



# AMERICAN FOREIGN POLICY COUNCIL

## DEFENSE TECHNOLOGY PROGRAM BRIEF

### ASSESSMENT OF THE PLA ROCKET FORCE'S DETERRENCE CAPABILITIES

By: Eamon Passey

#### BRIEFING HIGHLIGHTS

**Material Build-Up:** The PLARF has significantly expanded its missile arsenal, including advanced systems like the DF-41 with MIRV capabilities and new silo-based missile fields.

**Joint Training:** Since 2012, there has been an increase in joint and interregional training exercises involving both nuclear and conventional PLARF units, aimed at improving operational readiness.

**Technical Support:** The PLARF has developed an integrated military-civilian technical support system, recruiting civilian experts to bolster its capabilities.

**Challenges:** Despite advancements, the PLARF faces issues such as shortages of experienced personnel, corruption concerns, and suboptimal training practices.

**Deterrence Assessment:** While the PLARF demonstrates robust deterrence capabilities on paper, uncertainties remain regarding its operational readiness and effectiveness in real-world scenarios.

**U.S. Comparison:** The U.S. maintains nuclear superiority, but China leads in conventional and hypersonic missile technology.

**Policy Recommendations:** (1) Develop mobile and decentralized command centers. (2) Fortify critical infrastructure and establish redundant communication channels. (3) Enhance cooperation with regional allies through joint exercises and shared logistics frameworks.

Since the 18th National Congress of the Communist Party of China, President Xi Jinping has promoted the enhancement of strategic forces, stressing new developmental plans for the People's Liberation Army Rocket Force (PLARF). To bolster its multidomain deterrence capabilities, the PLA is scrutinizing each PLARF combat unit according to the standard of being able to "launch effective damage on time any time."<sup>1</sup> This has entailed expanding the PLARF's missile arsenal, including adding new silo-based missiles, introducing dual-capable platforms that can carry either conventional or nuclear weapons, increasing the frequency of joint and interregional training exercises involving the PLARF, and recruiting more civilian experts to bolster technical support.<sup>2</sup>

China has long maintained a formal "no-first-use" policy, instead prioritizing the establishment of a viable second-strike capability to deter a "powerful enemy" from intervening or threatening China's national sovereignty and territorial integrity.<sup>3</sup> While these enhancements to systems crucial for wartime mobilization are pivotal in the PLA's pursuit of these objectives, the PLA faces several intangible challenges that impede reform and effective threat deterrence. These include shortages of battle-tested experts, corruption concerns, poor quality of conscripts, and unrealistic training exercises. As highlighted in a RAND Corporation study, the PLA's military build-up should be seen as "a story of mixed success, continued challenges, and unrealized potential"—a point underscored by a Pentagon report claiming China's nuclear arsenal will reach 1,000 by 2030.<sup>4</sup>

#### MATERIAL BUILD-UP AND EXPANSION OF PLARF CAPABILITIES

The PLARF's role has expanded in recent decades to encompass conventional missile launches and nuclear co-mingling. Consequently, the PLARF has expanded in size, with the number of its launch brigades increasing from 22 to 41 since 2005, enhancing its range and support capabilities (Figure 1).<sup>5</sup>

Moreover, over the past 15 years, the PLARF has significantly enhanced its arsenal (Figure 2). This includes the development of advanced mobile intercontinental ballistic missiles (ICBMs), and shorter-range regional ballistic missiles equipped with nuclear warheads. Notably, during the 2019 National Day parade in Beijing, the PLA

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**FIGURE 1: LOCATIONS OF PLARF LAUNCH BRIGADES (2023)<sup>6</sup>**



#### Base 61

Brigade 96711	Chizhou	DF-26
Brigade 96712	Leping	DF-21A
Brigade 96713	Shangrao	DF-15
Brigade 96714	Yong'an	DF-17
Brigade 96715	Meizhou	DF-11
Brigade 96716	Gangzhou	DF-17*
Brigade 96717	Jinhua	DF-16
Brigade 96718	Nancheng	Unknown

