Penghu County, approximately 50 miles off the southwest coast of Taiwan (fig 1). Chinese vessels continue to harass civilian and military ships in the Taiwanese Strait. The Republic of China (ROC) forces from Taiwan are decimated and disoriented from the first wave. Senior leaders in Taiwan and US suspect the island will not survive a second wave without significant operational adjustments. Based on seasonal patterns, waters in the Taiwanese Strait are expected to become much more tumultuous in the beginning of May. This incentivizes China to expedite the follow-on attack. The US must find a way to ensure Taiwan fends off the second wave without the escalating the conflict.

The partially successful knockout poses four main problems for the US in support of Taiwan. First is the constant threat of PLA amphibious assaults on the west Taiwanese coast. Taipei, Kaohsiung and Taichung are the most likely targets, but there are a host of suitable landing locations (fig 1). ROC forces must direct limited ground troops efficiently. Second is the constant harassment of supply ships by PLAN vessels in the Taiwan Strait. Lack of food and fuel to Taiwanese forces could weaken a decimated ROC further. The US and Taiwan must work together to locate and characterize threatening Chinese vessels. Third is the constant possibility of Chinese air strikes. PLAAF air supremacy could suffocate ROC maneuverability. In 2016, senior analysts at RAND declared that ROC Surface to Air Missiles (SAMs) provided a “viable way to contest Chinese air superiority” provided they invest heavily in asymmetric capabilities. In 2018, Taiwan did just that. The ROC invested in mobile, long distance SAMs [3]. If UAVs can detect massing, ROC can preposition these SAMs effectively. Fourth is operating within China’s powerful space and cyberspace A2/AD systems. PLA disruption, denial or degradation of space and/or cyberspace assets could make ROC efforts on land, sea, and air useless. All these problems must be solved in the face of significant environmental constraints. Diplomatically, the US can only provide support to the extent that it is not perceived as escalating the war per international agreements [4]. If the US does not support Taiwan, it risks all world-wide alliances questioning US dedication. UAVs

can be configured without weapons in order to present China with a low speed, non-kinetic, quiet aircraft. This bolsters US politicians' claim to the international community that the US is not escalating the war. On the economic front, the US can only divest funds commensurate with the priority of the conflict. According to analysis of the National Defense Strategy (NDS), US defense of Taiwan is the sixth of nine US defense priorities [5]. UAV assets require low fuel, manpower and maintenance in. For example, the MQ-9 costs only \$1,496 per flight hour [6]. Now that the problems and constraints have been brought to light, it's possible to explore UAV ISR's role in all domains.

The first problem is the threat of a Chinese amphibious assault along the Taiwanese coastline. In the ROC, the Army is the branch best positioned to achieve strategic effects due to direct interaction with invaders [7]. However, the heavy attrition from the first wave means the Army must allocate resources efficiently to defend the second wave. At a minimum, ROC leaders must be aware of massing PLA troops on Taiwanese beaches. Moving target track (MTT) capable assets can cover nearly the entire western coast of Taiwan. UAV aircraft could be stationed at Taipei, Kaohsiung and Taichung (fig 1), the most likely beaches for a PLA amphibious assault [2]. Once a track is found, UAV ISR assets can provide number of PLA soldiers, high fidelity location, and scheme of maneuver. This would enable ROC forces to exploit the PLA's vulnerability dismounting amphibious assault vehicles [8]. The earlier the ISR assets can detect massing, the more valuable the intel for the Taiwanese. UAV assets can use a maritime wide area search (MWAS) capability to detect incoming amphibious assault vessels. To detect massing even earlier, military leaders should note that the manpower, organization and technological requirements of an amphibious assault offer a finite number of Chinese ports that can serve as a staging area for follow-on forces. Submarines can effectively detect massing of troops on the Chinese coast [9]. The desired joint effort would combine ISR from Naval distributed common ground systems (DCGS) with Air Force DCGS. With synchronized ISR from submarines and airborne UAVs, Taiwan can make effective allocation of ground troops to the appropriate beaches. Furthermore, the government could clear civilians from

the beaches and detonate explosives to clear any concealment for PLA invaders. This increases chances of Taiwan surviving the second wave significantly. The ROC requires constant supply imports to execute this procedure effectively.

