



## **Summary**

This report examines the potential roles and missions of the People's Liberation Army's (PLA) new rotary wing capabilities in a cross-strait invasion. Looking specifically at the helicopter units of the PLA Army (PLAA), it discusses two possible scenarios in which these forces could serve as the main thrust in a campaign to seize control of Taiwan. In the first scenario, the PLAA would use nearly all of its rotary wing inventory simultaneously to overwhelm Taiwan's defenses and quickly convince the country's political leadership to surrender. In a second "unconventional" scenario, the PLAA would risk the destruction of older helicopters in order to launch a sudden attack against the island, thereby achieving the element of surprise while saving its most capable platforms for lengthy follow-on operations to fully subdue the island. Based on analysis of the scale, complexity, and frequency of recent PLAA exercises, this report argues that China is at best a decade away from having the ability to seize Taiwan by either approach.

## **Introduction**

China watchers have long paid close attention to the People's Liberation Army's (PLA) modernization efforts, which have gone on more or less continuously since Deng Xiaoping included them as one of his Four Modernizations. While much academic and media coverage of this process has understandably focused on high dollar and high technology platforms like fighter jets, submarines, and aircraft carriers, the PLA has also made significant investments in updating its rotary wing capabilities. Not only has the PLA developed and acquired more different types of advanced helicopters, but it has also bought more of them, evolved their organizational structure, and trained their pilots and aircrews to feature these capabilities more prominently. Due to the historical centrality of Taiwan "reunification" and recently increased cross-strait tensions, these developments beg the big question: how might these new helicopters help the PLA invade Taiwan?

This report seeks to answer that question, focusing specifically on the rotary wing capabilities of the PLA Army (PLAA). It proceeds in four parts. Part one explores the new rotary wing capabilities by analyzing the helicopters themselves, the organizations fielding them, and the training and doctrine for their employment. Part two focuses on scenario development. It presents two possible approaches that the PLAA might use to leverage these new capabilities in a Taiwan invasion. Part three provides an assessment of the PLAA's current readiness to play the roles envisioned in the two scenarios. Part four turns to Taiwan's options for responding to these developments and how best to counter the PLA's increased capabilities. This report focuses on changes within the PLAA's Aviation Corps. While rotary wing capability development has also improved the PLA Navy's (PLAN) options for anti-submarine warfare and amphibious operations, the bulk of significant change has occurred within the PLAA. With these new capabilities, a massive cross-strait air assault may look like an "easy button" to avoid the notorious difficulty of amphibious operations. This report argues that the PLAA currently lacks the capabilities needed to serve this function in a cross-strait invasion scenario.



Exhibit 1. Z-10s of the 80<sup>th</sup> Group Army Aviation Brigade take off for tactical formation flight training (October 2020).<sup>1</sup>

### The PLAA’s Helicopters, Aviation Units, and New Air Assault Capabilities

In the past ten years, the PLA has quickly developed a very robust helicopter force. The table below compares numbers in 2011, 2012, 2020, and 2021.

Table. Recent Growth in the PLA’s Helicopter Force<sup>2</sup>

Helicopter	2011	2012	2020	2021
<b>Attack/Recon</b>				
Z-10	10	16	150	150
Z-19	0	0	120	120
Z-9	126	226	234	234
<b>Lift</b>				
Heavy: Z-8	7	17	105	111
Medium: Mi-17	200	200	278	278
Medium: Z-20	0	0	12+	24+

These numbers suggest that the PLAA’s aviation forces are still very much in development. The rapid fielding of new helicopters—the Z-10, Z-19, and, most notably, Z-20—means that baseline proficiency for pilots and units will take time to achieve, putting operational capability even further down the road. This table also captures some degree of uncertainty about where the overall fielded helicopter force is going, particularly with the introduction of the Z-20. It is unclear how many total

<sup>1</sup> 某陆航旅开展大机群战术编队飞行训练 [“An Army Aviation Brigade Carries Out Large Tactical Formation Flight Training”], China Aviation News, October 23, 2020, <http://www.cannews.com.cn/2020/10/23/99313809.html>.

<sup>2</sup> IISS, *The Military Balance*, respective years noted, [www.iiss.org/publications/the-military-balance/archive](http://www.iiss.org/publications/the-military-balance/archive).

orders of Z-20s the PLA has made and whether these new “homegrown” Chinese helicopters will fully replace Mi-17s and Z-9s in combat formations. It is possible that this current initial fielding of Z-20s is a test run of their reliability before scaling up full production to replace older platforms. A December 2020 article in *China Military Online* implied that the Z-20s would eventually replace the Mi-17s completely, stating “this reflects the general trend that the Z-20 is replacing the Mi-17 series.”<sup>3</sup> Given the relatively slow rate of fielding shown in *The Military Balance* numbers (from 12+ to 24+) in the last two years, it is reasonable to expect a correspondingly slow training period to retrain former Mi-17 and Z-9 pilots and train new pilots to fly the Z-20. Later in this report, I discuss the downstream effects of that on operational capabilities.

How do these helicopters stack up qualitatively against their U.S. equivalents? While it might be tempting to run through charts of maximum airspeeds, gross weights, and other technical minutiae, that type of analysis could miss the forest for the trees. Helicopters have technical limitations that come down to the basic physics and aerodynamics of rotary wing aviation. This current generation of Chinese platforms likely compares favorably to its U.S. counterparts, which should come as no surprise given the latecomer catch-up advantage and the proliferation of technological expertise.<sup>4</sup> The more relevant analysis focuses on operational capabilities, not technical capabilities.

The recent reorganization of the PLAA has significantly overhauled how aviation fits into the operational scheme, making Army aviation brigades an essential part of all 13 group armies.<sup>5</sup> This aligns with overall PLA efforts to prepare for modern warfare and generally mirrors how the U.S. Army includes a Combat Aviation Brigade in each of its divisions. In addition to those 13 brigades, aviation brigades are assigned to both the Tibet and Xinjiang Military Districts.