#### Base 63

Brigade 96731	Jingzhou	DF-5
Brigade 96732	Shaoyang	DF-31AG
Brigade 96733	Huitong	DF-5
Brigade 96734	Yueyang	DF-5*
Brigade 96735	Yichun	DF-10
Brigade 96736	Shaoguan	DF-16A

#### Base 65

Brigade 96751	Chifeng	DF-41*
Brigade 96752	Jilin City	DF-41*
Brigade 96753	Unknown	DF-21D
Brigade 96754	Haicheng	DF-26*
Brigade 96755	Tonghua	DF-17*
Brigade 96756	Jinan	DF-100
Brigade 96757	Jinzhou	Unknown

#### Base 62

Brigade 96721	Yibin	DF-31AG
Brigade 96722	Yuxi	DF-31A
Brigade 96723	Luorong	DF-10A
Brigade 96724	Danzhou	DF-21D
Brigade 96725	Jianshui	DF-26
Brigade 96726	Qingyan	DF-26
Brigade 96727	Puning	DF-17

#### Base 64

Brigade 96741	Hancheng	DF-21A
Brigade 96742	Datong	DF-31AG
Brigade 96743	Tianshui	DF-31AG
Brigade 96744	Hanzhong	DF-41
Brigade 96745	Yinchuan	DF-41*
Brigade 96746	Korla	DF-26
Brigade 96747	Xining	DF-26

#### Base 66

Brigade 96761	Lushi	DF-5
Brigade 96762	Luanchuan	DF-5*
Brigade 96763	Nanyang	DF-31A
Brigade 96764	Xiangyang	DF-31AG
Brigade 96765	Changzhi	DF-26
Brigade 96766	Xinyang	DF-26

\*Under Construction

nal of anti-ship ballistic missiles (ASBMs) and long-range ground-based conventional missiles. For instance, in 2015, the PLA introduced the DF-26, notable for its dual capability to carry both conventional and nuclear payloads.<sup>11</sup>

While doubts persist about the PLARF's far seas defense capabilities due to the limited reach of its land-based surface-to-air missile systems, the PLA's material capabilities are indeed rapidly enhancing China's deterrence capabilities and its capacity for confrontational actions aimed at countering an adversary's deterrent efforts and preventing nuclear coercion, termed counter-deterrence capabilities.<sup>12</sup>

### COMPARISON TO U.S. MISSILE FORCES

In terms of nuclear capabilities, the United States continues to maintain a significant advantage over China. Since 1996, China has progressively modernized its nuclear forces, improving both their quantity and quality. While the U.S. is heavily investing in modernizing its own nuclear arsenal,

showcased the Dongfeng-41 (DF-41) missiles, featuring a three-stage solid propellant missile capable of reaching 15,000 kilometers and carrying multiple independently targetable reentry vehicles (MIRVs).<sup>7</sup>

The PLA resumed deploying new silo-based missiles after years of prioritizing the development of mobile systems. It has constructed at least three large ICBM silo fields, adding 260 missile silos under the command of the PLARF (Figure 3).<sup>9</sup> This shift may indicate challenges in maintaining mobile missiles. However, it could also signify the PLA's intent to bolster its deterrent capabilities and acquire the hardware needed to potentially reconsider its "no-first-use" doctrine, shifting to a doctrine of launching missiles upon receiving warning of an attack.

