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Preparing for Great Power Conflict

How Experience Shapes U.S. and Chinese
Military Training



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Published by the RAND Corporation, Santa Monica, Calif.

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Library of Congress Cataloging-in-Publication Data is available for this publication.

ISBN: 978-1-9774-1054-2

Cover: ffikretow/Getty Images composited with zabelin/Getty Images.

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About This Report

Since 2001, the U.S. and Chinese militaries have been shaped by a distinct set of direct and indirect experiences. Following the terrorist attacks of September 11, 2001, and the Iraq invasion in 2003, the U.S. military focused its energies and resources on combating terrorism and performing counterinsurgency operations in Iraq and Afghanistan. The People's Liberation Army (PLA) has largely focused on modernizing and developing a military capable of waging major war in a regional contingency that would likely involve combat with the U.S. military. In this report, we examine how these experiences have shaped the way both militaries approach training at the highest tactical level of war as they develop the capabilities necessary for major power conflict. We also explore how experience, cognitive biases, and organizational culture might inhibit adaptation and highlight instances in which both militaries have either overcome or been hindered by these problems.

The research reported here was completed in December 2022 and underwent security review with the sponsor and the Defense Office of Prepublication and Security Review before public release.

RAND National Security Research Division

This research was sponsored by the Office of Net Assessment and conducted within the Forces and Resources Policy Program of the RAND National Security Research Division (NSRD), which operates the National Defense Research Institute (NDRI), a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the Unified Combatant Commands, the Navy, the Marine Corps, the defense agencies, and the defense intelligence enterprise.

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Acknowledgments

We greatly appreciate the sponsorship and assistance provided by Stephan Pikner and Denise Der during the concept development and research phases of this project. We are also indebted to our reviewers, Sean Barnett and John Gordon, whose feedback improved the report tremendously.

Summary

Since 2001, the U.S. and Chinese militaries have been shaped by a distinct set of direct and indirect experiences. Following the terrorist attacks of September 11, 2001, and the Iraq invasion in 2003, the U.S. military focused its energies and resources on combating terrorism and performing counterinsurgency operations in Iraq and Afghanistan. Even in 2023, U.S. emphasis on major power competition contends with other national security priorities, including current crises and continued deployments around the globe. The People's Liberation Army (PLA), on the other hand, has largely focused its military modernization and restructuring to prepare for a regional conflict that would likely involve U.S. military intervention. Despite having no combat experience since the 1979 Sino-Vietnamese War, the PLA has conducted an in-depth study of all aspects of the U.S. military's technological and operational capabilities—including its organization, command and control, logistics, joint operations, and concepts of operation—since the 1990s.

The dichotomy presented by the experiences of both militaries raises several questions about how they are preparing for the possibility of a major power conflict. Since the early 1990s, the U.S. military has gained significant direct combat experience but has done so against technologically inferior, nonpeer adversaries. In contrast, the PLA has no direct combat experience. Even though its concepts of operation are designed to fight a major power, these concepts are largely derived from indirect observations and lessons from U.S. operations since 1991. The ways that each military gains and processes experience and incorporates it into training will heavily affect readiness for and performance in a future war.

Issue

In this report, we examine both the extent to which the experience gained by the U.S. and Chinese militaries since 2001 has shaped the way these militaries train and the potential effects these experiences and recent training trends will have on the readiness of both nations for major power conflict. The report focuses on two primary research questions: (1) How has the military experience gained by both the U.S. military and the PLA since 2001 shaped the way both militaries train? and (2) What effect do these experiences and training trends have on readiness for major power conflict?

Approach

Our research approach consisted of three components. The first was an examination of historical examples that provided insights into how military organizations have adapted training to meet emerging security requirements and why some countries adapted successfully

while others failed. We considered specific types of experience in the historical examples and focused on a broad variety of factors that might have helped or hindered adaptation. Defining and categorizing experience revealed that militaries either internally develop operational models that drive experiential learning and training or import models from other militaries. These operational models help build connections between experience and the political, economic, and social factors that play a critical role in how militaries adapt. For the second component of our research, we took findings from historical examples to develop a logic model that we used to evaluate how experiential and institutional factors are likely to shape U.S. military and PLA training. Finally, we applied this logic model to a limited number of current U.S. military and PLA case studies to assess how experience is shaping U.S. and Chinese military training today.

Key Findings

Seven major takeaways emerged from our research:

- The PLA gains experience through a structured process involving observation of wars and study of military science through a Marxist-Leninist lens, concept development, experimentation, demonstration, and implementation and training across the force.
- The U.S. military has a mostly indigenous experiential model based on direct combat, but indirect experimentation figures more prominently as the global threat picture changes and near-peer adversaries seek to undermine the global security position of the United States.
- The nature of both militaries' experiences since 2001 raises questions about their preparations for major power conflict and, specifically, whether the training component of those preparations will be sufficient for operational success.
- China has an advantage in the focus it applies to concepts and capabilities needed to deter, delay, or defeat a U.S. force entering China's neighborhood—stressing the home field advantage. The United States has been forced to reckon with the idea that China might have the means to make such U.S. intervention prohibitively costly, putting U.S. forces in a reactive mode to develop concepts and capabilities to change that equation.
- The U.S. military has advantages in adaptive and innovative capacity based on direct experience and a head start in operational concepts stressing networked precision strikes against key systemic nodes. Ultimately, one of the most significant and enduring advantages enjoyed by the U.S. military has been the quality of its training and the ability to update that training to meet changing conditions and threats.
- Time is an advantage for the United States when it comes to conceptual and functional change in preparing for major power conflict. The PLA's focus on preparing to fight the United States appears nearly singular in some respects but involves massive revisions of the PLA's command culture. These revisions must occur in an environment already fraught with changing priorities on other fronts.

- Training and exercise approaches, tools, and infrastructure needed for PLA joint operations are improving but still nascent compared with those of the U.S. military. U.S. direct experience since 2001 provides the basis for a training system that the PLA cannot entirely emulate in the absence of similar experiential pressures.

Recommendations

This report provides two major recommendations:

- Further comparative study on U.S. and Chinese experimentation, training, and exercises related to major war concepts and capabilities would benefit U.S. planners and strategists in campaign development. A comprehensive database that quantifies the number, scope, and scale of these activities, along with qualitative assessments of the capabilities and vulnerabilities in evidence, would inform net assessments and scenario-specific games and analyses.
- U.S. policymakers and senior warfighters should likewise seek additional insight on how China's leadership assesses PLA readiness for major power conflict from the intelligence community and federally funded research and development centers. Understanding how senior Chinese Communist Party decisionmakers evaluate PLA experience as a factor in decisions to employ military force is a key component in designing U.S. deterrence approaches.

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Introduction

Lin Haonan, the commander of Red First Company, prepared his troops for an assault on their primary objective: a fortification on top of Hill 312. He did so by reminding them of their unit's storied past and its soldiers' ability to endure hardship and willingness to sacrifice all to achieve their objective. Red First Company traced its lineage back to Mao Zedong, having been established in 1927 as one of the first units in the People's Liberation Army (PLA).¹ As Lin led his company toward its objective, he was unaware that the "new-type" opposing force commanded by Ge Rui had monitored Red First Company's movements from their initial point and maneuvered into position, waiting until their critical targets were visible and in range. Red First Company, surprised, took heavy fire from multiple concealed locations. The opposing force targeted Red First Company's cherished banner, riddling it with holes. Lin Haonan and 19 of his soldiers were "killed," while the remainder were caught completely unaware and surrounded by the opposing force. In a postexercise, after-action review chaired by a senior PLA commander, Lin Haonan was relieved of his command and replaced by Ge Rui, Lin's former subordinate for nearly five years in Red First Company. The senior commander railed against Red First Company for clinging to its past glory and failing to adapt to the new methods of warfare. Ge Rui's task after taking his new command was to reshape Red First Company's thinking and prepare its soldiers for the future fight.

This scenario is the backdrop for *Target Locked*, a movie produced by the PLA's August First Film Studio in 2013.² The movie was released at a point when the Jinan Military Region led the PLA's experimentation effort to develop its newest operational concept, target-centric warfare, which served as the movie's primary conceptual storyline. Notably, Liu Shenyang, Jinan Military Region's deputy commander at the time, played a role in the movie's creation, and several members of his staff served as military consultants. The characters of Lin Haonan and Ge Rui represent two archetypes within the PLA.³ Lin Haonan is a traditional PLA com-

¹ An Baijie, "Young Soldiers Rewrite Rules," *China Daily*, November 1, 2011.

² *Target Locked*, dir. Ron Dai, August First Film Studio, 2013.

³ Cheng Ronggui, "Combat-Guided Training, Soldiers Should Train as They Would Fight: A Series of Talks on the Commander in Chief's Order to Focus on Military Training," *Jiefangjun Bao*, January 15, 2020; Li Xuanliang and Mei Shixiong, "Xi Jinping Stresses at the Grassroots Building Meeting of the Central Military Commission to Carry Forward Excellent Tradition, Strengthen Reform and Innovation, and Promote Comprehensive Progress and Comprehensive Excellence in the Army's Grassroots Building," Xinhua,

mander mired in the old methods of war, absorbed by unit history and honorifics, and concerned with saving face after losing at the hands of the opposition force. As Lin Haonan prepares his company for their opening exercise, one of Lin's soldiers reverently comments on the watch he wears, a gift commemorating Lin's participation in Peace Mission—a combined PLA-Russian military exercise series that began in 2005. The unit's political officer and senior noncommissioned officer (NCO) also represent traditional forces within the PLA that further hindered Red First Company's ability to adapt to the new conditions of warfare. The company's combat-relevant experience is shaped largely by the lessons it derived from its unit history, political work, emphasis on frontal assaults, and set-piece training events that served as opportunities for the unit to gather more banners but offered little in terms of realistic training.

The character of Ge Rui was transferred from Red First Company after serving there for nearly five years. His assignment when the movie opens is with one of the PLA's new-type units, which has been trained using the emerging target-centric warfare concept. Ge Rui embraces these new concepts and embodies the vision of modern warfare that the movie promotes. His unit relies on the integration of various combat specialties, advanced sensors and intelligence platforms, and precise targeting to determine the enemy system's most critical elements. More importantly, Ge epitomizes a new type of unit leader who exercises initiative and creativity and can adapt to new and unforeseen situations. After defeating Red First Company decisively, Ge admonishes the insulted and angry Lin, telling him “if you continue the old way of the traditional infantry without throwing away old habits . . . I'm confident to tell you the loser will be you . . . in the future.”⁴ Lin's failure of command and his unwillingness to adopt new operational concepts and tactics result in his storied unit's defeat and embarrassment.

Layers of Experience

Around 2013, when *Target Locked* was released, the PLA was engaged in various debates about its readiness, progress, and the operational concepts that would drive its future development and modernization.⁵ The movie itself is not a tutorial on target-centric warfare, although it discusses many of the concept's core elements. Its primary focus mirrors a broader contemporary reckoning underway in the PLA that centered on overcoming old ways of doing business,

November 10, 2019; Li Xueyong, Li Xuanliang, Mei Shixiong, Fei Shiting, and Qian Zongyang, “Leading the Strength of the Army—Chairman Xi Jinping Leads the Advancement of Military Training in the New Era,” *Xinhua*, November 24, 2020.

⁴ *Target Locked*, 2013.

⁵ Mark Cozad, Jeffrey Engstrom, Scott W. Harold, Timothy R. Heath, Sale Lilly, Edmund J. Burke, Julia Brackup, and Derek Grossman, *Gaining Victory in Systems Warfare: China's Perspective on the U.S.-China Military Balance*, RAND Corporation, RR-A1535-1, 2023.

deeply entrenched peacetime habits, and outdated operational practices.⁶ The new Chairman of the Central Military Commission (CMC) at the time, Xi Jinping, believed that the PLA needed substantial change to prepare for future wars that would likely involve an advanced enemy employing modern technologies and combat methods.⁷

Many of the themes covered in *Target Locked*—training quality, realism, “formalism,” “new-type operational units,” command decisionmaking, force generation, and systems warfare, among many others—remain significant concerns for the PLA’s senior leaders, Xi most significant among them.⁸ *Target Locked* offers several examples of direct and indirect experiences that influence PLA commanders, personnel, and the organization more broadly, including references to Peace Mission, earlier set-piece exercises, and the unit lineage and history reinforced by Red First Company’s commander and political officer. Likewise, Ge Rui’s opposition force is indicative of other experiential processes at work in the PLA, such as new concept development, experimentation, and the popularization of new types of training and combat methods.⁹

Although *Target Locked* was not intended for general release, it eventually came out in two formats: a shorter public version and a longer “internal use only” version for the PLA. The film’s primary purpose was not entertainment, nor was it intended to be a tutorial on the tactics, techniques, and procedures (TTP) associated with target-centric warfare. Its purpose was political: *Target Locked* was meant to provide a series of central messages and themes that the PLA wanted to reinforce to its members regardless of their rank. By picking Red First Company, the movie highlighted that old habits remain a problem and must be eradicated from all corners of the PLA—even its most decorated and loyal units. Since 2012, the year before *Target Locked* was released, Red First Company “has been recognized as an advanced PLA unit,” “completed numerous major missions including international peacekeeping, rescue and disaster relief,” and has taken “part in international military competitions and joint exercises.”¹⁰ These designations and experiences place Red First Company among the most-experienced PLA units.

Recent arguments among U.S. observers have examined the relevance of experience in estimating how likely a country might be to go to war and how effectively it would fight if it does.¹¹ In these debates, observers devote significant attention to the contrast between the PLA’s lack of recent combat experience and the United States’ continual military engagement

⁶ Cheng, 2020; Li and Mei, 2019.

⁷ Li et al., 2020.

⁸ Li and Mei, 2019.

⁹ Bu Xianjin and Zhang Dequn, *Lectures on the Science of Operational Experimentation*, Military Science Press, 2013; Chen Jun and Hou Jun, “Continuous Improvement of Joint Operations Experimental Capabilities,” *Jiefangjun Bao*, April 9, 2019.

¹⁰ Zhang Yangfei, “PLA’s ‘Red First Company’ Innovates to Hone Edge,” *China Daily*, July 27, 2021.

¹¹ Timothy R. Heath, “China’s Military Has No Combat Experience: Does It Matter?,” *RAND Blog*, November 27, 2018; Kyle Rempfer, “Does Your Combat Experience Even Matter Against Chinese and Russian

in the post-Cold War era. Both sides of the debate recognize the disparity, although they disagree about how important it would ultimately be if the United States and China did go to war. What Red First Company's experiences in *Target Locked* reveal, however, is that overall experience cannot be defined solely or even predominately through participation in combat. Experience must be considered and understood based on the effect of different layers of direct combat experience and indirect, noncombat experiences on the PLA and other militaries. In *Target Locked*, Red First Company overcomes such hurdles as institutional memory, old habits, formulaic training, and failure to build new experience that prepares the unit for modern warfare through institutional learning, experimentation, and realistic training. In addition, the real-world Red First Company's deployments for peacekeeping, disaster relief, and foreign exercises are all part of this broader universe of noncombat experience that Western observers should consider in their assessments of the PLA's readiness and capabilities. Direct experience in combat is not one of the many types of experience that currently shape the PLA's preparation for future wars.

Divergent Learning Paths

Since 2001, the U.S. and Chinese militaries have been shaped by distinct sets of direct and indirect experiences. Following the terrorist attacks of September 11, 2001, and the Iraq invasion in 2003, the U.S. military focused its energies and resources on combating terrorism and performing counterinsurgency (COIN) operations in Iraq and Afghanistan. Members of all services experienced repeated deployments, mission-focused training, and professional military education that emphasized the needs of the United States' current fight rather than future conflicts, avoiding what one former Secretary of Defense termed "next-war-itis."¹² In 2023, the United States' emphasis on major power competition with China contends with other national security priorities, including current operations and continued problems in the Middle East, Africa, and, most recently, Europe. Senior leaders within the U.S. Department of Defense (DoD) have provided updated strategic guidance and directed the military to develop new operational concepts for countering major power adversaries, most notably China.¹³ However, it is unclear how quickly and effectively the U.S. military can adapt its training to meet this guidance after two decades oriented toward radically different problem sets.

In the same time frame, the PLA has had a single, driving priority behind its modernization and development: preparation for a future conflict involving the United States and its

Troops?" *Military Times*, May 9, 2019; Steve Sacks, "China's Military Has a Hidden Weakness," *The Diplomat*, April 20, 2021.

¹² Robert M. Gates, *Duty: Memoirs of a Secretary at War*, Alfred A. Knopf, 2014, p. 248.

¹³ Colin Clark, "SecDef OKs Joint Warfighting Concept; Joint Requirements Due Soon," *Breaking Defense*, June 16, 2021b.

allies. The PLA has had no combat experience since its 1979 war with Vietnam. However, since the 1990s, the PLA has conducted an in-depth study of all aspects of the U.S. military's technological and operational capabilities, including its organization, command and control (C2), logistics, joint operations, and concepts of operation. In contrast to their U.S. counterparts, PLA officers have been almost exclusively focused on preparing for high-intensity, major power conflict. Few members of the PLA, if any, have direct combat experience. Only a limited number have been involved in the PLA's operational deployments since Vietnam. Instead, the PLA has gained experience through a highly structured internal process characterized by lessons learned, concept development, experimentation, demonstration, and implementation across the force.¹⁴ Xi Jinping's directives ordering the PLA to prepare for military struggle are attempts to improve PLA capabilities and readiness, with a particular focus on improving training.

The nature of both militaries' experience since 2001 presents a dichotomy that raises several questions about how the U.S. military and PLA are preparing for future conflict and whether the training components of those preparations will be sufficient for operational success. Over this period, the U.S. military has gained significant, direct experience in combat, although in a largely permissive environment that did not involve a peer competitor. In contrast, the PLA has had no direct combat experience. Even though its concepts of operation are designed to fight a major power, these concepts are largely derived from indirect observations and lessons learned from U.S. operations since 1991. None of the PLA's concept developers, supporting experts, or trainers have directly experienced combat. Over time, combat experience and in-depth military scientific study have left deep institutional impressions and perspectives that will influence the way each military structures and adapts its future training.

Purpose

This report provides an initial exploration of how different types of experience influence training in the U.S. military and the PLA. It is centered around two primary research questions: (1) How has the military experience gained by both the U.S. military and PLA since 2001 shaped the way both militaries train? and (2) What effect do these experiences and training trends have on readiness for major power conflict? Our research examines how divergent experiences, in both in type and substance, shape the way these two militaries approach training at the highest tactical level of war as they develop the capabilities necessary for major power conflict. Furthermore, we explore how experience and other factors, such as military and national culture, military strategy, resources, training design decisions, and implementation, interact in ways that might inhibit or advance adaptation of military train-

¹⁴ There is a wide body of military science literature produced by the PLA that describes these processes. Two important studies on training and experimentation address these issues. See Wu Quanxu, *Science of Military Training*, Military Science Publishing House, 2003; and Bu and Zhang, 2013.

ing programs. Our research highlights specific instances in which both militaries have either overcome or been hindered by these adaptation problems. Finally, we use these findings to identify conclusions and implications for how these experiential and institutional factors are shaping both militaries' training for the possibility of major power conflict.

Approach

Our approach for addressing these research questions consisted of three components. The first was an examination of historical examples that provided insights into how a select number of military organizations have adapted their training to meet emerging security requirements. Our research explored why some countries were successful in adapting while others failed. As we considered specific types of experience in our use of historical examples, we also focused on a wider variety of factors beyond experience that might have helped or hindered these militaries' ability to adapt. A key issue that emerged in our research was the relevance of operational models that militaries have either developed internally or imported from other military powers. This idea of operational models is particularly important in building connections between experience and the wide variety of political, economic, and social factors that play a critical role in how militaries adapt. For the second component of our research, we took findings from these examples to develop a logic model that we used to identify the experiential and institutional factors that contributed to recent decisions guiding U.S. military and PLA training. Finally, we applied this logic model to an overview of recent U.S. and PLA training developments to assess how experience shapes U.S. and Chinese military training.

Historical Lessons

We examined a select set of historical examples to establish a baseline of how military organizations have adapted their training programs in the past. Using these examples, we also examined the role that experience played in shaping significant changes to how militaries tailored training programs to meet their needs using military strategy, organization, and institutional priorities. We identified various circumstances that led to changes, which are frequently intertwined with or products of experience. The selected examples are widely studied and highlight discrete concepts or issues; more specifically, we selected examples based on regional and temporal variation, contrasts within time periods, variations in strategic circumstances, and examples from different warfighting domains. The selected examples also helped us address the importance of operational models and influences to identifying major shifts in training emphasis.

Operational Models

An *operational model* reflects a broader set of institutional characteristics that serve as the basis for how a given military is organized, develops and applies technology, and is employed in wartime. The development and implementation of operational models was a significant

factor in several of the historical examples, whether as an indicator of military innovation or an example of adaptation (i.e., other militaries attempted to adopt those models). We identified four general models that have had formative influences on militaries since the mid-19th century: (1) the Western (or North Atlantic Treaty Organization [NATO]) model, (2) the Soviet-Russian model, (3) the Maoist or People's War model, and (4) hybrid models that combine facets of different operational models. We examined the relationship between military innovation, the selection of innovation strategies, and the influence of organizational, technical, and cultural factors and experience on success in adapting new operational models and applying them to military training.

Experience Definitions and Categories

Another issue that emerged from our historical analysis was the need to identify specific categories of *experience*—something that many existing experiential learning models fail to do.¹⁵ As the earlier discussion of *Target Locked* and current debates on PLA combat experience demonstrate, military training and, ultimately, capability are shaped by a wide variety of experiential factors besides direct involvement in combat. Following our historical analysis, our research focused on a variety of direct and indirect experiences that must be considered in our efforts to discuss the relationship between experience and training reform. Direct experiences involve both presence at and involvement in an activity or event. These direct experiences form the basis for experiential learning and typically have a longer-lasting influence.¹⁶ Indirect experience involves task performance, learning, and observation through either academic or otherwise structured processes.¹⁷ This category of experience can involve data analysis or concept development in a synthetic environment and might be based on abstract concepts.

Although our original research question focuses on recent experience, the historical examples demonstrate that enduring experience is relevant at broad historical and institutional levels.¹⁸ For instance, historical experience can play a significant role in how nations perceive their core security concerns. This experience thus has an indirect and sometimes enduring role in how militaries structure their training to meet security needs. Similarly, institutional experiences are likely to shape the style and focus of training. As Lin Haonan's

¹⁵ David A. Kolb, *Experiential Learning: Experience as the Source of Learning and Development*, 2nd ed., Pearson Education, 2015.

¹⁶ Janine Davidson, *Lifting the Fog of Peace: How Americans Learned to Fight Modern War*, University of Michigan Press, 2010, p. 9.

¹⁷ Barbara Levitt and James G. March, "Organizational Learning," *Annual Review of Sociology*, Vol. 14, No. 1, August 1988, p. 319.

¹⁸ David B. Ralston, *Importing the European Army: The Introduction of European Military Techniques and Institutions in the Extra-European World, 1600–1914*, University of Chicago Press, 1990; Michael Eisenstadt and Kenneth M. Pollack, "Armies of Snow and Armies of Sand: The Impact of Soviet Military Doctrine on Arab Militaries," *Middle East Journal*, Vol. 55, No. 4, Autumn 2001; Caitlin Talmadge, *The Dictator's Army: Battlefield Effectiveness in Authoritarian Regimes*, Cornell University Press, 2015.

case in *Target Locked* demonstrates, incentives and rewards are generally derived from institutional traditions and priorities. In many cases, these experiences might make reform or adoption of new programs difficult. In this report, we address both quality and variation in the different types of experience. Both factors can be key determinants in successful adaptation based on the quality, intensity, and relevance of an experience.

Logic Model

We used the findings from our historical analysis, examination of operational models, and definition and categorization of experience to develop a logic model. The model provides a structured basis for understanding how decisions about training adaptation evolved and where, in a national security decisionmaking process, factors such as experience, bias, or other organizational, cultural, and institutional considerations might help explain the success or failure of U.S. military and PLA efforts to adapt training to prepare for major power conflict. The logic model breaks this process into four core elements: inputs, activities and processes, outputs, and outcomes. Each of these four elements is further distilled into a series of factors and subfactors that historically played roles in how militaries formulated strategy and translated those strategic priorities into military training programs. The logic model provides a systematic tool for identifying the relationship between experience and other relevant factors that shape decisions that influence training.

Applying Findings and Models to Current U.S. and China Cases

The final element of our approach was to apply the logic model to current U.S. and Chinese training programs. Our information on training programs in both countries is derived from official military publications and press. We used this information to identify how training in both militaries has evolved since 2001 and its overall suitability to building the capabilities necessary for major power conflict. We then applied the logic model to these findings to identify which parts of the evolution of the training process were likely influenced by experience and by what type of experience, as well as, where possible, the positive or negative effect of such experience on training. In addition, we identified several cross-cutting themes that carry through the cases and highlight formative experiences and self-assessments of progress, outputs, and outcomes. These findings are tied into our final conclusions and implications.

Assumptions and Biases About Experience

This report addresses some key assumptions and biases that exist in many contemporary debates about the importance of experience in assessing U.S. and Chinese military capability and readiness. Although these assumptions and biases are not universally accepted, they quite frequently shape how observers approach and frame their understanding of the importance of experience. Our application of the logic model is an attempt to avoid this

type of generalization and contribute to a more contextualized understanding of the U.S.-China military balance by acknowledging the advantages and disadvantages of experience. The logic model also allows us to place experience within a broader systemic context that helps explain the interaction between experience and many other factors that influence how militaries adapt to changing threats and environments.

The most significant assumption in these debates is that combat experience is paramount and holds pride of place among all other categories of experience, granting militaries with combat experience an immediate advantage over those without it.¹⁹ A second frequent assumption is that experience, in general, is positive.²⁰ This assumption tends to ignore the many cases in which experience reinforces bad habits, as demonstrated by the set-piece training that the fictional version of the real-world Red First Company underwent prior to its defeat by the opposing force. There are many historical examples in which experience led to complacency and existing operational models went unchallenged, even when new innovations and modes of operation were emerging, although in some of these cases, the military was eventually successful.²¹ The third frequent assumption is that experience is most valuable and relevant when it approximates a given task, operation, or type of war.²² By this logic, experience in peacekeeping operations, disaster relief, and COIN operations would have limited value to a military preparing for major regional conflict and a military with experience and training derived from major combat operations would have difficulty adapting its training to address COIN operations.

A final issue—which is a bias, not an assumption—must be acknowledged and addressed by applying the structure found in our logic model. This bias is one that relates to U.S. observers' views of U.S. experience, which typically downplay its relevance, quality, and applicability, while viewing U.S. adversary experience in the opposite light. This negativity bias can be seen in several contemporary accounts that provide comparative analysis of U.S. and Chinese military capabilities.²³ It is also prevalent in other discussions of experience and training.

¹⁹ David Lai, Andrew Scobell, and Roy Kamphausen, eds., *Chinese Lessons from Other Peoples' Wars*, U.S. Army War College, 2011, pp. 2–6.

²⁰ Heath, 2018; Rempfer, 2019; Sacks, 2021.

²¹ Israel's success in 1967 is a case in which success reinforced existing practices and slowed the Israeli Defense Forces' (IDF's) ability to adapt to new developments in 1973. Avi Shlaim, "Failures in National Intelligence Estimates: The Case of the Yom Kippur War," *World Politics*, Vol. 28, No. 3, April 1976; Lawrence Whetten and Michael Johnson, "Military Lessons of the Yom Kippur War," *The World Today*, Vol. 30, No. 3, March 1974.

²² Raphael S. Cohen and Gian Gentile, "The United States Learned from Iraq and Afghanistan. Russia Didn't," *Lawfare*, blog, July 24, 2022.

²³ Christian Brose, *The Kill Chain: Defending America in the Future of High-Tech Warfare*, Hachette Books, 2020; Elbridge A. Colby, *The Strategy of Denial: American Defense in an Age of Great Power Conflict*, Yale University Press, 2021.

Scope

This report is an initial, exploratory study. Its primary purpose is to examine how experience factors into U.S. and PLA decisions regarding military training and the effect that experience might ultimately have on how both militaries are preparing for the possibility of conflict against one another. For this reason, we were limited in the depth and breadth of topics we could examine. In most cases, the discussions captured in this report provide a preliminary exploration of a complex issue. In that sense, there are a variety of possible avenues for future research. Because of the time and resources available for this study, we were forced to choose a limited number of historical examples for examination. Likewise, the cases briefly discussed in the chapter on operational models merit more-in-depth treatment because of their relevance to the broader question of how experience might influence adaptation. Lastly, in applying our logic model to our two core research questions, we had to rely on a qualitative approach that emphasizes a limited number of cases. The issues highlighted in this report surrounding our understanding of experience provide a wide variety of important future research topics that, if pursued, could improve the ability to understand the relative strengths and weaknesses of the U.S. military as all sides in the multipolar security environment innovate, counter, and adapt to gain advantage against their primary competitors.

Report Organization

This report is divided into nine chapters, including this introduction. In Chapter 2, we examine historical examples of how experience has influenced the ability of militaries to adapt to changes in the security environment. We address the importance of operational models in Chapter 3, provide a taxonomy of factors that influence decisions about training in Chapter 4, and describe the logic model that we apply in subsequent chapters in Chapter 5. In Chapters 6 and 7, we explore how U.S. and Chinese military training, respectively, have evolved since 2001 and the role that experience has played in that process. In Chapter 8, we provide an overall assessment of what effect training has had on the U.S. military and the PLA. We also address how experience might influence the suitability of training by both militaries for anticipated types of future conflict. Finally, in Chapter 9, we present conclusions and implications from our key findings.

Historical Lessons: Experience, Training, and Change

Competition is frequently a catalyst for change. In the international security environment—especially in times of increased tension and conflict—the need to at least maintain parity with primary competitors leads nations to closely monitor global military changes that might place their militaries at a strategic disadvantage. This dynamic also strongly incentivizes militaries to experiment with new technologies, concepts of operation, and organizational structures. At times, these developments lead to innovation, a process that requires change on technological, financial, and organizational levels.¹ Frequently, the changes required to accommodate these innovations transcend the military realm and challenge existing social, political, and economic relationships within a society. The emergence of state bureaucracies, national banks, industrial policies, state infrastructure, and national, cultural, and educational institutions have all affected the adoption of new military models or innovations.²

This interactive process between military and societal realms has been underpinned by regional conflict and economic exchange as powers fought and traded throughout history. The most notable departure and intense early periods of innovation occurred during the French Revolution and Napoleonic Wars in the late 18th century. Europe's significant economic expansion, rapid population growth, early industrial processes, technological advances, and the emergence of state institutions initiated a period during which battlefield success by a given nation created new operational paradigms that others mimicked in order to compete.³ By the mid-19th century, European militaries had developed a common set of institutions, procedures, and tactics that served as the basis for a recognizable military model.⁴ The European (or Western) model's success over the next several decades created interest from non-European empires and nations—China, Japan, the Ottoman Empire,

¹ Michael C. Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics*, Princeton University Press, 2010, pp. 26–29.

² Barry R. Posen, "Nationalism, the Mass Army, and Military Power," *International Security*, Vol. 18, No. 2, Fall 1993, pp. 84–85.

³ John A. Lynn, "The Evolution of Army Style in the Modern West, 800–2000," *International History Review*, Vol. 18, No. 3, August 1996, p. 510.

⁴ Lynn, 1996, p. 510.

Egypt, and Russia—all of which had been important regional powers in the not-too-distant past. Recent failures, ineffective military institutions, and threats from outside powers created incentives for national leaders to seek change with the tested and successful model pioneered by the West.

Except in Japan, these attempts to adopt the Western model failed to achieve the desired improvements for a variety of reasons. In some cases, nonmilitary, societal, or governmental reforms needed to occur to make the Western model work. In others, organizational barriers, education, and social relations within militaries hobbled change. In this chapter, we examine eight prominent examples in which militaries either adapted or failed to adapt their training in response to a major military reform or based on experience in recent wars. We selected widely studied examples that highlight discrete concepts or issues. More specifically, we selected historical examples based on regional and temporal variation, contrasts within periods, variations in strategic circumstances, and examples from across warfighting domains. Military adaptation is a complex process that often involves several factors outside the military. Sometimes change is implemented successfully, and sometimes it fails. The examples that follow examine this process and address how experience factored into this adaptation.

Importing the Western Model: China and Japan

China

The mid-19th century was a turbulent era for the Chinese military. China suffered humiliating defeats to European powers in the First (1839–1842) and Second Opium Wars (1856–1860) and was wracked by the bloody Taiping Rebellion against the Qing Dynasty beginning in 1850. Although the gap in weapons technology between the Chinese military and its most powerful adversaries—particularly Great Britain and France—was considerable and widely viewed as the primary factor behind China’s defeat, Chinese military training was also considered insufficient to develop the capabilities for modern warfare.⁵

The gap in effectiveness between Chinese and Western powers, illustrated by China’s mid-century defeats, encouraged Chinese leaders to expand China’s military training program by integrating Western techniques and practices. The ultimate objective was to capitalize on foreign technological and tactical proficiency to become a modern military based on the Western model.⁶ Western powers embraced the opportunity to increase contact and trade with—and exert influence on—China by providing training and military equipment. Although some of China’s elites were concerned about the effect of foreign influence on China’s social

⁵ Richard J. Smith, “Foreign-Training and China’s Self-Strengthening: The Case of Feng-Huang-Shan, 1864–1873,” *Modern Asian Studies*, Vol. 10, No. 2, April 1976; Barton C. Hacker, “The Weapons of the West: Military Technology and Modernization in 19th-Century China and Japan,” *Technology and Culture*, Vol. 18, No. 1, January 1977.