PLAA aviation brigades generally follow the same organizational structure. Each brigade includes four transport battalions, two attack battalions, one reconnaissance squadron, a headquarters element, and a maintenance and support battalion.<sup>6</sup>

The two specially-designated air assault brigades assigned to the 75<sup>th</sup> and 83<sup>rd</sup> Group Armies are exceptions to this rule. These air assault brigades differ from the standard aviation brigade because they have two or three permanently assigned infantry battalions.<sup>7</sup> This arrangement enables them to focus narrowly on training for air assault operations and increases their proficiency for that specific mission set.<sup>8</sup>

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<sup>3</sup> Chen Lufan, “Z-20 To Play More Roles in China’s Military,” *China Military Online*, December 19, 2020, [http://english.chinamil.com.cn/view/2020-12/19/content\\_9955018.htm](http://english.chinamil.com.cn/view/2020-12/19/content_9955018.htm).

<sup>4</sup> Much of the technological expertise was likely stolen, but those gains being ill-gotten is largely irrelevant to the analysis here. The Z-20 is a near-copy of the Blackhawk. The PLA was able to reverse-engineer much of the technology from its purchase of S-70s in the 1980s. See Kyle Mizokami, “Meet China’s Blackhawk Helicopter, the ‘Copyhawk,’” *Popular Mechanics*, November 9, 2017, [www.popularmechanics.com/military/aviation/a28956/china-blackhawk-helicopter-copyhawk/](http://www.popularmechanics.com/military/aviation/a28956/china-blackhawk-helicopter-copyhawk/).

<sup>5</sup> Dennis Blasko, “The PLA Army after ‘Below the Neck’ Reforms: Contributing to China’s Joint Warfighting, Deterrence, and MOOTW Posture,” *Journal of Strategic Studies*, 44 no. 2 (2021), 17.

<sup>6</sup> Headquarters, Department of the Army. *ATP 7-100.3: Chinese Tactics*. August 9, 2021. 43.

<sup>7</sup> Blasko, “The PLA Army after ‘Below the Neck’ Reforms,” 16.

<sup>8</sup> For a detailed account of the initial training of these units, see 林乘东, 钱晓虎, 蔡鹏程 [Lin Chengdong, Qian Xiaohu, and Cai Pengcheng], 突击, 朝着中国陆军腾飞的方向 [“Assault: The PLA Takes Off in a New Direction”], *解放军报* [*PLA Daily*], January 21, 2019, [http://www.81.cn/jmtt/2019-01/21/content\\_9409406.htm](http://www.81.cn/jmtt/2019-01/21/content_9409406.htm).

Due to the massive growth of the PLA's helicopter fleet over the last decade and the significant turnover in types of helicopters, it remains difficult to ascertain the exact numbers of helicopters per battalion in each of these brigades. Based on the IISS numbers, Dennis Blasko estimates about 80 helicopters per brigade, but he recognizes that the brigades may not yet be at full strength.<sup>9</sup> By comparison, sources suggest that the U.S. Army's active Combat Aviation Brigades (CABs) have 110 helicopters.<sup>10</sup> These CABs belong to divisions that typically have 10,000-15,000 soldiers.<sup>11</sup> Since Blasko assesses that PLA Group Armies are typically manned at 50,000-60,000 personnel,<sup>12</sup> this is clearly not an apples-to-apples comparison. The U.S. Army has a much higher ratio of helicopters to soldiers. However, the PLA may be building up to a more robust ratio of helicopters to soldiers to meet the demands of modern combat.

Helicopters provide unmatched mobility and flexibility, and it appears that the PLAA recognizes this and is changing its tactics and organizations accordingly. The clearest statement of this sentiment appeared in a 2018 *PLA Daily* article by PLAA Staff member Yuan Ziliang, entitled "Winning the Ground War from the Air."<sup>13</sup> This detailed run-down of the development of air assault capabilities provides an invaluable window into recent PLA thinking about why helicopters matter on the modern battlefield and an assessment of current progress in implementing changes to support these new capabilities.

Yuan specifically cites the lessons learned from air assault operations in Vietnam, the Gulf War, Iraq, and Afghanistan to argue how essential these capabilities are for fighting modern wars. He goes on to introduce six types of air assault operations: attack in-depth operations (超越攻击作战), leapfrog combat (蛙跳合击作战), vertical landing operations (垂直登陆作战), point seizure operations (要点夺控作战), special air raid operations (特种空突作战), and crisis control operations (危机管控行动). These are basically listed in a descending order of size and complexity.

All six types of air assault operations could be used in Taiwan scenarios, but the first three are most relevant to a large-scale amphibious invasion. They are the most robust capabilities, so they have the highest chance of being decisive. It is reasonable to expect that all six might be used to varying degrees, but the most dangerous (from the perspective of Taiwan's defense) are attack-in-depth, leapfrog combat, and vertical landing operations.

PLAA views on air assault and vertical envelopment likely share similarities with U.S. Army doctrine. A 2019 *PLA Daily* article quotes a Deputy Brigade Commander, Shi Lei, who described air assault as "not just army aviation carrying infantry, but a new combat force combining the two."<sup>14</sup> This description is remarkably similar to the way the U.S. Army regards air assault operations. For example, the 2010 edition of the *Gold Book*, the 101<sup>st</sup> Airborne's unofficial guide to executing air assault operations, describes air assault as a "combined arms mobile strike," exploding the myth that

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<sup>9</sup> Blasko, "The PLA Army after 'Below the Neck' Reforms," 19.

<sup>10</sup> John Pendleton, "Force Structure: Army's Analyses of Aviation Alternatives," GAO-15-430R, Government Accountability Office, April 27, 2015, 11.

<sup>11</sup> "Division," U.S. Department of Defense, Accessed April 19, 2021, <https://www.defense.gov/Experience/Military-Units/Army/#army>

<sup>12</sup> Blasko, "The PLA Army after 'Below the Neck' Reforms," 16.

<sup>13</sup> 袁自亮 [Yuan Ziliang], 从空中打赢地面战争 ["Winning the Ground War from the Air"], 解放军报 [*PLA Daily*], July 12, 2018, [http://www.81.cn/jfbmap/content/2018-07/12/content\\_210771.htm](http://www.81.cn/jfbmap/content/2018-07/12/content_210771.htm).

<sup>14</sup> Lin Chengdong et al. "Assault: The PLA Takes Off in a New Direction."

they are merely “air movements of rifle companies.”<sup>15</sup> The similarity between the way PLA leaders and U.S. Army leaders view this capability is almost certainly not coincidental. The PLA is a learning organization, and the U.S. Army has by far the most experience in air assault operations from which to draw, so it is unsurprising to see the PLA mirroring U.S. Army doctrinal thinking.