The PLARF has also developed an advanced arse-

it is also committed to arms control agreements, such as the Strategic Arms Reduction Treaty (START) and New START, which have led to reductions in the number of operational warheads and delivery systems.<sup>13</sup> Despite these reductions, the U.S. retains a considerable numerical advantage, with a warhead ratio of at least 13 to 1.<sup>14</sup> Consequently, a Chinese first strike would be unlikely to eliminate the U.S. retaliatory capability. Nevertheless, China's nuclear survivability has improved significantly over time, making any disarming first strike against China highly unlikely.<sup>15</sup>

When it comes to conventional missiles, the PLARF holds a significant hardware advantage. China has developed an extensive array of advanced conventional missiles, including both ballistic and cruise variants, which are often more numerous and sophisticated than their U.S. counterparts. Notably, China leads in hyper-

**FIGURE 2: KEY PLA MISSILE SYSTEMS<sup>8</sup>**

SYSTEM	CLASS	RANGE	LAUNCHERS PER BRIGADE	LAUNCHERS TOTAL (2022)	2028 ESTIMATE
<b>DF-4</b>	ICBM	4,500 - 5,500 km	4+	0	0
<b>DF-5</b>	ICBM	13,000 km	6 to 12	18	48
<b>DF-11</b>	SRBM	280-300 km	27 to 36	54 to 72	27 to 36
<b>DF-15</b>	SRBM	600 km	27 to 36	54 to 72	27 to 36
<b>DF-16</b>	SRBM	800 - 1,000 km	27 to 36	54 to 72	54 to 72
<b>DF-17</b>	MRBM	1,800 - 2,500 km	27 to 36	27 to 36	108 to 144
<b>CJ-10</b>	GLCM	1,500 km	27 to 36	27 to 36	0 to 36
<b>DF-10A</b>	GLCM	1,500 - 2,000 km	27 to 36	27 to 36	27 to 36
<b>DF-100</b>	GLCM	2,000 - 3,000 km	~24	~24	~24 to 48
<b>DF-21A</b>	MRBM	1,750 km	12	12	0 to 24
<b>DF-21C</b>	MRBM	1,500 km	12	0	0
<b>DF-21D</b>	MRBM	1,500 km	~24	~48	~48
<b>DF-26</b>	IRBM	4,000 km	36	216	~252
<b>DF-31</b>	ICBM	7,000 - 11,700 km	0	0	0
<b>DF-31A</b>	ICBM	7,000 - 11,700 km	12	24	0 to 24
<b>DF-31AG</b>	ICBM	7,000 - 11,700 km	12	48 to 56	48 to 80
<b>DF-41 (Mobile)</b>	ICBM	12,000 - 15,000 km	6 to 12	12 to 20	24 to 50

sonic missile technology, demonstrating its ability to create and deploy missiles that challenge existing missile defense systems (Figure 4). While the U.S. is also investing in hypersonic technology, it currently lags behind China in both development and deployment due to the high costs and complexities of integrating these systems into its military framework.<sup>16</sup>

China has been able to make significant investments in its missile capabilities largely because it is not constrained by arms control treaties. The PLARF operates an independent, highly focused, and expansive missile program that has evolved rapidly to integrate both nuclear and conventional capabilities within a unified command structure. This strategic emphasis has enabled China to build the largest and most comprehensive missile arsenal globally.<sup>18</sup> In contrast, the U.S. lacks a dedicated branch for missile systems and has seen a reduction in missile investments due to arms control agreements, such as the Intermediate-Range Nuclear Forces (INF) Treaty, which restricted the development and deployment of intermediate-range missiles.<sup>19</sup> These factors have led to a relative underinvestment in U.S.