⁶ Smith, 1976, pp. 195–196.

structures, military leaders and scholars believed that the increased exposure to Western scientific and military advancements would provide a “self-strengthening” approach to increase military effectiveness.⁷ Ultimately, China aimed to use Western technology and know-how to increase military capabilities and eventually field forces that could counter Western forces and ensure Chinese independence.⁸

To pursue this “self-strengthening” approach, a new training and education regimen was established with Western assistance. These programs were focused on science and engineering, as well as military history and operations. One scholar in particular, Wei Yuan, argued that in order for China to strengthen itself relative to the Western powers, it would need to improve its commercial and economic viability, improve its technology and weapons, and develop an efficient training and supply system.⁹ His studies and recommendations helped the Chinese government form their self-strengthening approach to improve their military. Similarly, educational programs were set up to analyze Western military strategies and increase the overall educational level of Chinese military officers. To this end, military schools were created, with classes in language, arithmetic, algebra, geography, trigonometry, geometry, navigation, and nautical astronomy.¹⁰

The new training and education programs faced significant challenges that eventually led to their collective demise. Although self-strengthening was a focal point of maintaining Chinese independence, political and internal issues hindered progress. China faced uprisings, such as the Taiping Rebellion, which eventually killed an estimated 20 million people. Additionally, after the Opium Wars, the West made the Chinese sign trade agreements that benefited the Western powers economically, causing economic downturns for China.

A lack of resources contributed to the failure to adopt Western military ways. Chinese Naval officers were sent to Europe to learn Western tactics but failed to finish their programs because of funding issues.¹¹ Additionally, industrial decline at Fuzhou Navy Yard caused by insufficient funds affected Chinese Naval development.¹² One prevalent misconception among Chinese military leaders was that “China could defend its traditional society against the West with Western weapons, [or] that the West’s military technology could be detached from Western culture as a whole.”¹³ But as the Qing Dynasty became weaker and resources dwindled, China’s political system could not keep up with technologi-

⁷ Smith, 1976, pp. 195–196.

⁸ Smith, 1976, pp. 195–196.

⁹ Peter M. Mitchell, “The Limits of Reformism: Wei Yüan’s Reaction to Western Intrusion,” *Modern Asian Studies*, Vol. 6, No. 2, March 1972, pp. 199–200.

¹⁰ Benjamin A. Elman, “Naval Warfare and the Refraction of China’s Self-Strengthening Reforms into Scientific and Technological Failure, 1865–1895,” *Modern Asian Studies*, Vol. 38, No. 2, May 2004.

¹¹ Elman, 2004, pp. 284–286.

¹² Elman, 2004, p. 287.

¹³ Hacker, 1977, p. 52.

cal and strategic modernization. With interests divided among leadership, it was difficult for the Chinese military to adapt to Western military strategy. New leadership at this time prioritized different efforts and shifted the Chinese military's focus and resources, negatively affecting the "self-strengthening" effort.

Another critical challenge to successfully adapting Western military methods for use in the Chinese military was the inability to set up the program for long-term integration. Foreign military training assistance was meant to help the Chinese military modernize and secure vulnerable areas. But, from the onset of the training programs, China wanted to ensure that its military stayed independent.¹⁴ To China, the arrangement was meant to be temporary:

In Chinese eyes, the employment of foreign troops and officers could never be anything more than a temporary expedient. [Qing] policy makers aimed at eliminating dependence on foreigners as soon as possible, while building China's own military capabilities in order to contend with both internal and external challenges. These twin goals lay at the heart of self-strengthening.¹⁵

Ultimately, the lack of long-term support for the integration of Western military techniques, combined with a lack of resources and political and social instability, doomed the project. Some Western techniques were adopted while others were ignored, decreasing Chinese military effectiveness through piecemeal adaptation of the successful Western model. The program failed to create a nucleus of Western-trained officers that could fully implement the new tactics and strategies and forced China to employ foreign officers in leadership and command positions in a society that had significant antiforeigner sentiments for the rest of the 19th century.¹⁶

Japan

Japan, like China, was an agrarian-based society in the early half of the 19th century. Japanese culture, politics, and military science had rejected opening up to Western influences until U.S. Commodore Matthew Perry forcibly opened Japanese society to international trade and relations in 1853. Japan, to a much greater extent than China, embraced modernization and was more open to importing foreign technologies and Western military tactics.¹⁷

Japan recognized the growing military superiority of the West and absorbed the lessons of China's defeats to Western powers in the Opium Wars.¹⁸ Japan learned from the superiority

¹⁴ Smith, 1976.

¹⁵ Smith, 1976, p. 195.

¹⁶ Smith, 1976.

¹⁷ Hacker, 1977.

¹⁸ Hacker, 1977.

of Western technology and strategy in these conflicts, believing it necessary to expand trade and import Western methods in order to avoid China's fate.

Because the Japanese chose to expand international connections, open trade, and adopt Western ideas and technologies, they were able to modernize their own industry and production processes. This process opened the economy and made it possible for different industries to emerge. Although Japan relied on imported weapons for some time, various modernized transport and shipping methods were installed to lay the groundwork for Japan to eventually produce its own Western-style weapons

In the 1860s, the Japanese government experimented with different Western methods, including British and Dutch military training models. By 1864, more than 13,000 troops were trained in Western infantry, cavalry, and artillery tactics and strategies, although with unsatisfactory results in conflicts with Choshu imperial forces in 1864 and 1865.¹⁹ From this result, the Japanese government ultimately chose to adopt the French model to ensure a standardized training regimen for all forces and lessen the possibility of confusion on the battlefield. Additionally, many in the Japanese military already had knowledge of the French model and language.²⁰ These reforms, however, were slow to materialize. By 1866, only one military school was established and just 250 students were selected for attendance before the outbreak of the Japanese Civil War in 1867.

The Japanese Civil War of 1867 was a crucial turning point in Japan's attempts to build a modern military. Both sides—the government of the Tokugawa Shogunate and rebel factions intent on returning power to the emperor and diminishing foreign influence—recognized the importance of the Chinese defeats in the Opium Wars and the superiority of Western weapons and strategies and made attempts to acquire weapons and training from the West. Rebel forces had invested heavily in Western weapons and defeated a much larger Shogunate army at Kyoto in 1868, eventually overthrowing the government and starting the imperial restoration, or the Meiji Restoration, in 1869.

Following the Meiji Restoration, the Japanese government again focused on acquiring Western military training and weapons. In 1872, a new national army was formed from the military forces of different political factions around the country.²¹ There was great debate about whether to abolish the “warrior-status” that allowed different tribal forces who trained and equipped their forces according to their own customs and experiences. “Warrior-status” was ultimately abolished and a unified training program was established.²²

The post-Meiji Restoration era saw the Japanese continue to employ a French model for training and organization but adopt a German model for conscription into the newly created

¹⁹ Hyman Kublin, “The ‘Modern’ Army of Early Meiji Japan,” *Far Eastern Quarterly*, Vol. 9, No. 1, November 1949.

²⁰ Kublin, 1949.

²¹ Kublin, 1949.

²² D. Colin Jaundrill, *Samurai to Soldier: Remaking Military Service in Nineteenth-Century Japan*, Cornell University Press, 2016, pp. 73–104.

national army. The Conscription Act of 1873 was based on the principle of universal military service in the German model. It called for three years of active-duty service and two years of reserve service.²³ The creation of this new conscription-based national army met resistance from some traditional elements of the population and suffered from funding constraints and an overly generous exemption process that, by 1879, exempted almost 90 percent of the Japanese population from the Conscription Act.²⁴

Inadequacies in resourcing and training the new army were evident during the Saigo Uprising in 1877. Samurai Saigo Takamori, a leader of the 1867 rebellion, took up arms against the government and marched a force of 10,000 men into a conflict against more than 30,000 Japanese Army troops. Though armed with antiquated firearms and traditional samurai weapons, Saigo's forces inflicted heavy losses on the modernly equipped Japanese Army before ultimately facing defeat.²⁵

The results of the Saigo Uprising led to continued reforms in the Japanese military and closer ties to Western militaries. However, this time, the government did not have to start from the beginning. The evolution in learning, training, adaptation, and industrialization that had occurred since the Tokugawa period aided Japan in developing capable military forces that could use their modern equipment.²⁶ The military training, reorganization, and adoption of international techniques ended up being successful. In the next few decades, Japan faced several world superpowers, defeated Russia in the Russo-Japanese War of 1904–1905, and created a world-class military force by the time of World War II.²⁷

Conclusion

These two cases highlight the complexities faced by governments and militaries attempting to import a foreign military model. Both countries faced an array of internal and external threats, and both recognized the need to reform their militaries to address those threats, particularly the threat posed by Western militaries. The effective implementation of these military reforms, however, required significant changes on a societal level in the areas of education, economics, political systems, and social norms. As these examples demonstrate, the results that both countries achieved stood in stark contrast to the other country's results, largely because of the willingness of Japanese and Chinese political leaders to tackle the broad societal and political reforms necessary for Western models to be successfully implemented. Japan's leaders took on significant risk when they instituted reforms that upended long-

²³ Kublin, 1949.

²⁴ Rokuhara Hiroko, "Local Officials and the Meiji Conscription Campaign," *Monumenta Nipponica*, Vol. 60, No. 1, Spring 2005.

²⁵ Kublin, 1949.

²⁶ Thomas C. Smith, "The Introduction of Western Industry to Japan During the Last Years of the Tokugawa Period," *Harvard Journal of Asiatic Studies*, Vol. 11, No. 1–2, June 1948.

²⁷ Kublin, 1949.

standing norms, including traditional hierarchical relationships, governmental processes and institutions, and educational practices. Additionally, Japan's leaders—although grudgingly at times—embraced foreign assistance and went to great lengths to emulate and adopt Western practices. Conversely, China's leaders were unable to accomplish similar reforms despite impressive gains in areas such as shipbuilding and arms manufacturing. In the end, the dispersion of centralized power and the Chinese leadership's unwillingness to embrace and implement the difficult reforms required to make these foreign models work prevented effective, lasting reforms to China's military.

Out of the Rubble: The Interwar Period

France, Great Britain, Germany, and the United States' learning and adaptation decisions throughout the interwar period were heavily influenced by their experiences during World War I. France and Britain's experiences during the war—and their desire to avoid similar bloodshed—meant that they prioritized defensive strategies, operations, and tactics. These priorities influenced service training and investment decisions. Service rivalries often hindered joint experimentation. Resource constraints affected all four countries, and this dictated investment and innovation choices. France, Germany, the United States, and Britain studied their performances in the previous wars, with varying levels of fidelity. The *Reichswehr*, the German army, was the most committed to analyzing lessons learned from World War I and applying them to its procurement and training programs. Often, innovation occurred because of the advocacy of a military leader. Because of these learning and adaptation decisions, the allies took much longer than the Germans to learn and adapt to new concepts, and thus were largely unprepared for the outbreak of World War II.²⁸

France

The French experience in World War I heavily influenced France's postwar military strategies. The interwar years saw France adopt a defensive strategy along its frontier that was based on a combination of military, societal, and financial factors.²⁹ First, France's experience in the war was traumatic to French society. France suffered more than 1.3 million casualties and the occupation of significant parts of its most economically important departments.³⁰ Although France was considered a victor in World War I, public sentiment among the French

²⁸ Williamson Murray and Allan R. Millet, *A War to Be Won: Fighting the Second World War*, Belknap Press, 2000.

²⁹ Brian Bond and Martin Alexander, "Liddell Hart and De Gaulle: The Doctrines of Limited Liability and Mobile Defense," in Peter Paret, ed., *Makers of Modern Strategy: From Machiavelli to the Nuclear Age*, Princeton University Press, 1986.

³⁰ Bond and Alexander, 1986, p. 598.

was that the country survived rather than won the war. These sentiments led to significant antiwar attitudes among the French in the interwar period.³¹

Second, France's military budget was constrained because of an economic recession and public aversion to defense spending.³² Political and public opinion influenced defense procurement decisions. For example, tanks were seen as bellicose and thus "inappropriate to the defensive pretensions of democratic France," a viewpoint that bridged party lines.³³ Third, France's experience of the attrition warfare prevalent during the war fostered a belief that any future conflict would play out along similar lines, which made prioritizing defensive strategies the most logical conclusion. As a result of this attitude, defensive strategies were seen as a way to minimize casualties.³⁴ Overall, these factors prejudiced French approaches to learning and adaptation in favor of those that supported its defensive strategy and against those that would challenge this strategy, such as combined-arms tactics.³⁵

The French did not encourage experimentation with military concepts and technologies during the interwar period if they were not defensively oriented. To minimize casualties in a future war of attrition, the French adopted a "methodological battle" concept on the ground.³⁶ This concept focused on "maximizing firepower and preventing heavy casualties by tightly controlling the movements of relatively untrained draftees and reservists who made up the bulk of the army."³⁷ Although the French army relied on inexperienced draftees, it did not emphasize their training: "Its exercises provided little training and even less food for thought. The French trained lackadaisically . . ."³⁸ The army gave priority to training those who needed "special skills," such as wireless operators.³⁹ Moreover, there seemed to be an aversion to learning and adapting within the military:

The French officer corps studied World War I for lessons that reflected credit on the army; it did not study the past to discover unpleasant truths. Moreover, there was a Cartesian tendency toward deductive reasoning in the approach of French military leaders, as well as a willingness to cook the books whenever empirical evidence from the last war or

³¹ Bond and Alexander 1986, p. 598.

³² Bond and Alexander, 1986, p. 607; Jonathan M. House, *Combined Arms Warfare in the Twentieth Century*, University Press of Kansas, 2001.

³³ Bond and Alexander, 1986, p. 617.

³⁴ Bond and Alexander, 1986, p. 598.

³⁵ Murray and Millet, 2000, pp. 24–25.

³⁶ Murray and Millet, 2000, pp. 24–25; House, 2001, p. 85.

³⁷ Murray and Millet, 2000, pp. 24–25.

³⁸ Murray and Millet, 2000, p. 25.

³⁹ Bond and Alexander, 1986, p. 616.

results of recent military exercises did not agree with current doctrine and practices. The leadership was inclined to press on a “hope” that things would turn out well.⁴⁰

France’s commitment to a defensive strategy influenced its analysis. Mechanization—both conceptually and technologically—flourished in the 1920s under the advocacy of French officers, such as General Edmond Buat.⁴¹ However, from 1927 to 1930, Marshal Philippe Pétain and General Marie-Eugène Debney oversaw the “systematic suppression of tactical initiative in favor of centralized [C2].”⁴² The concept of centralized C2 complemented their defensive strategy. Some innovation did begin to creep back into French doctrinal thought during the 1930s, a time that was “rich with technical and doctrinal reflection and experimentation.”⁴³ For example, the 1932 exercises at Mailly Camp led to the development of a new cavalry division. French doctrine, however, maintained defensive priorities. Although France had numerical superiority in armor and some substantial technical advantages over Germany at the beginning of World War II, French doctrine relied on firepower and did not anticipate the German emphasis on speed, shock, and surprise to encircle enemy forces and drive deep into enemy rear areas.⁴⁴

The French were similarly unprepared in the air domain. Although France had an independent air service, the French government did not invest in updating their air capabilities or concepts until it was too late.⁴⁵ Although experimentation did occur throughout the interwar years, it resulted in the development of multimission-capable aircraft that were inadequate to perform tasks.⁴⁶ Moreover, the French took so long to procure airplanes that the aircraft were often outdated by the time they were produced.⁴⁷ The French began to manufacture modern planes only on the eve of World War II. As a result, their force “ran into the same problems with maintenance, accidents, inexperienced crews, and low operationally ready rates . . . that had plagued the [British Royal Air Force] and the Luftwaffe in the late 1930s.”⁴⁸ Had the French adapted earlier, they might have been able to mitigate some of these issues.

⁴⁰ Murray and Millet, 2000, pp. 24–25.

⁴¹ Bond and Alexander, 1986, pp. 602–604.

⁴² Bond and Alexander, 1986, p. 604.

⁴³ Bond and Alexander, 1986, p. 608.

⁴⁴ R. J. M. Porter, “Higher Command and Staff Course Staff Ride Paper: As the Experience of the French and German Armies in 1940 Demonstrates, Doctrine Not Equipment Is the Key to Success in Modern Warfare,” *Defence Studies*, Vol. 3, No. 1, Spring 2003.

⁴⁵ House, 2001, p. 90.

⁴⁶ House, 2001, p. 90.

⁴⁷ House, 2001, p. 90.

⁴⁸ Murray and Millet, 2000, p. 35.

During the interwar period, the French displayed “sheer complacency” in planning for future war.⁴⁹ When innovation did occur, it was driven by advocacy from individual leaders within the military rather than organizational directives.⁵⁰ The French military was not well trained, relied on military concepts that did not enable them to react to sudden changes on the battlefield, and conducted biased historical military analysis. Because of these factors, it did a poor job learning and adapting during the interwar years and was thus ill-equipped for the start of World War II.

United States

The United States drastically reduced its military expenditures during the interwar period. The United States, geographically isolated from Europe and the Pacific, was historically distrustful of maintaining a permanent, standing army. World War I demonstrated that the army could mobilize when required, diminishing—in the American opinion—the need for ground forces.⁵¹ This opinion was reinforced by a strategic environment in which the United States lacked an obvious threat, decreasing the need to expend resources on military forces.⁵² Additionally, the onset of the Great Depression in 1929 constrained the resources available for the military.⁵³ Overall, these circumstances led to a “national consensus for strict neutrality.”⁵⁴

As a result, the army was effectively skeletonized during the interwar years. Army resources were meager, affecting military readiness, training, and personnel.⁵⁵ Thus, Army leadership was not “particularly supportive of ideas that would make further demands on resources already heavily strained.”⁵⁶ The Army prioritized retaining personnel over investing in equipment, such as tanks.⁵⁷ As a result, technological development slowed dramatically in all areas except aviation.⁵⁸

Culturally, most Army officers viewed technology suspiciously, as a “vestige of a pre-war army that had relied heavily on animal power.”⁵⁹ The Army did not conduct any type of probing analysis of its performance at the strategic level during the war:

⁴⁹ Murray and Millet, 2000, p. 35.

⁵⁰ Bond and Alexander, 1986, pp. 602–604.

⁵¹ David E. Johnson, *Fast Tanks and Heavy Bombers*, Cornell University Press, 1998.

⁵² Johnson, 1998, pp. 102–103.

⁵³ Johnson, 1998, p. 108.

⁵⁴ Johnson, 1998, p. 108.

⁵⁵ Johnson, 1998, p. 55.

⁵⁶ Johnson, 1998, p. 71.

⁵⁷ Johnson, 1998, p. 115.

⁵⁸ Johnson, 1998, p. 115.

⁵⁹ Johnson, 1998, p. 56.

The officers charged with assessing the lessons of the Great War were by and large “Old Army.” . . . To senior Army officers it surely seemed that the American doctrine of open warfare had worked, with relatively few alterations The Great War had thus verified American strategic and tactical concepts. The areas that had proven deficient—personnel mobilization and industrial production—were those targeted for remedy.⁶⁰

This viewpoint, combined with skepticism of new technology, prompted an “evolutionary, rather than a revolutionary, reorganization of the U.S. Army,” drowning out those with opposing viewpoints.⁶¹ Resource limitations and the “general neglect of the U.S. Army” inhibited major capability and design changes until a few years before the start of World War II.⁶²

Although resources were limited and the ability to make an honest assessment of the Army’s effectiveness in the previous war was suspect, some innovation did occur, albeit in different ways at the operational and tactical levels of the Army. At the operational level, the U.S. Army copied French doctrine, “simply translating the French manual in the early 1930s. This caused considerable difficulties in exercising large unit operations.”⁶³ At the tactical level, however, under the leadership of General John J. Pershing, the Army conducted a comprehensive analysis of World War I and produced the Field Service Regulations of 1923, which contributed to the ability of troops to rapidly adjust to the realities of the battlefield in World War II.⁶⁴

The Army’s experience in World War I showed that the next war would demand more firepower and mobility, specifically motorization.⁶⁵ This innovation led to the creation of a new generation of weapons, such as the Garand M-1 semiautomatic rifle, which replaced older bolt-action rifle designs.⁶⁶ The army also experimented with force design, featuring the “streamlining of infantry divisions to three regiments and the pooling of specialized units at [the] corps level.”⁶⁷

Overall, learning and adaptation within the army was haphazard. The most-notable innovation efforts occurred between 1929 and 1941 at the Field Artillery School.⁶⁸ Exercises in 1940 and 1941 led to novel combined arms techniques, and “[t]he most heartening innovation was the ability of the artillery to adjust and mass fires on unseen targets, either by map

⁶⁰ Johnson, 1998, pp. 54–55.

⁶¹ Johnson, 1998, pp. 58–59.

⁶² House, 2001, pp. 96–97.

⁶³ Murray and Millet, 2000, p. 28; House, 2001.

⁶⁴ Murray and Millet, 2000, p. 28.

⁶⁵ Murray and Millet, 2000, pp. 28–29.

⁶⁶ Murray and Millet, 2000, p. 29.

⁶⁷ Murray and Millet, 2000, p. 29.

⁶⁸ House, 2001, p. 101.

analysis or, more importantly, by the use of ground or airborne observers.”⁶⁹ The development and fielding of armored vehicles, however, did not progress as well. Intraservice rivalry complicated innovation efforts regarding tanks and mechanization as “American tank development became a battle for control between the user and the provider.”⁷⁰

In 1920, the U.S. Congress abolished the tank corps created in World War I and placed tanks in the infantry branch, which ended any notion of experimenting with tanks in roles other than directly supporting the infantry and hindered the formulation of a forward-thinking mechanization policy. This move corresponded with a time of more-innovative thinking in the domain of armored warfare by some European military leaders, who posited that armored warfare, in combination with other weapon systems, such as aircraft, could fight and win a war of fire and maneuver. The United States began falling behind European powers in armored warfare development.⁷¹

In the air domain, airpower was subordinated within the army as the United States Army Air Corps. The United States believed that the center of gravity in the air was its enemy’s airpower.⁷² Close air support was a secondary mission: “Given the fact that the air corps was part of the army it had to pay lip service to tactical support of the ground forces, but its actual force structure underscored where its priorities lay.”⁷³ As a result, there was little training in close air support.⁷⁴ The Army did, however, allow pilots to test close air support concepts during peacetime.⁷⁵

The Army Air Corps Tactical School helped develop U.S. thinking regarding airpower and tactics for long-range bombing.⁷⁶ The Tactical School was intended to be a “clearing-house into which tactical ideas [could] flow, where they [could] be tried, and where the doctrine [could] go out to the service to be put into practice and be evaluated.”⁷⁷ The Tactical School became the “hub of airpower advocacy and indoctrination.”⁷⁸ The school’s analysis was not flawless, however. For example, American bomber theorists did not broadly learn from Brit-

⁶⁹ Murray and Millet, 2000, p. 30.

⁷⁰ Johnson, 1998, p. 79.

⁷¹ John T. Hendrix, “The Interwar Army and Mechanization: The American Approach,” *Journal of Strategic Studies*, Vol. 16, No. 1, March 1993.

⁷² Murray and Millet, 2000, p. 32; Johnson, 1998, p. 166.

⁷³ Murray and Millet, 2000, p. 32.

⁷⁴ House, 2001, p. 33.

⁷⁵ House, 2001, p. 33.

⁷⁶ Murray and Millet, 2000, p. 32.

⁷⁷ Johnson, 1998, p. 155.

⁷⁸ Johnson, 1998, p. 155.

ish and German operational experience at the beginning of World War II.⁷⁹ U.S. airpower learning and adaptation occurred, but often emphasized preconceived notions of airpower.

In the naval domain, the 1922 Washington Naval Treaty limited U.S. Navy warships in number, size, and capability. As a result, the U.S. Navy suffered from a lack of resources in the interwar period, contributing to manpower and training challenges:

A major Navy Department assessment in 1938, and updated each year thereafter, identified serious weaknesses: under manning, poor training due to lack of ammunition and fuel, too few ships in the “fleet train,” underdeveloped naval bases outside the continental United States, obsolete ship types and aircraft, and too few ships in landing aircraft for the Fleet Marine Force.⁸⁰

Despite these challenges, naval learning and adaptation did occur during the interwar period. The U.S. Navy and Marine Corps demonstrated how to use different methodologies to innovate. Under Admiral William Sims, the U.S. Naval War College conducted wargames to test the efficacy of aircraft carrier operations prior to investment in procurement. Navy and Marine Corps theorists also examined the future of amphibious operations.⁸¹

Through these exercises and experimentation, the Navy learned about key aspects of carrier operations, including using carrier aircraft in mass formations to attack enemy forces. This innovation led to aircraft carrier designs that focused on deploying large air wings, which differed from other naval powers, such as Great Britain. For example, “by 1929 the Saratoga boasted a deck park of over 100 aircraft—a number simply inconceivable to Royal Navy officers.”⁸² Navy leaders attempted to address the lack of resources faced by the Navy in the 1938 Naval Expansion Act, which mandated an increase in naval manpower and authorized the construction of new and larger battleships.⁸³ However, after decades of resource constraints, the U.S. military still lagged behind other world powers.

Great Britain

Great Britain’s postwar strategy focused on containing German ambition. By combining its economic strength with its traditional strategies of naval blockades, Great Britain believed that it could preserve the postwar peace in continental Europe. Great Britain also recognized that the growing capabilities of airpower necessitated strengthening its air defenses to

⁷⁹ Johnson, 1998, p. 172.

⁸⁰ Murray and Millet, 2000, p. 42.

⁸¹ Murray and Millet, 2000, pp. 39–40.

⁸² Murray and Millet, 2000, p. 40.

⁸³ David J. Rogers, *Deployment of the World’s Fastest Battleships*, Missouri University of Science and Technology, undated.

prevent strategic bombing and invasions. These strategies influenced Great Britain's postwar rearmament.

In the immediate postwar years, Great Britain expended considerable effort to understand the lessons of World War I, leading to a restructuring of the British Army with the goal of restoring mobility to ground units.⁸⁴ The British Army was traditionally structured around its regimental system, in which each regiment "was a law unto itself."⁸⁵ This structure led to innovations that were often stovepiped and not disseminated because of the nature of British military culture and the regimental system, hindering experimentation in favor of continued reliance on traditional operational tactics and strategies.⁸⁶ Training exercises were generally considered unrealistic.

Attempts in the early 1930s to create new doctrine based on analysis of World War I operations were met with opposition and eventually suppressed because the analysis was too critical of the British Army.⁸⁷ During this time, there was also significant opposition to fighting continental wars in British politics and society.⁸⁸ The British instead decided to focus their resources on countering the threat from Germany and assigned this mission to the Navy and Royal Air Force (RAF).⁸⁹ As a result, resources flowed away from the Army and toward these two services.⁹⁰

In the air domain, British airpower doctrine focused on strategic bombing at the expense of tactical proficiencies. Chief of Staff Sir Hugh Trenchard was a fierce advocate for airpower and was responsible for ensuring that it remained an independent force in the aftermath of World War I. This advocacy, however, led to a "fanatical commitment to the bomber as the sole embodiment of air power."⁹¹ Airpower was touted as being capable of preventing the "slaughter" of World War I. Specifically,

Air attacks aimed at the sources as opposed to the manifestations of an enemy strength, it was argued, would both restore decisiveness to warfare and produce a much swifter and hence in the end more humane decision. Here as well Trenchard took the lead, coming more and more to emphasize the decisiveness of an attack aimed at the enemy's morale.⁹²

⁸⁴ Bond and Alexander, 1986, pp. 599–600.

⁸⁵ Murray and Millet, 2000, p. 24.

⁸⁶ Murray and Millet, 2000, p. 24.

⁸⁷ Murray and Millet, 2000, p. 24.

⁸⁸ Bond and Alexander, 1986, p. 611; Murray and Millet, 2000, pp. 23–24.

⁸⁹ Bond and Alexander, 1986, p. 611.

⁹⁰ Bond and Alexander, 1986, p. 611.

⁹¹ Murray and Millet, 2000, p. 31.

⁹² David MacIsaac, "Voices from the Central Blue: The Air Power Theorists," in Peter Paret, ed., *Makers of Modern Strategy: From Machiavelli to the Nuclear Age*, Princeton University Press, 1986, p. 633.

Moreover, because RAF leaders were trying to establish a distinct service culture, they wanted to focus on Air Force–specific missions.⁹³ As a result, officers did not commit to or invest in the force structure to perform operations such as close air support.⁹⁴ For example, after an exercise in which the RAF practiced this concept with the Army, the Air Ministry “formally requested that the army refrain from encouraging pilots to violate RAF doctrine.”⁹⁵ The RAF’s resources were dedicated to the Bomber Command for the majority of the interwar period.⁹⁶ This dedication of resources came despite evidence that demonstrated that bombing was often inaccurate and suggested that long-range escort aircraft were needed to ensure that bombers made it to their destination.⁹⁷

More innovation and experimentation were accomplished on the Fighter Command side of the RAF. Air Marshal Hugh Dowding was responsible for developing Great Britain’s air defense network and encouraged experimentation with coordinating radar units and fighter aircraft that reinforced the air defense network.⁹⁸ Once at the helm of the Fighter Command, he amalgamated defensive air technology with these concepts.⁹⁹ On the eve of World War II, Prime Minister Neville Chamberlain’s government decided to prioritize resources to Britain’s air defenses over its fighter force. This decision, which faced stiff opposition from the Air Ministry, enabled Britain to have a “a functioning air defense system that had integrated aircraft, radar, and communications into a coherent whole.”¹⁰⁰

The Royal Navy struggled to learn and adapt during the interwar period. One reason for this was interservice competition. At the end of World War I, the Royal Navy had 11 aircraft carriers.¹⁰¹ However, when the RAF was formed in 1917, it absorbed the Royal Navy’s air capabilities and the development of the carrier languished. This restructuring meant that “naval pilots floated between the two services in an uneasy limbo which prevented the emergence of Admirals with direct knowledge of airpower, and carrier aviation in Great Britain never received the conceptual push from naval thinkers that was occurring in the United States.”¹⁰² Another reason for the lack of learning and adaptation was overconfidence. The

⁹³ House, 2001, p. 71.

⁹⁴ House, 2001, p. 71.

⁹⁵ House, 2001, p. 71.

⁹⁶ MacIsaac, 1986, p. 633.

⁹⁷ Murray and Millet, 2000, p. 31.

⁹⁸ Murray and Millet, 2000, p. 31.

⁹⁹ Murray and Millet, 2000, pp. 31–32.

¹⁰⁰ Murray and Millet, 2000, p. 32.

¹⁰¹ Murray and Millet, 2000, p. 36.

¹⁰² Murray and Millet, 2000, p. 36.

British believed that sonar capabilities negated the threat from German U-boats, although antisubmarine warfare was tested only in favorable conditions and against easy targets.¹⁰³

The Royal Navy also needed a maritime advocate with “the drive, imagination, and political acumen of William Moffett in [the] U.S. Navy.”¹⁰⁴ Without this advocacy, naval learning and adaptation suffered.¹⁰⁵ The Royal Navy, however, “did an outstanding job of training the next war’s leaders in the traditions of the eighteenth and nineteenth century Royal navies.”¹⁰⁶ This training gave Great Britain an edge in World War II because “[t]hat superior leadership allowed the British to hold the Mediterranean against a larger Italian fleet in the early war and eventually, at a terrible cost, to master the threat posed by the second great German submarine offensive.”¹⁰⁷

During the interwar period, service rivalries prevented the Royal Army, Navy, and Air Force from working together to experiment and train with new concepts. When training did occur, it did so in unrealistic conditions. British learning and adaptation decisions were often stovepiped during this time as well.

Germany

At the conclusion of World War I, Germany was required, under the terms of the Treaty of Versailles, to dismantle its military, leaving it “disarmed and much weaker than any of its potential enemies.”¹⁰⁸ The *Reichswehr*, the German Army, was reduced to 100,000 men, with only 5,000 in its officer corps.¹⁰⁹ These constraints did not, however, inhibit ingenuity, and the Reichswehr had the freedom to learn and adapt to new technology and concepts:¹¹⁰

To some extent, the German tactical successes of 1939–1942 were not due to any superiority in equipment quality but to the fact that the German tanks and other vehicles were produced early enough to allow extensive experimentation and training before the war. In contrast, the British and French had few modern weapons with which to train until the very eve of World War II, when they mass-produced them on a crash basis.¹¹¹

¹⁰³ Murray and Millet, 2000, p. 36.

¹⁰⁴ Murray and Millet, 2000, p. 36.

¹⁰⁵ Murray and Millet, 2000, pp. 36–37.

¹⁰⁶ Murray and Millet, 2000, pp. 36–37.

¹⁰⁷ Murray and Millet, 2000, p. 37.

¹⁰⁸ Michael Geyer, “German Strategy in the Age of Machine Warfare,” in Peter Paret, ed., *Makers of Modern Strategy: From Machiavelli to the Nuclear Age*, Princeton University Press, 1986, p. 554.

¹⁰⁹ Murray and Millet, 2000, p. 22.

¹¹⁰ House, 2001, p. 77.

¹¹¹ House, 2001, pp. 65–66.