Chinese media coverage of PLA air assault brigades offers some insights into the scale and quality of training. It is common to see reports on exercises with “several dozen helicopters.”<sup>16</sup> CCTV7 reports show runways full of helicopters with the blades turning accompanied by a follow on shot of numerous airborne aircraft headed off for the mission. One such shot showed 37 helicopters, which is no small feat given the notorious difficulty of helicopter maintenance. Involving over 3,000 troops and 100 helicopters, “Assault-2013” was reportedly the largest airmobile exercise PLAA aviation forces have ever conducted.<sup>17</sup>



Exhibit 2. Mi-17 and Z-9 helicopters seen during “Assault-2013.”<sup>18</sup>

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<sup>15</sup> 101<sup>st</sup> Airborne Division, U.S. Army *Gold Book*. (Fort Campbell, Kentucky: Locally published, 2010.) II-IV. This manual is available online in various editions. It is not “authoritative doctrine” as it makes clear on page II, but its existence and size both speak to the complexity of air assault operations. At over 300 pages, it culls numerous best practices from doctrine and experience.

<sup>16</sup> Among other similar reports in the *PLA Daily*, see from the last few years, 冯凯旋, 周朝荣 [Feng Kaixuan, Zhou Chaorong], “全景式记录习主席视察 79 集团军” [“Record of Xi Jinping’s Inspection of the 79th Army”], 解放军画报微信订阅号 [PLA Pictorial WeChat], October 18, 2018, [http://photo.81.cn/pla/2018-10/18/content\\_9316355\\_13.htm](http://photo.81.cn/pla/2018-10/18/content_9316355_13.htm); 吴世科, 张亮亮 [Wu Shike and Zhang Liangliang], 气温超 40°C 大漠深处有战鹰出没 [“War Eagles in the Depth of the Desert”], 中国军网 [China Military Online], July 17, 2017, [http://photo.81.cn/pla/2017-07/17/content\\_7678379.htm](http://photo.81.cn/pla/2017-07/17/content_7678379.htm); 王宁 [Wang Ning], 朝阳伴我去飞行 某陆航旅数十架直升机进行战术演练 [“Dozens of Helicopters Fly Tactical Exercises”], 中国军网 [China Military Online], December 5, 2014, [http://photo.81.cn/pla/2014-12/05/content\\_6256229.htm](http://photo.81.cn/pla/2014-12/05/content_6256229.htm).

<sup>17</sup> 特大动作:解放军 100 余架直升机集结练攻击 [“Extraordinary Action: Over 100 PLA Helicopters Gather for Attack”], 中国新闻 [China News], August 27, 2013, <http://www.chinanews.com/mil/hd2011/2013/08-27/239515.shtml>.

NOTE: The troop number referenced likely includes all service members involved in the exercise, so it should not be understood as representative of total troops carried or moved, as it includes pilots, maintainers, support elements, etc.

<sup>18</sup> 特大动作: 解放军 100 余架直升机集结练攻击 [“Extraordinary Action: Over 100 Helicopters of the People’s Liberation Army Gather for Attack”], 新华网 [Xinhua], August 27, 2013, <https://www.chinanews.com.cn/mil/hd2011/2013/08-27/239515.shtml>.

Nonetheless, just being able to put a large number of helicopters into the air for a long-planned exercise is not necessarily indicative of overall readiness or operational capacity. While these reports show that PLAA Aviation units are able to get their helicopters into the air simultaneously, it does not say much about the ability of these units to fly tight formations at low altitudes for long distances, the critical factors for a crossing of the Taiwan Strait. Indeed, most of the CCTV7 helicopter coverage shows very loose formations at relatively high altitudes. Both of those factors would contribute to easier detection for Taiwanese forces defending the island. Perhaps more importantly, the absence of media reports showing off the capabilities needed for a Taiwan invasion suggests that these aviation units are not yet at that proficiency level.

It is exceedingly difficult to assess the training level of a unit from these videos alone, but an April 2021 video of the 83<sup>rd</sup> Group Army's Air Assault Brigade is instructive for what it lacks.<sup>19</sup> While it does a nice job showing off the new Z-20 helicopter and exciting rappelling troop delivery techniques, it does not demonstrate that the ground forces can effectively communicate with the armed Z-10 helicopters to direct fires. A good portion of the segment focuses on this capability, but the training appears stilted and staged, which does not bode well for the unit's ability to accomplish the same task successfully in the more demanding mode of combat operations.



Exhibit 3. Troops train aboard a Z-20 of the 83<sup>rd</sup> Group Army's Air Assault Brigade (April 2021).<sup>20</sup>

<sup>19</sup> 插上“翅膀”的步兵 [“Infantry with Wings”], 国防故事 [National Defense Story], CCTV7, April 22, 2021. <https://tv.cctv.com/2021/04/22/VIDEKiiZWfO9mhWgcYPIndxu210422.shtml?spm=C28340.PbtJD1QH3ct0.ET7FuMZSfFtz.6>.

<sup>20</sup> Ibid.



Exhibit 4. A “liaison” (联络员) coordinates Z-10 fires against ground targets (April 2021).<sup>21</sup>

Air-ground integration is difficult, and it seems the 83<sup>rd</sup> Group Army’s Air Assault Brigade has a long way to go yet. To be clear, this is only the first step of air-ground integration, as it is within the organic unit’s capabilities set. Derek Solen’s recent paper about the PLA’s development of Close Air Support (CAS) details how far off the PLAA and PLA Air Force (PLAAF) remain from being able to integrate their platforms and units to achieve effects on the battlefield.<sup>22</sup> While they have the necessary technologies to accomplish this, the units seem to be at the very basic level of demonstrating that they can talk to each other, connect their weapons designation and delivery systems, and get rounds downrange. This is a far cry from the high-level integration that would be required to synchronize joint fires and air support to set the conditions for a cross-strait air assault, let alone the level of integration that ground forces would want to support their continued offensive operations following a successful landing. These are not capabilities that units can rapidly develop, as they are highly resource intensive and demand that each participating unit be proficient in its own missions before combining forces to execute effective joint training.