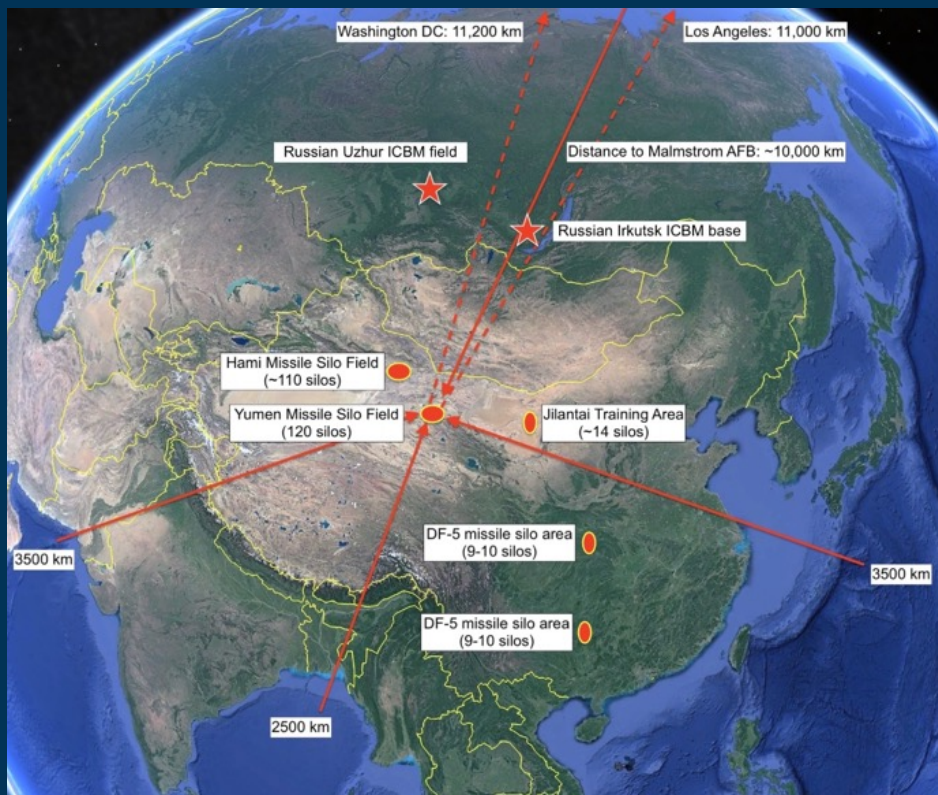
conventional missile systems and a reduction in overall missile force capabilities, allowing China to close the gap.

Thus, while the United States maintains nuclear superiority over China, the PLARF has emerged as a significant competitor in conventional and hypersonic missile technology. China's focused and expansive missile development, combined with the strategic disinvestment in U.S. missile forces, has enabled it to narrow the hardware gap in missile capabilities.

#### *REGULAR JOINT TRAINING EXERCISES*

To strengthen strategic and deterrence capabilities, both nuclear and conventional PLARF forces have increasingly participated in joint and interregional exercises since 2012. These exercises are designed to test interoperability and improve command structures. For instance, in 2018, the PLA conducted military drills in the Gobi Desert that integrated the PLARF. These exercises focused on scenarios such as missile launches and joint firepower operations, showcasing the PLA's commitment to integrating missile forces with other military branches to enhance operational efficiency and pre-



FIGURE 3: LOCATION OF THE PLARF'S NEW SILO FIELDS<sup>10</sup>

paredness in potential conflict situations.<sup>20</sup> More recently, in May 2024, China launched extensive military exercises near Taiwan under the name “Joint Sword-2024A.” These exercises included support and defensive measures by the PLARF, as well as test firings of conventional missiles in coordination with naval vessels, simulating strikes on high-value military targets.<sup>21</sup>

These drills are becoming increasingly common. According to Xinhua, 100 percent of PLARF brigades have participated in similar joint exercises, employing conventional missiles to support various branches in live-fire training exercises.<sup>22</sup> Nuclear weapons systems are also frequently deployed on readiness alert in conjunction with naval vessels and various aircraft to simulate nuclear strikes.<sup>23</sup> Such actions effectively counter nuclear coercion by other superpowers, thereby serving as a form of counter-deterrence. Furthermore, increased experience with coordinated precision strikes involving the navy, air force, and rocket force significantly bolsters Beijing’s capability to deter and retaliate against adversaries in other regions. The increasing frequency of these drills should raise concern.