The Reichswehr, led by General Hans von Seeckt, established 57 committees to assess and publish findings on their performance during World War I.¹¹² These committees were tasked with assessing the “revolutionary nature of the 1918 battlefield” and German army performance. This endeavor was important because German postwar society was rife with the *Dolchstoßlegende*—a myth that laid the blame for Germany’s defeat in World War I outside the German military, preventing the correct lessons from being learned.¹¹³

As a result of this meticulous study, the Germans created a military doctrine of combined arms that fully considered the lessons of World War I.¹¹⁴ The Reichswehr applied these lessons “with the Teutonic thoroughness that they brought to war.”¹¹⁵ The Germans developed organizational models and invested in equipment to complement their new doctrine.¹¹⁶ They also found work-arounds for the limits imposed by the Treaty of Versailles: “In those instances where field trials had to be conducted, the Germans used mock-ups, or tested forbidden equipment and concepts in secret within the Soviet Union.”¹¹⁷ Unlike the French, the Germans tested combined arms integration.¹¹⁸

The Reichswehr’s culture encouraged critical thinking. The Germans prioritized decentralized execution, which enabled innovation at the lower levels of military command. The German general staff embraced the concept of decision-oriented, operationally independent tank warfare.¹¹⁹ This culture was exemplified in the development and success of the blitzkrieg concept, which was employed with great effectiveness at the onset of World War II. This culture enhanced institutional learning and adaptation.

In the initial years after World War I, the *Luftwaffe*, the German air force, also studied the lessons learned from the Great War. Under Nazi leadership, the Luftwaffe focused on strategic bombing and air superiority and developed technology associated with these operations.¹²⁰ Although Germany’s experience in the Spanish Civil War (1936–1939) demonstrated the importance of providing close air support to ground troops, the Germans did not prioritize this type of operation and were unable to provide close air support to ground forces until 1941.¹²¹ However, “unlike the American[s] and the British, German airmen were willing to

¹¹² Murray and Millet, 2000, p. 22.

¹¹³ Murray and Millet, 2000, p. 22.

¹¹⁴ Murray and Millet, 2000, p. 23.

¹¹⁵ Murray and Millet, 2000, p. 25.

¹¹⁶ House, 2001, p. 77.

¹¹⁷ House, 2001, p. 77.

¹¹⁸ House, 2001, p. 83.

¹¹⁹ Geyer, 1986, p. 559; House, 2001, p. 77.

¹²⁰ House, 2001, p. 82; Murray and Millet, 2000, pp. 33–34.

¹²¹ House, 2001, p. 82.

work at providing support for the ground battle before the war.”¹²² This support provided the Germans with an advantage when World War II began.

In the naval domain, the *Kriegsmarine*, Germany’s navy, did not embark on the same search for innovation as the Reichswehr. Despite the achievement of its U-boat operations during World War I, the *Kriegsmarine* “evinced little interest in a repeat effort throughout the interwar years.”¹²³ Instead, the Germans focused on building battleships.¹²⁴ When they did employ submarines, the *Kriegsmarine* focused on tactics and technology instead of operations.¹²⁵

Learning and adaptation occurred asymmetrically across the Reichswehr, Luftwaffe, and *Kriegsmarine*. Of the three services, the Reichswehr conducted the most-rigorous analysis and accompanied their assessments with experimentation and training. Decentralized execution encouraged innovation within the Reichswehr. Within the Luftwaffe and *Kriegsmarine*, adaptation and learning were biased toward service preferences for missions; for example, strategic bombing was favored over close air support.

Conclusion

When comparing the learning and adaptation paths of the Allies—France, the United States, and Great Britain—with Germany’s during the interwar years, it might be simple to conclude that the Germans were far more prepared for World War II than the Allies:

Innovation demanded military organizations [that] could translate ideas and concepts into reality through hard, unrelenting training and work on the exercise fields. Here the contrast between the French and German armies is significant. Both armies embarked on war in 1939 with considerable weaknesses in the training and preparation of not only their reserve units but their regular units as well. The German[s] recognized those weaknesses and, through a ruthless training program of six days a week, twelve hours per day, they corrected those deficiencies. The French did not.¹²⁶

However, this would be an oversimplification.¹²⁷ The Germans—who, after World War I, had to rebuild their military from scratch—were not restricted by previous procurement decisions, which contributed to their ability to innovate.¹²⁸ For example, “[t]he German defense budget and tactical thought were less restricted to, or dependent on, 1918-era technology

¹²² Murray and Millet, 2000, p. 34.

¹²³ Murray and Millet, 2000, p. 37.

¹²⁴ Murray and Millet, 2000, p. 37.

¹²⁵ Murray and Millet, 2000, pp. 36–37.

¹²⁶ Murray and Millet, 2000, p. 43.

¹²⁷ Bond and Alexander, 1986, p. 633.

¹²⁸ House, 2001, pp. 65–66.

than were other armies.”¹²⁹ However, although the Reichswehr rigorously innovated, the Luftwaffe and Kriegsmarine conducted less experimentation.

Learning and adaptation occurred throughout the interwar period among all the Allies, but were not consistent:

The interwar period saw strides in the conceptualization of tactics and operations, but progress was uneven, and planners could rarely predict what would work in the next war and what would not. Some military organizations turned their back on the past, some distorted the lessons of the past, and only a few made progress in bringing to fruition revolutionary changes.¹³⁰

Innovation, when it did occur, often only arose because of military culture or strong advocacy by military leadership. Interservice and intraservice rivalries, defensive strategic concepts, and lack of resources often hindered experimentation.

Competing Operational Models: The Soviet Union and Russia and the United States

The Soviet Union and Russia

Russia, and before that the Soviet Union, has faced significant strategic challenges throughout its history that influenced its military thinking and application of military force, particularly since World War II. Russia’s geographic size and position, its technological capabilities, natural resources, and history of conflict with its neighbors have influenced the types of military forces it developed and the strategies used for their employment. Russia has evolved from operational models that took advantage of its numeric superiority during the Soviet era to an understanding that modern wars will involve both hybrid and noncontact warfare. These two forms of warfare rely on a mix of nonmilitary tools and long-range, precision strikes as means for targeting an adversary’s military-economic potential and national leadership. In general, Russian leaders have identified these types of warfare as two of the most prominent modes of warfare employed by the United States and its allies today. These developments in warfare have led Russia’s military to pursue capabilities and counters in both areas with varying levels of success.

During the Cold War, the Soviet Union’s experience during World War II continued to exert a heavy influence on how the Soviet military envisioned war and the manner in which it measured military strength.¹³¹ Soviet military leaders believed that future combat would

¹²⁹ House, 2001, p. 77.

¹³⁰ Murray and Millet, 2000, p. 21.

¹³¹ Clint Reach, Vikram Kilambi, and Mark Cozad, *Russian Assessments and Applications of the Correlation of Forces and Means*, RAND Corporation, RR-4235-OSD, 2020, p. 7.

closely resemble Soviet experiences at the end of World War II, which involved mass battles of attrition and large numbers of troops (grouped in divisions, army groups, and fronts) conducting maneuver warfare that penetrated enemy defenses and exploited enemy weaknesses based on rapid movement and synchronization at the operational level.¹³² Conscription was central to this system, and adults were required to complete two-year periods of service. Despite an initial assumption on the part of Soviet leaders that the enlisted force would closely resemble the one that existed at the end of World War II, the conscription system ultimately eroded a strong NCO corps and increased the number of responsibilities placed on the Soviet officer corps.¹³³ As military equipment grew more technically sophisticated and complex, Soviet officers took on roles as small unit leaders or technical specialists.

Russian Army tactical formations evolved from Soviet-style combined arms formations. Each Soviet ground unit in the years following World War II was built around a specific branch of combat arms: infantry, motorized infantry, or armor. This structure sometimes necessitated attaching different units, such as engineers, air defense, or antitank assets, to the organic battalion or regiment. The Soviet system evolved in the 1960s and 1970s to a combined arms structure with units that contained other organic elements apart from the type of core unit. Soviet exercises reflected this evolution, which occurred because it was believed to be a more effective structure to execute missions in a high-tempo, lethal environment.¹³⁴

After the Cold War ended, the Russian Armed Forces still heavily resembled the Soviet military in many respects, including its equipment, organization, doctrine, and force generation system. The Russian military's poor performance in Chechnya and Georgia in 2008 provided an impetus for change. These "New Look" reforms sought to align Russia's force structure with the types of wars envisioned in its most-recent strategies.¹³⁵ Most notably, these strategies identified local wars and noncontact warfare as the conditions most likely to confront Russia's military in the future. The New Look reforms attempted to shift the Russian Armed Forces away from a Soviet-style force posture centered on large-scale mobilization, reliance on conscripts, low peacetime readiness, and mass designed to fight large-scale wars of annihilation and attrition.¹³⁶

The Russian military that emerged from the New Look reforms was designed to be used against a variety of threats from nonstate groups that Russian defense planners identi-

¹³² Lester W. Grau and Charles K. Bartles, *The Russian Way of War*, Foreign Military Studies Office, 2016; Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*, Routledge, 1997, pp. 221–224.

¹³³ Grau and Bartles, 2016, p. 3.

¹³⁴ Lester W. Grau, *The Soviet Combined Arms Battalion—Reorganization for Tactical Flexibility*, U.S. Army Soviet Army Studies Office, September 1, 1989.

¹³⁵ Samuel Charap, Dara Massicot, Miranda Priebe, Alyssa Demus, Clint Reach, Mark Stalczynski, Eugeniu Han, and Lynn E. Davis, *Russian Grand Strategy: Rhetoric and Reality*, RAND Corporation, RR-4238-A, 2021, p. 86.

¹³⁶ Charap et al., 2021; Reach, Kilambi, and Cozad, 2020.

fied as the most-likely threats to large-scale conventional militaries.¹³⁷ One of the central ideas behind the Russian military's reforms was a move away from the mobilization system that existed under its predecessors and toward a higher-readiness, more professional force that would be ready on short notice for smaller-scale threats. Accordingly, Russia's ground forces emphasized the readiness of elite forces, such as the Airborne Forces, naval infantry, and special forces.¹³⁸ The Russian military did not do away with conscription during this period—leaders still envisioned a mobilization process for a significant portion of the military. However, a smaller, more professional component would ensure better readiness for crisis situations. In addition, Russian leaders invested significantly in the development of long-range precision strike capabilities across the services.

A key element of the New Look reforms involved reduction and consolidation across Russia's defense enterprise. Reductions in units and equipment occurred across all services, with sizable cuts to the ground forces, including cadre units and their bases and infrastructure.¹³⁹ Drastic reductions in armor, infantry fighting vehicles, tactical air defenses, and artillery were accompanied by similarly deep cuts to logistics, production, and ammunition storage facilities.¹⁴⁰ In the eyes of Russian planners, these reductions were a necessary step in the Russian Armed Forces' move toward a more ready, flexible, and advanced military that could succeed in the modern combat environment.

One example of this consolidation can be seen in Russia's ground force structure. Modern Russian ground forces are based around the battalion tactical group (BTG), which traces its lineage to Soviet combined arms units. A BTG is designed to be detachable from its parent brigade, with the ability to operate independently. Composed of motorized rifle and tank companies and artillery batteries, a BTG is designed to be self-sufficient, allowing local commanders to tailor available forces to specific missions.¹⁴¹

In recent years, Russian military leaders have identified and discussed a new "hybrid warfare" model as employed by Western powers, most notably the United States.¹⁴² This model combines *nonambiguous* types of warfare, such as conventional and nuclear, with *ambiguous* means, such as cyber capabilities, covert special forces, political and economic pressure, and

¹³⁷ Scott Boston and Dara Massicot, *The Russian Way of Warfare: A Primer*, RAND Corporation, PE-231-A, 2017, p. 5.

¹³⁸ Boston and Massicot, 2017.

¹³⁹ Charap et al., 2021.

¹⁴⁰ Charap et al., 2021.

¹⁴¹ Grau and Bartles, 2016.

¹⁴² This term was used by Russia's Chief of the General Staff Valery Gerasimov in a speech in 2015. It does not reflect a Russian concept. Rather, the term reflects Russia's understanding of how the Western way of war has evolved. For additional discussion, see Robert Seely, "Defining Contemporary Russian Warfare," *RUSI Journal*, Vol. 162, No. 1, February–March 2017, and Timothy Thomas, "The Evolution of Russian Military Thought: Integrating Hybrid, New-Generation, and New-Type Thinking," *Journal of Slavic Military Studies*, Vol. 29, No. 4, October 2016.

energy blackmail. These elements of power are employed simultaneously as a single strategy, with nonattributable means of warfare reinforced by hard power, such as armored divisions and nuclear weapons.¹⁴³ Ultimately, Russia's military has attempted to adapt to the new operational realities of hybrid warfare while also addressing the need to restructure and reform its conventional forces.

United States

The experience of the Vietnam War forced the U.S. military to reassess its operational model and the training requirements necessary to implement it. Each service recognized that a reorientation toward cooperation between services and training in realistic combat environments was necessary to evolve from Vietnam-style combat to competition against the Soviet Union. The post-Vietnam War era was marked by significant technological development in weapons and information systems. During this period, the U.S. military adopted a training model that emphasized joint operations, maneuver, information dominance, and training against opposing forces (OPFORs), which were schooled in enemy tactics and used weapons designed to simulate enemy capabilities.

After its experiences in Vietnam, the U.S. Army initiated several studies to examine training requirements. Some training programs had endured since World War I, and the Army recognized the need to update and modernize its training doctrine. One study examined the lack of resources that constrained Army training. Another study, conducted in 1977, called *A Review of Education and Training for Officers*, looked at training officers from the start of their career through general officer training and considered both individual development and the needs of the Army, as well as staffing numbers and requirements for each mission. Additionally, the study assessed how frequently training would be needed for participants to retain knowledge and perform up to standards.¹⁴⁴ With the knowledge gained from these evaluations, the Army created the National Training Center (NTC) to provide a realistic training center for future Army forces.

NTC was part of the reorientation of U.S. forces away from Vietnam-style combat and toward a conflict with a superpower. In a future war with the Soviet Union, the U.S. Army would likely fight a numerically superior foe and would have to learn how to "fight outnumbered and win."¹⁴⁵ The development and deployment of new technologies contributed to the need for a dedicated facility where battalion-size units could train against an OPFOR that employed weapons and tactics that mirrored a potential Soviet or Warsaw Pact adversary.

¹⁴³ Stephen R. Covington, *The Culture of Strategic Thought Behind Russia's Modern Approaches to Warfare*, Belfer Center for Science and International Affairs, Harvard University, October 2016, p. 9.

¹⁴⁴ Army Chief of Staff, *A Review of Education and Training for Officers*, Headquarters Department of the Army, 1978.

¹⁴⁵ Anne W. Chapman, *The Origins and Development of the National Training Center 1976–1984*, United States Army Center of Military History, CMH Pub 69-3, 1992, p. 1.

This development was combined with new training literature and curricula and the introduction of the after-action report as an integral part of the “train-evaluate-train” process.¹⁴⁶ The evaluation process, during which the unit could identify, analyze, and learn from its mistakes in simulated combat, was seen as key to applying training lessons to real war.

In addition to the internal recognition that change was needed to fight in a new environment, the Army also sought to capitalize on the experience of foreign militaries. The 1973 Yom Kippur War was one of the first modern armored warfare conflicts. The Israeli military fought a numerically superior enemy equipped with advanced weaponry, which reflected the combat environment the United States might encounter in a European war. The war revealed the lethality of modern weapon systems and the effects they could have on the modern battlefield, as proven by the early successes of the Arab forces. The key lesson, however, was that superior training and tactical doctrine allowed the Israeli military to fight and win against a superior force, a lesson that was not lost on the U.S. Army.¹⁴⁷

NTC provided realistic conditions short of actual war. The training consisted of two-week rotations of brigade-level units participating in a series of simulated combat scenarios against the indigenous OPFOR, which had the advantage of operating in the same space during each rotation. A laser-shooter and laser-sensor package was installed to accurately record results for each exercise.¹⁴⁸ The rotations included multiple after-action reports in which observer coach/trainer personnel guided the unit through lessons learned in each scenario and assisted in leadership development.¹⁴⁹ Observer coach/trainers, often senior NCOs, were chosen for their leadership skills, experience, and ability to guide units through the rotation and ensure that the proper lessons were learned.¹⁵⁰ In 1984, the Army began disseminating lessons learned from NTC rotations at Fort Leavenworth’s Combined Arms Training Activity.¹⁵¹

The U.S. Air Force (USAF) also examined its performance during Vietnam and took steps to address gaps in capabilities. During the Vietnam War, the USAF struggled to successfully work with the other services and did not have adequate training in realistic training settings. USAF training reform drew largely from “frustration with Vietnam War air [operations] command divisions.”¹⁵² Air combat performance was also disappointing. These circumstances led the USAF to form new relationships and institute new training programs.

¹⁴⁶ Chapman, 1992, p. 101.

¹⁴⁷ Chapman, 1992, p. 9.

¹⁴⁸ John F. Antal, “OPFOR: Prerequisite for Victory,” *Association of the United States Army*, May 1993.

¹⁴⁹ Pablo Villa, “National Training Center Leans on NCOs in Shift to Create High-Caliber Decisive Action Training Environment” *NCO Journal*, April 2015.

¹⁵⁰ Villa, 2015.

¹⁵¹ Paul J. Cook, “Normal Is a Cycle on a Washing Machine: The U.S. Army Asymmetric Warfare Group,” dissertation, Temple University, 2021.

¹⁵² Peter M. Swartz and Karin Duggan, “The U.S. Navy in the World (1970–1980): Context for U.S. Navy Capstone Strategies and Concepts,” briefing slides, Center for Naval Analyses, December 5, 2011.

To improve capabilities in joint operations with other services, the USAF's Tactical Air Command, which was responsible for air combat and close air support, formed a relationship with the U.S. Army Training and Doctrine Command, which was responsible for the creation of Army operational doctrine, to facilitate dialogue and coordinate on training and logistics to improve USAF support of ground operations.¹⁵³ The USAF also created the Red Flag series of exercises, which bring Air Force, Army, and Navy units together in realistic combat situations.

A key innovation in the Red Flag model, and one employed by the Army at NTC, was the creation of aggressor squadrons to better simulate the types of enemy forces the USAF would likely face in a future conflict.¹⁵⁴ These squadrons were made up of USAF personnel and “flew USAF aircraft but employed Soviet tactics and flying techniques to simulate realistic adversaries.”¹⁵⁵ Eventually, the USAF was able to mimic actual Soviet aircraft to make the training even more realistic.

Like the Army and USAF, the U.S. Navy created several new training programs to address issues that arose during the Vietnam War. In 1969, the Navy set up a new fighter school called the TOPGUN Fighter Weapons School following a decrease in naval aviation effectiveness in Vietnam. This school was an “innovation engine, creating tactics, teaching expertise, standardizing training, and driving technology and weapons requirements for the Navy fighter and strike-fighter communities.”¹⁵⁶ Like Red Flag, the TOPGUN Fighter Weapons School used an aggressor model that employed instructors versed in adversary tactics.

The Surface Warfare Officers School program was also created during this period. This school was created to “provide a continuum of professional education and training that prepares officers, enlisted engineers and quartermasters to serve at sea.”¹⁵⁷ The Navy also held meetings to collaborate with international stakeholders and partnering nations that opened the door for more international training exercises. The International Seapower Symposium was first held in 1969 and has continued to aid international collaboration.¹⁵⁸

Changing maritime strategies called for increased resources and more ships to be built. Additionally, the Navy created several small incubators for new strategies. Two examples of these are the Center for Naval Warfare Studies and the Office for the Chief of Naval Opera-

¹⁵³ Brian D. Laslie, *The Air Force Way of War: U.S. Tactics and Training After Vietnam*, University Press of Kentucky, 2015.

¹⁵⁴ “Constant Peg: Secret MiGs in the Desert,” fact sheet, National Museum of the United States Air Force, undated.

¹⁵⁵ “Constant Peg: Secret MiGs in the Desert,” undated.

¹⁵⁶ David Baranek, “TOPGUN: The Navy’s First Center of Excellence,” *U.S. Naval Institute Proceedings*, Vol. 145, September 2019.

¹⁵⁷ “Surface Warfare Officers School Command,” webpage, U.S. Navy, undated.

¹⁵⁸ “International Seapower Symposium,” webpage, U.S. Naval War College, undated.

tions' Advanced Technology Panel.¹⁵⁹ Other analysis groups and projects were particularly helpful to train and prepare the Navy for any future conflict. The Strategic Studies Group, for example, helped the Navy expand strategy and long-term planning.¹⁶⁰

In the post-Vietnam War era, the U.S. military examined its recent combat experiences and adopted a training model that focused on joint capabilities, integration of new technologies, and realistic training conditions. A key aspect to the new training was the use of aggressor or OPFOR units to simulate the tactics and capabilities of potential adversaries. Positive results from these innovations manifested themselves in future U.S. military operations, most notably Operation DESERT STORM in 1991. These changes continued into the 21st century and paved the way for the innovation and experimentation that exists in the U.S. military today.

Conclusion

Several themes emerged from the preceding examples of militaries attempting to institute change. The most significant theme is that—even when change appears to be an existential requirement, whether for a regime or a nation—national leaders and their military subordinates might find it hard to accept and implement the programs necessary to bring about the desired changes. Particularly in cases involving foreign operational models, the ability to modify existing institutions and practices is generally a prerequisite for successfully adopting a specific operational model because the operational models themselves reflect a much broader set of societal influences that might not translate from one military to the next. For this reason, experiences involving success might provide a false sense of security and an assumption that past success will lead to success in the future. Conversely, negative experiences might not always provide the strong incentive required to enable change. In fact, they might evoke risk-averse responses that avoid novel solutions in favor of maintaining the familiar privileges and relationships present in long-standing institutions.

Another major theme is that, although many factors contribute to the leadership decisions that ultimately affect the way militaries train, the political and military leaders who make those decisions are shaped by their own experiences. These examples highlighted a variety of wartime experiences, but national leaders have a variety of other experiences that shape their thinking. These experiences might involve previous attempts at social change, episodes of social instability, political intrigue, or the alienation of powerful elites. For some leaders, these experiences brought them into direct contact with the problems they sought to avoid or the successes they achieved and desired to replicate. However, in many cases, the experiences

¹⁵⁹ Laslie, 2015.

¹⁶⁰ Phil D. Hattendorf and Peter M. Swartz, eds., *U.S. Naval Strategy in the 1980's*, U.S. Naval War College, December 2008.

that shaped thinking were the product of a learning environment built around indirect experiences received secondhand. We address these categories of experience in a later chapter.

A final theme that emerged in these examples is the importance of operational models. These models emerged from trial and error in the form of operational and tactical experience in wartime. The most significant consideration operational models provide is that they are not readily translatable from one military to another. In those cases where an adopter was successful (e.g., Japan), national and military leaders instituted massive changes that went well beyond the military realm. In those where they were not successful (e.g., China), the inability to implement economic, social, and political reforms hindered what could credibly be achieved by the military. Likewise, the variation in operational models could be significant. Western militaries developed along roughly similar lines until the interwar period. At this point, militaries with similar experiences, access to similar technologies, and like institutions developed significantly different operational models that would be employed in the upcoming war. As all three sets of examples in this chapter demonstrate, the success of operational model adaptation varies across militaries based on their national strategy, military requirements, and experiences. In the next chapter, we examine operational models in more detail.

Operational Models and Military Training

In February 2004, roughly 150 airmen from Elmendorf Air Force Base, Alaska, arrived at Gwalior Air Force Station in India for Cope India 04, “the first bilateral dissimilar air combat exercise between the U.S. Air Force and the Indian Air Force [IAF] in more than 40 years.”¹ The exercise involved simulated air combat between USAF F-15Cs and a mix of IAF Mirage 2000, MiG-21, MiG-27, and Su-30 aircraft. The stated intent behind the exercise was to “enhance and mature operational understanding and set the basis for future cooperation” between the USAF and IAF.² The original relationship-building focus was quickly overshadowed by the IAF’s better-than-expected performance. Reactions from observers in the United States ranged from shock at how well the IAF performed to outright questioning of whether the United States had lost its significant advantage in aerial combat and needed to reexamine the way it trains its pilots.³ Continued IAF success the following year in Cope India 05 raised similar questions in the United States, while the Indian press sounded a triumphant tone.⁴

The Cope India exercises provide useful insights into the importance of operational models for the world’s militaries. In part, these models carry with them several assumptions about how the militaries that employ them—to the extent that they actually do—will operate from both a technical standpoint (based on the weapon systems associated with a given model) and an operational standpoint (based on the operators produced using these models and the tactics they employ). These assumptions appear to have been at play in the initial Cope India exercises, as a retired IAF air commodore noted: “Since the Cold War, there has been the general assumption that India is a third-world country with Soviet technology, and wherever the Soviet-supported equipment went, it didn’t perform well.”⁵ As this observation suggests, and the USAF’s surprise further demonstrated, American pilots had failed to

¹ Eric Badger, “Cope India 04 Begins,” U.S. Air Force, February 17, 2004.

² Quoted in Badger, 2004.

³ Lorenzo Cortes, “Cope India 04 Led Some in Air Force to Take a ‘Step Back’ Regarding F-15C Tactics,” *Defense Daily*, Vol. 222, No. 37, May 21, 2004.

⁴ Scott Baldauf, “Indian Air Force, in War Games, Gives U.S. a Run,” *Christian Science Monitor*, November 28, 2005; George Iype, “Indian Pilots Emerge Top Guns over U.S. in Cope India 2005,” *India Abroad*, December 9, 2005; Rakesh Krishnan Simha, “Cope India: How the IAF Rewrote the Rules of Air Combat,” *Russia Beyond*, blog, February 16, 2014.

⁵ Baldauf, 2005.

prepare for an alternative operational model—one developed based on the recognition that the IAF’s mixed Western and Soviet inventory, a unique operational environment, and previous operational successes and failures engendered solutions that were tailored to India’s technological, environmental, and operational realities.

In this chapter, we explore operational models from two perspectives that are important for understanding how experience influences training in the countries that develop or adopt operational models. The first perspective addresses how and why militaries choose to develop or adopt different operational models by examining four existing models, how these models were developed and proliferated, and the various means by which these models have been operationalized in other militaries. The second identifies why militaries have been successful or unsuccessful in adopting particular models. Militaries can evaluate the effectiveness of individual models based on results they achieve in combat, but how selection and implementation occur is based on a wide variety of criteria, including alliance relationships, access to technology, political or ideological considerations, and financial commitment. Similarly, a country’s ability to implement a particular model might be influenced by a wide variety of short- and long-term experiences that enable implementation or reinforce the cultural or organizational barriers that limit the model’s effectiveness after adoption or lead to failure. For militaries without direct combat experience, operational models have become the primary mechanism through which operational experience is developed. In some cases, these models provide formative experiences that can have a significant influence on how training programs are conceived, structured, and executed. In others, they clash with existing practices, norms, and experience and fail to take root.

What Is an Operational Model?

Militaries seek to replicate success, which is generally defined by victory in combat.⁶ This iterative, interactive, and evolutionary process has led opposing militaries to resemble one another as they assimilate lessons from one another’s experiences.⁷ A distinct military style emerged in Europe in the 19th century. This style reflected a wide variety of institutional characteristics shared by many contemporary European powers—recruitment, training, discipline, social makeup, motivation, command, organization, and administration, among others—and developed based on routine interactions in combat or through national relationships.⁸ The embodiment of these institutional characteristics, coupled with industrial resources and advanced technologies, formed a model that many militaries—those of China,

⁶ Posen, 1993; Lynn, 1996; Emily O. Goldman and Richard B. Andres, “Systemic Effects of Military Innovation and Diffusion,” *Security Studies*, Vol. 8, No. 4, June 1999.

⁷ Lynn, 1996.

⁸ Lynn, 1996, p. 507.

Japan, Egypt, the Ottoman Empire, and Russia—attempted to replicate.⁹ The degree to which the Western operational model reflected common practice is demonstrated by the use of different national trainers within the same militaries. For instance, China relied on interactions with German, French, and British militaries in pursuit of reform.¹⁰

This example provides the basis for the definition of *operational models* we use in this report. An *operational model* reflects a broader set of institutional characteristics that serve as the basis for how a given military is organized, develops and applies technology, and employs its military in wartime.¹¹ Although technology and tactics are critical elements for operational success, these models are based on institutional considerations that reflect the political values and objectives of the societies in which they originated. This reflection of values is particularly clear in the time since the interwar period, when ideological considerations began to factor heavily into the institutional makeup of fascist and communist militaries. Several factors both explain why individual nations might choose a particular operational model and contribute to the country's ability to successfully adopt that model.

Operational models, as discussed in this report, are not rigid and should not prescribe a blind application of doctrine, organization, or technology. Rather, they represent a general baseline that allows us to identify common institutional characteristics and enables comparisons between militaries—in this case, those of the United States and China. The way a model is adopted is influenced by a variety of factors, including a given nation's historical ties, political system, and the institutional factors outlined earlier. For example, it has long been argued that Middle Eastern militaries have achieved poor operational results because of their reliance on the Soviet model. However, on closer examination, it is apparent that these militaries have implemented only certain elements of the model and frequently rely on practices and institutions introduced by Great Britain, their former colonial ruler.¹² We briefly discuss four operational models that are relevant to both the United States and China and to our consideration of experience and training: (1) Western (or NATO), (2) Soviet-Russian, (3) People's War or Maoist, and (4) hybrid applications of more than one model.

Identifying Foreign Military Models

The Western operational model was the prevailing operational model among the world's major powers through World War I. During the interwar period, several developments in

⁹ For an examination of this process, see Ralston, 1990.

¹⁰ Ralston, 1990; Hong Zhang, "Yuan Shikai and the Significance of His Troop Training at Xiaozhan, Tianjin, 1895–1899," *Chinese Historical Review*, Vol. 26, No. 1, May 2019.

¹¹ This definition was developed using Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars*, Cornell University Press, 1984; Lynn, 1996; Horowitz, 2010.

¹² Kenneth Michael Pollack, *Armies of Sand: The Past, Present, and Future of Arab Military Effectiveness*, Oxford University Press, 2019.

the international system led to the emergence of new operational systems. The most significant of these developments emerged in the aftermath of the Russian Revolution, the founding of the Soviet Union, and the early phases of the Soviet Communist International's mission in China during the mid- to late 1920s, which provided financial support, weapons, and advisers.¹³ The political groundings and party allegiance of both militaries during this period represented a major shift away from the professional militaries that had taken root in Western Europe. Although the emergence of fascism in both Italy and Germany provided a distinct departure from normal civil-military relations in both countries, the structure did not have the same long-term influence as the Soviet and Chinese models. Party structures—particularly in areas such as party loyalty and reliability—were major points of departure from Western militaries.

After World War II and the start of the Cold War, the Western and Soviet operational models became dominant as both countries developed alliances and defined their spheres of influence.¹⁴ For the United States, the founding of NATO in 1949 began a long process of alliance-building that reinforced the fundamental aspects of the Western model not only in Europe but also with other allies globally, including Japan, South Korea, Israel, and Iran. For the Soviet Union, the development of the Warsaw Pact created a military bloc that adopted the Soviet operational model. Beginning in 1955, the Soviets offered military assistance on a larger scale after the limited success of indigenous communist movements in newly independent states. The Soviet Union's economic recovery, massive equipment surpluses, and large number of advisers allowed Soviet leaders to frame themselves to smaller militaries as a viable alternative to the West.¹⁵ For both superpowers, the bipolar competition and their dominant positions based on military power, population sizes, global political and ideological leadership positions, and defense industrial capacity "compelled, or at least encouraged, lesser military powers to look only to one or the other of the two superpowers."¹⁶

Following the Vietnam War, a significant divergence between the Soviet and Western models developed, most notably on the issue of mass mobilization. Through the end of World War II and the early period of the Cold War, both the United States and its NATO allies and the Soviet Union and Warsaw Pact countries relied on a mass-reserve model based on rapid mobilization that was designed to take advantage of large numbers of reserves and regular forces and maximize the production capacity of the defense industrial sector. After the Vietnam War, the United States recognized the limits of this system and implemented the professional, highly technical, all-volunteer force (AVF).¹⁷ Largely a political response to the unpop-

¹³ Bruce A. Elleman, *Modern Chinese Warfare, 1795–1989*, Routledge, 2001, pp. 149–150.

¹⁴ Lynn, 1996, p. 522.

¹⁵ Roger F. Pajak, "Soviet Arms Transfers as an Instrument of Influence," *Survival*, Vol. 23, No. 4, 1981, pp. 165–166.

¹⁶ Lynn, 1996, p. 523.

¹⁷ Lynn, 1996, p. 523.

ular draft, this change later provided significant benefits in personnel quality as increasingly advanced conventional weapons began entering the U.S. inventory. Eventually, the United States recognized that the military now required a much higher level of both technical expertise and tactical proficiency. The trade-off was fewer personnel overall but improved education and training for those entering the AVF.¹⁸ The first major test of the United States' new AVF was Operation DESERT STORM, a major success that ushered in a host of other U.S. and allied operations over the next decade.¹⁹

The mass-reserve model continued in the Soviet Union (and later Russia) and the People's Republic of China (PRC). For its part, the Soviet army was largely conscripted and dependent on a force generation model in which partially ready units manned by full-time cadres would be brought up to full strength after the mobilization and integration of reserves.²⁰ One of the key difficulties in this process was maintaining competent, permanent cadres with the institutional knowledge necessary to maintain the unit's equipment and bring the mobilized reserves up to speed. Although a large number of these cadre units were disbanded as part of the New Look reforms in 2009, many Russian officers argued that a large strategic reserve was vital to Russia's defense.²¹ As part of the New Look reforms, the Russian military tried to move itself toward a more professional force but has not had success with the transition to this point.²²

The PRC similarly had a mass-reserve model at the center of its operational model. During World War II, the PLA adopted the People's War operational model, which is one of the four we focus on in this report. The model was born out of a recognition that the PLA was far weaker than the occupying Japanese forces and the Kuomintang (Nationalist) Army. A key organizing principle behind the People's War model was broad mobilization of the population to establish bases, provide augmentation to the regular army, and provide supplies and support.²³ When the Soviet threat against China began to drive Chinese military planning, the concept evolved from the approach originally developed during World War II and toward an updated concept known as People's War under modern conditions.²⁴ The spread of People's War occurred in many areas, including Southeast Asia, Africa, Latin America, and South Asia, as the PRC provided weapons and advisers to several communist insurgencies

¹⁸ Lynn, 1996, p. 523.