An April 2021 report on the 80<sup>th</sup> Group Army Aviation Brigade shows how its training is increasingly complex. The report focused on the element of controlling helicopters far forward on the battlefield.<sup>23</sup> This coverage showed progress in terms of building institutional knowledge to develop aircrew proficiency while simultaneously demonstrating a tactical preference to retain control at the unit headquarters. There are significant tradeoffs in terms of initiative and flexibility with that type of control. Moreover, this approach relies on constant communication and shared situational awareness, which could be degraded by the distances across the strait and Taiwan’s active efforts to contest PLA forces in the electromagnetic spectrum. When coupled with the difficulty of integrating joint fires detailed above, this report showing PLAA aviation units taking initial steps on commanding and

<sup>21</sup> Ibid.

<sup>22</sup> Derek Solen, “The Improvement of the PLA’s Close Air Support Capability.” *China Aerospace Studies Institute*, December 17, 2020, [www.airuniversity.af.edu/Portals/10/CASI/documents/Research/CASI%20Articles/2020-12-17%20PLA's%20improving%20Close%20Air%20Support%20capability.pdf?ver=5Jah3h28qsohyD4SkMYz-g%3d%3d](http://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/CASI%20Articles/2020-12-17%20PLA's%20improving%20Close%20Air%20Support%20capability.pdf?ver=5Jah3h28qsohyD4SkMYz-g%3d%3d).

<sup>23</sup> 张硕 [Zhang Shuo], 为飞行员“私人订制”训练计划, “指标清单”里有什么? [“What is the ‘List of Indicators’ for a Pilot’s ‘Personalized’ Training Program?”], 人民陆军微信公众号 [PLA WeChat Official Account], April 28, 2021, [http://www.81.cn/lj/2021-04/28/content\\_10030019.htm](http://www.81.cn/lj/2021-04/28/content_10030019.htm).



controlling airmobile operations suggests how far away the PLA remains from the ability to execute these operations with proficiency.

### **Developing Scenarios for Air Assaults across the Strait**

While it is clear the PLA follows the U.S. military's example on air assault operations to some extent, it is essential to remember that there are significant differences between the air assaults the U.S. military has executed in its recent combat operations and the ones the PLA is developing for cross-strait operations in a Taiwan scenario. From Vietnam to Iraq to Afghanistan, the U.S. military has not had to deal with 100 miles of water separating its airbases from its targets. This certainly increases the degree of difficulty for the PLA as it thinks about how best to employ air assault capabilities in support of amphibious assault across the strait.

This section offers two plausible scenarios for a Taiwan invasion, one conventional and one unconventional. Both these possibilities reflect the recent development of helicopters as a “main force in cross-sea operations” as noted in December 2020 *Global Times* reporting.<sup>24</sup> Instead of using helicopter landings as a component in support of a large amphibious assault, the scenarios discussed below imagine helicopter landings as the decisive operation to achieve a victory for the PLA in taking Taiwan. These scenarios draw on the conclusions of Daniel Taylor and Benjamin Frohman in their analysis of Lieutenant General (ret) Wang Hongguang's bold assessment that the PLA can successfully seize Taiwan in three days.<sup>25</sup> They find that the PLA is not outfitting itself for a full-on Normandy-style landing and that Wang's argument for a multidimensional attack tracks with both the PLA's technological acquisitions and its development of new training and doctrine.

In both these scenarios, the large-scale air assaults would be nested within a larger joint scheme of maneuver that also includes a massive preparatory bombardment by air and missile forces followed by a significant amphibious assault. The primary goal of that amphibious assault would be to present the Taiwanese armed forces with multiple dilemmas, stretching Taiwan's resources and diverting attention away from the inland landing zones where the PLA aims to achieve overmatch and secure its victory. Key inland landing zones might include existing airfields and other infrastructure that would allow follow on forces to flow into Taiwan and control the island.

The main difference between the conventional and unconventional scenarios presented here is a strategic assumption about how quickly the PLA could compel Taiwan's political leadership to surrender. The conventional scenario assumes that rapid dominance moves this process along very quickly with the focal point at Taiwan's Presidential Office Building. The unconventional scenario assumes that the PLA anticipates a more drawn-out fight in which it could achieve relatively quick overmatch of the Taiwanese armed forces, but that it would have to transition into complex and difficult stability operations before getting Taiwan's leaders to the negotiating table. To prepare for that counterinsurgency in this unconventional scenario, the PLA would have to hold some of its best assets in reserve during the initial assault.

Both scenarios assume a moderately robust defense of Taiwan primarily by the Taiwanese armed forces and do not account for U.S. military assistance due to the rapidity of the operations. This is a “best case” scenario for the PLA, as it gives it the benefit of the doubt in achieving some level of

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<sup>24</sup> Liu Xuanzun, “PLA Army Helicopters Switch Role from Support to Main Force in Cross-Sea Operations,” *Global Times*, December 23, 2020, <https://www.globaltimes.cn/content/1210819.shtml>.

<sup>25</sup> Daniel Taylor and Benjamin Frohman, “Economic Integration is Not Enough: Policy and Planning for Taiwan in the Xi Jinping Era,” in Roy Kampenhausen David Lai, and Tiffany Ma, eds., *Securing the China Dream: The PLA's Role in a Time of Reform and Change*, (Washington, D.C.: National Bureau of Asian Research, 2020), 68-74.

strategic surprise by hiding China's intentions under the guise of exercises, training, or other normal military movements. While this may be highly unlikely given the deep mutual intelligence penetration on both sides of the strait, making these scenarios "worst case" for Taiwan clarifies how best to prepare for them and also demonstrates how difficult it would be for the PLA to pull them off even with such helpful assumptions.<sup>26</sup>

#### *Scenario 1: Conventional Air Assault Overmatch for Rapid Victory*

The first scenario is a massive air assault operation that attempts to maximize the number of soldiers on the ground within the shortest amount of time. This is a "putting all your eggs in one basket" approach. In this scenario, the PLAA would use nearly all of its rotary wing inventory simultaneously to overwhelm Taiwan's defenses and convince Taiwan's political leadership that resistance is futile and surrender is preferable. This scenario imagines PLAN amphibious assaults as feints to pull resources away from the airfields and population centers that are decisive for the PLA. Further, it requires that the PLAAF maintain air superiority over Taiwan for the 24 hours of near-constant air assaults spread throughout the island. The PLA Rocket Force (PLARF) would need to play a significant role in suppressing Taiwanese air defenses and launching preparatory fires on key targets and landing zones. This is a highly complex scenario requiring significant joint integration, originating from the highest levels of command and control, but necessary all the way down to the tactical level of unit coordination, deconfliction, and synchronization. While the PLA has made great strides in seeking "jointness," its own assessment is that it still has a long way to go on these fronts.<sup>27</sup>