### ENHANCING TECHNICAL SUPPORT

The PLARF has developed an integrated military-civilian technical support system (军民融合, *jun-min ronghe*) that combines peacetime and wartime operations. This system includes hundreds of civilian reserve officers stationed in 89 equipment research and production units across 23 provinces and cities.<sup>25</sup> Recognizing the inseparability of modern equipment from technical support in contemporary warfare, the PLARF made substantial investments in recruiting and maintaining this large reserve of “technical experts.” These efforts include joint training exercises involving reserve groups to prepare them for maintenance tasks in combat scenarios. Such support enhances the PLA’s mobilization capabilities, helping PLARF units “launch effective damage on time any time” across multiple domains.<sup>26</sup>

### INTANGIBLE PROBLEMS WITH THE PLARF’S TECHNICAL SUPPORT SYSTEM

While the creation of the above reserve force might initially suggest that China is effectively leveraging its economy and society to meet the PLA’s strategic needs, akin to the collaboration observed between defense and civilian sectors in the United States and other developed countries, a closer examination uncovers several intangible challenges that the PLARF must still confront.<sup>27</sup> First, the necessity for a reserve force suggests a gap in technical expertise among the soldiers, which the PLA aims to address by recruiting civilians.<sup>28</sup> Chinese sources indicate significant difficulties in this recruitment process. For instance, a 2017 article in PLA Daily acknowledged resistance from many technical experts to join the PLARF,

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necessitating coercive recruitment tactics such as blockades or interventions during their commute to work.<sup>29</sup>

These recruitment tactics expose several vulnerabilities for the PLARF. First, they raise doubts about the PLA's ability to maintain the missiles with its own active-duty soldiers. Second, the PLA does not seem to be able to ensure sufficient civilian technical support during mobilization, particularly amid uncertainties regarding the military's ability to sustain itself in emergencies. Third, the practice may likely leave the reserve force vulnerable to corruption, exacerbating existing issues within the PLARF.<sup>30</sup> Coercive recruitment tactics often imply wavering commitment, making it easier for external parties to sway reserve forces away from a cause they were already reluctant to support.