¹⁹ Nearly all NATO allies retained conscription into the early 2000s, at which time most adopted the all-volunteer model.

²⁰ Grau and Bartles, 2016, p. 15.

²¹ Grau and Bartles, 2016, p. 15.

²² Anika Binnendijk, Dara Massicot, Anthony Adler, John J. Drennan, Khrystyna Holynska, Katya Migacheva, Marek N. Posard, and Yuliya Shokh, *Russian Military Personnel and Proficiency: Policies, Reforms, and Recent Trends*, RAND Corporation, RR-A1233-6, forthcoming.

²³ Xiao Tianliang, *Science of Strategy*, National Defense University Press, 2020, p. 29.

²⁴ Mira Beth Lansky, "'People's War' and the Soviet Threat: The Rise and Fall of a Military Doctrine," *Journal of Contemporary History*, Vol. 18, No. 4, October 1983.

and wars against colonial powers.²⁵ At its core, however, the People's War concept remained heavily focused on the mass-reserve model.

During the Cold War, hybrid operational models emerged as a result of decolonization, the spread of national liberation movements, and the emergence of the nonaligned movement in the 1960s. The nations and militaries that developed these hybrid models drew from a variety of relationships and experiences, including their colonial military pasts, earlier alliances, and desires to pursue affordable technology and training while avoiding political pressure.²⁶ These hybrid-model militaries were often a product of their national leaders' choice not to align with either the Soviet Union or United States in the Cold War (e.g., India or Yugoslavia) or a change in alliance relationships (e.g., Egypt or Iran).²⁷ A frequent underlying consideration for many nations also centered on the desire to avoid becoming too dependent on any one source of technology and knowledge. The variety of strategic considerations at play for this relatively large number of countries led to a wide array of independent approaches that incorporated elements of several operational models with an equally wide variation in operational outcomes.

Each of these models has its own distinct features. Successful development or adoption is influenced by a variety of factors that include access to technology, core relationships, organizational culture, military institutions, and socioeconomic factors. The sections that follow briefly outline some of the major characteristics of the four operational models. Our discussion of operational models is not meant to suggest that operational models provide a firm template for understanding how individual militaries will operate. The models identified in this chapter provide a general framework for identifying core concepts, practices, and general institutional traits that have shaped individual nation's choices about military development. A summary of key characteristics and lead practitioners for each model is contained in Table 3.1. For this study, the general concept of operational models helps identify several factors that might aid or inhibit training innovation or adaptation, particularly in consideration of the variety of factors that underpin the general assumptions of each model. Understanding these dynamics will be critical to outlining the role that experience plays in shaping training in the U.S. military and the PLA.

²⁵ William E. Ratliff, "Communist China and Latin America, 1949–1972," *Asian Survey*, Vol. 12, No. 10, October 1972; Thomas H. Henriksen, "People's War in Angola, Mozambique, and Guinea-Bissau," *Journal of Modern African Studies*, Vol. 14, No. 3, September 1976; Peter Santina, "The People's War? The Resurgence of Maoism in Nepal," *Harvard International Review*, Vol. 23, No. 1, 2001.

²⁶ Pollack, 2019.

²⁷ Egypt presents a well-documented case of the impact of changing allegiances on the implementation of military models. See Gregory Hale Bradford, *The Rise and Fall of Soviet Influence in Egypt*, thesis, Naval Postgraduate School, 1976; E. V. Badolato, "A Clash of Cultures: The Expulsion of Soviet Military Advisors from Egypt," *Naval War College Review*, Vol. 37, No. 2, March–April 1984; Bradley Bowman, Jared Thompson, and Ryan Brobst, "Egypt's Transition Away from American Weapons Is a National Security Issue," *Defense News*, May 25, 2021.

TABLE 3.1
Key Attributes of Leading Operational Models

Operational Model	Characteristics	Developers and Adopters
Western (or NATO)	• Western weapon systems • High-tech driven • Emphasis on joint and combined operations • Centralized planning • Decentralized execution • Initiative at lower echelons • Apolitical	United States, NATO, Japan, South Korea, Israel, Singapore, Australia
Soviet-Russian	• Russian weapon systems • Emphasis on operational level of war • Combined arms • Limited authority and initiative delegated to tactical-level commanders • Heavy focus on maneuver and firepower • Army is lead service • Politically oriented	Russia, North Korea, Cuba, Syria, Warsaw Pact countries
People's War or Maoist	• Combination of guerilla and mobile warfare • Avoids decisive battles • Emphasis on people over technology • Oriented toward protracted conflict • Largely rural or agrarian • Politically oriented	PRC, New People's Army (Philippines), Shining Path (Peru), Naxalite-Maoists (India), Communist Party of Nepal—Maoist
Hybrid	• Mix of Soviet-Russian, Western, and possibly indigenously produced weapon systems • Tactics and practices that reflect elements of both Western and Soviet-Russian operational models • Reliance on legacy training	India, Egypt, Iran, Iraq, PRC

The Western or NATO Model

The Western or NATO operational model has evolved considerably since the 19th century. Then, it was largely characterized as a mass-reserve military organization that had a core of professional personnel but more broadly relied on the mobilization of conscripts and reserves to fill out its ranks. One of the core factors that made the Western model effective and viable over time was the general capacity of Western European militaries for rational organization that included a bureaucratic state capable of supporting a standing army.²⁸ Among these organizational skills was effective planning that permitted Western militaries to synchronize large-scale operations to support the mobilization of national resources, including personnel, industry, infrastructure, and finance. Some of the key elements behind this organizational construct that made other world powers wanted to replicate it include discipline, training, professionalism, and a degree of decentralization that allowed authority and initiative at all

²⁸ Ralston, 1990.

levels.²⁹ Today's Western model, particularly in the United States, is also heavily oriented toward joint and combined operations, which add a significant degree of complexity to the organization and planning of military operations.

The Western operational model's primary practitioners typically come from "low power distance societies" with "low-context cultures."³⁰ *Low power distance societies* are "characterized by flat organizational structures, consultative or participatory management style, and an expectation of egalitarianism."³¹ For this reason, subordinates are not only encouraged to demonstrate initiative but also expected to exercise it. Additionally, practitioners of the Western operational model tend to come from low-context cultures in which "responsibility is diffused throughout the system."³² Accordingly, the Western operational model relies on a greater degree of trust than other models as increasing levels of responsibility are delegated down the chain of command. Junior officers and NCOs are entrusted with significant leadership functions as a matter of course. Because of these two characteristics, the Western operational model has evolved into a system that relies on centralized planning and decentralized execution, with a significant emphasis on tactical-level initiative.³³

As discussed earlier in this chapter, a major component of the Western operational model is its status as a "technical-volunteer" military.³⁴ The technical element of this operational model has been demonstrated routinely since the First Gulf War. The development and fielding of modern weapon systems with greater range, precision, and lethality than those possessed by other militaries creates a significant demand for educated, trained, and technically proficient personnel at all levels. The need for technical skill creates an ecosystem of proficiency in which junior personnel rely on more-senior technicians and formal training and education processes to build proficiency. Because of the level of technical sophistication, NCOs and senior officers must be both operationally and technologically proficient to effectively plan and lead operations.

The volunteer component is a critical differentiator between the Western operational model and other models. By the technical requirements of today's Western military, using volunteers has been viewed as a more effective way to maintain technical and operational skill without having to rely on mass conscription or drafts, which require considerable time to get new recruits trained and ready for combat. In addition, the volunteer force delivers a high level of motivation and reliability, a significant factor that contributed to its institution following the Vietnam War. Today, the vast majority of practitioners of the Western opera-

²⁹ Ralston, 1990, pp. 8–12.

³⁰ Dima Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the U.S., and Israel*, Stanford University Press, 2010, p. 18.

³¹ Adamsky, 2010, p. 18.

³² Adamsky, 2010, p. 18.

³³ Naveh, 1997.

³⁴ Lynn, 1996, p. 524.

tional model have followed suit and either rely entirely on a volunteer force or have reduced conscription or the length of military service considerably.

The Soviet-Russian Model

The major divergence between the Soviet-Russian model and the Western model was Russia's continued reliance on the mass-reserve system until the New Look reforms were initiated in 2009. As mentioned earlier, these reforms created significant debate within Russian military circles. Eventually, the Russian Ministry of Defense chose to implement programs—deactivation of cadre units, increased emphasis on contract soldiers, reduced numbers of conscripts—that would begin to move the Russian military down the volunteer-technical military path.³⁵ Despite Russian efforts to reform and major questions about the military's success in implementing change, the mass-reserve element of the Soviet-Russian model has remained a core concept among its practitioners.

In contrast to the Western model described earlier—low power distance and low context—the practitioners of the Soviet-Russian model are generally from “high-context” and “high power distance” societies, which are less likely to delegate authority and responsibility to lower levels, leaving planning and decisionmaking responsibilities to higher levels of authority.³⁶ Likewise, these societies tend to produce management structures with many levels of hierarchy, clear divisions of labor and responsibility, and significant power differentials between levels within the hierarchy.³⁷ In these systems, decisionmaking, initiative, and innovation are all centralized and practiced in a top-down manner. The level of organizational trust is considerably lower, largely because of questions of competence and reliability that arise the further down one goes in the chain of command, as well as the perceived negative consequences of failure.³⁸

The hierarchical nature and centralization of planning and decisionmaking at higher levels result in an organizational structure in which creativity and adaptability occur primarily at the operational level of war, which is defined by a single campaign or theater.³⁹ Under this operational model, success at the operational level of war was of paramount importance and far less emphasis was given to success at the tactical level (i.e., in individual battles).⁴⁰ This focus on the operational level created a condition in which the emphasis of command, control, and planning was focused on giving operational-level commanders maximum lati-

³⁵ Grau and Bartles, 2016, pp. 15–18.

³⁶ Adamsky, 2010, p. 18.

³⁷ Adamsky, 2010, p. 18.

³⁸ For example, one explanation for the high rate of Russian senior officer casualties in Ukraine is the need for those officers to become involved in combat because of the inability of subordinates to resolve tactical problems. See “Russia's Military Hit by High-Ranking Losses in Ukraine,” Reuters, March 23, 2022.

³⁹ Pollack, 2019, p. 248.

⁴⁰ Pollack, 2019, p. 248.

tude in planning, decisionmaking, and the allocation of forces.⁴¹ The Soviet-Russian model's more centralized approach also limited the variety of actions that tactical-level commanders could make, so as to ensure the integrity and effective execution of the operational-level plan. This did not mean that tactical-level commanders had no room to exercise creativity, or that they were relegated to simple, singular solutions that were to be followed regardless of the tactical situation. Instead, they faced detailed parameters outlined by operational-level commanders and planners. This approach was reflected in junior officer training, which emphasized "battle drills" that provided "tactical maneuvers (very much like football plays) which tactical commanders were expected to employ" in different circumstances.⁴²

This description of the Soviet-Russian model might seem to suggest that officers at lower levels of command are trained to be unthinking or unresponsive to developing situations. However, as World War II progressed, Soviet Army commanders at all levels gained practical experience operating in this highly complex system. Because of the nature of the wars for which mass-reserve systems were designed, long periods of service, massive numbers of reserves, and overall intensity of combat, mass-reserve armies developed high degrees of tactical competency and operational proficiency. Their proficiency grew rapidly as wars progressed; however, as these armies transitioned back to peacetime status and short-service tenures, these levels of competence and proficiency atrophied.⁴³ Russia's experience in Ukraine highlights several of the worst problems associated with conscript-oriented systems, such as limited readiness, poor training and proficiency, and lack of initiative. These problems are exacerbated and compounded in the absence of a well-trained, professional cadre to manage training, force generation, and wartime preparations.

The People's War Model

The Chinese People's War operational model is another mass-reserve system, but one that begins with a significantly different perspective. First, in contrast to the mass-reserve concepts that underpin earlier Western and Soviet models, the People's War model does not rely on mass from the standpoint of strength. Instead, its adoption during the Japanese occupation in World War II was out of recognition of the PLA's inferior position, limited material resources, and lack of combat strength. The model, in this case, depended on effective mobilization and organization of the population into guerilla and militia forces that augmented the PLA's main combat units.⁴⁴ In addition to serving as combat support, an effectively mobilized population was vital for the purposes of psychological warfare, propaganda, and intelligence-gathering.

⁴¹ Pollack, 2019, pp. 248–249.

⁴² Eisenstadt and Pollack, 2001, p. 556.

⁴³ Lynn, 1996, p. 523.

⁴⁴ Xiao, 2020, p. 29.

Since World War II, the PRC's thinking on the People's War model has evolved in response to the nature of the threats it faces. Regardless, the core concept still receives mention in PLA official defense papers and professional military education.⁴⁵ The first major shift in the People's War model came in the 1980s as the PRC focused its defense planning on the mobilization of resources for an anticipated conventional mass struggle with the Soviet Union.⁴⁶ In the mid-1990s, the concept went through additional updates to reflect the PRC's 1993 Military Strategic Guidelines for the New Era and its directive to prepare for local wars under modern, high-tech conditions.⁴⁷ Most recently, in the 2015 publication of *China's Military Strategy*, the PLA stated that it would "give full play to the overall power of the concept of [P]eople's [W]ar, persist in employing it as an ace weapon to triumph over the enemy, enrich the contents, ways and means of the concept of [P]eople's [W]ar, and press forward with the shift of the focus of war mobilization from human resources to science and technology."⁴⁸ This reflects PLA efforts since Operation Allied Force in 1999 to develop and implement the PRC's national defense mobilization system as a core component of its military capability and readiness. That said, the ideas related to People's War today bear only partial resemblance to the original concept, mainly in terms of mobilization, a core element of the mass-reserve system.

The People's War model was also widely exported, but not for its relationship to the mass-reserve system. The primary reason for its adoption was its guerilla roots and political content. The primary adopters were foreign communist insurgency movements throughout Southeast Asia, Africa, and Latin America. Although this guerilla component of People's War is not currently a centerpiece of Chinese strategy and has not been for decades, the role of political work and the army's subordinate relationship to the Chinese Communist Party (CCP) remain.

Hybrid Models

The final category of operational model encompasses combinations of the previously discussed models. Since interest in foreign operational models took hold among the major non-Western European powers in the 19th century, many nations have attempted to adopt a foreign model or had one imposed on them by colonial rule, foreign domination, or alliance relationships. Because of this, fewer militaries have adopted and closely adhered to a single operational model. Cuba, North Korea, and members of the Warsaw Pact closely adhered to

⁴⁵ State Council Information Office of the People's Republic of China, *China's National Defense in the New Era*, July 24, 2019; Xiao, 2020.

⁴⁶ Harlan W. Jencks, "People's War Under Modern Conditions: Wishful Thinking, National Suicide, or Effective Deterrent?" *China Quarterly*, No. 98, June 1984; Ellis Joffe, "People's War Under Modern Conditions: A Doctrine for Modern War," *China Quarterly*, No. 112, December 1987.

⁴⁷ Liu Sheng, Miao Lin, and Zhang Guoliang, *People's War Under Modern Local War Conditions*, Army Scientific Press, 1996.

⁴⁸ State Council Information Office of the People's Republic of China, *China's Military Strategy*, May 2015, p. 7.

the Soviet model, while Great Britain, France, Germany, Australia, Japan, Singapore, South Korea, and members of the NATO alliance adopted and followed the Western model.⁴⁹

Many other militaries have adopted characteristics of multiple operational models for a variety of reasons. In several cases, militaries with colonial pasts retained organizational attributes, routines, and practices from their former colonizers well beyond independence. A prime example of this influence can be seen in the Iraqi Army, which possesses significant amounts of Soviet equipment but relies on a mix of tactics that includes French, American, and Iraqi elements to augment largely British tactics.⁵⁰ Other examples of hybrid operational model adopters include Egypt, Iran, India, and the PRC.

Operationalizing the Models

The examination of operational models in this report is not meant to suggest that any single model is superior to the others. Militaries have, at different times and under different strategic circumstances, employed each of these models to great effect. Indeed, the Soviet Army and PLA that emerged from World War II were highly capable, combat-tested organizations that demonstrated great adaptability and creativity under difficult conditions. Both possessed a high level of expertise operating within their particular models and a high level of combat effectiveness. However, poor execution of any of these models will almost surely result in diminished combat effectiveness and poor outcomes. The PLA that entered Vietnam in 1979 and the Soviet Army that invaded Afghanistan used operational models that were similar to their earlier counterparts, but because of systemic problems in planning and execution, achieved poor results.

Our examination of operational models in this report focuses on the relationship between the type of operational model a military adopts and the experience it gains as a result. In certain cases, individual operational models are born of wartime experience involving trial and error, incremental development, and innovation. In most other cases, operational models are adopted as part of a broader range of interactions between nations. During the Cold War, alliance relationships and foreign military sales programs contributed to the development and spread of operational models in several countries, most notably among NATO and Warsaw Pact members. Along these lines, as nations sought to diversify their arms supplies, militaries such as India's and Iraq's developed mixed inventories of Soviet and European equipment, requiring a blended approach to doctrine, training, and employment.

During the decades after World War II, anticolonial revolutions and civil wars led to the emergence of revolutionary movements and militaries that sought support from the Soviet Union, China, or both. Support for these movements typically entailed military advisers, equipment, and political and ideological support. Conversely, British and French colonial

⁴⁹ Pollack, 2019, p. 77.

⁵⁰ Eisenstadt and Pollack, 2001, p. 550.

influences remained strong in newly independent states, such as Egypt, India, and Iraq. Even where Soviet influence was spreading, the transition to or from one operational model to another was almost never complete. For this reason, militaries in many parts of the world developed hybrid systems in which the models provided by either of the superpowers or a former colonial ruler intersected with indigenous lessons learned and practices suited to the adopter's social, cultural, and political norms.

The spread of operational models has always been an interactive process that required engagement between two or more nations and militaries. This interaction is most notable in war and typically has a sharp, violent effect on the ways militaries adapt after early engagements. The second category of interaction can be characterized by formal agreements, whether through alliances and partnerships or formal contracts for the sale of weapons and equipment, which typically involve advisory support and training. The final interaction is political in nature and based on the ideological affinities and relationships between groups. One example of an ideologically based interaction is the Spanish Civil War, in which combatants were supported by either the Soviet Union or Germany and Italy. More recently, national liberation movements have been the primary means of this political and ideological interaction. Table 3.2 contains an overview of the primary mechanisms through which these operational models spread.

The process through which operational models are disseminated and adopted is by no means straightforward. Several examples demonstrate the difficulties of adapting a foreign model to a military, including the cultural, social, demographic, and organizational challenges that might produce less-than-optimal results. These potential difficulties arise from two general sources. The first involves the relationship and the nature of the interaction between the client and the adopter. When Egypt decided to receive Soviet military assistance in the early 1970s, the relationship between the Egyptian military and its leaders and the Soviet advisers was strained. The Soviets had engaged extensively with Arab military personnel by the time the program began in 1967. Between 1955 and 1979, the Soviets trained or educated nearly 20,000 Arab military personnel—mostly Egyptians, Syrians, and Iraqis—in the Soviet Union.⁵¹ These programs provided the baseline introduction of Soviet organization, tactics, and operational concepts. The Soviet military advisory mission in Egypt was also sizable, growing from a few hundred to approximately 2,000, with advisers assigned to “every military training facility, air and naval base, and maintenance depot, and attached to all ground units down to the battalion level, air units to the squadron level, and on every major naval combatant.”⁵²

The problems in the relationship began almost immediately; each side complained about the other. From an Egyptian standpoint, the Soviet advisers were condescending, rude, arro-

⁵¹ Eisenstadt and Pollack, 2001, p. 553.

⁵² Eisenstadt and Pollack, 2001, p. 553.

TABLE 3.2

Means for Disseminating Operational Models

Process, Action, or Event	Description
Application and refinement in war	All three major operational models—Western, Soviet-Russian, and People's War—were developed and refined based on combat experience. For all three, World War II proved formative. In the decades that followed, combat experience for the West—particularly the U.S. experience in Vietnam and the First Gulf War—led to major changes in the Western operational model. Likewise, Russian combat experience in Georgia led to reform efforts in several areas. Finally, changes in China's threat perceptions and its observations of other global military developments led to fundamental changes in its People's War model through an added emphasis on high-tech operations.
Alliances and partnerships	NATO and Warsaw Pact relationships played a significant role in the adoption and implementation of the Western, or NATO, and Soviet-Russian operational models. Alliance standards in areas such as doctrine and training led to a generally uniform application of both models in the militaries of both alliances. Furthermore, U.S. alliances and partnerships with a wide variety of countries, including Japan, South Korea, Israel, and Australia, played a significant role in proliferating the Western operational model.
Foreign military aid and sales	Foreign military aid and sales provided a means by which both the Western and Soviet-Russian operational models have proliferated. These programs provided recipients with a wide variety of training and education on individual weapon systems, strategy, planning, training, and doctrine. In many cases, changes in a nation's military relationships created a mix of the two models.
Political and revolutionary ties	Political and revolutionary ties were a primary means of proliferating and developing operational models beginning with the formation of the Soviet Union. In countries such as Cuba, North Korea, and Vietnam, affinities between communist organizations were a primary driver behind adoption.
Colonial and postcolonial ties	Following World War II, the People's War model was widely adopted for anticolonial revolutions and civil wars. In many cases, the Soviet-Russian model was adopted following independence.

gant, mentally inflexible, difficult to deal with, and by at least one Egyptian account, after the 1967 war, the “quality of experts (Soviet) was uneven, and many commanders, junior and senior, found their continual presence irksome.”⁵³ The Soviet advisers, on the other hand, were frustrated and complained about the Egyptians’ inability to grasp highly technical warfare and core elements of Soviet strategy and doctrine.⁵⁴ The degree of animosity on both

⁵³ Badolato, 1984, p. 74.

⁵⁴ Badolato, 1984, p. 76.

sides of the relationship created an atmosphere of distrust that eventually led to Egyptian President Anwar Sadat's surprise expulsion of Soviet advisers in 1972.

The second source of difficulty in disseminating a foreign model involves the adopter's ability and willingness to accept a given model and its prerequisites—which frequently require significant systemic change to implement. At its core, this source of difficulty introduces a host of issues tied to cultural and social context, organization, and internal political dynamics. The conflict in Egypt's relationship with the Soviet Union was not simply a communication problem between adviser and advisee. Rather, a host of cultural problems led the program to fail, in part because of the Soviet advisers' inability to understand and accommodate Egyptian psychology and social and political sensitivities.⁵⁵ The notion that operational models are universal and can be implemented by any given military oversimplifies a complex and challenging problem.⁵⁶ Recent failure, the recognition of a new or increasingly dangerous threat, or the need to match the latest military innovations are not always reason enough to motivate the often necessary systemic change required to adopt a new model, even when systemic change is feasible. The earlier examples of Chinese and Japanese attempts to adopt a Western model in the 19th century provide an important and informative contrast regarding this point. Both countries faced internal divisions and stability problems coupled with threats from Western colonial powers. The need for military reform prompted leaders in both countries to seek out Western advisers with the objective of implementing, at minimum, the Western best practices that had proven successful in combat. The outcomes were different because China was unable to complete the reforms as a result of the scope of the problems it faced and, in part, as a result of an unwillingness to make the types of necessary changes for reform.⁵⁷ In contrast, Japan initiated a series of revolutionary reforms that shifted social, economic, and political institutions toward a Western model that enabled reforms in military organization, political structures, and personnel management and training.⁵⁸

Operational Models in Practice

A nation's military practice and experience, national strategic requirements, foreign influence, and organizational structure and culture all play important roles in shaping how it responds to and adopts operational models. Several cases in preceding sections of this report have demonstrated that the responses to a new operational model can vary for many reasons. They also demonstrate that simply perceiving a need for change is not always a sufficient motivator to ensure the successful adoption of a military model. Along those lines, opera-

⁵⁵ Badolato, 1984, p. 79; Michael Eisenstadt and Kenneth Pollack, "Training Better Arab Armies," *Parameters*, Vol. 50, No. 3, Autumn 2020, p. 98.

⁵⁶ Eisenstadt and Pollack, 2001, p. 557.

⁵⁷ Ralston, 1990, pp. 138–141.

⁵⁸ Ralston, 1990, pp. 158–165.

tional models should not be viewed as mere templates to be followed uncritically. The variety of strategic needs, relationships, and experiences that militaries bring to the table lead to wide variations in how these models are applied.

The United States and Soviet Union developed operational models based on their experience in World War II and the series of evolutionary changes in the decades that followed that experience. The United States and its allies carried on with several elements of an extant model. Beginning in the 1970s and 1980s, however, that model changed in important ways, with the introduction of volunteer forces and the gradual reduction in the use of conscription and drafts as a primary source of personnel. The size of forces would also shrink as a technically and tactically proficient force relied more heavily on advanced technology than sheer numbers. As the Western model continued to proliferate, its primary adopters invested heavily in weapon systems, technology, training, and education. In the most-successful cases—Israel and Singapore, for example—deep ties and continuous interaction built on common organizational and cultural elements. In cases of failure—most notably, Afghanistan—the political and cultural dynamics involved made successful implementation exceedingly difficult.

Adoption of the Soviet-Russian operational model has led to a wider variety of outcomes. Beginning in 2009, Russian leaders initiated the New Look reforms, particularly to its mass-reserve component. In several earlier examples, efforts to adopt the model in different regions proved difficult because of continued reliance on organizations and practices from former colonial rulers. For that reason, variations in the application of the Soviet-Russian model are more pronounced compared with the Western model. Table 3.3 provides a brief overview of how operational models have been applied in different militaries. This table is not exhaustive and provides only representative examples.

Israel

Since its inception, the IDF—including its precursor, Haganah—has been heavily influenced by both the British and U.S. militaries. As a result, the IDF displays many characteristics associated with the Western operational model, despite several unique strategic circumstances that have shaped the evolution of its operational thought and application of that model. Prior to the establishment of the state of Israel, large numbers of Jewish men and women served in the British Army, including approximately 26,000 total during World War II.⁵⁹ The growing capability, readiness, and size of the Jewish paramilitary forces in Palestine caught the attention of the commander of British forces in the Middle East, who grew increasingly concerned about the “‘probability’ of an anti-British revolt” once the war ended, noting that “[the] Jews mean business and are armed and trained.”⁶⁰ Regardless, during the war, the British also aided the establishment of the Palmah, which was designed to be a small,

⁵⁹ Benny Morris, *1948: A History of the First Arab-Israeli War*, Yale University Press, 2008, p. 28.

⁶⁰ Morris, 2008, p. 28.

TABLE 3.3

Application of Operational Models in Selected Countries

Nation	Characteristics	Influences and Models over Time
Israel	- Israel has significant ties to Western militaries and relies on these relationships for the development of its defense industries. - Equipment is based on Western designs. - Strategy, doctrine, and tactics are heavily influenced by Western concepts and tailored to immediate security needs and threats.	United States and Great Britain
India	- India has a mix of Russian and Western equipment, increasing the need for new operational concepts and tactics for integrating different system designs. - Training and education influence has come from both Russia and the West. - A closer relationship with Israel might also lead to increased training and education opportunities for key mission areas.	United States, Great Britain, Soviet Union, Russia
Singapore	- Singapore has strong ties to Western militaries, particularly that of the United States. - Inventory includes advanced Western equipment for all services. - Singaporean pilots train at U.S. facilities as part of an extensive training relationship. - Singapore's exercise program involves engagement with Western militaries, including the United States and Australia. - Singapore is generally recognized as having a highly competent, technically advanced military.	Great Britain and United States
Cuba	- Cuba is one of the primary practitioners and best examples of the Soviet operational model. - During the Cold War, Cuba served in Africa and was frequently relied on as a stand-in for Soviets in military advisory missions and selected operations.	Soviet Union
Egypt	- Heavy early influence from Great Britain was because of their colonial relationship. - Later influence from the Soviet Union led to increased numbers of Soviet systems in inventory and wide placement of Soviet advisers. - After Soviet expulsion, Egypt developed an extensive relationship with the United States that included foreign military sales, training agreements, and exercises. - Egypt fought with the coalition in the First Gulf War and had diminished defense ties with the United States after the Arab Spring.	Great Britain, Soviet Union, United States
Iraq	- Iraq had extensive ties to the Soviet Union for several years in the late 1960s and 1970s. These ties included foreign military sales, advisers, and training. - Iraq never fully embraced the Soviet model and often relied on practices rooted in its colonial experience with Great Britain. - India (air force training) and China (foreign military sales) also had military ties to Iraq prior to the First Gulf War. - After the Second Gulf War, the Iraqi military received extensive training from the United States, NATO, and their partners.	Great Britain, Soviet Union, United States

elite strike force that could fend off Arab attacks and act as a commando unit in the event that the German Afrika Korps moved on Palestine.⁶¹

U.S. influence on IDF military development and training came after World War II and has been particularly strong since the early 1960s and the founding of Israel's military alliance with the United States. The United States has provided Israel with significant military aid in the form of military sales, technology development, and training. Accordingly, Israel enjoys the status of major non-NATO ally, which provides a variety of privileges that have further cemented the U.S.-Israeli military-to-military relationship. Most notably, this status allows Israel to enter into "agreements with the United States for cooperative furnishing of training on a bilateral or multilateral basis" and allows prospects for conducting "cooperative research and development projects on defense equipment and munitions."⁶² Since the 1970s, a significant portion of Israel's most advanced weapon systems and munitions have been the product of cooperative research and development and acquisition programs between the United States and Israel that have included the F-35, KC-46A, F-15, and F-16 aircraft and the Terminal High-Altitude Area Defense air and missile defense system.⁶³ The close relationship between both defense establishments—including defense industries and the military services—has further reinforced Israel's application of a Western operational model.

Israel's demographic circumstances and geographic position have played a critical role in the IDF's evolution and operational thought. Israel, since its inception, has faced multiple adversaries around its peripheries, all of which have significant advantages in population and military manpower.⁶⁴ Because of this demographic imbalance, Israel has had to rely on a militia-oriented military structure based on universal conscription and military service. During peacetime, the military is populated by a small number of professional soldiers that is then augmented by a much larger body of conscripts during times of crisis or war. The IDF's militia-type organization allows a larger percentage of Israel's population to remain productive in the workforce and enable social and economic development.⁶⁵

Geography also factors heavily in Israel's defense planning, most notably because of its lack of strategic depth. To compensate for this natural shortfall, the IDF emphasizes rapid maneuver, involving a combination of armor and airpower, to bring the fight to adversary territory and avoid fighting conventional wars or insurgencies in its territory. A gradual shift in Israel's defense planning began after the Yom Kippur War, in 1973, with the decline of large-scale conventional wars and the emergence of nonstate threats. This transition forced

⁶¹ Morris, 2008.

⁶² Bureau of Political-Military Affairs, "Major Non-NATO Ally Status," fact sheet, United States Department of State, January 20, 2021.

⁶³ Jeremy M. Sharp, *U.S. Foreign Aid to Israel*, Congressional Research Service, RL33222, November 16, 2020.

⁶⁴ David Rodman, *Sword and Shield of Zion: The Israel Air Force in the Arab-Israeli Conflict, 1948–2012*, Sussex Academic Press, 2013.

⁶⁵ Rodman, 2013, p. 5.

Israeli defense planners to rethink their approach to overall defense planning because of a new set of realities, most notably the transition from a reduced threat from the state adversaries that initially shaped these defense concepts (e.g., Egypt, Jordan, Syria) and an increased threat from nonstate actors, such as Hezbollah.⁶⁶

These factors—Israel’s relationship with Great Britain and the United States, demography, and geographic situation—all contribute to the prominence of a Western operational model. Historically, the IDF has placed great emphasis on an overall approach in which senior officers provide “general directions, leaving the commanders on the ground to translate the spirit of the command into action.”⁶⁷ Within this system and culture, all ranks were “encouraged to challenge ideas, suggest modifications, and come up with innovative solutions to problems.”⁶⁸ Although this approach enabled a dynamic, highly adaptive system, it also created an environment that deemphasized strategic planning and a culture that frequently resisted innovation. The IDF’s success also limited incentives for senior leaders to develop lessons learned that could enable the IDF to stay ahead of global military developments.⁶⁹

Because of its geographic and demographic environment, the IDF has developed into a force that emphasizes technology, qualitative advantages, a highly trained professional core, and Israel’s well-educated, motivated population. Accordingly, the IDF is smaller but considerably more advanced than its key adversaries. This overall reliance on technology is accompanied by advanced training, particularly in key areas such as air combat; close air support; special forces; intelligence, surveillance, and reconnaissance (ISR); and, increasingly, cyber capabilities.⁷⁰ Significant restructuring, based on the IDF’s understanding of its primary security challenge, has refocused the IDF’s force structure and key capabilities to be better positioned to respond to asymmetric threats including urban warfare, COIN, and cyber threats.⁷¹ Accordingly, IDF training has increasingly emphasized asymmetric and high-tech warfare.⁷²

Despite building a track record and reputation for success—particularly in its early conventional wars in 1956, 1967, and 1973—the IDF experienced various challenges from the 1980s through the early 2000s. These challenges came largely from efforts to change focus to confronting low-intensity threats in Lebanon, Gaza, and the West Bank. When confronted

⁶⁶ Avi Jager, “The Transformation of the Israel Defense Forces,” *Naval War College Review*, Vol. 74, No. 2, Spring 2021, p. 21.