A brief rundown of the complexity of this scenario helps in assessing its plausibility. Given the objective of maximizing PLA personnel on the ground in Taiwan in the shortest amount of time, this scenario revolves around securing airfields and ports to ensure that massive numbers of reinforcements could flow in rapidly following the initial invasion. The two specially-designated air assault brigades of the 75<sup>th</sup> and 83<sup>rd</sup> Group Armies would be tasked with securing the crown jewels of Taipei Songshan Airport and Kaohsiung Airport and Harbor. Other Army aviation brigades would assault other important targets including Taoyuan Airport, Taichung Airport, military bases, and key terrain in support of the amphibious landings. The PLA would likely leave some assets in reserve to preserve flexibility and retain the ability to reinforce itself, as well as maintain vigilance on other fronts in case a neighboring force takes advantage of Beijing's preoccupation with Taiwan. Excepting the Tibet and Xinjiang brigades, a plausible number of brigades in reserve is three, leaving ten full brigades to participate in the scenario.

To pre-position the required helicopters, personnel, and ammunition within range of their destinations across the strait, the PLAA would have to move five out-of-area brigades into assembly areas closer to the coast. While the helicopters would likely fly there despite some risk of detection, the troops and materiel would probably move over land via rail and road. It would be nearly impossible for the PLA to move this much muscle without raising eyebrows in the foreign intelligence community, not to mention the possibility of local populations sharing pictures of so many helicopters flying overhead via social media. In the very best case, this type of movement

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<sup>26</sup> Tanner Greer cites Ian Easton's assessment that Taiwanese, American, and Japanese intelligence will have relatively high confidence of an invasion 60 days prior and know for sure at least 30 days prior. See Tanner Greer, "Taiwan Can Win a War with China," *Foreign Policy*, September 25, 2018, <https://foreignpolicy.com/2018/09/25/taiwan-can-win-a-war-with-china/>.

<sup>27</sup> Joel Wuthnow, "A Brave New World for Chinese Joint Operations," *Journal of Strategic Studies*, 40 no. 1–2 (2017), 169–195; Dennis Blasko, "The Chinese Military Speaks to Itself, Revealing Doubts," *War on the Rocks*, February 18, 2019, <https://warontherocks.com/2019/02/the-chinese-military-speaks-to-itself-revealing-doubts/>.

would take multiple days—and more likely over a week—to iron out maintenance kinks that arise in the initial deployment and set up refueling and rearming operations.

Assuming a successful initial deployment, the next big hurdle is getting across the strait. While spreading target destinations out geographically makes the problem set a bit easier, it would still be a tall task to manage the airspace to sequence hundreds of helicopters fully loaded with troops supported by helicopter gunships securing their landings and subsequent maneuver. The distance involved to cross the strait from suitable mainland staging areas does not allow much room for error in deconflicting the airspace. Each brigade-level air assault demands its own unique entry and exit routes, and prudence dictates planning at least an alternate route, if not a second alternate as well, depending on resistance encountered at the shoreline or elsewhere. Helicopter pilots generally prefer remaining closer to the ground to avoid radar detection and threats, but successful suppression of that threat would open up other flight profiles for these PLA helicopters.

One advantage for the PLA in this planning is that the terrain is static, so it can conduct thorough reconnaissance of the target terrain over time via multiple methods, ranging from technologically advanced geospatial intelligence to simple, seemingly innocuous tourism. Detailed reconnaissance allows for better planning, and these benefits multiply when coupled with high quality simulations capabilities.<sup>28</sup> The PLA is sure to exploit opportunities for rehearsals in accurately constructed virtual training environments, likely for years leading up to an actual attempt to secure “reunification” by force.

Another aspect of the extremely crowded airspace is that the attack helicopters would likely be tasked with conducting independent attacks in addition to securing the air assaults. That increases the demand for air corridors and further complicates airspace management. Once again, this planning process would need to be deeply joint to succeed, as both the PLAAF and PLARF would simultaneously put significant demands on the airspace to achieve their desired effects on the battlefield.

Even though air assaults are the decisive operations in this scenario’s scheme of maneuver, it is reasonable to expect that there would also be several airborne operations as well, since paratroopers could overwhelm other targets and force more dilemmas for the Taiwanese armed forces. The PLA Special Operations Forces might be airdropped from PLAA aviation brigade’s small planes,<sup>29</sup> which are capable of inserting teams of 8-12 soldiers, while the larger airborne operations would rely on PLAAF transport planes (Y-20, Il-76, Y-9,<sup>30</sup> and Y-8) carrying larger loads of over 100 paratroopers.<sup>31</sup> These airborne operations require more airspace deconfliction and would place even greater demands on the rotary-wing attack aviation assets in support of ground maneuver.

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<sup>28</sup> 奋进“十四五”开启新征程 运用“科技+”为战斗力赋能 [Forge Ahead in the 14<sup>th</sup> Five Year Plan, Start a New Journey, Use “Tech+” to Empower Combat.], 军事报道 [*Military Report*], CCTV7, April 20, 2021, <https://tv.cctv.com/2021/04/20/VIDEFU33XMUYsu76Ad0UHgWs210420.shtml?spm=C52346.PPajx7cbYDEB.S60782.19>. Because the PAP unit depicted seems well-equipped with robust simulations capabilities, PLA aviation units would likely have similar facilities, and they might have even better ones.

<sup>29</sup> Blasko, “The PLA Army after ‘Below the Neck’ Reforms,” 19.

<sup>30</sup> The PLA Army also has its own Y-9s, so they could also develop organic options here and not necessarily rely on their sister services. For a media report on this, see Li Jiayao, “Transport Planes Boost PLA Abilities,” *China Daily*, December 20, 2017, <https://www.airuniversity.af.edu/CASI/Display/Article/1401088/transport-planes-boost-pla-abilities/>.

<sup>31</sup> For a thorough discussion of the PLAAF’s development of these capabilities, see Cristina Garafola and Timothy Heath, “The Chinese Air Force’s First Steps Toward Becoming an Expeditionary Force,” RAND Corporation, 2017, [www.rand.org/pubs/research\\_reports/RR2056.html](http://www.rand.org/pubs/research_reports/RR2056.html).