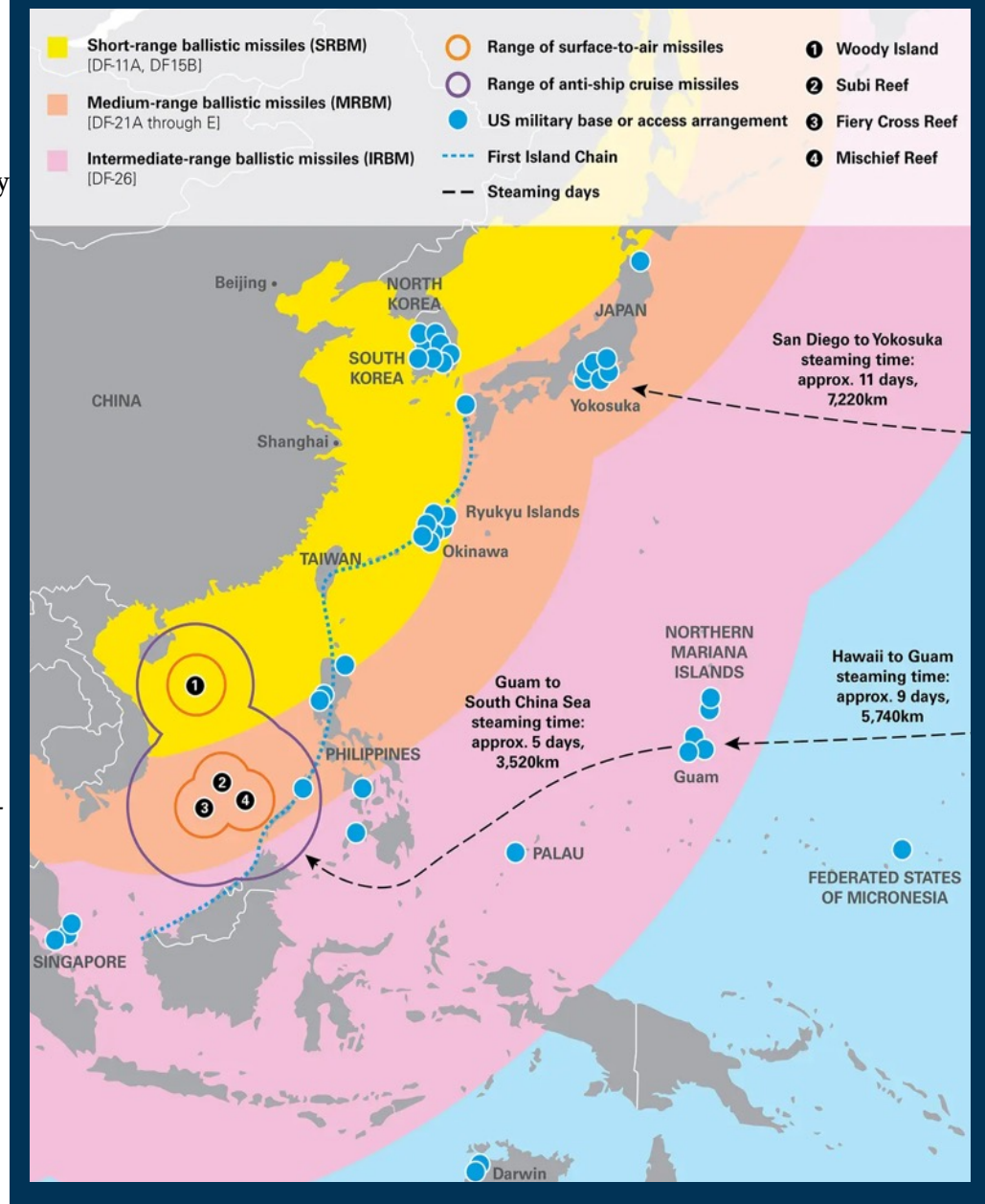
These practices also raise leadership concerns regarding the combat readiness of this reserve force. Chinese sources have pointed out that during live-fire exercises, reservists were "frightened by the atmosphere of actual combat."<sup>31</sup> Consequently, concerns linger over whether these experts can provide timely support under the stress of combat. Knowledge alone may not suffice for them to deliver quick maintenance amid the urgency and demands of battle.<sup>32</sup>

#### UNREALISTIC TRAINING EXERCISES

Over the past decade, the PLA has increasingly used competitions to train recruits and assess unit skills, motivating troops to seek promotion and perform well. However, this approach has transformed PLA combat training into a pursuit of victory rather than an opportunity to develop new skills and learn from mistakes. For instance, an article in PLA Daily highlighted controversy within a PLARF brigade when an inexperienced recruit was sent to a competition. "I just want to

not be ranked last," remarked a soldier in the brigade.<sup>33</sup> This incident underscores a culture in the PLA that prioritizes winning competitions over cultivating practical combat skills. As the PLARF uses these competitions to gauge combat readiness and determine promotions, there is concern that officers may lack proficiency beyond the competition's narrow context, potentially further jeopardizing overall battle readiness.

**FIGURE 4: CHINA'S MISSILE THREATS TO U.S. BASES AND REGIONAL ACCESS LOCATIONS<sup>17</sup>**





### FINAL CONCLUSIONS

Considering all of these factors, does the PLA possess the capability to launch a significant retaliatory strike against a “powerful enemy” such as the United States or India?

From a material perspective, the PLA has made substantial advancements over the past three decades. It has developed modern weapons systems, including dual-capable platforms, and has built up a robust arsenal that includes mobile and silo-based nuclear missiles, long-range conventional missiles, and anti-ship ballistic missiles. In fact, the focus of this build-up appears to extend beyond mere retaliation, prompting concerns about potential shifts in the PLA’s nuclear strategy aimed at achieving a first-strike capability. Moreover, efforts to enhance training and technical support within the PLA have improved its proficiency in joint operations and systems warfare, thereby enhancing its multi-domain deterrence and counter-deterrence capabilities across regions.