⁶⁷ Adamsky, 2010, p. 118.

⁶⁸ Adamsky, 2010, p. 118.

⁶⁹ Adamsky, 2010, pp. 118–119.

⁷⁰ Diana Kraft, “End the Draft? In Israel, Some Mourn What Would Be Lost,” *Christian Science Monitor*, January 19, 2022.

⁷¹ Jager, 2021, p. 26.

⁷² Arie Egozi, “Israel, U.S. Team up for High-Tech Urban Warfare Competition,” *Breaking Defense*, March 31, 2022.

with a higher-intensity threat in a Hezbollah force that fought from heavily defended positions, the IDF showed itself to be poorly trained and ill-equipped. In particular, IDF units were “unprepared for the scope and high intensity of combat with dug-in Hezbollah fighters who engaged the IDF in lengthy gun battles from fortified positions and used offensive and defensive tactics, indirect mortar fire, and mobile assault squads that carried out bold offensive operations.”⁷³ The IDF’s reliance on reservists, lack of a professional NCO corps, and focus on training that depended too heavily on simulators and wargames all contributed to this poor performance.⁷⁴ In recent years, the IDF has attempted to address these problems using a thorough reexamination and restructuring of its training programs.

A key influence on the IDF’s operational model is its relationship and engagement with the United States and other advanced militaries. All branches of the IDF have regularly taken part in advanced training events and exercises involving all services and multiple functional domains. The Israeli Air Force has routinely participated in Red Flag exercises in the United States and, more recently, hosted a Blue Flag exercise that included advanced fighter aircraft from Great Britain, Germany, the United States, Greece, Italy, India, and the United Arab Emirates.⁷⁵ Israel also has participated in both maritime and missile defense exercises focused on asymmetric threats—particularly Iran—and the employment of unmanned platforms.⁷⁶ The IDF also focused recent training on joint operations and interoperability with the United States, both in combined exercises and through staff consultations on issues, such as the threat of Iran.⁷⁷

Another critical element tied to the IDF’s operational model is its emphasis on advanced training involving both red force units and training centers. In addition to dissimilar air combat training with highly proficient pilots from other modern air forces, exercises such as Blue Flag 2021 involved aggressor units designed to replicate the capabilities and tactics of

⁷³ Raphael D. Marcus, *Israel’s Long War with Hezbollah: Military Innovation and Adaptation Under Fire*, Georgetown University Press, 2018, p. 195.

⁷⁴ David E. Johnson, Jennifer D. P. Moroney, Roger Cliff, M. Wade Markel, Laurence Smallman, and Michael Spirtas, *Preparing and Training for the Full Spectrum of Military Challenges: Insights from the Experiences of China, France, the United Kingdom, India, and Israel*, RAND Corporation, MG-836-OSD, 2009; Marcus, 2018.

⁷⁵ Anna Ahronheim, “Israel Will Not Participate in Any Red Flag Exercises This Year,” *Jerusalem Post*, February 22, 2022; Bradley Bowman, Jacob Nagel, and Ryan Brobst, “Blue Flag Exercise Has Israel’s Enemies Seeing Red,” *Defense News*, November 3, 2021.

⁷⁶ “Israel, U.S. Hold Joint Missile Defense Drill amid Iranian Threat,” *I24news*, September 5, 2022; NAVCENT Public Affairs, “U.S. and Israeli Navy Begin Exercise Intrinsic Defender,” press release, U.S. Central Command, March 28, 2022; NAVCENT Public Affairs, “U.S., Israel Begin Maritime Exercise in Red Sea,” press release, U.S. Central Command, August 1, 2022.

⁷⁷ Lisa Ferdinando, “Upcoming Joint U.S.-Israeli Exercise Aims to Improve Interoperability,” U.S. Department of Defense News, February 26, 2018; Seth J. Frantzman, “Marines Train with Elite Troops in Israel as Iranian Tensions Linger,” *Marine Corps Times*, November 5, 2021; Judah Ari Gross, “Israeli Air Force, U.S. Military Hold Joint Aerial Drill over Negev,” *Times of Israel*, January 16, 2022; Amos Harel, “Large U.S. Army Delegation in Israel Reflects Tighter Ties, and Sends a Powerful Message,” *Haaretz*, June 24, 2022.

likely adversaries.⁷⁸ Training events such as this give the Israeli Air Force experience operating with potential coalition members, planning for mixed-strike packages with aircraft possessing a wide variety of capabilities, and fighting against an opposing force that is even more capable than one Israel would face in an actual combat scenario. The IDF has also invested in ground-oriented training centers that are similar to the U.S. NTC located at Fort Irwin, California. These facilities—funded in part by U.S. military grants and located in the Negev Desert and near the Golan Heights—provide IDF units with a training environment focused on urban and tunnel and subterranean operations.⁷⁹ Like in the Blue Flag exercises and at NTC, IDF units training at both facilities are provided with a variety of live fire events, advanced simulators, and a highly capable OPFOR.

The Western operational model employed by the IDF has developed out of four of the five ways through which operational models are typically disseminated. First, the model has been applied and refined through experience in multiple wars since 1948. The IDF's focus on the use of rapid maneuver and airpower emerged from an early realization that Israel was at a significant military and demographic advantage. Although its success led, at times, to complacency and neglect, the IDF's emphasis on quality, initiative, and dynamism has continued to define its military ethos. Second, alliances and partnerships—particularly with the United States—have played a significant role in the IDF's employment of a Western operational model through training, education, research and development, and staff consultations. Third, foreign military aid and sales of advanced weapon systems provided the IDF with technology and systems that complement its focus on individual decisionmaking and autonomy among its service members. Finally, Israel's colonial ties to Great Britain and post-colonial ties to the United States significantly influenced the IDF, as many early members of the Haganah served in the British Army in World Wars I and II and a relationship with the United States provided technology and operational know-how.

India

The Indian military's hybrid model evolved from two primary influences—its colonial legacy with Great Britain and its Cold War reliance on the Soviet Union for military hardware and, to a limited extent, training. Like other countries in the British Empire—Iraq and Egypt, for instance—Indian soldiers served in multiple wars under the British Army's command. During World War II alone, as many as 2.4 million Indians served in the British military.⁸⁰ Based on this breadth of service, India's experiences in both World War I and II—not to mention the long period of British colonial rule—played a major role in shaping the Indian armed forces that emerged after India achieved independence in 1949. Like in Iraq and

⁷⁸ Bowman, Nagel, and Brobst, 2021.

⁷⁹ Barbara Opall-Rome, "Israeli Army Revamps Training Regimen," *Defense News*, November 27, 2015.

⁸⁰ Kate Imy, *Faithful Fighters: Identity and Power in the British Indian Army*, Stanford University Press, 2019.

Egypt, British influence was deep and had a long-lasting effect on military thought and operational practice. Following independence, India's defense policy goals centered on creating a self-reliant defense establishment and indigenous defense industry while diversifying the nation's access to advanced weapons and decreasing its dependence on outside powers.⁸¹

Since independence, and owing, in part, to its close adherence to a policy of nonalignment, India's military avoided being tied too closely to either bloc during the Cold War. Although many among India's bureaucratic and military elite maintained pro-Western sympathies, many senior Indian leaders recognized limits to the types of materiel and training they could obtain from the West.⁸² For this reason, India's armed forces pursued a policy that attempted to maintain ties with the West in areas such as professional military education and training, while pursuing large arms and technology purchases from the Soviet Union (and later from Russia). This arrangement did not preclude purchasing weapons from Western sources or obtaining training from the Soviet Union; however, it did outline a series of preferences that influenced the way the Indian military's operational thought and practice would evolve over the rest of the Cold War and beyond.

From the outset, the Soviet Union was willing to provide both complete systems and technical assistance for the licensed manufacturing of aircraft in India, as demonstrated by the 1962 sale of MiG-21 aircraft to India.⁸³ Despite the apparent success that this deal represented, key elements of India's defense establishment questioned the wisdom of closer ties to the Soviet Union, in part because of the Western educational backgrounds and ties that still pervaded the Indian defense decisionmaking process. Indeed, because of India's nearly exclusive exposure to Western weapon systems until the early 1960s, the influx of Soviet equipment presented a host of problems in areas such as training, logistics, maintenance, and integration into the force.⁸⁴ Over time, these problems were addressed and the near-term deficiencies in readiness and proficiency subsided. India's turn to the Soviet Union was based on its frustration with Western suppliers, such as the United States, and an immediate, urgent need to modernize and increase the size of the Indian military in light of the threat of both China and Pakistan.

The initial difficulties India faced in transitioning from Western to Soviet equipment highlights an important element that must be factored into any discussion about operational models: the extent to which human factors, engineering, systems interface, and other design features reflect key aspects of different operational models. Several characteristics of Soviet (later Russian) weapon systems show significant contrasts in who designers viewed as the likely operators of their systems, the manner in which those systems were expected

⁸¹ P. R. Chari, "Indo-Soviet Military Cooperation: A Review," *Asian Survey*, Vol. 19, No. 3, March 1979, pp. 230–234; Ramesh Thakur, "The Impact of the Soviet Collapse on Military Relations with India," *Europe-Asia Studies*, Vol. 45, No. 5, 1993, p. 834.

⁸² Chari, 1979, p. 232.

⁸³ Chari, 1979, pp. 232–233.

⁸⁴ Chari, 1979, p. 234.

to work together, and the nature of the C2 principles that oversaw the operations of units from theater down to the tactical level. For example, Soviet systems were designed based on the principle that operator proficiency and technical knowledge in a conscript force would require design features and interfaces to be oriented toward an operator with considerably less technical training and knowledge of the system. Likewise, other Soviet design features—in fighter aircraft, for example—provided operators with considerably less sensor data and situational awareness based on the idea that control of larger formations would be performed by dedicated control mechanisms (e.g., ground-controlled intercept stations). This design is in marked contrast with the philosophy behind Western systems, which were designed to be operated and maintained by personnel with a much higher level of technical proficiency. Individual systems are typically designed to provide the operators as much situational awareness and data as possible to enable rapid decisionmaking at much lower levels.

Recognizing distinct cultural influences and political differences, India's political and military leaders opted to pursue Soviet technology; however, they minimized the amount and type of training that Indian officers would receive from the Soviet Union. Between 1955 and 1984, approximately 3,480 Indian military personnel received training in either the Soviet Union or Eastern Europe, but this training was largely restricted to familiarization with Soviet equipment and weapon systems.⁸⁵ At no point did Indian officers participate in Soviet staff colleges or professional military education courses in the Soviet Union. Instead, Indian officers routinely attended professional military education in Great Britain and Canada.⁸⁶

The Indian armed forces' hybrid operational model can be seen in a variety of areas. In terms of weapon systems and technological applications, India has embarked on several programs that mix Soviet (or Russian) equipment with Western components, including avionics, sensors, and missiles, and vice versa.⁸⁷ Several of India's aircraft purchases from Russia—including MiG-21 upgrades and the Su-30 MKI—all received significant Western avionics upgrades. Likewise, earlier programs involved British-designed frigates armed with Soviet missiles and Western components and upgrades provided by Indian designers and technicians.⁸⁸ This mix of Western and Soviet-Russian technology, along with India's reluctance to adopt Soviet operational practices, were reflected in the 2004 Cope India exercise described in the opening section of this chapter.

Over the decade preceding that exercise, the Indian military—particularly the IAF—faced the reality that its most reliable arms supplier might balk under politically difficult circumstances as it had in the Gulf War in 1991. The need for India to continue (and perhaps even double down) on its programs to incorporate Western weapons and components into Soviet systems seemed a foregone conclusion. More importantly, Indian defense officials conducted

⁸⁵ Thakur, 1993, p. 834.

⁸⁶ Thakur, 1993, p. 834.

⁸⁷ Thakur, 1993, p. 835.

⁸⁸ Thakur, 1993, p. 835.

detailed studies of the poor performance of both Soviet weapons and doctrine, finding significant shortcomings in both. These findings, in part, vindicated earlier decisions to forego Soviet training and education.⁸⁹ Regardless, IAF officers had played a role in training Iraqi Air Force pilots prior to the war, raising questions about the overall effectiveness of Indian training after Iraq's defeat.⁹⁰ Finally, IAF analysts recognized the need to modernize systems rather than planes.⁹¹

Indian military development since the Gulf War emphasized the idea of systems upgrades and more-effective integration of both Western and non-Western systems into tailored force packages. Initial IAF operational success during the Kargil crisis and in later exercises with the United States and other advanced militaries shows the level of progress India has made in recent decades.⁹² Indeed, the Indian armed forces regularly conduct exercises with other advanced militaries, including Great Britain, France, Israel, Australia, and Japan. In addition, India has attempted to leverage these relationships through the development of advanced training facilities inside India and by participating in foreign exercises. For the past several decades, India's Tactics and Air Combat Development Establishment has served a similar purpose to that of the USAF Weapons School and the Navy's TOPGUN.⁹³ In addition, Indian units have been involved in exercises such as Red Flag and Blue Flag.⁹⁴

The development of India's hybrid model demonstrates several of the factors identified in Table 3.2 as the main methods through which operational models are disseminated. For India, its colonial legacy (e.g., educational and doctrinal ties to Great Britain) counterbalanced the heavy Soviet influence in military aid and arms sales that began in the 1960s. Although India's early experiences in its wars against China and Pakistan were formative in the development of the Indian armed forces, its more recent observations of the effectiveness of Soviet weapons and doctrine have proven more important in the past three decades of India's modernization. Similarly, India's desire to build military training relationships with multiple countries that adopted the Western operational model clearly demonstrates the hybrid nature of India's military model.

Singapore

The Singapore Armed Forces (SAF) consciously and deliberately adopted a Western operational model when Singapore achieved independence in 1965, not only because of Singapore's

⁸⁹ Thakur, 1993, p. 836.

⁹⁰ Philip Rajkumar, "The Indian Air Force in Iraq," Bharat Rakshak, Indian Air Force, April 4, 2014.

⁹¹ Thakur, 1993, p. 836.

⁹² See Benjamin Lambeth, *Airpower at 18,000': The Indian Air Force in the Kargil War*, Carnegie Endowment for International Peace, 2012, for a description of IAF operations in the crisis.

⁹³ Kapil Bhargava, "TACDE," Bharat Rakshak, Indian Air Force, November 30, 1999.

⁹⁴ Rajat Pandit, "IAF Readies for Red Flag, Its Toughest Exercise with US," *Economic Times*, July 13, 2018; Bowman, Nagel, and Brobst, 2021.

connection to Great Britain during its period of colonial rule, but also because of a decision to model its defense strategy and military on a state facing similar challenges—Israel.⁹⁵ Like Israel, Singapore lacked strategic depth, depended on access to economic and natural resources that lay outside its borders, and was surrounded by neighbors who viewed its population as a threat. Accordingly, Singapore developed a system that could make best use of its limited population and resources. Beginning in 1967, Israeli advisers played an integral role in the development of Singapore's strategy of Forward Defense, which emphasized preemptive defense, the need to fight aggressors away from Singapore's own territory, a high-readiness reserve system, and an emphasis on qualitative advantage.⁹⁶

Prior to its departure, Great Britain's military footprint in Singapore was sizable. It included the largest Royal Navy base outside Great Britain, which employed approximately 40,000 people and represented nearly 20 percent of Singapore's total economy.⁹⁷ Following Great Britain's departure in 1968, Singapore inherited these facilities and embarked on a process of building its military through the procurement of Western systems and an expanded set of training relationships to compensate for its small size and lack of dedicated training facilities and ranges. In the 1960s, one of its earliest foreign relationships involved a secret program with Taiwan called the Starlight Project, which allowed Singapore access to the facilities needed to conduct exercises and simulations.⁹⁸ Similarly, Singapore has established a variety of permanent training facilities in other countries, including the United States, Thailand, Brunei, and Australia.⁹⁹

The SAF are recognized as the most effective military in the region, largely because of the high quality of their personnel, technologically advanced equipment, and the overall quality and effectiveness of their training programs.¹⁰⁰ One of the most significant contrasts between Singapore's armed forces and those of Israel and India is that they have not been involved in combat at any point in their history, although they have been involved in various peacekeeping operations and in a combat support role in Afghanistan.¹⁰¹ Because of this lack of experience, Singapore has gone to great lengths to ensure that its personnel are of high quality

⁹⁵ Andrew T. H. Tan, "Singapore's Defence: Capabilities, Trends, and Implications," *Contemporary South-east Asia*, Vol. 21, No. 3, December 1999, p. 454.

⁹⁶ Tan, 1999, p. 454.

⁹⁷ Tan, 1999, pp. 453–457.

⁹⁸ I-wei Jennifer Chang, "Taiwan's Military Ties to Singapore Targeted by China," *Global Taiwan Brief*, Vol. 5, No. 9, May 6, 2020, p. 5.

⁹⁹ Tan, 1999, p. 461.

¹⁰⁰ Tan, 1999, p. 459; Ben Brimelow, "How a Tiny City-State Became a Military Powerhouse with the Best Air Force and Navy in Southeast Asia," *Business Insider*, April 8, 2018.

¹⁰¹ Anant Mishra, "Assessing Republic of Singapore Air Force's Defensive Air Operations Capabilities," *Journal of Indo-Pacific Affairs*, Vol. 3, No. 1, Spring 2020.

in terms of image, technical competence, and tactical proficiency.¹⁰² Likewise, its training relationships and participation in bilateral and multilateral military exercises have provided the SAF with a mechanism to develop and test capabilities in as close an approximation to actual combat as possible. Ultimately, the SAF have built their current military efforts around technology and transformation—both of which require access to advanced systems and training.¹⁰³

Singapore's relationship with the United States has been particularly important since the 1980s, even though Singapore has avoided choosing sides in the increasingly contentious strategic competition between the United States and China. Although Singapore maintains a defense relationship with China, the nature of that relationship is not one that involves operational exchanges, technology or arms transfer, or advanced training.¹⁰⁴ The U.S.-Singapore defense relationship, in contrast, involves SAF involvement in a wide variety of military exercises and training opportunities. As a trusted strategic partner, Singapore has been able to gain access to the most-advanced U.S. systems and has multiple training detachments located in the United States, most notably with its former presence at Luke Air Force Base and at Ebbing Air National Guard Base, which will house the SAF's detachment of F-35s and RSAF F-16s that will transfer from Luke.¹⁰⁵

The SAF have also conducted a variety of exercises with the United States to build “sense and shoot” capabilities, interoperability, and service-specific technical and tactical proficiency. Exercises such as Forging Sabre have involved multiple SAF services—in this case, Army and Air Force—and tested key capabilities, including the use of advanced unmanned aerial vehicles, advanced counterfire radars, and C2.¹⁰⁶ Other exercises, such as Peace Vanguard, have involved the deployment of service-level systems, such as Republic of Singapore Air Force AH-64 gunnery training at an Idaho National Guard facility.¹⁰⁷ Similarly, exercises such as Pacific Griffin have involved a wide array of advanced training for both the U.S. Navy and Singapore Navy in areas such as anti-air, antisurface, and antisubmarine warfare involving live fire events.¹⁰⁸ The experience gained from these training events not only provides the

¹⁰² Bernard Fook Weng Loo, “Image Matters: Military Effectiveness and SAF,” *RSIS Commentaries*, No. 67, May 3, 2011.

¹⁰³ Joshua Ho, “The Republic of Singapore Navy: From Humble Beginnings to a Balanced Fleet,” *Le Marin Du Nord [The Northern Mariner]*, Vol. 24, No. 4, October 31, 2014.

¹⁰⁴ Chang, 2020.

¹⁰⁵ Alessandra Giovanzanti, “U.S. Base in Arkansas to Host RSAF's F-16 Training Detachment and Future F-35B Training Unit,” *Janes*, blog, June 7, 2021.

¹⁰⁶ Lim Min Zhang, “SAF Holds Complex, High-Tech Integrated Strike Exercise in US with 800 Troops,” *Straits Times*, September 23, 2021.

¹⁰⁷ Robert Taylor, “Singapore Peace Vanguard Trains at Idaho Army Guard Facility,” U.S. Army, July 30, 2021.

¹⁰⁸ Gregory Juday, “U.S., Republic of Singapore Navies Strengthen Partnership During Pacific Griffin 2021,” U.S. Navy, June 22, 2021.

SAF with improved tactical proficiency but also enables them to address future needs and operational challenges. One such example is the Singapore Army's stand up of a new Headquarters Sense and Strike, which will apply new technologies to its battlefield C2 processes and assist with command automation and decision support systems that will help Singapore deal with a decreasing pool of enlistees.¹⁰⁹

The most-prominent mechanisms in Singapore's adoption of the Western operational model have been its partnerships and its access to foreign military technology. Singapore's early reliance on Israel as a model for its defense strategy and initial training played a formative role in shaping the SAF's future. Similarly, Singapore's close relationship with the United States since the 1980s has provided it with access to state-of-the-art technology and weapon systems along with advanced training. Indeed, Singapore's web of training relationships has played a significant role in its development and proficiency. Notably, all its key training relationships have been with Western militaries (the United States, France, and Great Britain) or militaries with extensive Western ties and influences (e.g., Israel, Taiwan, Thailand).

As mentioned earlier in this section, Singapore's complete lack of combat experience since its founding stands in stark contrast to Israel and India, both of which have fought multiple wars that shaped the direction of their militaries. Singapore has recognized this difference and ensured that its military receives the resources and access to the elements necessary to build its proficiency and competence—technology, people, and training.

Cuba

Cuba's Revolutionary Armed Forces, the *Fuerzas Armadas Revolucionarias* (FAR), stand in contrast to the examples provided in previous sections for a variety of reasons. First, the FAR were not shaped to any significant extent by Cuba's former colonial ties to the United States or Spain. In the cases of Israel, India, and Singapore, earlier relationships—particularly with Great Britain—played a considerable role in shaping key elements of all three militaries. Second, the FAR eventually adopted the Soviet operational model in the 1970s and 1980s. In contrast with the three previous examples, this transition reflected a major shift in Cuba's defense strategy, as former foreign policy goals of spreading revolution throughout Latin America gave way to a perceived need to build conventional forces to defend against the United States.

Following Cuba's revolutionary success in 1959 and concerns about U.S. efforts to destabilize and replace the Castro regime, a significant component of Cuba's foreign and defense policies were centered on exporting and supporting revolutionary movements in other parts of Latin America as a means of promoting an active defense policy.¹¹⁰ Cuba's support for

¹⁰⁹ Cindy Co, "Singapore Army Completes Transformation to a 3rd Generation Force, on Track for Next-Gen Shift," *Channel News Asia*, June 30, 2021.

¹¹⁰ Hal Klepak, *Cuba's Military 1990–2005: Revolutionary Soldiers During Counter-Revolutionary Times*, Palgrave Macmillan, 2005, p. 44.

revolutionary movements in Latin America expanded considerably as Cuban-trained fighters operated in countries including Guatemala, Nicaragua, Venezuela, Colombia, Peru, Bolivia, and Argentina.¹¹¹ As Cuba's revolutionary aspirations grew, the role of the FAR in training African revolutionaries expanded dramatically toward the end of the 1960s. In particular, Cuban training of African revolutionary movements included the use and maintenance of Chinese and Soviet weapons and equipment, as well as tactical training, physical conditioning, and political and ideological instruction.¹¹² Following Che Guevarra's death in 1967, Raul Castro led a gradual transition toward a Soviet operational model that involved extensive ties in foreign military sales, training, and education.¹¹³

The 1980s marked a significant departure from Cuba's earlier defense strategy that emphasized the export and support of revolutionary movements. Early in the decade, Cuba's leadership was focused on professionalizing the FAR and implementing a new defense strategy that could credibly counter a U.S. invasion of the island. The new defense concept—*la guerra de todo el pueblo* (the war of all the people)—was centered on a capable, proficient military force of regulars and reserves that could mobilize quickly, inflict serious damage to the invading force, and provide Cuba with a credible deterrent.¹¹⁴ The focus on professionalization required a wholesale change in the way the FAR were organized, trained, and equipped. Cuba's leaders turned to the Soviet Union. Over the next decade and until the Soviet Union's collapse, significant numbers of Cuban officers and NCOs were trained by Soviet advisers in Cuba in a train-the-trainers program. Cuban officers and NCOs were also sent to the Soviet Union and Eastern Europe for technical training, professional military education, and other specialized training courses in planning, strategy development, intelligence, and C2.¹¹⁵

The FAR's extended training in the Soviet Union led to the development of a body of officers highly proficient with most categories of Soviet weapon systems, including fighter aircraft, submarines, air defense, artillery, and armor.¹¹⁶ Cuban military trainers often stood in for Soviet advisers in key areas because of their familiarity and proficiency with Soviet systems.¹¹⁷ Although the FAR did adopt many elements of the Soviet operational model, it differed in certain respects from Soviet and Warsaw Pact militaries. In terms of the political commissar structure, the FAR did not adopt the Soviet system. Instead, the Cuban Commu-

¹¹¹ Jonathan C. Brown, *Cuba's Revolutionary World*, Harvard University Press, 2017, pp. 7–10.

¹¹² Edward Christian George, "The Cuban Intervention in Angola, 1965–1991 from Che Guevara to Cuito Cuanavale: A Detailed Study of Cuban Internationalism and the Angolan War," thesis, University of Bristol, 2001, p. 88.

¹¹³ Klepak, 2006, pp. 44–45.

¹¹⁴ Klepak, 2006, p. 60.

¹¹⁵ Klepak, 2006, p. 58.

¹¹⁶ Brian Latell, *The Cuban Military and Transition Dynamics*, Institute for Cuban and Cuban-American Studies, University of Miami, 2003, p. 18.

¹¹⁷ Pollack, 2019, pp. 102–103.

nist Party viewed its role in the FAR as “an organization of propaganda and discipline as well as an instrument for the political activity of soldiers.”¹¹⁸ In contrast to the Warsaw Pact militaries, the FAR were never placed under Soviet high command and its commanders maintained both operational and internal autonomy.¹¹⁹ Therefore, the FAR, unlike their Eastern European counterparts, were able to oversee their own strategic planning.

The Cuban-Soviet military relationship was marked by a relatively high level of trust. Cuban officers were viewed as capable and proficient enough to take on training responsibilities for other Soviet client states. Likewise, there is no indication, particularly not from Soviet military leaders and planners, that the types of reliability and proficiency issues that plagued Warsaw Pact militaries were present in the FAR.¹²⁰ Accordingly, the most significant influences behind the implementation of the Soviet operational model in Cuba can be attributed to Cuba’s strong partnership with the Soviet Union, especially in the 1980s, and its access to Soviet technology and training. Wartime experience in Angola reflected how close the two militaries had become and how deeply entrenched the Soviet model was in the Cuban military, but the experience did not lead to major refinements based on FAR experiences in Africa. It is possible that, had the Soviet Union not collapsed, these refinements might have occurred.

Finally, as mentioned earlier in this section, Cuba’s colonial legacy did not have a significant influence in shaping the FAR operational model following independence. Cuba’s revolutionary leaders adopted an approach that built on their success against the Batista regime and, over the subsequent decade, attempted to export the approach as widely as possible. In addition, although political and revolutionary ties played a significant role in Cuba’s early defense strategy, the FAR’s later relationship with the Soviet Union and their adoption of a conventional operational model would eventually reflect the predominant defense perspective of Cuba’s political and military leaders.

Egypt

Egypt’s relationship with the Soviet Union and its experiences trying to adopt a Soviet operational model were discussed earlier in this chapter and demonstrate the cultural and political difficulties that might arise when militaries try to adapt foreign military models. Egypt’s experience in trying to incorporate foreign concepts, technologies, and institutional models spans several periods that extend back to the 19th century, including the long-lasting and substantial influence that the British Army had on its administrative and operational practice until the 1950s. Later experiences involving the postcolonial Egyptian army, the period following Egypt’s defeats in the Arab-Israeli wars, and the most recent tilt toward the United

¹¹⁸ Klepak, 2006, p. 53.

¹¹⁹ Latell, 2003, p. 12.

¹²⁰ Alex Alexiev, A. Ross Johnson, and Barbara A. Kliszewski, *East European Military Reliability: An Emigre-Based Assessment*, RAND Corporation, R-3480, 1986, pp. 3–4.

States highlight several key themes related to the difficulties associated with imposing foreign operational models on a military.

One of the first themes—echoed in the cases of Israel, India, and Singapore—involves the lasting influence that colonial interactions had on several militaries, including the Egyptian armed forces. A key reason for this influence is that personnel from each of these countries were integrated into a military structure and, in some cases, such as those of India and Israel, served during wartime. The integration of indigenous troops into imperial militaries gave direct experience to officers and enlisted troops alike at a deep institutional and practical level, a significant contrast to the much more limited interactions that militaries such as Egypt's had with their Soviet advisers. When Soviet advisers were training Egyptian forces in Soviet doctrine and tactics, Egyptian personnel often reverted to tested and accepted practices from former colonial ties. From this standpoint, the depth of ties in postcolonial militaries proved much more valuable than the new relationships they were able to form with their Soviet advisers.

Another key theme involves the importance of culture and cultural norms in the process of instilling a new operational model. The earliest examples of Egypt's efforts to import a European military model demonstrate that bureaucratic interests, cultural differences, and social conditions (e.g., education and social status) all acted as limitations on the Egyptian military's success and proved a key complication in this earliest set of reforms. Egypt's military confronted similar issues during both the Soviet period and after the withdrawal of Soviet advisers in 1979. Egypt's political and military leaders often viewed Soviet advisers in Egypt as condescending and arrogant and generally insensitive to Egyptian cultural norms. Soviet advisers were seen as aloof and unwilling to mix with their Egyptian clients. Their critiques were often treated with disdain by senior Egyptian officers, who thought they were overly critical and dismissive of Egypt's early military experiences. Although the situation improved when the United States became Egypt's primary security partner, issues related to technical competence, education, and social status resurfaced in many of the same areas that frustrated the Soviet advisers. Although the Western and Soviet operational models differ in many respects, there are common elements that proved difficult for the Egyptian military.

Today, Egypt's military remains heavily influenced by its interaction with the United States from the late 1970s to the Arab Spring. U.S. sanctions and limits in the military-to-military relationship led Egypt's leadership to seek alternative relationships and sources of military technology, primarily from Russia. As a result of Egypt's relatively short periods of exposure to both the Soviet Union and the United States, it is unclear how deeply either operational model took hold. Although the Soviet model never fully took hold, Egyptian performance in Operation DESERT STORM called into question the effectiveness of the U.S.-Egypt relationship on many levels. Politically, the benefits were clear, but many questions remain about the overall consequences for the effectiveness of Egypt's military. It also seems certain that Egypt's colonial connections are far less influential than they were when Soviet advisers first arrived in the country. What seems apparent is that little, if any, indigenous development and

experimentation has taken place resembling India's initiation of a new or indigenously developed hybrid model that incorporates a variety of operational models.

Iraq

Our final example of how operational models have been adopted and applied focuses on Iraq. Although there are many similarities between Iraq and Egypt—and other Middle Eastern militaries, such as Syria's—there are key differences in how Iraq's military applied different operational models that merit discussion. First, Iraq's colonial legacy involved Great Britain and the Ottoman Empire. Iraq's military was created in the 1920s and built around organization, equipment, doctrine, and training that conformed to British practice; however, during this process, a significant number of the new recruits consisted of former Ottoman officers.¹²¹ The Ottoman officers disappeared from the ranks within a generation, but this additional factor helps demonstrate the variety of influences that shaped Iraq's military. This trend continued after Britain's colonial rule ended, leading to an eclectic application of operational influences from the Soviet Union, Britain, France, and, eventually, the United States. A second factor that highlights the domestic political context that shaped the Iraqi Army was its primary role in ensuring internal security.¹²² In Iraq, like in other Middle Eastern militaries, including those of Egypt and Syria, the military's role in internal politics involves a close association between rulers and the army “that has persisted through the centuries under Arab and Ottoman rule.”¹²³

The deployment of operational models in Iraq's military is an example of how difficult organizational change can be while facing multiple competing influences. Like other Middle Eastern militaries that developed relationships with the Soviet Union, earlier experiences with other military models were difficult to overcome. These militaries frequently reverted to practices inherited from their former colonial rulers. For example, even as Egypt and Syria were attempting to adopt Soviet doctrine and tactics, officers in both militaries continued to rely on familiar practices gained during their association with the French, British, and Ottoman militaries.¹²⁴ Even when Soviet influence was at its highest point in Iraq, Iraqi doctrine and tactics mixed influences derived from previous foreign equipment, training, and experience.

Of all the Middle Eastern militaries that received support from the Soviet Union, Iraq's military was the least likely to adopt Soviet organization and doctrine. It tended “toward eclecticism despite the Soviet origin of much of their arms—adding Soviet, French, Ameri-

¹²¹ Roger Owen, “The Role of the Army in Middle Eastern Politics—A Critique of Existing Analyses,” *Review of Middle East Studies*, Vol. 3, 1978, p. 74.

¹²² Owen, 1978, p. 74.

¹²³ Majid Khadduri, “The Role of the Military in Middle East Politics,” *American Political Science Review*, Vol. 47, No. 2, June 1953, p. 516.