While the PLA has increased joint exercises and is working up to greater planning and execution integration, the difference in scale between those exercises and this operation are massive.<sup>32</sup> The PLA has significant work to do in this area before it can feel confident in its ability to manage this high level of complexity for the airspace alone. This discussion omits another major challenge: planning and sequencing of fire support missions. Suffice it to say that coordinating rocket and missile fires across the strait in support of the PLAA's missions while deconflicting with the simultaneous PLAN amphibious assault would be difficult. It is also worth a reminder here that the rosy assumption about achieving some strategic surprise is very rosy indeed.

This scenario also calls for a direct assault on the Presidential Office Building by PLA Special Operations Forces in an effort to seize control of the governmental decision-making apparatus, to physically capture Taiwan's political leaders, and to deal a devastating psychological blow to both the military and civilian populace. The well-documented mock-up of this key building at Zhurihe demonstrates the PLA's focus on it as a target and allows for hyper-realistic training.<sup>33</sup> The psychological effects of seeing one's seat of government captured in military training exercises are certainly not lost on PLA planners. However, the difficulty of this portion of the operation cannot be overstated, mostly because Taiwan knows it is coming. This allows for thorough contingency planning to keep Taiwan's political leaders safe.

In this scenario, the full employment of the PLAA's rotary wing aviation capabilities would target the rapid seizure of ten key targets in the initial wave. This assumes one target each for ten aviation brigades, with three held in reserve and the Xinjiang and Tibet brigades remaining committed to their military districts. Subsequent waves could either reinforce those targets or secure lower priority targets. Planners would have to assume some attrition of helicopters in each sortie, but optimistically they could plan for four total cross-strait insertions in the first 24 hours, assuming the units are fully manned, able to execute a mid-day crew swap, and can keep the helicopters flying all day.<sup>34</sup> Sorties later in the day would likely be planned for smaller units and targets given the anticipated combat attrition and demands of helicopter maintenance. Returning to the planning assumption of rapid victory, these high levels of flight hours are unsustainable for anything but the briefest operational windows. This scenario hopes for rapid war termination that mirrors the bold assumptions made by Lieutenant General Wang in his version of a successful invasion.

### *Scenario 2: Unconventional Air Assault for the Long Haul*

This second scenario differs from the first because of its driving assumption that securing a political end to armed conflict will take much longer. If the PLA accepts this planning assumption, it could consider innovative approaches such as taking advantage of its reported pending replacement of Mi-17s with Z-20s.<sup>35</sup> While the PLA could theoretically mothball this fleet or sell these excess Mi-17s to foreign militaries to recoup some of their investment, they could also use them for a one-way trip

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<sup>32</sup> Leng Shumei and Liu Xuanzhu, "Joint PLA Combat Exercises to be Normalized Amid Intensifying Situation in Taiwan Straits and SCS," *Global Times*, November 14, 2020, <https://www.globaltimes.cn/content/1206802.shtml>.

<sup>33</sup> For a detailed look at China's premier training facility with a full mock-up of Taiwan's Presidential Office Building, see Joseph Trevithick. "China's Largest Base Has Replicas of Taiwan's Presidential Building, Eiffel Tower." *The Drive: The Warzone*, May 27, 2020, <https://www.thedrive.com/the-war-zone/33591/chinas-biggest-base-has-huge-replicas-of-taiwans-presidential-building-and-the-eiffel-tower>.

<sup>34</sup> It is nearly impossible to overstate how significant a maintenance demand flying for twenty hours in a single day is for helicopters. In a series of admittedly rosy assumptions, this may be the rosier yet.

<sup>35</sup> Chen, "Z-20 To Play More Roles in China's Military."

across the Taiwan Strait as the initial assault force for a planned occupation of the island.<sup>36</sup> This would allow the PLA to assume greater risk with these helicopters as they would be unnecessary for the long-term design of the PLA.

This scenario offers some significant advantages for the PLAA's aviation forces when compared to the more conventional first scenario. Chief among these is an increased ability to achieve some degree of strategic surprise. Because this approach would not employ the entire helicopter inventory, there is a greater chance that it could be concealed under the guises of divestment of the Mi-17 inventory or other false pretenses. It would also be smaller in scale, making it more likely to escape the notice of watchful intelligence analysts in Taiwan, Japan, and the United States. Finally, the one-way trip aspect of this operation would allow for more distant staging of these forces, enabling better concealment of preparations. Depending on the loading and use of auxiliary fuel tanks, assault elements could stage as far away as 1,000 km, well beyond the mainland coastal areas typically associated with cross-strait operations.

The general theory of this scenario would be to accept a high risk with the initial air assault force by attacking a similar target set as the first scenario, but without the full support of attack helicopters and with less joint support by preparatory fires. This unconventional initial assault would then allow for a follow-on mission that looks more like the conventional first scenario. However, it would be much easier because opening with the unconventional wave would force Taiwan to expend its anti-air resources and show its hand. Because the PLA would accept the higher losses of Mi-17s and expect that most, if not all, of them would not return to the mainland, this would alleviate much of the complexity in airspace management for the second wave.

Another significant benefit of this approach is the diminished risk for the second wave of helicopters, so the PLA could expect higher survivability for those aircraft and preserve that combat power for the transition to stability operations. Employing these newer and higher cost platforms in this way is a particularly attractive option if the PLA expects that it will have to sustain a fighting force on Taiwan for prolonged operations to force Taiwan's leaders to the negotiating table. Once airfields and ports are secured, the PLA would flow huge numbers of ground forces into Taiwan, and the Army aviation brigades would provide these forces with impressive mobility and flexibility to occupy key terrain all over the island.

The most significant drawback to this unconventional approach is the high expected initial attrition rate. Commanders might have a hard time motivating their pilots and ground forces to accept such a high-risk mission, especially because the overall scheme of maneuver makes quite clear that this is a one-way trip for most and acknowledges that much of the mission's tactical utility stems from forcing Taiwan to expend its defensive anti-air resources. While the ideological fervor of PLA forces may be robust especially with regard to the sacrosanct mission of "national reunification," PLA leaders would probably have to oversell the expected survivability of these forces to the participants themselves. Some of that might depend on the broader political context at the time, as certain circumstances could encourage greater volunteerism for a mission that borders on martyrdom.

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<sup>36</sup> Both are unlikely scenarios, especially because the PLA is in the process of increasing its helicopter-to-soldier ratio, as previously mentioned. A more likely role for these helicopters is to remain as legacy platforms for as long as they are still useful.