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Solely focusing on hardware, however, fails to capture the complete picture. The PLARF faces various challenges that impact its mobilization and support capabilities, potentially impeding combat units from “achieving timely and effective deployment” despite a substantial military build-up. While the PLA demonstrates the capacity to inflict “effective damage,” doubts persist about its ability to do so “on time any time.” Issues such as corruption, inadequate experience and morale among recruits, and ongoing doubts about the quality and realism of PLA training, despite reform efforts, have limited the PLA’s progress. These factors affect the rapid deployment of troops and technology, as well as the capability of officers to respond effectively to unforeseen circumstances.

In situations involving shows of force and coercion, the PLA seems to possess adequate deterrence capabilities. However, uncertainties remain about the PLA’s operational readiness to effectively and swiftly respond in the face of intervention by a powerful adversary.

### POLICY RECOMENDATIONS

To address the escalating military threat posed by the PLARF and ensure effective deterrence of aggression, particularly as the PLA aims to achieve first-strike capability, the following policy recommendations are crucial. These recommendations focus on two main areas: protecting command and control capabilities and invigorating joint operations with allies. Considering China’s apparent shortcomings in operational readiness and timely response, these strategies are designed to improve resilience against precision strikes, ensure robust command and control, and enhance cooperative defense efforts with regional partners.

First, to mitigate the risks posed by China’s advanced targeting capabilities, U.S. and allied military strategies should reduce reliance on fixed facilities and nondispersed forces that could be targeted at the onset of a conflict. This involves the development and deployment of mobile command and control centers, akin to the U.S. E-4B National Airborne Operations

Center, to ensure that command functions are not centralized in vulnerable locations.<sup>34</sup> Such measures will enhance the resilience of command structures during a conflict, decrease the risk of a single point of failure, and ensure operational continuity despite potential disruptions.

Second, in light of the PLA’s focus on system destruction warfare and “war control” prior to escalation, it is crucial to bolster resilience against such threats.<sup>35</sup> This involves investing in the fortification of critical infrastructure, including fixed command centers and key logistics nodes, as well as implementing robust ballistic missile defenses and electronic countermeasures to diminish the impact of precision strikes. Additionally, the U.S. military should not shy away from creating redundant communication networks. Establishing and maintaining multiple secure communication channels—such as satellite communications, undersea cables, and other resilient systems—will ensure operational continuity in the face of disruptions. Internally, fostering a culture of mission command and proactive rules of engagement is essential. This approach empowers field commanders to make real-time decisions and adapt to evolving threats without waiting for centralized directives.

Third, enhancing cooperation with regional allies

and partners is crucial for effective deterrence and defense. The U.S. military should prioritize conducting regular joint exercises with allied forces, focusing on interoperability and the integration of command and control systems. These exercises should address scenarios involving PLARF precision strike threats and rapid response to disruptions. Additionally, the United States should develop and maintain diversified shared logistics frameworks and supply chains with allies to ensure sustained operational capability during extended conflicts. This includes stockpiling essential supplies and securing access to repair and resupply facilities across allied nations. Furthermore, the U.S. should advocate for increased defense spending among allies, particularly Taiwan, to ensure that defense expenditures align with the perceived threat and emphasize acquiring advanced capabilities to counter Chinese aggression. Finally, the U.S. needs to modernize its own strategic missile capabilities and warheads in light of the threat from China (not to mention Russia, North Korea, and potentially Iran).

Considering China's growing military capabilities and its strategic ambitions, it is imperative to adopt a comprehensive approach to deterrence and defense. By protecting command and control capabilities from precision strikes and invigorating joint operations with allies, the U.S. and its partners can effectively deter Chinese aggression and maintain regional stability. These policy recommendations will enhance resilience, strengthen alliances, and ensure that any attempt by China to alter the status quo via the PLARF is met with a robust and unified response.

## ENDNOTES

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# DEFENSE TECHNOLOGY PROGRAM BRIEF

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