The second problem facing the ROC is Chinese ships cutting off supply routes. UAV ISR can mitigate damage to the Taiwanese military and civilian population by locating and characterizing vessels in the Taiwan Strait. China's government, overseen by the Chinese Communist Party (CCP), is willing and able to take control of military and/or civilian vessels instantly in order to harass supply routes [10]. This means that ship harassment can be coordinated real-time and from nearly infinite locations. Thus, maximizing ISR coverage helps defeat ship harassment. US ISR assets in Southeast Asia have the capability to use MTT sensors to cover nearly all of the waters in the Taiwan Strait [9]. Once a bogey vessel is obtained via MTT, UAV aircraft can obtain hull number, composition of forces and weapons onboard. UAV loiter times are often greater than twenty hours, which allows this process to persist constantly and largely with a low audible and visible signature. With high fidelity reach back of UAV feeds, there is the potential to capture film of Chinese vessels performing operations that could be suspicious to the global population. This increases diplomatic leverage. It also enables the Taiwanese to use its limited resources in the most efficient manner possible. For vessels that contain small arms only, ROCA forces could position artillery to defend the threat. For a more formidable force, the Taiwanese could release its underwater oil to burn the ships. For vessels posing imminent threat, an AEGIS equipped aircraft carrier could be brought to bear. UAV aircraft will not be able to perform this ISR function without protection from aerial engagements.

The third problem is the ability for PLAAF to conduct air strikes at any time. US can equip the Taiwanese to preserve control of their airspace by providing Taiwan's SAM forces early launch warning of Chinese aircraft. Taiwan's Integrated Air Defense System (IADS) includes a small number of high-quality SAMs [11]. Since many ROC SAMs are mobile, proper prepositioning of IADS units is paramount.

UAV ISR assets must detect massing of PLAAF aircraft in Chinese airfield. These same assets should verify that real, dummy and decoy ROC SAMs are positioned properly to defend the island. The ROC Air Force has a significant geographic advantage. The mountains at the center of the island could provide cover for fighters launching from the east coast. This enables the ROC to outmaneuver the PLA forces in the air. Thus, if Taiwan's IADS are effective, it is likely that PLAAF will suffer disproportionate aircraft losses. This will severely decrease the likelihood of a third wave attack. These land, sea and air procedures will not be possible if the allied effort cannot operate within China's space and cyberspace A2/AD.

The fourth problem facing the ROC is China's A2/AD in space and cyberspace. An Electronic Attack (EA) analyst claims that "A2/AD is basically a fight in the electromagnetic spectrum" [12]. UAVs can decrease China's ability to dominate the EMS via increased coordination with US cyber and space units. In order to defend from cyber-attacks, US can provide early warning to ROC. Similar to operations in Afghanistan, DCGS cells can maintain a location and description of known high value individuals (HVI) associated with known cyber activities. US intelligence can also record known "cyber farms" in China. As UAVs monitor these suspected locations, SIGINT correlation of an HVI approaching a cyber farm indicates the potential for an attack. Offensive cyber operations can mitigate Chinese ability to deny, degrade or disrupt space US cyber and space ops. UAV ISR can detect and record historic cyber propaganda farms. This gives cyber leaders ability to leverage these centers of gravity. When ROC forces are unable to maneuver in any domain, a Taiwanese cyber-attack on one of these critical vulnerabilities can stifle the PLA offensive. Even if the cyber-attack does not fully defeat the Chinese cyber/space node, the attack would disorient decision makers. The resulting delay would allow Taiwan to gain a significant tactical advantage. It's unlikely to defeat Chinese space and cyber A2/AD. Yet, UAV ISR provides convergent effects in real time.

The likelihood of China attempting to invade Taiwan increases each day. UAV ISR is linchpin to success in all domains within the highly sensitive environment. This paper recommends US military leaders include UAVs in operations defending Taiwan after partially successful invasion.

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