## Assessing PLA Readiness for Cross-Strait Air Assaults

In both of these scenarios, the PLA would mass its rotary wing capabilities to achieve dominance via a series of complex cross-strait air assaults. The significant build-up of helicopters within the PLAA and its accompanying training and doctrinal updates make these kinds of operations possible for future Taiwan contingencies. Based on the evidence currently available, the PLAA is at best a decade away from being able to mount an operation on this scale with the requisite joint integration to give it a fighting chance for success.<sup>37</sup> This assessment is primarily based on the observed exercises as reported by Chinese media sources, in which the key weaknesses in both scale and jointness are readily apparent. To be fair, the PLA acknowledges that these advanced capabilities remain aspirational and in development. PLAA expert Yuan Ziliang (discussed above) set the time horizon at 20-30 years before reaching operational proficiency in line with the demands of the modern battlefield.<sup>38</sup>

Observers should continue to watch these joint exercises and the PLA's professional publications for developments as the PLA builds this capacity.<sup>39</sup> Key indicators of progress would include the scale, complexity, and frequency of the exercises. Media reports consistently emphasize scale, but there has been little in the way of multi-brigade rotary wing participation. For complexity, it is worth noting how many different types of units are involved in these exercises and how many different mission tasks are trained over the course of a large-scale exercise. Until there is evidence of operations that include the PLAA, PLAAF, and PLARF synchronizing their efforts to achieve effects, foreign observers should be highly skeptical that they can accomplish the necessary coordination to get across the strait and into desired key target areas to land helicopters and dismount maneuver forces. Exercise frequency is another critical signal. Prior coordination of such exercises is extremely difficult. When the PLA develops habitual relationships across its joint force, it will be able to conduct more frequent exercises.

One word of caution about relying on exercises for this analysis: soldiers tend to dislike “dog and pony shows.” In our media-driven world, there is growing demand for photos and videos to prove something happened. With military training, the best photos and videos do not necessarily demonstrate the greatest degree of proficiency or readiness. What makes for a great video might not be tactically sound. Further, getting a hundred helicopters into the air simultaneously for the photo opportunity might come at the cost of training something more complex and tactically useful.

Further assessment demands a discussion of the key risks the PLA faces in an attempted cross-strait air assault. From a rotary wing perspective, this is all about the surface-to-air threat, which includes surface-to-air missiles (SAMs), man-portable air-defense systems (MANPADS), and good old-fashioned guns. Technological developments in these systems favor the defense.<sup>40</sup> Most analyses of these anti-air capabilities focus on their effects against fighter, bomber, and C2 capabilities because

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<sup>37</sup> This assessment is highly contingent on how acceptant CCP and PLA leaders would be of risk, both military and political. How decision-makers determine what exactly a “fighting chance for success” is depends on the goals they set and the losses they are willing to accept to achieve them.

<sup>38</sup> Yuan, “Winning the Ground War from the Air.”

<sup>39</sup> For a good example of the currently limited scope and scale of these joint exercises, see Liu Xuanzun, “PLA Army's Attack Helicopters Conduct Sea-Crossing Assault Drills on Navy Warship,” *Global Times*, August 5, 2020, <https://www.globaltimes.cn/content/1196799.shtml>.

<sup>40</sup> For a brief review of how the U.S. Air Force is thinking about these developments, see Kyle Rempfer, “Here's How Improving Enemy Anti-Aircraft Threats Put Pilots and Crews at Risk,” *Air Force Times*, May 6, 2019, <https://www.airforcetimes.com/news/your-air-force/2019/05/07/heres-how-improving-enemy-anti-aircraft-threats-put-pilots-and-crews-at-risk/>.

the battle between those platforms determines air superiority. Helicopter pilots tend to conceptualize this threat a bit differently, for two reasons. First, helicopters are lower priority targets, so in a resource constrained environment (say, an island defense, for example) they are less likely to draw fire from the most advanced platforms. Second, attempting to evade the radar threat turns any and every gun into an anti-aircraft gun.<sup>41</sup> Well-planned battle positions with interlocking fields of fire present a real threat to low-flying helicopters, even if the adversary only has light machine guns. While the PLA has some countermeasures for the SAM and MANPADS threats,<sup>42</sup> there are not a lot of effective ways to remain safe from flying lead, except speed, stealth,<sup>43</sup> and counter-fire.



Exhibit 5. A formation of Z-10s employs countermeasures in training.<sup>44</sup>

Taiwan has a significant advantage here as it prepares defenses for an anticipated PLA air assault. Terrain restricts the suitability of landing areas while also dictating preferred air corridors, so there is ample time to plan defenses of key terrain and increase the degree of difficulty for PLA helicopters. One way the PLA could overcome this need for landing space is insertion via fast-roping.<sup>45</sup> Fast-roping allows for insertion into restrictive terrain, with jungle and urban environments most relevant for this analysis. Its most significant advantage is that it does not require the helicopter to land, so if executed aggressively, it shortens the time required at an objective. It does, however, require the helicopter to perform a stationary hover as the ground troops dismount—making it extremely vulnerable to the full range of surface-to-air threats. The primary mitigation of risk comes from the speed of the fast roping. While this is an impressive special capability, its tactical utility diminishes at scale and is not likely to be used for such a massive operation as a cross-strait air assault.

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<sup>41</sup> Not a pistol or other handgun, but pretty much everything else.

<sup>42</sup> Evidence abounds for this in CCTV7 broadcasts and other media reports. For a particularly striking photo, see Feng and Zhou, “Record of Xi Jinping’s Inspection of the 79th Army.”

<sup>43</sup> Here, “stealth” refers to “avoiding detection” broadly without regard for technological capabilities.

<sup>44</sup> Feng and Zhou, “Record of Xi Jinping’s Inspection of the 79th Army.”

<sup>45</sup> Chen, “Z-20 To Play More Roles in China’s Military.”



Exhibit 6. 71<sup>st</sup> Group Army special operations and aviation forces practice fast roping.<sup>46</sup>

Appreciating how dangerous and difficult such an air assault would be begs the question, how does the PLA interpret these risks and to what extent are its CCP leaders willing to accept that risk and accompanying low probability of success? This opens the door to a much broader analysis of Chinese military strategy and decision-making that is beyond the scope of this report. However, the PLA’s doctrinal preference for caution suggests that such a high risk and low certainty operation does not match the clear objectives of managed risk and high certainty embraced by the PLA.<sup>47</sup> Still, air assault operations do present new opportunities for the PLA as it considers its options for future Taiwan scenarios. Given the notorious difficulty of amphibious operations, the PLA is making a prudent investment by developing more robust air assault capabilities.