¹²⁴ Pollack, 2019, p. 61.

can, and indigenous Iraqi touches to their mostly British tactics.”¹²⁵ This mix of practices was on display in the Iran–Iraq War that lasted from 1980 to 1988. During the war, Iraqi organization and order of battle for both armor and air defense units reflected a mix of Soviet, British, and French systems and operating doctrines. In terms of armor, Iraqi tank platoons reflected Soviet practice, companies were a mix of Soviet and British models, and units at the battalion level and above generally had no set table of organization and equipment.¹²⁶ Iraqi air defense units used the Soviet air defense model, despite the national-level air defense C2 system being designed by a French firm and Iraqi forces having a mix of Soviet and French weapons and radars.¹²⁷ Not long after the war, a Soviet newspaper carried comments by a Soviet MiG pilot who served as an instructor for the Iraqi Air Force. He complained that Iraqi pilots “were incapable of demonstrating aggressiveness, flexibility, and improvisational abilities required by the Soviet air system”—a criticism not unlike those provided by the IAF instructor pilots serving in Iraq during this period.¹²⁸

Iraq’s ineffectiveness in the early stages of the Iran–Iraq War and later in the Gulf War cannot be directly attributed to its implementation of a particular operational model. Like Egypt’s experience demonstrated, a host of cultural, political, and social factors played a significant role in the overall performance of the Iraqi military. Social and cultural factors were reflected in the criticisms voiced by foreign instructors; however, the role of internal politics was potentially the largest obstacle for Iraq’s military. A key legacy for many Middle Eastern militaries—particularly Iraq’s—was the critical role the military played in domestic politics. For Saddam Hussein and many of his regional counterparts, the military’s most important mission was protecting regimes from military coups.¹²⁹ The systems that resulted built their promotion, training, command, and information-management policies to address these imperatives, routinely at the expense of operational proficiency and effectiveness.¹³⁰

The political, social, and cultural factors that complicated adoption of these operational models should not suggest that Iraq’s military could not perform in a proficient manner when needed. During the latter stages of the Iran–Iraq War, Saddam recognized the potential threat he faced based on the Iraqi Army’s poor performance, its low morale, and the frustration of its officer corps. As a result, Saddam modified his policies to decrease the emphasis on internal security and promote conventional military effectiveness, thus empowering military expertise and improving operational effectiveness.¹³¹ These changes resulted in a

¹²⁵ Eisenstadt and Pollack, 2001, p. 550.

¹²⁶ Eisenstadt and Pollack, 2001, p. 567.

¹²⁷ Eisenstadt and Pollack, 2001, p. 567.

¹²⁸ Rajkumar, 2014; Pollack, 2019, pp. 74–75.

¹²⁹ Khadduri, 1953, p. 520.

¹³⁰ Caitlin Talmadge, “The Puzzle of Personalist Performance: Iraqi Battlefield Effectiveness in the Iran–Iraq War,” *Security Studies*, Vol. 22, No. 2, April 2013, p. 183.

¹³¹ Talmadge, 2013, p. 183.

new approach to the war in which Iraqi general staff devised a series of “extensively scripted offensives that Iraq’s forces could accomplish with massive superiority in firepower, numbers, and surprise.”¹³² Ultimately, Iraq was able to repel Iranian forces and settle the conflict into a stalemate.

Since the early 2000s, the United States has been heavily involved in training the new Iraqi military. However, as Iraq’s previous experiences in adopting new operational models suggest, a host of challenges remain and success is far from certain.¹³³ Today, the influence of Iraq’s colonial legacy has faded and the influence that British doctrine and practice exerted over the Iraqi officer corps is long gone. Likewise, the effect of Soviet doctrine and training left an unclear legacy, as many of the key elements of Soviet military thought were never incorporated into Iraq’s organization and employment of forces. The most important influence on Iraq’s military development over the past several decades has been the political role of the military, particularly in regime protection.

Conclusion: Operational Models and the Role of Experience

Operational models provide a framework that clarifies how nations make choices about their military modernization. Most often, modernization that entails massive organizational change, technological adaptation, and reorientation of existing practices is not completed from the ground up. As this chapter demonstrates, operational models provide national leaders and their militaries with existing templates of doctrine, capabilities, and tactics. The templates are typically not followed as the models’ originators had intended, but they provide a starting point from which to build. For this reason, the selection of an operational model—which also requires decisions on key military relationships—involves a wide variety of considerations regarding military strategy, existing organizational parameters, culture, and experience. In the next chapter, we provide a logic model that outlines this process, particularly in terms of how these types of decisions affect decisions related to training.

¹³² Eisenstadt and Pollack, 2020, p. 103.

¹³³ Caitlin Talmadge and Austin Long, “Why the U.S. (Still) Can’t Train the Iraqi Military,” *Washington Post*, September 22, 2015.

Factors Influencing Decisions on Training

We developed a logic model to depict factors that can affect how militaries train their forces; how the training, in turn, influences training outcomes and military effectiveness; and how biases affect team decisionmaking. We developed the model in an iterative fashion, drawing from past research on team decisionmaking, military history, analysis of specific historical cases presented in Chapters 2 and 3, and our hypotheses or suppositions about factors and processes that might or should be relevant to the model. Ultimately, we used the model to identify points in the decisionmaking process where experience would be most likely to affect decisions about military training, including its alignment with strategic objectives, organization, programmatic structure, and content. Identifying points in the process where experience will most likely influence training-related decisions also provided a means for identifying the type of experience involved, as well as the specific experiences. Figure 4.1 provides a schematic overview of the elements in the model. Constructs and elements in the model and relationships between them are described in the sections that follow.

Inputs

Military strategy is a central input that affects how nations train their forces. A credible military strategy should include realistic assessment of a variety of elements, including *objectives*, *geography*, *innovation*, *resources*, and *war experience*.

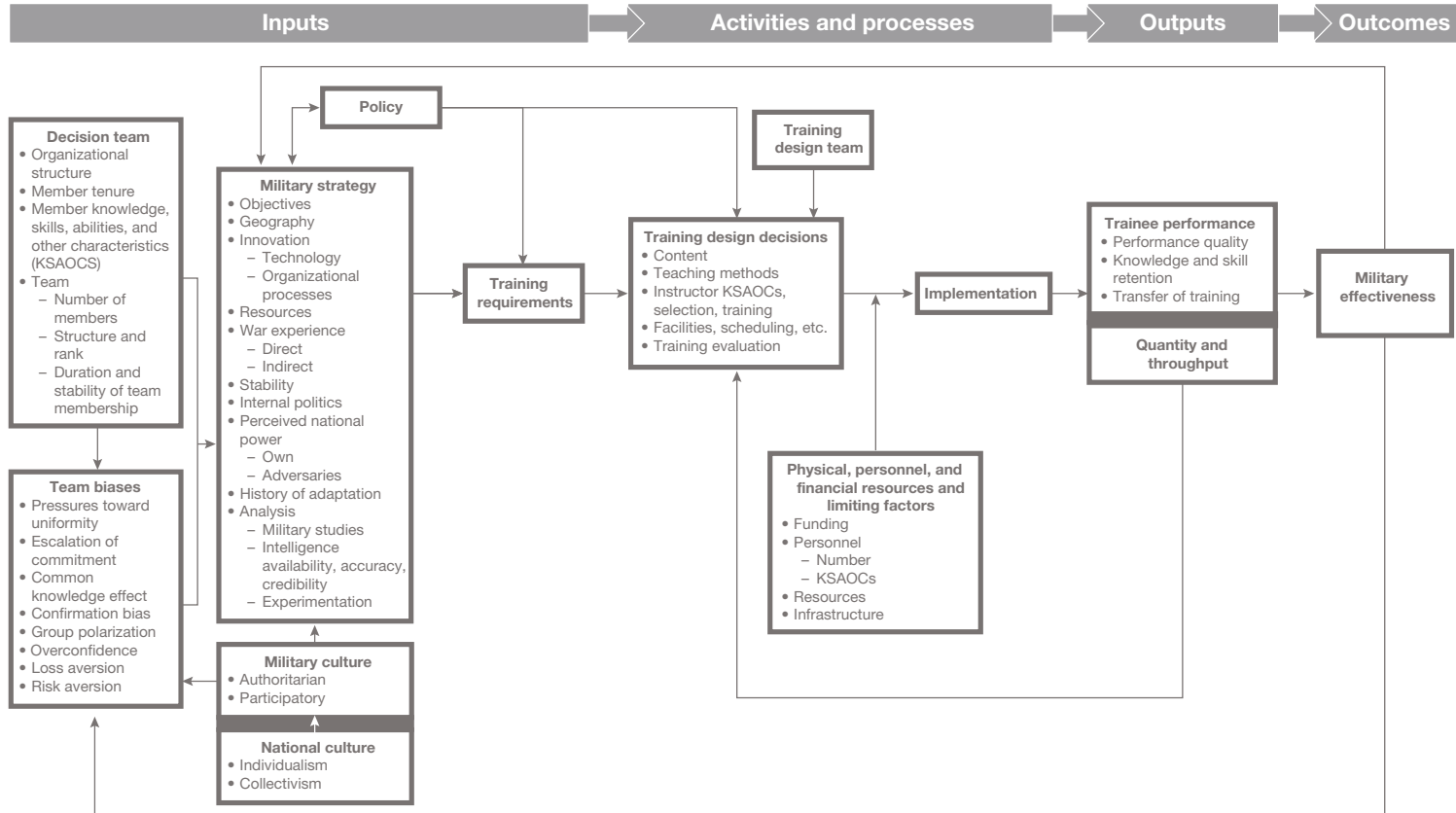
Objectives

Military strategy is formulated to respond to a nation's national defense objectives. These objectives identify national security goals and outline how military institutions are expected to achieve those goals. These objectives include defending sovereign territory, combating internal threats and maintaining stability, projecting power to promote a peaceful global economic and security environment, incorporating new technologies, and supporting allies.

Geography

A nation's geographic characteristics play a major role in the formulation of military strategy. Natural boundaries, access to waterways, the availability of resources, and proximity of allies

FIGURE 4.1
Factors Influencing Training Program Decisions



or potential adversaries contribute to determining force structure, weapons development, and logistical needs. Geographic realities also influence perceptions of the type, proximity, and immediacy of threats a country faces and the domains most relevant to its national security. Accordingly, a country's geographic realities play a significant role in decisions about training.

Innovation

Advancements in both technology and organizational processes or functioning affect strategy by improving capability to meet objectives. We posit three categories of innovation: acquisition, possession, and use. *Acquisition* refers to the ability of a nation's industrial base to provide innovative advancement for military purposes or the nation's ability to acquire advanced equipment from outside sources. *Possession* refers to the willingness of a nation's defense institutions to incorporate new technologies, equipment, procedures, or structures into planning. *Use* refers to the ability to adapt doctrine to incorporate technologies, equipment, procedures, or structures and then provide adequate training on these innovations. When technological and organizational developments are possible, strategy should incorporate these new capabilities—a process that would likely be reflected in military training. A lack of innovation or unwillingness to adapt strategy to innovation can create gaps in capability.

Resources

An accurate assessment of the availability of resources is critical to the formulation of military strategy. Raw materials, energy, personnel, and funding play key roles in what types of forces a military can field. Resources also affect strategy by identifying strategic locations, such as shipping lanes, that need to be secured or protected in the event of hostilities. In the end, resource considerations affect training in two ways. The first involves content, which can dictate the types of training scenarios used. The second involves the types of materiel, funding, technology, and equipment available to the military and dedicated to supporting its training programs.

War Experience

War experience affects strategy both directly and indirectly. A nation's experience in war is not limited to its own combat experience; it includes a host of social, economic, and political factors. All of these factors contribute to a nation's understanding of what wars entail and which critical functions are necessary for wartime success. Likewise, a nation's strategy can be heavily influenced by the combat experiences of others, particularly in terms of major military innovations that alter characteristics of war and the way that nations are able to achieve war objectives. Combat operations can also be observed without direct participation using liaisons, observers, information exchanges, and dedicated programs to develop lessons learned from individual conflicts. This indirect experience can have a significant influence

on a country's understanding of its security environment and trends in modern warfare, thus precipitating changes in military strategy and training. Nations with combat experience can provide insights through education and training programs that might serve as surrogates and sources of indirect experience for their allies and partners without direct combat experience.

Stability

Stability can affect military strategy in several ways, both internally and externally. Dramatic and unexpected changes to internal political, social, and economic conditions can affect national objectives, funding, and popular support for military operations. National leadership's perception of internal threats and its prioritization of those issues in its security strategy will have a significant effect on the nation's strategic objectives. Likewise, drastic changes in the international order can force dramatic changes in a nation's military strategy by causing the realignment of regional, technological, or funding priorities.

Internal Politics

Militaries exist in a domestic political ecosystem. Accordingly, they tend to reflect the attributes and values of the political system they serve. The level of internal political support and the military's role in national politics are key factors that influence strategy development. For most countries, political and senior military leadership develop the national security objectives that military strategy then plays a part in fulfilling. Therefore, strategy is based on political objectives and requires clear and consistent guidance. Internal politics are also responsible for determining military funding, roles, and missions. These factors, in turn, dictate force structure, priorities between service branches that might lobby for their own interests, and technological development, acquisition, and use.

Perceived National Power

Perceived national power refers to leadership's beliefs about the strengths and weaknesses of the comprehensive power of their nation and other parties. Perceptions of comprehensive power are based on a set of diverse factors, including economic capacity, geographic advantages, natural resources, and internal social and political stability and support. Leaders' perceptions of national power can influence military strategy via their assumptions about the capabilities, strategies, and will of a nation; a nation's allies; potential adversaries; and the international community at large. A nation with leaders who perceive it as strong in many or all categories of comprehensive national power has more latitude in strategy. In contrast, leaders who perceive their nation as weak in one or more areas, such as susceptibility to the actions of external actors through the imposition of economic sanctions or the provision of support to an adversary, might be forced to develop a strategy to win quickly before those areas of weakness become relevant.

History of Adaptation

The combat operations, reforms, and innovations of other nations can heavily influence a nation's strategy. A nation's willingness to adapt outside ideas or reform its current practices can challenge the status quo and prevent strategic inertia, leading to increased capabilities. Some nations have had more success than others in adapting to major developments in the security environment, particularly in the realms of military affairs and advanced technologies. A nation with a track record of successful adaptation over time is more likely than a nation with limited experience and success in this area to be able to adapt its military strategy when needed.

Analysis

Analysis plays a key role in the development of military strategy by enabling military institutions to identify and understand systemic change. We posit three types of analysis. *Military studies* or *military science* reflects the role of a nation's military institutions in analyzing global military affairs and might include analysis of successes and failures of past or ongoing military operations and analysis of the suitability of current capabilities of its own and other military forces and their application to strategy. *Accurate and credible intelligence* about potential adversaries' capabilities is another central component of analysis, as is a nation's willingness to *experiment* with new techniques, tactics, and procedures to understand their potential benefits and drawbacks.

Factors Influencing Military Strategy

We propose that several factors can influence military strategy, which we discuss in the sections that follow.

Decision Team and Team Biases

We hypothesize that aspects of the decision team can have direct effects on military strategy and indirect effects through team biases. Characteristics of teams, such as *member tenure*, and *KSAOCs*, and structural aspects of the team, such as *hierarchy* and *stability of membership*, can directly or indirectly affect strategic decisions. For example, implicit or tacit knowledge (i.e., knowledge that is difficult for individuals to articulate, sometimes referred to as *intuition*) develops through experience and affects the speed and quality of decisions.¹ Recent research shows that status hierarchies within teams affect the information-sharing

¹ See Jennifer Hedlund, George B. Forsythe, Joseph A. Horvath, Wendy M. Williams, Scott Snook, and Robert J. Sternberg, "Identifying and Assessing Tacit Knowledge: Understanding the Practical Intelligence of Military Leaders," *Leadership Quarterly*, Vol. 14, No. 2, April 1, 2003; Michael D. Matthew, *Head Strong: How Psychology Is Revolutionizing War*, Oxford University Press, 2014.

that leads to decisions.² These aspects of decision teams can affect *team biases*, which in turn influence strategic decisions. Such factors as time pressure, homogeneity of team membership, working in groups with coalitions that are invested in a particular outcome, and pressure from managers can exacerbate *pressures toward uniformity*, whereby team members are inhibited from sharing information because of their desire to go along with the group.³ As Straus et al. (2009) describe, these biases can also build on each other; for example, group discussions that favor confirming and shared information (*confirmation bias* and the *common knowledge effect*, respectively) might substantiate members' beliefs, leading to *over-confidence*, which is associated with *escalation of commitment* (i.e., persisting in a course of action despite opposing evidence).⁴ These biases are likely to deter teams from pursuing strategies that might be more effective. We have identified some biases that we expect are the most likely to affect team decisions about military strategy, but there are many other possible biases. In our case analyses, we can sometimes infer that a team bias might have occurred vis-à-vis poor decisionmaking, but we cannot determine the nature of the team bias from the information presented.

Policy

Policy and military strategy might have reciprocal effects, as shown by the two-sided arrow connecting the two in Figure 4.1. For example, a policy that dictates joint operations necessitates a military strategy that emphasizes the integration of military forces in all domains under a unified commander rather than strategies conceived and executed by individual service branches. Strategy also affects policy; a change in military strategy to joint force orientation might lead to the development of a new policy requiring officers to serve rotations in joint command positions.

² These hierarchies can suppress information-sharing when higher-status members exert more control over team discussions or lower-status members feel inhibited from contributing to discussions (compared with teams with more homogeneity in status). Conversely, information-sharing can be enhanced when higher-status members share information with and solicit input from lower-status members. See Steven M. Gray, John Stuart Bunderson, Gerben S. Van der Vegt, Floor Rink, and Yeliz Gedik, "Leveraging Knowledge Diversity in Hierarchically Differentiated Teams: The Critical Role of Hierarchy Stability," *Academy of Management Journal*, Vol. 66, No. 2, January 26, 2022.

³ See Susan G. Straus, Andrew M. Parker, James B. Bruce, and Jacob W. Dembosky, "The Group Matters: A Review of the Effects of Group Interaction on Processes and Outcomes in Analytic Teams," RAND Corporation, WR-580-USG, 2009.

⁴ Max H. Bazerman, Toni Giuliano, and Alan Appleman, "Escalation of Commitment in Individual and Group Decision Making," *Organizational Behavior and Human Performance*, Vol. 33, No. 2, April 1984.

Culture

Cultural factors influence both team biases and military strategy. One aspect of culture is *national culture*, which experts often discuss in terms of *collectivism* and *individualism*.⁵ Collectivistic cultures are those in which people tend to value the good of the group over individual outcomes. Eastern countries, such as China, tend to be collectivistic. Individualistic cultures are those in which people tend to value their own welfare over that of the group. The United States and other Western cultures tend to be individualistic. *Military culture* typically follows from these national cultures. Countries with more-collectivistic national cultures tend to have more-authoritarian military cultures that emphasize compliance and discourage or stifle independent thought and initiative. Countries with more-individualistic cultures tend to have more-participatory military cultures that encourage initiative and questioning of prevailing ideas. We hypothesize that cultural factors affect team biases. For example, pressures toward uniformity might be more prevalent in collectivistic and authoritarian cultures than in individualistic and participatory cultures. Cultural factors might also have a direct effect on military strategy. For example, Japanese cultural attitudes shifted away from imperial conquests after Japan's defeat in World War II. This shift led to strategies that emphasized territorial defense and the creation of military forces to fulfill that strategy.

Shaping the Training Process

Military strategy, in combination with policy, should dictate *training requirements*. For example, a strategy emphasizing covert, precision strikes that is combined with policies emphasizing the use of autonomous platforms to minimize friendly casualties would create the need for personnel who are trained to operate unmanned systems. The same strategy without a policy to minimize friendly casualties might require more trained pilots.

Training requirements lead to training activities and processes. That is, the requirements should drive the training design teams' decisions about training, including *content* (what is trained), *teaching methods* (how training is delivered), requirements for instructors (KSAOCs that instructors should have and *how individuals are screened and selected* for those capabilities) administrative processes related to training (e.g., *facilities* and *scheduling*), and *training evaluation* (e.g., collecting and analyzing data to determine whether training is effective). However, in addition to identifying the appropriate pedagogical approach to train on requirements, *physical, personnel, and financial resources and limiting factors* affect decisions on training design and delivery. That is, the ability to design and *implement* training depends on having needed *funding*, instructors or other supporting *personnel* with needed KSAOCs, equipment, and other aspects of *infrastructure* for training (e.g., ranges, security protocols).

⁵ Harry C. Triandis, "Collectivism and Individualism as Cultural Syndromes," *Cross-Cultural Research*, Vol. 27, No. 3, August 1993; Harry C. Triandis, "Individualism-Collectivism and Personality," *Journal of Personality*, Vol. 69, No. 6, December 2001.

Outputs in the logic model follow from the implementation of the training. Outputs are measures of training quality and quantity gathered during the training evaluation process. There are multiple aspects of quality, including the *quality of trainees' performance* (i.e., do trainees perform tasks accurately and within required time requirements?); the extent to which trainees *retain knowledge and skills* over time; and *transfer of training*, or the application of learned knowledge and skills while on the job. *Quantity* refers to throughput, or how many personnel are trained in a given time frame. Systematic evaluation showing unsatisfactory performance on quantity or quality should result in changes to training content, methods, or other aspects of training design, as indicated by the feedback loop from these outputs leading back to the Training design decisions box in Figure 4.1.

Outcomes are longer-term effects of training in terms of *military effectiveness*. Ineffectiveness might result in a change to military strategy, as shown in Figure 4.1 by the feedback loop, which might, in turn, change training requirements. We also hypothesize that military effectiveness affects team biases. For example, effective performance might lead decisionmakers to be overconfident or ignore disconfirming evidence and therefore lead to related biases (the common knowledge effect and confirmation bias).

Defining and Categorizing Experience

“In war you learn your lessons, and they stay learned, but the tuition fees are high.”¹

Ernst Jünger, *Storm of Steel*

Experience is the central component in the organizational learning process. It also serves as a key element in assessments of military capability and readiness. The general assumption is that militaries with combat experience, particularly when that experience is derived from the specific situations or environments for which they are being evaluated, have an advantage over those with less or zero experience. U.S. and Chinese analysts made this assumption prior to the First Gulf War, and many analysts made similar assumptions about Russia’s military prior to its invasion of Ukraine in 2022.² Analysts have also examined the PLA’s lack of combat experience since the 1980s.³ Since then, the PLA has had only minor involvement in such peacekeeping and noncombat operations as counterpiracy and noncombatant evacuation operations (NEOs), all of which have had varying levels of complexity and success. The PLA recognizes this problem and has placed training reform at the top of its list of priorities, in part by developing training programs that more closely resemble actual combat.⁴

Conversely, the United States has been engaged in combat since 1990 and Operation DESERT STORM. A significant portion of that time and experience was developed fighting insurgents and terrorists in Iraq and Afghanistan. The United States also conducted two major land operations against Iraq, multiple large-scale air campaigns (First Gulf War, Operation Allied Force, Operation Iraqi Freedom), and several other operations, including Opera-

¹ Ernst Jünger, *Storm of Steel*, Penguin Books, 2003, p. 226.

² John J. Fialka and Andy Pasztor, “Grim Calculus: If Mideast War Erupts, Air Power Will Hold Key to U.S. Casualties—They May Be a Few Hundred or Thousands, Depending on Need for Troop Action—No Place to Hide in the Desert,” *Wall Street Journal*, November 15, 1990; Benjamin Weiser, “Computer Simulations Attempting to Predict the Price of Victory,” *Washington Post*, January 20, 1991; Harlan W. Jencks, “Chinese Evaluations of ‘Desert Storm’: Implications for PRC Security,” *Journal of East Asian Affairs*, Vol. 6, No. 2, Summer–Fall 1992; Dan Lamothe and Karoun Demirjian, “As Ukraine War Bogs Down, U.S. Assessments Face Scrutiny,” *Washington Post*, July 2, 2022.

³ Heath, 2018; Rempfer, 2019; Sacks, 2021.

⁴ Cheng, 2020.

tions Deliberate Force, Desert Fox, Odyssey Dawn, and Inherent Resolve. The span of capabilities cuts across numerous mission areas involving land warfare, special forces, close air support, and integrated air operations, among others. The conspicuous absence from this list is large-scale maritime operations against an opposing fleet, a core element in nearly all most-likely future combat scenarios with China. Likewise, U.S. operations have not involved a peer competitor with the technological capability, defense industrial capacity, and multidomain capabilities possessed by the PRC. This raises a central question for this study. Is U.S. combat experience since 1990 relevant to training and preparation for future great power conflict?

The contrast between the PLA and the U.S. military raises questions about how organizations gain experience, derive lessons from it, and put it to use. The PLA recognizes the problems created by its inexperience, particularly because the future combat for which it prepares is fundamentally different and distant from its experience. As a result, the PLA has developed several tools, including military science research, foreign engagement, exercises, simulations, and wargaming, that might provide its ranks with the experience and quality training necessary for informatized wars. The United States, for its part, is in the process of revamping its training and reorienting away from the heavy COIN focus at its center. The U.S. military faced a similar situation in the late 1970s when it left Vietnam, redeveloped its concepts of operation to focus on the Soviet Union, and initiated several training programs that revolutionized military training.⁵ After Vietnam, this reorientation in focus was a prime contributing factor to the overwhelming success of the U.S. military against an experienced Iraqi military that had failed to adapt and innovate. After Iraq and Afghanistan, the U.S. military is developing a new exercise series dedicated to space and cyber warfare and updating training programs at the service training and test centers.⁶

In this chapter, we examine the nature of experience and its importance to the organizational learning process. To do so, we focus on several theoretical elements of organizational learning and how they relate to militaries, mainly in terms of the influence of culture, routine, and organizational attitudes to change on the process of instituting change. These issues of change are focused on how the United States and China are adapting military training to prepare for great power conflict. For China, this means compensating for its lack of combat experience. The United States is adapting to ensure that its recent experience can be either reoriented or reappropriated toward the high-end fight. Finally, we identify categories of experience, describe their benefits and drawbacks, and provide conclusions about how experience is gained and used by both militaries.

⁵ Davidson devotes a chapter to these developments. See “Learning to Learn: The Training Revolution in the Post-Vietnam Military,” in Davidson, 2010, pp. 97–128.

⁶ Christine Saunders and Lindsey Heflin, “Test Trifecta: Orange, Emerald, Black Flag Combine to Enhance Large-Scale Test,” U.S. Air Force, November 4, 2021; U.S. Cyber Command Public Affairs, “DOD’s Largest Multinational Cyber Exercise Focuses on Collective Defense,” U.S. Department of Defense, December 6, 2021; Greg Hadley, “Space Force Plans Two New Exercises: Polaris Hammer and Black Skies,” *Air & Space Forces Magazine*, January 26, 2022; Thomas Newdick, “Air Force’s Black Flag Test Exercise Goes International with Focus on China,” *The Warzone*, blog, May 20, 2022.

Organizational Learning and Experience

Red First Company's experience in the movie *Target Locked*, which we described in Chapter 1, provides an excellent example of the role that organizational learning plays in interpreting and employing experience. Red First Company was confronted with a significant change during its exercise defeat—one that was completely unexpected and that shattered the foundations of earlier routines that emphasized specific training methods, rewarded outmoded behaviors, and reinforced historical legacies that prevented change even in the midst of calls within the PLA to throw away old habits. *Organizational learning* is defined as the “process by which an organization . . . uses new knowledge or understanding gained from its experience or study to adjust institutional norms, doctrines, and procedures in ways designed to minimize gaps in performance and maximize future successes.”⁷ The organizational learning process takes place in an institutional environment that encompasses positions, policies, programs, procedures, messages, and directives that permit “organizations to encode, store and retrieve lessons of history despite the turnover of personnel and the passage of time.”⁸ Accordingly, the institutional environment in which organizational learning takes place is defined by routine-based and target-oriented organizations whose actions are history-dependent.⁹

Militaries resist change because of a combination of organizational structure, norms, and policies that are reinforced through routine as a means of directing members of the organization toward specific objectives and outcomes.¹⁰ Typically, these routines are based on the institution's interpretation of the past as opposed to being forward-looking and oriented toward the future.¹¹ They also tend to be implemented on an incremental basis following feedback on outcomes.¹² Routines exert a significant influence on organizational behavior and learning and generally reflect broader elements of an organization's culture. These factors are central to how organizations, particularly militaries, interpret experience. In particular, formative experiences have an inordinately strong influence on organizational behavior, and routines play a powerful role in how organizations process and interpret information.¹³

The case studies examined earlier in this report provided insights into how militaries grappled with the question of adaptation and the role that organizational leadership and

⁷ Davidson, 2010, p. 19. Davidson cites Richard Duncan Downie, *Learning from Conflict: The U.S. Military in Vietnam, El Salvador, and the Drug War*, Praeger, 1998.

⁸ Levitt and March, 1988, p. 319.

⁹ Lynne G. Zucker, “Institutional Theories of Organization,” *Annual Review of Sociology*, Vol. 13, August 1987, pp. 449–450.

¹⁰ Davidson, 2010, p. 11.

¹¹ Levitt and March, 1988, p. 320.

¹² Levitt and March, 1988, p. 320.

¹³ Davidson, 2010, p. 15.

experience play in that process. The militaries in these case studies had reasons to change and a variety of experiences, which influenced how organizational learning occurred in each example. Our logic model also identified a variety of factors behind major decisions on strategy and the best types of preparation and training to meet these objectives. Cultural, social, and bureaucratic impediments can complicate military reform and possibly lead to its failure. Most attempts to adopt Western military practices in the 19th century—most notably by China, Egypt, the Ottoman Empire, and Russia—faced these impediments. In these cases, a major contributing factor to failure was national leadership’s unwillingness or inability to make changes in organizational structures, social institutions, or personnel. Leaders had to overcome established routines and a lack of recognition of and buy-in to the intended outcome of these reforms. History-dependent processes also prevent forward-looking reform. In a successful example, Japan’s leadership went to great lengths to ensure that change in the Japanese military was complemented by wider changes to Japan’s social, economic, and political systems. In each of the unsuccessful cases, the inability to change routines proved to be the key contributing factor to the failure to adapt operational models.

Routines capture experiential lessons of history “in a way that makes the lessons, but not the history, accessible to organizations and organizational members who have not themselves experienced the history.”¹⁴ The processes by which these routines are transmitted involve a combination of socialization, education, imitation, professionalization, and personnel movements, and changes to routines usually result from new experiences and interactions within a community of learning organizations.¹⁵ New experiences are never assimilated independently from other interpretive processes. For this reason, valuable or highly relevant experiences might be discarded if they do not conform to contemporary, well-entrenched routines. Likewise, they might lose their transformative effect because of an interpretive learning process that discards significant or meaningful elements of experience for the sake of conformity and consistency. Simply put, change frequently does not occur simply because newer, better experiences lend themselves to novel ways of doing business. Change is spurred by a catalyst, which for military organizations often involves a combination of “(1) external pressure, (2) the opportunity or need to grow/or survive, and (3) failure.”¹⁶

The role that experience plays in the development of new routines is complex and certainly not a direct template. Likewise, not all experiences are treated equally, nor are they interpreted in the same manner. The major powers during the interwar period provide evidence of this. Each of the five powers—Great Britain, France, Germany, the United States, and the Soviet Union—fought in World War I. Each was aware of and had access to the latest military technologies, including tanks and planes. All shared common experiences, but each had a unique national experience. As a result, the operational concepts and the

¹⁴ Levitt and March, 1988, p. 320.

¹⁵ Levitt and March, 1988, p. 320.

¹⁶ Davidson, 2010, p. 12.

application of technologies that emerged varied greatly at the outset of World War II.¹⁷ This dynamic resulted in part from the ways that individual militaries interpreted and made use of their individual experiences.

To understand the influence of experience on a military, particularly its training, there must be some framework for categorizing and understanding what constitutes experience in its various forms. The PLA and the U.S. military have vastly different experiential bases, both in terms of combat experience and learning processes and the historical underpinnings of their individual routines. The sections that follow examine different categories of experience.

Categories of Experience

Organizational learning is the process by which inferences from history are encoded and embedded into routines. Experience plays a significant role in this process through an organization's learning from direct experience and the experience of others.¹⁸ This formulation follows thinkers such as Carl von Clausewitz, who pointed out that militaries can learn from historical examples, personal battlefield experience, and the experience of other armies.¹⁹ The experiences available to military practitioners can be thought of as direct and indirect experience, both of which have benefits and drawbacks related to availability, quality, and accessibility.

Direct Experience

Direct experience is the most authentic example of learning.²⁰ This is even more true when it comes to combat because of war's violence, unpredictability, psychological impact, and uncertainty. Effective training requires more than simply developing, emulating, or routinizing specific skills or tasks. These technical skills, although frequently complicated, are typically not beyond the capacity of most militaries to adopt. For the most part, these skills can be learned in benign settings without the sense of urgency or psychological pressure that complicates task execution and synchronization in combat. For this reason, militaries strive to emulate combat to the greatest extent possible in daily exercises and training. Militaries must balance developing proficiency (training to build baseline skills) and ensuring that operators are also presented with realistic combat training to the greatest extent possible.

Clearly, direct experience in combat and realistic training both build experience. This report, however, treats them differently. Because the nature of direct experience involves live enemies, high stakes, danger, and severe consequences for failure, we make a distinction

¹⁷ Lynn, 1996, p. 509.

¹⁸ Levitt and March, 1988, p. 319.

¹⁹ Davidson, 2010, p. 9.

²⁰ Levitt and March, 1988, p. 321.

between direct experience and a synthetic training environment. Similarly, militaries such as the PLA view other forms of real-world, noncombat operations, such as peacekeeping missions, as analogs to combat because of their unpredictability and often-high stakes. We do not suggest that combat experience will always be more desirable than training. Both have value for militaries that is generally determined by the quality, applicability, and intensity of the experience. Accordingly, our report breaks direct experience into three categories: combat, nonwar operations, and firsthand observation.