### Takeaways for Taiwan

Taiwan can take steps to make the challenges described above even more insuperable for the PLAA. While some might advocate for high-cost platforms and high technology sensors in the face of a threat from the air, a low cost, high volume approach that focuses on the procurement of mobile high caliber machine guns and significant ammunition stores would provide greater flexibility and resilience to face the air assault threat. The Taiwanese could also pursue the development of anti-helicopter mines, especially to harden known targets and to exploit the advantages of terrain.<sup>48</sup> These

<sup>46</sup> 空地协同 陆航特战联合兵力投送 [“Air-Ground Coordination, Army Aviation and Special Operations in Joint Force Projection”], 军事报道 [Military Report], April 17, 2021, [https://www.js7tv.cn/video/202104\\_245717.html](https://www.js7tv.cn/video/202104_245717.html).

<sup>47</sup> This preference for caution is embodied in the concept of “effective control” (有效控制). See Project Everest, *The Science of Military Strategy* (2013), China Aerospace Studies Institute, February 8, 2021, [https://www.airuniversity.af.edu/CASI/Display/Article/2485204/plas-science-of-military-strategy-2013/#:~:text=In%20the%20E2%80%9CIn%20Their%20Own.%2C%20operational%2C%20and%20tactical%20levels,135-143](https://www.airuniversity.af.edu/CASI/Display/Article/2485204/plas-science-of-military-strategy-2013/#:~:text=In%20the%20E2%80%9CIn%20Their%20Own.%2C%20operational%2C%20and%20tactical%20levels,135-143.). For a thorough dive into this literature and its implications for defense and strategic planners, see Burgess Laird, “War Control: Chinese Writings on the Control of Escalation in Crisis and Conflict,” Center for New American Security, April 2017, <https://s3.us-east-1.amazonaws.com/files.cnas.org/documents/CNASReport-ChineseDescalation-Final.pdf>.

<sup>48</sup> For a brief introduction to this relatively underexplored technology and the dilemmas it presents, see Michael Peck, “The U.S. Army Fears Russia’s (And Others) ‘Helicopter-Killer’ Mines,” *The National Interest*, January 3, 2017, <https://nationalinterest.org/blog/the-buzz/the-us-army-fears-russias-others-helicopter-killer-mines-18925>.



recommendations could help the Taiwanese military to inflict casualties quickly and retain its own freedom of maneuver in the face of potentially overwhelming numbers coming from the mainland.

Taiwan could further bolster its ability to deter and defend against a PLAA air assault by more explicitly preparing for this specific scenario and exercising its response. Such exercises would be clear signals to the PLA and CCP that Taiwan is thinking through its defense plan thoroughly and considering the specific risks presented by rotary wing capabilities. Including a segment of the civilian population in a response drill would further communicate resolve to counter the threats presented by the PLA's development of these new capabilities. While there are risks of overinflating the threat and creating unnecessary fear in the civilian populace by exercising a large-scale response, they may be worth taking if they heighten the average Taiwanese citizen's awareness about how the PLA thinks about its role in a future invasion. As noted PLA observer Lonnie Henley made clear in recent testimony to the U.S.-China Economic and Security Review Commission's Hearing on Cross-Strait Deterrence, "Taiwan's will to resist is vital but unknowable."<sup>49</sup> Such exercises could simultaneously test and build this critical will to resist while signaling resolve to both the PRC and Taiwan's international partners.



Exhibit 7. Xi Jinping dons a special Z-10 helmet to observe the helicopter's onboard systems.<sup>50</sup>

<sup>49</sup> Lonnie Henley, "PLA Operational Concepts and Centers of Gravity in a Taiwan Conflict," Testimony to U.S.-China Economic and Security Review Commission, February 18, 2021, [https://www.uscc.gov/sites/default/files/2021-02/Lonnie\\_Henley\\_Testimony.pdf](https://www.uscc.gov/sites/default/files/2021-02/Lonnie_Henley_Testimony.pdf).

<sup>50</sup> Feng and Zhou, "Record of Xi Jinping's Inspection of the 79th Army."

### **Conclusion: Not an “Easy Button,” Yet**

The PLAA has developed significant rotary wing capabilities in the last decade, and it appears poised to make even greater gains in the next decade judging by its continued fielding of new helicopters and commitment to training for the complexity of modern battlefields. While it takes a long time to build pilot, aircrew, and unit proficiency and even longer to integrate that capability with ground brethren and the joint force, PLA watchers should continue to closely follow developments in this space. In theory, they could eventually become a game-changer for the military balance across the strait, but they are not that yet. The PLA might decide to test these new capabilities on a softer target like Kinmen or Matsu islands,<sup>51</sup> although that comes with significant political risk, discussion of which is beyond the scope of this analysis. From solely a military perspective, those islands are much harder for Taiwan to defend due to the extremely favorable geography (small size and proximity to the mainland) for the PLA.

In the final analysis, all cross-strait military scenarios depend significantly on the political circumstances in which they would play out. Air assault operations to cross the Taiwan Strait represent a new development and present Taiwan with another challenge for defending the island, but not an immediately pressing one and not an undeterrable one. Nonetheless, as the PLA continues to strengthen these capabilities, the CCP will aim to exploit additional political leverage gained by shifting the military balance further in its favor. While deterrence remains possible now and well into the future, the most important variable to watch is the risk tolerance of CCP leaders for bearing the significant casualties that would accompany any attempts to take Taiwan by force. Air assaults are not an “easy button” for the CCP, but in the next decade they will become a more realistic option with lower costs than an amphibious assault. And it could be a button political circumstances tempt CCP leaders to press.

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<sup>51</sup> The 2020 *China Military Power* report assesses that the PLA is capable of invading one of these islands now. This assessment seems correct, but Taiwan could make it a very costly operation if it chose to defend the islands. See Office of the Secretary of Defense, *Military and Security Developments Involving the People’s Republic of China 2020*, Annual Report to Congress, <https://media.defense.gov/2020/Sep/01/2002488689/-1/-1/1/2020-DOD-CHINA-MILITARY-POWER-REPORT-FINAL.PDF>, 114.

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