Combat

Ernst Jünger was one of the most decorated German soldiers in World War I and an early commander of German storm troops, units designed to bypass the dominance of artillery and provide new approaches for achieving tactical breakthroughs that had once been nearly impossible. His comment about the unforgiving nature of combat and the importance of experience, which opens this chapter, has been recognized repeatedly throughout history. A regularly cited example of this phenomenon involves the survival rate of new Navy and Air Force pilots during the Vietnam War. American pilots early in their tenure were shot down at higher rates than combat veterans—a dynamic that suggested that once an experiential threshold had been passed, survival and success rates would increase.²¹ Those findings led Navy and Air Force leaders to develop training programs that more closely approximated a dynamic combat environment as a means for providing pilots with a training experience that is as close to actual combat as possible. Ultimately, both services desired an institutional mechanism capable of capturing veteran pilots' combat experience so it could be relayed to newer pilots prior to their first combat experiences. To serve this purpose, the Navy's TOPGUN was founded in 1970 and the Air Force's Red Flag was founded in 1975. Army leaders recognized the value of this approach from their own experiences in Vietnam, and the NTC was founded in 1982.²²

The Soviet Army's experience in World War II provides a stark example of the "tuition" paid because of a lack of experience. However, it also provides a vivid example of how combat experience builds within an army and the effect that accumulated experience can have on a war's outcome. There were critical shortcomings in the Soviet Army at the outset of World War II, including a significant shortage of leaders with relevant combat experience—only a "sprinkling of qualified leaders from the Japanese and Finnish campaigns" remained in service—and the general inclination of the remaining leaders to avoid exercising independent judgment and initiative for fear of reprisal should they fail.²³ At the outset of the war, Soviet losses were staggering. By June 22, 1941, the first morning of the German invasion, more than 1,200 Soviet aircraft had been destroyed and Soviet defenses were overwhelmed across a

²¹ Davidson, 2010, p. 100.

²² Davidson, 2010, p. 100.

²³ David M. Glantz and Jonathan M. House, *When Titans Clashed: How the Red Army Stopped Hitler*, University Press of Kansas, 2015, p. 338.

front that extended nearly 1,800 miles. In the first week of fighting, German forces advanced nearly 200 miles into Soviet territory, destroying nearly 4,000 aircraft and killing, wounding, or capturing approximately 600,000 Soviet troops.²⁴ The heavy Soviet losses at the outset of the war were the result of several factors—poor planning, training, and preparation and a significant lack of leadership and experience among most Red Army officers.²⁵

The German military's experience only provided an advantage for so long. At the war's start, the Soviet Army lacked proficiency in large-scale maneuver warfare, aerial combat, and planning. As the war progressed, the Red Army became much more proficient in its ability to plan and execute "its own form of complex mechanized warfare," a dynamic that German officers failed to see materializing based on their own strongly held perceptions and stereotypes of the "inflexible peasant soldier who displayed no initiative."²⁶ Increased Soviet proficiency reduced Soviet casualties and correspondingly increased German casualties. This effectively reduced the level of training among German soldiers, a problem that was made more acute as the war continued.

As these two examples show, combat experience or its close approximation has historically been critical in several areas related to wartime success: reduction of casualties, increased tactical proficiency, and improved planning and decisionmaking. However, the advantages of combat experience might provide only temporary advantage until an adversary closes the gap, as was the case for the German military. Combat experience might also prevent adaptation if, like in the case of the German military, early success reinforces the wrong lessons or assessments of an enemy's ability to change. In this sense, successful experience could lead to a "competency trap," which occurs when "favorable performance with an inferior procedure leads an organization to accumulate more experience with" and persist with suboptimal technologies or procedures.²⁷ For this reason, combat experience—while universally acknowledged as being beneficial—can both help and hinder a military.

Nonwar Operations

Nonwar operations are also a class of direct experience, although not one involving combat. They consist of operational activities such as foreign deployments, humanitarian assistance and disaster relief (HADR), counterpiracy missions, and peacekeeping operations. Although this category of experience does not directly build operational and tactical proficiency in warfighting, it does involve a host of critical functions necessary in wartime, including logistics, C2, ISR, and planning. For the PRC, the experiential value of these types of operations

²⁴ Marcus Jones, "Operation Barbarossa: A Deadly Turning Point in World War II," Smithsonian Institute Evening Lecture, January 30, 2014.

²⁵ Glantz and House, 2015, pp. 355–356.

²⁶ Glantz and House, 2015, p. 356.

²⁷ Levitt and March, 1988, p. 322.

is viewed as a critical component of command training.²⁸ Similarly, U.S. experience with routine global operations has aided organizational learning in a significant way. Humanitarian assistance operations in Haiti in 1994 and Indonesia in 2004, participation in counterpiracy operations through Combined Task Force 151, and routine global deployments appear to be viewed as less significant to the United States than similar experiences are to the PRC, whose operational experience outside its borders is considerably more limited than that of the United States.

Firsthand Observation

A final category of direct experience is firsthand observation, typically through military advisers who are present during action in a noncombat advisory role. The experience gained from these missions plays a limited role in relation to training for both the U.S. military and PLA. In addition, observations can be made by technical assessment teams, such as the Combined Weapons Effectiveness Assessment Teams that were deployed to Iraq in 2003 to assess the effectiveness of the U.S. air campaign in Operation Iraqi Freedom.²⁹ These teams were composed of operators, targeting specialists, and technical experts, and had the primary function of documenting the technical effectiveness of weapon types against their intended targets. The most notable experiential output from this process was to improve targeting and planning processes based on weapon effectiveness, a process in which insights accumulated over time. In both cases, these activities could also be categorized as indirect experiences; however, because advisers and technical analysts are present at combat operations and have direct access to individual target sites, the level of experience and knowledge gained goes beyond lessons learned from a secondhand account.

Indirect Experience

The second broad category of experience consists of two of the three examples that Clausewitz provided: historical examples and the experiences of other armies.³⁰ Although commonly accepted as a form of experience, the process of capturing experience from other organizations—in this case, militaries—is one that involves the “transfer of encoded experience in the form of technologies, codes, procedures, or similar routines.”³¹ This process relies on multiple factors. First, information might be unavailable or access to it might be denied. Militaries might not share relevant information because of operational security concerns, particularly in cases involving competitors or adversaries. Second, the information that is

²⁸ Cheng, 2020, and Liu Wei, ed., *Theater Joint Operations Command*, 1st ed., National Defense University Publishing House, 2016.

²⁹ Patricia Lang, “Team Assessing Bombing Targets,” U.S. Air Force, June 18, 2003; Kent Harris, “Teams Check Iraq Bomb Effectiveness,” *Stars and Stripes*, July 4, 2003.

³⁰ Davidson, 2010, p. 9. For an organizational learning perspective, see Levitt and March, 1988, p. 319.

³¹ Levitt and March, 1988, p. 329.

available might be incomplete, lacking detail, or based on secondhand observations. An observer trying to benefit from indirect experience must fill in the gaps, which might prove problematic based on the complexity of the subject matter. For example, it might be possible to use observed experience to deal with technical or tactical issues, while complex organizational problems could prove more difficult. Lastly, the indirect experience leaves significant room for interpretation. Depending on the motivation that drives change for a given military, another military's experience will often be interpreted through the lens of existing historical interpretations, beliefs, assumptions, and perceptions and framed in ways that conform to existing routines. For this reason, absent a compelling motivation for change and a clear vision of the intended outcome, change-resistant organizations such as militaries might resist or downplay the value of indirect experiences.

Another element of indirect experience includes activities involving the practical application of skills to a problem. For military organizations, this involves the use of wargames and simulations, training, and experimentation. Each of these practical elements is critical to building a military's experience and factors heavily in considerations regarding military readiness and effectiveness in both the United States and China.³² However, training design, quality, and realism are all factors that affect the suitability and quality of the gained experience. For this reason, the process through which direct and indirect experience shape these three categories of training (i.e., wargames and simulations, training, and experimentation) is of central importance.

Secondhand Observation

This category of indirect experience covers a variety of activities involving systematic study of contemporary military developments, internal lessons-learned processes, and the study of military history. Most major militaries have a variety of institutions dedicated to most of these issues, typically located in senior-level staffs (e.g., Soviet or Prussian General Staffs or the United States Joint Staff) or professional military education institutions with corresponding departments dedicated to the study of each. In the case of China, both the PLA's National Defense University (NDU) and the Academy of Military Science (AMS) have departments dedicated to the study of contemporary military affairs, military history, and campaign tactics and theory.³³ Each of these departments is responsible for providing insights and analysis through the publication of journals, such as *China Military Science*, as well as producing

³² State Council Information Office of the People's Republic of China, 2015; State Council Information Office of the People's Republic of China, 2019; Chairman of the Joint Chiefs of Staff, *Joint Training Policy for the Armed Forces of the United States*, January 13, 2020.

³³ Cao Zhi, "An Inaugural Ceremony for the Newly Reshuffled and Established Academy of Military Science, National Defense University, and National University of Defense Technology Under the People's Liberation Army; and a Symposium of Principal Leaders of Military Academies, Scientific Research Institutions, and Training Institutions Held in Beijing. Xi Jinping Confers Military Flags to the Academy of Military Science, the National Defense University, and the National University of Defense Technology and Delivers an Exhortation; Attends the Symposium and Delivers an Important Speech," Xinhua, July 19, 2017.

focused studies that are used for professional military education or are published as part of broader research programs directed by the PLA. PLA experts are also routinely involved in exercises and experiments to provide institutional knowledge to the units and commanders taking part.³⁴

For militaries lacking in recent operational experience, secondhand observation is a critical means for identifying trends, exploring concepts of operation that could not be done in a combat environment, and developing an understanding of an enemy without engaging that enemy on the field of battle. The keys to success in this element of organizational learning are twofold. The first is access to relevant, accurate information on the subject being studied. The second is the ability to effectively interpret the information in ways that allow critical elements of experience to be translated into practical use without losing their essential value through an interpretive lens.³⁵

Wargaming and Simulation

The wargaming held at the Naval War College prior to World War II is one of the most recognizable examples of developing experience through wargaming.³⁶ Since then, wargames and simulations have been an indispensable tool in training and a primary means for providing indirect experience. Both the United States and the PRC have placed renewed emphasis on wargaming as a tool. In the United States in 2015, Deputy Secretary of Defense Bob Work and Vice Chairman of the Joint Chiefs of Staff GEN Paul Selva called for a revitalization of wargaming.³⁷ One of its key benefits, according to Work and Selva, is that wargames allow participants to interact with a thinking adversary: “wartime is best duplicated when wargames are conducted in an iterative series of moves, wherein decisions and their outcomes in one move informs the starting condition for the next.”³⁸ This process allowed participants to adapt and innovate in response to a dynamic adversary.

³⁴ Chai Xiaofeng, Zhao Guan, and Xu Shaoyu, “Forge Ahead, Gyeonggi Iron Fist Shows Its Edge,” *PLA Daily*, July 8, 2022; Li Yiwei and Yao Chunming, “Turn the Great Trust of the Supreme Leader into Their Lofty Aspirations, Speed Up the Pace of Fulfilling the Missions,” *Kongjun Bao*, February 22, 2018; Liu Guojun and Tan Heyi, “Hone Crack Troops and Strong Forces in Complex Electromagnetic Environments,” *Jiefangjun Bao*, January 9, 2018.

³⁵ Thomas G. Mahnken, “Uncovering Foreign Military Innovation,” *Journal of Strategic Studies*, Vol. 22, No. 4, December 1999.

³⁶ Edward S. Miller, *War Plan Orange: The U.S. Strategy to Defeat Japan, 1897–1945*, Naval Institute Press, 1991; John Matthew Lillard, “Playing War: Wargaming and US Navy Preparations for WWII,” dissertation, George Mason University, August 2013; James A. Miller, “Gaming the Interwar: How Naval War College Wargames Tilted the Playing Field for the U.S. Navy During World War II,” thesis, Army Command and General Staff College, December 13, 2013.

³⁷ Bob Work and Paul Selva, “Revitalizing Wargaming Is Necessary to Be Prepared for Future Wars,” *War on the Rocks*, December 8, 2015.

³⁸ Work and Selva, 2015.

The PLA has also placed a great deal of emphasis on wargames and simulations, seeing them as a cost-effective alternative to live combat that puts participants in unexpected situations. Some of the biggest advantages PLA leaders see in wargaming is their ability to assist in the development of strategic decisionmaking, the exploration of operational concepts, and exposure to the types of strategic and operational problems that participants will likely face in a real wartime situation.³⁹ Notably, PLA ideas about wargaming reflect many of those held by their U.S. military counterparts. In January 2015, the PRC Central Military Commission (CMC) and General Staff Department directed the implementation of the *Interim Provision of the Chinese PLA on Joint Campaign Training*, the “mother law” that was designed to standardize joint training across the PLA.⁴⁰ A key component of the provision was to “make full use of wargaming systems and other new-type training organizing means” as part of the PLA’s broader effort to make training more realistic and reflective of actual combat.⁴¹

A central thrust of efforts to improve wargaming and simulation in both countries is to promote innovative methods for training that will make use of advanced technologies, such as artificial intelligence and advanced simulation technology. Both countries have invested considerable resources in these technologies with the objective of providing realistic, cost-effective training. For the PLA, this effort is also designed to incorporate greater volumes of secondhand information into PLA wargaming and simulations, so as to maintain a scientific approach to both training and the development of new doctrine and concepts of operation.⁴²

Training and Exercises

The chapters that follow provide significantly more detail on U.S. military and PLA training. In terms of training and exercises as a means of gaining indirect experience, both the U.S. military and the PLA recognize the importance of realism and the need for training to be as challenging and close to actual combat as possible. Key elements in the U.S. revolution in military training were to incorporate the lessons of combat experience, provide operators with a better understanding of the combat environment before entering combat the first time, and improve survival rates in combat.⁴³ PLA leadership has also made attempts to improve

³⁹ Li Wei and Liang Xiaoping, “Make Calculations Before Battles, the More Calculations, the More Victories—Strategic Wargaming Calls for ‘Intelligence+,’” *Jiefangjun Bao*, May 18, 2021.

⁴⁰ “To Standardize the Army’s Joint Campaign Training,” *Jiefangjun Bao*, January 27, 2015.

⁴¹ “To Standardize the Army’s Joint Campaign Training,” 2015.

⁴² Liu Jianwei, “Leaders of the Strategic Campaign Training Bureau of the Joint Staff Headquarters of the Military Commission Answered Reporters’ Questions on the Release of the ‘Chinese People’s Liberation Army Joint Operations Outline (Trial),”” *PLA Daily*, November 26, 2020.

⁴³ Davidson, 2010, p. 100.

combat realism in its training in recent years, making it a key element in the effort to improve the “capacity to fight and win.”⁴⁴

Experimentation

The final category of indirect experience is experimentation. Historically, one of the key drivers of innovation has been the use of experimentation as a means of developing new doctrine, operational concepts, and military formations. Examples discussed in Chapter 2 highlight this process in Germany and Great Britain during the interwar period. Both countries had experimentation programs that explored uses of new technologies in combat that proved pivotal to their wartime application. Experimentation has led to “the establishment of new military formations and the promulgation of doctrine to govern their employment.”⁴⁵ The effects can be transformative, leading to novel warfighting concepts and significant changes to military organizations by creating new organizations, commands, branches of service, and career pathways.

Both the U.S. military and the PLA place significant emphasis on experimentation in the development of new operational concepts. The PLA defines *experimentation* as a method “to study operational issues by using combat simulation tools in a controllable, measurable, approximately realistic, simulated confrontation environment.”⁴⁶ The most significant attributes of the experimentation process, according to the PLA, are its scientific quality, which “aims at continuous approximation of the actual combat situation,” and its ability to support a wide variety of training and development, as well as analyze the risk and cost of operations, the processes associated with combined or joint tactics, and command efficiency, among others.⁴⁷ More importantly, the PLA views progress in the realm of experimentation as a practice carried out by modern militaries and a core step in building an informatized military. Accordingly, the PLA has invested in an experimentation infrastructure that involves specialized training centers and “service arms combat experiment centers” capable of simulating multiple combat scenarios.⁴⁸

The U.S. military also commits significant resources to its experimentation programs through the creation of initiatives such as the Rapid Defense Experimentation Reserve, which is designed to support a wide variety of Joint Warfighting Concept (JWC) experiments in the areas of C2, information advantage, contested logistics, and advanced fires.⁴⁹ In

⁴⁴ “Xi Jinping Signs Central Military Commission Order No. 1 of 2021 to Give Mobilization Order for Training to All Armed Forces,” Xinhua, January 4, 2021.

⁴⁵ Mahnken, 1999, p. 33.

⁴⁶ Jiang Yamin, “On Warfighting Experimentation,” *Zhongguo Junshi Kexue [China Military Science]*, No. 4, 2014, pp. 115–121.

⁴⁷ Jiang, 2014, pp. 115–121.

⁴⁸ Liu Jianwei, 2020.

⁴⁹ Courtney Albion, “Pentagon Wants at Least \$377 Million over Five Years for New Rapid Experimentation Fund,” *Defense News*, April 26, 2022b.

addition, each of the services has individual experimentation efforts designed to explore the new technologies and operational concepts that are necessary for high-end conflict.⁵⁰ These experiments focus on new organizational structures, technologies, and scenarios and environments that the United States is most likely to face against its technologically advanced adversaries.

Conclusion: Operationalizing Experience

Experience is a critical element in the organizational learning process, but it is not a straightforward endeavor. An organization's history, culture, and established routines all play a role in how an organization understands and interprets experience. The complex process of operationalizing experience involves several organizations that gather, interpret, and mobilize information in the form of routines, and disseminate and popularize their findings. PLA organizations, such as the NDU and AMS, command academies and other professional military education institutions, technical institutions, high-level military staffs, and party and military-affiliated press all play roles in the organizational learning process through a formalized system that is heavily focused on building the PLA's knowledge and experience through indirect sources. In general terms, the PLA continues to develop its experience in areas such as systems warfare, integrated joint operations (IJO), and informatized warfare through a process that heavily depends on translating the experiences of other militaries into practical activities, including wargames, simulations, experiments, and exercises. As the cinematic example of *Target Locked* illustrates, overcoming deeply ingrained routines (e.g., norms, behaviors, historical attachments, culture) makes change difficult without a meaningful catalyst.

Since the early 1990s, the U.S. military has had significantly more access to direct experience, although a significant portion of that direct experience came via warfare in environments considerably different from those the U.S. military would face in a future conflict with the PLA. For that reason, elements of recent U.S. experience that would translate are being incorporated into current training (e.g., urban combat), while experimentation and development of new operational concepts, capabilities, and organizational structures are focused on addressing the operational necessities of war against a high-end adversary. The U.S. military also has a much longer history of translating recent experience into its training. One of the central ideas behind the development of service training centers and their joint and combined sister organizations is the need to incorporate recent direct experience into the training process, thereby enhancing the realism and practical value the training provides. This incorporation of direct experience is largely accomplished by implementing service and joint

⁵⁰ Jay Koester, "JADC2 'Experiment 2' Provides Looking Glass into Future Experimentation," U.S. Army, April 23, 2020; Philip Athey, "New in 2021: The Corps Gets a New Unit—the Marine Littoral Regiment," *Marine Corps Times*, January 19, 2021; Saunders and Heflin, 2021; Jen Judson, "At Next Project Convergence, 7 Scenarios Will Test American Tech Against Adversaries," *Defense News*, September 7, 2021.

lessons-learned processes to gather data and inputs from units involved in combat and using that information to inform new training approaches or refine existing ones. Access to direct experience does not automatically change mindsets developed during recent conflicts or suggest better outcomes. Like in other organizations, including the PLA, changing routines is a complex process. As noted throughout this chapter, the process is complicated further by the inherent resistance to change within military organizations.

In the chapters that follow, we examine recent efforts by the U.S. military and PLA to operationalize the experience they have gained since the early 2000s. We also address the successes and continued challenges that both militaries have encountered, largely through the context of the processes outlined in our logic model and the categories of experience and their influence on organizational learning examined in this chapter. These two factors—organizational processes and learning—provide a basis for understanding the extent to which the PLA can benefit from indirect experience and assimilate it into operational models and training, as well as the extent of U.S. military ability to reorient training to address the complex, high-tech environment of a great power conflict.

U.S. Experience and Training

The terrorist attacks of September 11, 2001, changed the strategic environment for which U.S. military forces had planned and trained. The post–Vietnam War focus on reorienting U.S. forces to near-peer competition and the major conflict against the Soviet Union in Europe gave way to a new operating environment based on a fight against irregular forces conducting insurgent operations. Operation Enduring Freedom and Operation Iraqi Freedom became land-based and focused more heavily on urban warfare, requiring the U.S. military to adapt its doctrine to a new environment.

As these two operations evolved over several years and refinements to warfighting concepts and doctrine proliferated throughout the U.S. military, the strategic environment changed again. The rise of Chinese military capabilities and the desire to expand Chinese influence in the western Pacific and beyond, along with a resurgent Russia that launched military campaigns in Georgia and Ukraine and employed offensive cyber capabilities to intimidate neighboring countries have forced the U.S. military to reexamine its warfighting concepts and doctrines and how its forces are trained.

The 2018 National Defense Strategy (NDS) emphasized the reemergence of long-term, strategic competition, with Russian and China being the chief challengers to global U.S. security interests through a desire to shape the world according to their authoritarian model in order to gain “veto authority over other nations’ economic, diplomatic, and security decisions.”¹ One of the central doctrines of future potential adversaries, especially China, is the concept of anti-access/area denial (A2/AD). This concept rests on the ability to field military forces that can deny the U.S. military the ability to rapidly flow forces into a region during a crisis.

The objective of A2/AD systems is to create “‘impenetrable red bubbles’ that prevent physical movement” of opposing troops.² A2/AD systems leverage time by forcing opposing forces to fight their way into a contested region, increasing the chance that China can achieve a quick victory, and of making U.S. counterattacks too costly to execute.³ To counter these capabilities, the U.S. military has sought to adapt its warfighting capabilities to function in

¹ Department of Defense, *Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military’s Competitive Edge*, 2018, p. 2.

² Charles McEnany, “Multi-Domain Task Forces: A Glimpse at the Army of 2035,” Association of the United States Army, March 2, 2022.

³ McEnany, 2022.

multiple domains and with distributed forces over a larger area, breaking away from the concept of massing forces together for more-effective fire effects.

The resurgence of near-peer competition and the military and technological advancements made by U.S. competitors have necessitated operating in evolving domains, such as cyber and space, and the need to link forces in ways that provide commanders with a complete operating picture. The rise of technologies such as artificial intelligence (AI) and machine learning (ML) offer the promise of achieving rapid information processing and decisionmaking, allowing forces to fight dispersed operations and complicating an adversary's operating environment.

The changes envisioned in new warfighting concepts and doctrines require adapting training to fully realize the potential of new technologies and concepts. The U.S. military has begun the process of incorporating new concepts and doctrine into training exercises; the services are conducting a series of exercises to test new concepts, provide a realistic training environment that leverages experiences gained in previous operations, and take advantage of the available, robust training infrastructure.

The U.S. military also trains extensively to fight alongside allies and partners. Most U.S. military operations in recent history, including Operation Desert Storm, the Balkans campaigns, and Operations Enduring Freedom and Iraqi Freedom, have involved operation inside allied coalitions and required allied forces to maintain a level of interoperability to successfully conduct operations. Thus, the experience gained in coalition operations has led U.S. training exercises to focus heavily on including allies and partners, refining interoperability processes, and showing the resilience of alliances and partnerships. Training programs now include large, multinational exercises and foreign military personnel, and units participate in training conducted at the service-level training centers.

The end of World War II increased U.S. defense commitments around the world. These commitments required the U.S. military to create and maintain a global force posture to respond to global crises. This network of bases and communications and logistics resources allowed the U.S. military to deploy substantial forces to respond to threats to U.S. and allied interests, even where no previous partnerships existed. As with training to improve and maintain coalition forces and interoperability, the global force posture has gained experience over decades of operations. Training with allies continues to refine the quick deployment of forces to remote or nonconventional areas to execute expeditionary operations.

In this chapter, we discuss the new warfighting concepts and doctrines being introduced in the U.S. military's operating environment and identify where training is being used, adapted, and experimented with to refine those concepts and doctrines within the new operating environment. This discussion includes training exercises conducted globally and advancements made at service training centers to address the role experience plays in the new environment. We also discuss traditional training conducted with allies and partners and how the global force posture's ability to move quickly in response to crises is maintained through exercises.

Preparing for Great Power Conflict

Overview of Warfighting Concepts

The reemergence of near-peer competition has forced the U.S. military to adapt its warfighting doctrine and concepts to the changing environment. The associated advancements in long-range, precision fires, information technology, air defense systems, and cyber capabilities have led to an intense debate within the U.S. military about future operating environments and the capabilities needed to successfully execute combat operations in those new environments. Thus, military planners have moved toward concepts that stress multidomain operations (MDO) or all-domain operations (ADO) and distributed forces that are able to operate independently while linked through robust networks that process information more quickly and provide an accurate and common operating picture.

The refocusing of U.S. military doctrine and concepts has occurred in both the joint environment and at the service level. The recognition of the need to fight jointly in the potential new environment, a staple of U.S. military planning since before this refocusing, has led to the belief that all campaign assets must be brought to bear in a coordinated manner in all domains. To effectively move toward MDO or ADO that force an adversary to consider and plan for attacks that could come from anywhere at any time, the U.S. military must create a common operating picture in which all assets in all domains are at a commander's disposal and the information needed to make quick, effective decisions is provided by joint networks using advanced information technology.

Likewise, advancements in precision, long-range strike capabilities and the ISR and information networks that support them have rendered major U.S. military assets, such as carrier strike groups (CSGs) and large air bases, vulnerable to attack. Therefore, a second core innovation is the conceptual move to dispersed or distributed operations in which smaller units operate over larger areas, such as combat aircraft moving to smaller bases or improvised fields and naval units operating in smaller groups. Distributed operations are designed to make enemy targeting more difficult by increasing the number of targets and possible attack vectors while decreasing large, vulnerable formations. Like MDO or ADO, distributed operations rely on robust information and C2 networks to link the smaller formations yet be able to mass fires for desired effects. The following section provides an overview of the new joint and service warfighting concepts and identifies exercises and training programs that are designed to test the new concepts in realistic scenarios and identify the personnel, skills, weapons, and networks required to successfully implement those concepts.

Joint Warfighting Concepts

Current JWCs focus on ADO in which a potential adversary can engage across multiple domains and U.S. information superiority is not assured, a key ingredient in recent military operations. The central idea is that joint forces should focus on achieving deterrence by denial or fielding new systems that operate better and faster than adversary systems while ensuring

survivability.⁴ AI could be used to achieve this goal by creating “human-machine collaborative battle networks waging algorithmic operations” to secure U.S. information assets and move faster than the systems of an adversary.⁵ The key aspect of the new JWC is the idea of “expanded maneuver,” which involves “understanding how adversaries can operate in all domains and how to stop them while protecting DOD and coalition forces.”⁶

Expanded maneuver encompasses four functional areas or supporting concepts: joint fires, contested logistics, joint all-domain command and control (JADC2), and information superiority. Joint fires, as a concept, involves bringing fires to bear in all domains and from each service. Contested logistics systems ensure that U.S. forces can deploy to a crisis quickly and effectively. JADC2 provides C2 systems that link all assets and provide a commander with a complete picture of the battlespace. Lastly, information superiority enables interoperability across the joint force by seamlessly connecting people and systems.⁷

Joint fires is the concept of bringing fires on the enemy from every domain and every direction, complicating an enemy’s ability to defend itself.⁸ This includes fires in traditional domains combined with offensive cyber capabilities to identify, target, and destroy enemy forces without the need for massed formations. Dispersed or distributed forces offer the ability to attack from different directions simultaneously.

Contested logistics, known as the Joint Concept for Contested Logistics (JCCL), assumes that logistics assets will be contested and targeted globally, denying the ability to use logistical resources, even within the United States. To counter the threat, JCCL seeks to address three lines of effort: making logistical C2 more resilient and integrated, assuring joint power-projection capabilities, and ensuring that sustainment is available for distributed operations.⁹ To accomplish this, JCCL relies on globally deployable assets and capabilities, forward presences, and the cooperation of allies and partners to ensure that supplies flow from the domestic United States and to retain the strategic capability to employ forces wherever necessary in a crisis.¹⁰

The concept of information advantage recognizes that the U.S. military has relied heavily on having information superiority—the flow of information between U.S. forces uninhibited by enemy actions. The recognition by near-peer competitors that the U.S. military

⁴ Robert O. Work, “A Joint Warfighting Concept for Systems Warfare,” *Center for a New American Security*, December 17, 2020.

⁵ Work, 2020.

⁶ David Vergun, “DOD Focuses on Aspirational Challenges in Future Warfighting,” U.S. Department of Defense, July 26, 2021.

⁷ Vergun, 2021.

⁸ Vergun, 2021.

⁹ Frank Wolfe, “Joint Warfighting Concept Assumes ‘Contested Logistics,’” *Defense Daily*, October 6, 2020.

¹⁰ Duane A. Gamble, “Anticipating Joint Force Requirements,” U.S. Army, May 24, 2021.

relies on the free flow of information creates vulnerabilities if information systems can be attacked and disabled, depriving U.S. forces of battlespace awareness. Information advantage “involves connecting systems and people seamlessly with each other and enabling interoperability across the joint force and with allies and partners.”¹¹ The ability to accomplish this task would allow U.S. forces to make timely decisions and stay one step ahead of an enemy’s ability to react and counter U.S. moves.

Service Warfighting Concepts

Agile Combat Employment

The USAF response to the concept of distributed operations has become known as agile combat employment (ACE). The concept is described in Air Force directives as “a proactive and reactive operational scheme of maneuver executed within threat timelines to increase survivability while generating combat power throughout the integrated deterrence continuum.”¹² The core of the concept is developing the ability to operate in a dispersed manner away from major operating bases (MOBs) that are vulnerable to long-range precision strikes from a near-peer adversary.

Advancements by near-peer adversaries, specifically Russia and China, have included deploying advanced capabilities in reconnaissance and strike assets that threaten MOBs and the ability of the Air Force to generate sorties in support of combat operations.¹³ Air bases are no longer sanctuaries from which to conduct sustained operations. Thus, ACE relies on multi-capable airmen and tailored force packages with the ability to execute operations across a variety of operating locations and that are dispersed to allied bases or improvised fields to complicate an adversary’s targeting processes while maintaining sufficient mass to concentrate fires.¹⁴

The renewed expeditionary capabilities are designed to ensure survivability, and ACE relies on an operational framework with the following five key elements:

- *Posture* refers to the starting position of forces or the ability to redistribute “both theater-assigned and follow-on forces to positions of advantage to best support operations plan execution.”¹⁵
- *C2* refers to the flexibility and responsiveness needed to orchestrate changes in real time and overcome the challenges associated with time, geography, and communications inherent to dispersed operations.

¹¹ Vergun, 2021.

¹² Air Force Doctrine Note 1-21, “Agile Combat Employment,” U.S. Air Force, 2021, p. 1.

¹³ “CSAF Signs Agile Combat Employment Doctrine Note,” press release, Air University Public Affairs, January 1, 2022.

¹⁴ Air Force Doctrine Note 1-21, 2021.

¹⁵ Air Force Doctrine Note 1-21, 2021, p. 5.

- *Movement and maneuver* allows the expansion of the operational footprint that complicates enemy targeting.
- *Protection* is the need for an integrated defense, whether of the MOB or using allied assets to defend a dispersal site.
- *Sustainment* recognizes the difficulty of resupplying a network of forward bases. Sustainment plans are meant to consider operations across a wide area and tailor plans to match.¹⁶

Another key element of ACE is multi-capable airmen. To assist in dispersing forces, airmen are to be trained in multiple functions and skills necessary to operate in an expeditionary manner.¹⁷ These skills, in areas such as mission generation, C2, and base-operating support, enable airmen to function in a contested and degraded environment.

Distributed Maritime Operations

Distributed Maritime Operations (DMO) is an emerging concept for the employment of U.S. Navy forces that moves focus away from large battle groups and toward smaller, more-dispersed forces that complicate an enemy's operational environment. The growth of Chinese and Russian A2/AD capabilities has placed large-carrier battle groups at greater risk. The basic concept behind DMO is the ability to geographically distribute naval forces to provide more targets while maintaining integration and synchronizing operations across all domains.¹⁸ DMO is based on three principles; hard to find, hard to kill, and lethal.¹⁹

The goal of A2/AD is to deny U.S. power-projection capabilities and give an adversary freedom of movement and time to accomplish military objectives before the U.S. military can intervene. DMO attempts to use small, dispersed land and sea units to threaten an enemy's, specifically China's, forces and lines of communication under the A2/AD umbrella.²⁰ These distributed naval forces would be linked through fleet and joint-based C2 networks (such as JADC2) and exchange mass for speed and mobility, making them hard to find and hard to kill while maintaining a level of lethality that threatens enemy forces.²¹

Smaller, more distributed forces, such as the Lightning Carrier concept (explored in subsequent sections) would present the ability to move in and out of the operational area, launch-

¹⁶ Air Force Doctrine Note 1-21, 2021.

¹⁷ Valerie Insinna, "Denied Hot Meals and Indoor Toilets, U.S. Airmen Prepare for the Fog of War," *Defense News*, August 28, 2019.

¹⁸ Edward Lundquist, "DMO Is Navy's Operational Approach to Winning the High-End Fight at Sea," *Seapower*, February 2, 2021.

¹⁹ Richard Mosier, "Distributed Maritime Operations—Becoming Hard-to-Find," Center for International Maritime Security, May 12, 2022.

²⁰ Benjamin Jensen, "Distributed Maritime Operations: Back to the Future?" *War on the Rocks*, April 9, 2015.

²¹ Jensen, 2015.

ing strikes at key enemy nodes while retaining the mobility to evade enemy strikes. This ability will rely on the new Naval Operational Architecture, which will form connections between assets through sensors, platforms, and weapon systems by creating new infrastructure with increased computing speed, data storage, and networks; it will also create a common picture to maximize the forces available.²²

Expeditionary Advanced Base Operations

Much like the Navy's DMO concept, the U.S. Marine Corps is developing the Expeditionary Advanced Base Operations (EABO) concept. EABO relies on dispersed Marine forces operating inside an adversary's A2/AD umbrella. The developmental concept envisages supporting a host of naval missions including sea control, sea denial within the littorals, maritime domain awareness, forward C2 and ISR capabilities, and forward sustainment.²³

EABO "involves the employment of mobile, low-signature, operationally relevant, and relatively easy to maintain and sustain naval expeditionary forces from a series of austere, temporary locations ashore or inshore within a contested or potentially contested maritime area to conduct sea denial, support sea control or enable fleet sustainment."²⁴ The concept is based on four key mission elements: mobility, persistence, low signature, and integration with other naval forces. *Mobility* refers to the ability to organically move from place to place, which in turn facilitates persistence by allowing the force to remain in the operational area, although not necessarily in one place. Low signature relies on managing signatures to make it difficult for an enemy to locate and target the force. Marine units would then execute their missions as part of an integrated naval force.²⁵

EABO envisages moving small Marine formations to strategic locations to conduct a variety of missions, including surveillance, antiship and antisubmarine warfare, and air and missile defense, all while inside the enemy's weapons engagement zone. Once the mission has been executed, marines could move to different locations, setting up and executing the next mission.²⁶ Like ACE and DMO, EABO would rely on networks to provide accurate, real-time information to the expeditionary unit to make decisions even at the lowest level.²⁷

Joint All-Domain Command and Control

A key element to implementing the proposed warfighting concepts in the joint realm or at the service level, and one worth examining more closely, is the development of the JADC2

²² Lundquist, 2021.

²³ U.S. Marine Corps, *Tentative Manual for Expeditionary Advanced Base Operations*, February 2021.

²⁴ Mikayla Easley, "Marine Corps Training Evolving for EABO Operations," *National Defense*, December 2, 2021.

²⁵ U.S. Marine Corps, 2021.

²⁶ Megan Eckstein, "Marines Begin Experimentation to Refine Manual for Expeditionary Advanced Base Operations," *United States Naval Institute News*, April 15, 2021.

²⁷ Easley, 2021, p. 1.

concept. The recognition that the services must adapt to fight in all domains at once necessitates a C2 system that provides the entire operating picture simultaneously to the joint commander. JADC2 is meant to give the U.S. military an advantage over near-peers, such as China and Russia, by connecting disparate systems and seamlessly passing data to improve reaction times and make decisions faster.

JADC2 is meant to provide a coherent approach to shaping future joint C2 capabilities.²⁸ Through this approach, the U.S. military seeks to “sense, make sense and act at all levels and phases of war” in a joint and combined forces environment. The Joint Force Commander is positioned to be the primary beneficiary of this holistic approach through C2 that overlays existing, domain-specific networks. JADC2 is meant to be a collaborative effort between stakeholders who support the unified approach with developmental resources and produce an improved, cross-domain, joint capability.²⁹

JADC2 will incorporate AI and ML advancements to accelerate the commander’s decisionmaking cycle.³⁰ A commander might need to link information across hundreds of combat vehicles, aircraft, ships, and other assets to develop a picture of the battlespace.³¹ To accomplish this, AI and ML advancements have the potential to extract, consolidate, and process massive amounts of data directly from sensors, allowing new C2 systems to take advantage of this capability.³² To bring this capability to fruition, extensive testing and experimentation is being instituted to support development across services and domains. The exercises are meant to be iterative, meaning each subsequent test will build on and add to the previous test, incorporate all the services in multiple domains, and include AI and ML technologies. Each service has its own project to develop, test, and field the required capabilities.

The goal of JADC2 is to link disparate systems in a joint operating environment, allowing information to flow from all-domain sensors to create a common operating picture, complicate an adversary’s operational processes, and create decision advantages. Each service has contributed significant resources to addressing the JADC2 concept in their specific operating environments. These include the Navy’s Project Overmatch, the Army’s Project Convergence, and the Air Force’s Advanced Battle Management System (ABMS).

Project Overmatch is the U.S. Navy’s contribution to the JADC2 architecture.³³ Spearheaded by the Naval Information Warfare Systems Command, Project Overmatch experiments with linking networking systems together to “impose risk over a wider expanse” for a

²⁸ Colin Demarest and Courtney Albon, “Pentagon’s JADC2 Strategy Focuses on ‘Approach,’” *C4ISRNET*, March 18, 2022.

²⁹ Demarest and Albon, 2022.

³⁰ Demarest and Albon, 2022.

³¹ Colin Clark, “SecDef OKs JADC2 Strategy—Now OSD Has ‘Teeth,’” *Breaking Defense*, June 4, 2021b.

³² Demarest and Albon, 2022.

³³ Megan Eckstein, “Navy Remains Mum on Project Overmatch Details, so China Won’t Steal Them,” *Defense News*, February 25, 2022.

potential adversary.³⁴ The initiative aims to create a “robust Naval Operational Architecture” that links platforms, sensors, and shooters so C2 elements can obtain information from a variety of sensors and choose the best shooter for the mission.³⁵

The seamless network outlined by Overmatch includes both manned and unmanned platforms and is intended to employ AI to address warfighting gaps. The Navy recently selected the winner of its Artificial Intelligence and Networks Advanced Naval Technology Exercise Prize Challenges, which were designed to leverage the latest in AI technology and explore new technologies to advance maritime tactical networks.³⁶ The first operational tests of a scaled-down version of the Naval Operational Architecture envisaged in Overmatch occurred when the USS *Carl Vinson* CSG deployed the Battle Management Aid 2020 during its 2020–2021 cruise. This Battle Management Aid was designed to produce a common site picture for E2-D Hawkeye aircraft and the carrier’s combat information center.³⁷ Additional testing on more-advanced iterations of the new networks is scheduled for incorporation into the USS *Theodore Roosevelt*’s CSG in 2023.³⁸

Project Convergence is the U.S. Army’s contribution to JADC2. Like Project Overmatch, the Project Convergence initiative seeks to connect manned and unmanned platforms through networks that pass information to weapon systems, using AI to select the most appropriate shooter among the assets available regardless of service.³⁹ Conducted by the Army Futures Command, Project Convergence is an experimental enterprise based around five core elements: soldiers, weapon systems, C2, information, and terrain. The series of experiments is designed to test different formations and capabilities; look for ways to incorporate new technologies, such as AI, ML, and robotics; and create common data standards and architectures to make decisions across domains.⁴⁰

Lastly, the ABMS is the USAF’s input into JADC2. ABMS “aims to enable real-time data processing and transmission at the point of collection” and quickly and efficiently organize,

³⁴ Richard R. Burgess, “NAVWAR Commander: Overmatch Is ‘Imposing Risk Over a Wider Expanse,” *Seapower*, May 7, 2021.

³⁵ Naval Information Warfare Systems Command, “NAVWAR Announces Project Overmatch Prize Challenge Winners,” press release, November 19, 2021.

³⁶ Naval Information Warfare Systems Command, 2021.

³⁷ Mallory Shelbourne, “Navy Testing Battle Management Aid on Aircraft Carrier,” *United States Naval Institute News*, November 26, 2020.

³⁸ Megan Eckstein and Mallory Shelbourne, “Navy to Field Early ‘Project Overmatch’ Battle Network on Theodore Roosevelt CSG in 2023,” *United States Naval Institute News*, February 10, 2021.

³⁹ Stew Magnuson, “Army’s Project Convergence Continues on 10-Year Learning Curve,” *Defense News*, December 17, 2021.

⁴⁰ Andrew Feickert, *The Army’s Project Convergence*, Congressional Research Service, IF11654, September 27, 2021a.

analyze, and transmit data to shorten the sensor-to-shooter cycle.⁴¹ ABMS would use cloud environments and new communication technologies to share data seamlessly and employ AI to shorten decisionmaking time frames and disaggregate platforms.⁴² Originally conceived as a replacement program for the E-3 Sentry C2 aircraft, ABMS took on the task of identifying or creating new digital technologies that could be shared across multiple platforms in a cloud-based environment.⁴³ Each service implementing these three programs has invested in testing their concepts in the field, allowing for the development of new operational concepts as these systems undergo experimentation and refinement.

JWC Wargames, Exercises, and Future Experimentation

The current JWC was informed by a series of wargames that tested U.S. military assumptions about future conflicts with near-peer competitors. Previously, the U.S. military enjoyed total control across all domains, most importantly in information technology. The U.S. military has come to rely on this advantage, and competitors have progressed in designing systems to degrade and deny this capability to offset American military superiority.⁴⁴ The wargames revealed gaps in U.S. capabilities that an aggressive adversary could exploit.⁴⁵

During the games, U.S. forces concentrated together to aggregate fire and provide reinforcement. However, in an environment in which an adversary has information systems that can find and fix U.S. forces, those forces can be subjected to fires in all domains. Additionally, U.S. forces have enjoyed information domination, but lost their ability for networked communications at the beginning of the game and struggled to adapt.⁴⁶

The results of this series of wargames provided an impetus to reexamine warfighting concepts and focus on all-domain operations. This shift in focus is an example of the U.S. military learning from the wargame experience and revising doctrine to respond to gaps. These revisions then filter down to the key components necessary to implement the concept.

As a central element of the new warfighting concepts, JADC2 has been incorporated in several exercises. The Scarlet Dragon series of exercises, conducted in 2021, tested JADC2 and brought together elements of each service and imagery from the National Geospatial-

⁴¹ Kris Osborn, "The Advanced Battle Management System Turns Data into a Weapon," *National Interest*, March 9, 2022.

⁴² John R. Hoehn, *Advanced Battle Management System (ABMS)*, Congressional Research Service, IF11866, February 15, 2022.

⁴³ Hoehn, 2022.

⁴⁴ Chris Dougherty, "Confronting Chaos: A New Concept for Information Advantage," *War on the Rocks*, September 9, 2021.

⁴⁵ Tara Copp, "'It Failed Miserably': After Wargaming Loss, Joint Chiefs Are Overhauling How the U.S. Military Will Fight," *Defense One*, July 26, 2021.

⁴⁶ Brett Tingley, "Joint Chiefs Seek a New Warfighting Paradigm After Devastating Losses in Classified Wargames," *The Warzone*, blog, July 27, 2021.

Intelligence Agency. The test focused on AI-enabled fires, multidomain tasks and interoperability, and providing National Geospatial-Intelligence Agency satellite data to AI-assisted assets for target identification and selection. One test used drone images; air assets from the Marine Corps, Navy, and Air Forces; and Army high-mobility artillery rocket system (HIMARS) to identify targets in a 7,200-square-kilometer area and engage those targets with air-to-surface munitions.⁴⁷

JADC2 tests are also taking place at the combatant command level. U.S. Northern Command has developed an exercise known as the Global Information Dominance Exercise-2. This exercise tests three “decision aids” that incorporate AI technology to enable “all-domain situational awareness, information dominance and real-time cross-Combatant Command collaboration.”⁴⁸ The first event was a tabletop exercise that included coordination with multiple geographic and functional combatant commands to feed multidomain intelligence assets into an AI algorithm, which generated possible enemy courses of action and friendly response options.⁴⁹

The Army has incorporated JADC2 elements into its Project Convergence series of events that test sensor-to-shooter scenarios. The entire series of events focuses on simulating phases of MDO and interoperability to perform long-range joint fires.⁵⁰ One recent event tested the data-fusing capabilities central to the JADC2 concept by incorporating data from an Air Force F-35 into the Army’s Integrated Air and Missile Defense Battle Command System to identify and track a ground target and provide targeting information to Army field artillery data systems.⁵¹

In addition to exercises linking units and assets in different locations, the U.S. military has conducted exercises to enhance its expeditionary capabilities to meet the requirements of distributed operations. These exercises have included both large-scale Naval and Marine exercises incorporating aspects of DMO and Air Force exercises deploying units and personnel to austere bases.

Large Scale Exercise 21 was a two-week exercise conducted in summer 2021 that tested both Navy DMO and Marine Corps EABO concepts to integrate operations across Atlantic- and Pacific-based fleets.⁵² Large Scale Exercise 21 was conducted across 17 time zones and included three combatant commands, more than a dozen command staffs, 25 warships, and

⁴⁷ Todd South, “Army’s ‘Scarlet Dragon’ Uses AI with Navy, Air Force and Marine Assets to Rapidly Find, ID and Destroy Targets,” *Army Times*, October 7, 2021b.

⁴⁸ Theresa Hitchens, “Exclusive: NORTHCOM Developing, Testing AI Tools to Implement JADC2,” *Breaking Defense*, March 5, 2021.

⁴⁹ Hitchens, 2021.

⁵⁰ Andrew Eversden, “Army’s IBCS Passed F-35 Sensor Data to Artillery System at Project Convergence 21,” *Breaking Defense*, January 20, 2022.

⁵¹ Eversden, 2022.

⁵² Steven Stashwick, “US Navy, Marines Conclude Giant Two-Ocean Exercise,” *The Diplomat*, August 17, 2021.

25,000 Navy and Marine Corps personnel.⁵³ The exercise focused on C2 linkages and simulated combat environments, and personnel took advantage of the Navy Continuous Training Environment, which allows personnel and ships at different locations to participate in simulated wargames.⁵⁴

A main element of the exercise consisted of both East- and West-Coast fleets surging their headquarters elements to forward locations in response to a simultaneous global crisis.⁵⁵ The exercise also included Marine Corps units staging a landing, via landing craft and airborne insertions, at a remote Hawaiian beach, setting up an advanced expeditionary base, and successfully employing antiship cruise missiles in a live-fire exercise. This successful exercise demonstrated the core EABO concept of being able to control or deny sea lanes with small, mobile units placed at strategic locations.⁵⁶

The Air Force has begun placing more emphasis on expeditionary operations in training to support ACE. During Operation Rapid Forge, a 2019 exercise, USAF aircraft and personnel deployed from their main European and U.S. bases to forward air bases located in Poland and the Baltic nations. The units trained in refueling and rearming operations in a forward environment, and airmen gained experience operating in an austere environment under strict time constraints.⁵⁷

In addition to training in forward locations, the airman participated in cross-function training to evaluate the multi-function airman component of ACE. These activities included cross-training in refueling and rearming aircraft and performing maintenance functions. Specifically chosen maintenance trainers were available at each location to train personnel in F-35A maintenance with the goal of reducing the crew size for F-35A servicing from seven to nine personnel to two airmen in forward locations.⁵⁸

The Air Force continued ACE exercises with Operation Castle Forge, a multinational exercise examining partnerships and collective defense in the Black Sea region in 2021.⁵⁹ U.S. domestic-based aircraft deployed to Greek airfields and then practiced rapid redeployments to Bulgarian airfields, conducting combat training maneuvers with host nation aircraft and

⁵³ Sam LaGrone, "Large Scale Exercise 2021 Tests How Navy, Marines Could Fight a Future Global Battle," *United States Naval Institute News*, August 9, 2021.

⁵⁴ LaGrone, 2021.

⁵⁵ Stashwick, 2021.

⁵⁶ Stashwick, 2021.

⁵⁷ Insinna, 2019.

⁵⁸ Kyle Cope, "Operation Rapid Forge Concludes," U.S. Air Force, July 28, 2019.

⁵⁹ Amy Hudson, "USAFE Conducts Agile Combat Employment Capstone Exercise," *Air & Space Forces Magazine*, October 6, 2021.

air defense forces.⁶⁰ The exercise was designed to showcase the development of the ACE concepts of rapidly deploying forces to forward, dispersed locations.

DoD and the armed forces see the need to continue investing in training for these evolving concepts. In April 2022, DoD requested an additional \$377 million over five years to fund experimentation projects that support emerging JWC concepts.⁶¹ Part of this request was to fund the Rapid Defense Experimentation Reserve, an initiative instituted by the Office of the Under Secretary of Defense for Research and Engineering to address “high-need capability gaps across the military with technology demonstrations.”⁶²

Adaptability to Threat and Combat Experience

Adapting training programs and resources by taking experience into account and applying lessons learned to current and future operations are key components to fielding effective forces and developing proper tactics. The U.S. military has trained for the wrong war before, in the cases of Vietnam and the post–September 11, 2001, operations in Iraq and Afghanistan, for example. Each of these experiences, however, spurred processes of adaptation and innovation to address deficiencies revealed in combat, both in real time and for future operations.

Premier training programs, such as the training offered at NTC, prepared U.S. forces for the most-likely future conflicts. Actual combat operations, such as Operation Enduring Freedom and Operation Iraqi Freedom, however, forced the U.S. military to fight a different enemy, with different strengths and weaknesses, on different terrain. The U.S. military had to adapt in real time, absorbing lessons from the field and modifying training to match. The gradual drawdown in operations in Afghanistan and Iraq and the rise of China and Russia refocused U.S. attention to near-peer competition; it also forced U.S. planners to consider operations in new domains against opponents that could degrade traditional U.S. advantages in information, precision fires, and ISR. The environment the U.S. military faces today requires maintaining traditional training while revamping some areas to meet the threats of operations in new domains.

NTC Adaptability: Peer to COIN to Peer

During the Vietnam War, the U.S. military fought a COIN campaign against conventional North Vietnamese Army and Viet Cong forces and smaller guerilla Viet Cong forces that operated among the population and in a largely jungle-type environment. After the U.S.

⁶⁰ Andrew Layton, “US, Bulgarian Air Forces Share Best Practices in Operation Castle Forge,” U.S. Air Force, November 10, 2021.

⁶¹ Albon, 2022b.

⁶² Courtney Albon, “Pentagon Tech Chief Says New Rapid Experimentation Reserve Is Moving Forward,” *C4ISRNET*, January 13, 2022a.

withdrawal, military figures recognized that future threats were unlikely to mirror the experience in Vietnam and the U.S. military would have to adapt its training. The experience in Vietnam had degraded the military's ability to conduct large-scale maneuver warfare. The U.S. Army's NTC was created as part of a training revolution that occurred at the end of the Vietnam War. The experience of Vietnam and the reorientation of U.S. national security interests to counter a possible Soviet incursion into Western Europe revealed the need to create a training center that provided the ability to conduct large-scale maneuver exercises in a realistic combat setting. The vast, open areas of Fort Irwin, California, provided a setting that mimicked a potential European battlefield.⁶³ As part of this revolution, the Army created NTC to give units the opportunity to train against the types of threats that the Army might face in the future.

From its inception in the late 1970s to the turn of the century, NTC was oriented to train Army units in maneuver warfare against an enemy that employed Soviet-style equipment, doctrine, and tactics. The attacks of September 11, 2001, changed the environment in which the Army was expected to fight. In 2001 and 2003, Operation Enduring Freedom and Operation Iraqi Freedom reoriented the Army toward COIN-centric operations, which was not a core competency taught at NTC. NTC needed to change its methods to adapt to the new environment. By 2004, NTC had replaced its traditional maneuver warfare scenarios with COIN-based mission rehearsal scenarios that prepared units for the conditions they were likely to encounter in upcoming deployments.⁶⁴ The physical and human infrastructure was adapted to the new operating environment. NTC expanded urban warfare complexes and populated them with Arabic-speaking roleplayers to simulate the human environment. Cave complexes, forward operating bases, and mountain strongholds were also created.⁶⁵

In addition to changing the physical and doctrinal focuses of training, NTC forged important partnerships to incorporate real-world experience into training. NTC partnered with the Joint Improvised Explosive Device Defeat Office to give training units access to the latest counter-improvised explosive device tactics and technologies. Much of the information gained during training for Iraq and Afghanistan deployments was reflected in new Army field manuals and training guidance pertaining to COIN operations published in 2006 and 2008.⁶⁶

Since the drawdowns in Iraq and Afghanistan, NTC has tried to adapt its training to perceived new threats. The 2018 NDS, which emphasized joint combined arms and ADO, conveyed the idea that joint forces must be "competent operating all five domains to include

⁶³ Chapman, 1992, p. 1.

⁶⁴ Thomas C. Greenwood, Terry Heuring, and Alec Wahlman, "The 'Next Training Revolution': Readyng the Joint Force for Great Power Competition and Conflict," *Joint Force Quarterly*, Vol. 100, No. 1, January 2021, p. 30.

⁶⁵ Greenwood, Heuring, and Wahlman, 2021, p. 30.

⁶⁶ Greenwood, Heuring, and Wahlman, 2021, p. 31.

being able to deliver space and cyber effects in real time at all levels of war.”⁶⁷ Achieving this level of competence would include training against competitive force-on-force operations and in environments where information dominance is not assured. The use of nonkinetic systems and the need to operate in a distributed or dispersed manner are likely to be key force requirements. To add realism to the training environment, NTC expanded the use of lethal drone simulations and access to satellite information by OPFOR to simulate how an enemy might track and engage future U.S. forces.⁶⁸

New Domains

Advancements in cyber and space capabilities of potential adversaries have required the adaptation of traditional training regimens to these new domains. Both China and Russia possess considerable offensive cyber capabilities that threaten U.S. military information dominance and global U.S. military operations. Likewise, advances in space and counterspace capabilities threaten U.S. space-based capabilities, which are critical nodes providing global command, control, and communications; ISR; and targeting capabilities.

Russian and Chinese offensive cyber forces have grown in scope and potency and provide covert and often deniable capabilities to attack military, government, and civilian targets.⁶⁹ In the 2020 SolarWinds cyberattack, which was attributed to Russia, malicious cyber actors used gaps in updates to software used by a wide variety of civilian, government, and military organizations to penetrate networks, including DoD networks.⁷⁰ To adapt to these types of threats, U.S. Cyber Command created the Cyber Flag series of exercises. Cyber Flag is similar to the USAF’s Red Flag exercises, in which blue units compete against red aggressor units trained in adversary tactics.

Because the cyber domain does not involve geographic boundaries and can affect multiple countries simultaneously, the Cyber Flag exercise is a multinational program involving Cyber Protection Teams from all U.S. military services, other U.S. government organizations, and allies and partners.⁷¹ Unlike other domains, which have dedicated training ranges such as NTC, cyber training lacked an online environment dedicated to holistic training, leading cyber leadership to develop online tools.

⁶⁷ Greenwood, Heuring, and Wahlman, 2021, pp. 31–32.

⁶⁸ Todd South, “New Challenges Await Army Units at the National Training Center,” *Army Times*, March 29, 2022.

⁶⁹ See Cybersecurity & Infrastructure Security Agency, *Russian State-Sponsored and Criminal Cyber Threats to Critical Infrastructure*, alert AA22-110A, April 20, 2022, revised May 9, 2022, and Cybersecurity & Infrastructure Security Agency, “China Cyber Threat Overview and Advisories,” webpage, undated, for overviews of malicious Russian and Chinese cyber activities.

⁷⁰ Dina Temple-Raston, “A ‘Worst Nightmare’ Cyberattack: The Untold Story of the SolarWinds Hack,” NPR, April 16, 2021.

⁷¹ Brad D. Williams, “Cyber Flag 21-2 Showcases New CYBERCOM Training Environment,” *Breaking Defense*, June 23, 2021.

Beginning in the early 2010s, the National Cyber Range (NCR) was developed to provide a dedicated cyber training environment for DoD assets to conduct virtual cyberspace training and mission rehearsals.⁷² NCR “enables a high degree of collaboration, development and assessment of U.S. and allied cyber tactics, techniques and procedures for defensive cyber missions that transcend boundaries and networks.”⁷³ Operators can design and implement tailored operating environments to realistically emulate real-world scenarios, tailor threat profiles, and customize specific instrumentation for exercise participants. NCR assists in refining the TTP to adapt to the constantly changing cyber environment.⁷⁴

In addition to NCR, the Persistent Cyber Training Environment (PCTE), a new training tool, was introduced during the Cyber Flag exercise in 2020.⁷⁵ PCTE is an online service that allows geographically dispersed exercise participants to perform collective training or mission rehearsals from anywhere in the world.⁷⁶ Inside PCTE, Cyber Protection Teams have the ability to conduct exercises in virtual ranges to “detect, identify, isolate, and counter fictitious adversaries.”⁷⁷

U.S. military forces rely on space-based assets to provide global command, control, and communications; ISR; and targeting capabilities, making space a critical domain for conducting military operations. Potential near-peer adversaries have developed a wide variety of counterspace capabilities, including ground, air, cyber, and space-based assets that can interdict U.S. space assets. These countermeasures can take the form of jamming, sensor blinding, and kinetic attacks against space-based systems or the infrastructure supporting the assets.⁷⁸ To address this threat, the U.S. Space Forces have developed a series of exercises that are designed to represent a realistic threat environment.

The USAF Space Command created Space Flag, a series of multinational adversarial exercises in which blue and red cells simulate space-based operations. Like in the cyber environment, space operations are not limited to national borders and require participation of allied space personnel. These exercises covered an array of threats that are possible in a conflict with a near-peer adversary, both in space and supported by terrestrial assets, such as object

⁷² U.S. Cyber Command Public Affairs, 2021.

⁷³ U.S. Cyber Command Public Affairs, 2021.

⁷⁴ U.S. Army PEO/STRI, “National Cyber Range,” webpage, undated.

⁷⁵ Williams, 2021.

⁷⁶ Mark Pomerleau, “For the First Time, Cyber Command’s Major Exercise Will Use New Training Platform,” *CAISRNET*, June 15, 2020.

⁷⁷ Williams, 2021.

⁷⁸ Theresa Hitchens, “DIA Sees ‘Dramatic’ Change in Space Competition; China, Russia ‘Mature’ Capabilities,” *Breaking Defense*, April 12, 2022a.

identification, antisatellite weapons, terrestrial jamming, and directed-energy weapons. Space Flag exercises included intelligence analysis of red cell capabilities.⁷⁹

The establishment of the U.S. Space Force in 2019 created the first independent military branch dedicated to space operations. As part of Space Force, the Space Training and Readiness Command (STARCOM) was activated to provide the necessary training, education, doctrine, and infrastructure support to space operations.⁸⁰ STARCOM has sponsored several Space Flag exercises, focusing on C2 functions for space operations.

One key challenge to training space forces is the inability to create a physical test range in space because of international conventions that prohibit claiming areas of space under a national flag. While a portion of national territory can be carved out in the land, air, and sea domains to create training ranges and cyber training can be conducted virtually, space forces are prohibited from building the necessary infrastructure. To adapt to this situation, STARCOM is developing the National Space Test and Training Complex. The National Space Test and Training Complex is based on the USAF Academy's FalconSAT program, which allows Air Force cadets to build and fly small satellites, and will be a training and testing range based on digital models and potential testing of hardware in the on-orbit part of the range.⁸¹

Reliability

The U.S. All-Volunteer Force

In the next chapter, we discuss the necessity for Chinese military officials to ensure the ideological purity of the personnel in military service. The necessity to focus on this aspect of a soldier's reliability takes resources and opportunities away from other necessary functions, such as training. The United States, in contrast, moved to an AVF that ended conscription at the conclusion of the Vietnam War. Although a full analysis and assessment of the AVF is beyond the scope of this study, in general, the AVF has removed much of the military-societal friction that arose from the use of the selective service process during the Vietnam War.

The unpopularity of the Vietnam War in significant sectors of the American population was manifested in many ways, perhaps most importantly in protests against the military draft. The draft was seen as inequitable; it was required of the poorest segments of society

⁷⁹ Lauren Hill, "CSAF Pays Visit to Space Flag: Participants Increase Warfighter Capabilities," U.S. Air Force Space Command Public Affairs, April 26, 2019.

⁸⁰ Secretary of the Air Force Public Affairs, "Space Force Activates Space Training and Readiness Command," *Space Force News*, U.S. Space Force, August 23, 2021.

⁸¹ Theresa Hitchens, "STARCOM Eyes Live Orbital Range for Testing and Training, but Hurdles Abound," *Breaking Defense*, April 14, 2022b.

while other segments could be exempted.⁸² A prevalent perception was that exemptions for marriage, paternity, and educational enrollments meant that a large number of the eligible male population could ignore the process.⁸³ Many believed the system of deferments got out of control, leading to public perceptions of inequity.⁸⁴

The U.S. Army lost confidence in the draft system because discipline issues from draftees that were brought into the service rose to unacceptable levels. In addition, the number of military personnel applying for conscientious objector status was significant. During the war, the Selective Service granted more than 170,000 exemptions for conscientious objectors and more than 3,000 already-inducted personnel were discharged.⁸⁵

The move to the AVF in the mid-1970s was preceded by a substantial debate over the merits of the new system. Some feared that the military would not be able to entice enough recruits and that those who did join would be inferior to previous generations because people with valuable skills would join the private sector.⁸⁶ The costs of paying recruits as an incentive to enlist were also a concern. One of the arguments in favor of the AVF was that everyone who joined would desire military service and would therefore be more committed to the military and its way of life. This belief ultimately prevailed.

Although the military has not always met its recruitment goals, it is generally accepted that the move to the AVF produced a more effective and professional military. The quality of new recruits, measured by such factors as mental aptitude and education level, has increased.⁸⁷ Recent studies found that 91 percent of new recruits had high school diplomas, as opposed to 70 percent in the 1960s and 1970s.⁸⁸ The percentage of the force that has more than four years of experience grew steadily from 1969 to 2007 and more than doubled in the Army.⁸⁹ The military is now more ethnically and racially diverse and the number of women in the ranks has substantially increased. Proponents of the system that opined that the AVF would bring more-committed recruits can look at the historical rates of conscientious objec-

⁸² Richard V. L. Cooper, *Military Manpower and the All-Volunteer Force*, RAND Corporation, R-1450-ARPA, 1977.

⁸³ Bernard Rostker, *I Want You! The Evolution of the All-Volunteer Force*, RAND Corporation, MG-265-RC, 2006.

⁸⁴ Rostker, 2006, p. 28, footnotes 28 and 31.

⁸⁵ "Background: Soldiers at War," webpage, PBS, October 16, 2008.

⁸⁶ Heidi Golding and Adebayo Adedeji, *The All-Volunteer Military: Issues and Performance*, Congressional Budget Office, July 2007.

⁸⁷ Cooper, 1977, p. vi.

⁸⁸ Jomana Amara, "Revisiting the Justification for an All-Volunteer Force," *Defense & Security Analysis*, Vol. 35, No. 3, 2019, p. 335.

⁸⁹ Rostker, 2006, p. 8.

tor status in Vietnam and compare them with the much lower rates in recent wars, with some sources reporting fewer than 100 cases per year.⁹⁰

The move to the AVF has helped the U.S. military decrease reliability issues in the ranks. The AVF solved many of the problems associated with the draft process in Vietnam that resulted in a demoralized military and created societal tensions. Without the need to devote resources to enforcing ideological purity in its ranks, the U.S. military can invest more heavily in warfighting capabilities.

Alliances and Partnerships

Importance of Networks and Alliances

The United States maintains extensive military alliances and partnerships around the world. These alliances and partnerships further U.S. national security and defense objectives by sharing security burdens among friendly nations, deterring aggression, and providing a stable environment for economic growth. The current network of alliances and partnerships traces its roots through decades of experience to the end of World War II and the creation of NATO and other security arrangements meant to deter global Soviet advancements. Dealing with Soviet competition, whether in the form of massive military formations that threatened Western Europe or Soviet sponsorship of conflict in regions key to U.S. security, required the United States to create and maintain alliances and partnerships. Although the United States fielded the largest and most-capable forces, its capabilities required reinforcement from like-minded nations to provide the necessary forces, resources, and access to maintain the global order.

The network of alliances and partnerships continued after the collapse of the Soviet Union into the post–September 11, 2001, security environment. Partner nations provided forces for U.S. military operations and access for U.S. forces conducting operations in Afghanistan, Iraq, and the Horn of Africa. The system, which has evolved from experience, provides a “unique comparative advantage” in a rapidly changing global security environment that has seen the reemergence of near-peer competition.⁹¹

To maximize the benefits of the network, the U.S. military engages in a wide variety of training and exercises with partners and allies. This training enhances indigenous partner military capabilities, aids in filling capability gaps in alliance military planning, and increases interoperability in the event that combined forces need to fight together. This training and exercise program spans the breadth of military cooperation, from soldier-to-soldier instruction to massive exercises involving tens of thousands of military personnel from multiple countries.

⁹⁰ Rowan Moore Gerety, “The Way of the Conscientious Objector,” *New York Times*, May 29, 2021.

⁹¹ Christine Wormuth, “The Role of Allies and Partners in U.S. Military Strategy and Operations,” testimony presented before the House Armed Services Committee, RAND Corporation, CT-A867-1, 2020, p. 1.

Exercises and Training

Rim of the Pacific

An important part of enhancing cooperation and capabilities between the United States and its allies and partners is the operation of large multinational exercises. One such exercise is the Rim of the Pacific (RIMPAC) family of maritime exercises conducted biennially since 1974. This exercise routinely involves 20 or more nations and thousands of military personnel and naval vessels and aircraft.

The purpose of RIMPAC is to contribute to increased “lethality, resiliency and agility needed by the Joint and Combined Force to deter and defeat aggression by major powers across all domains and levels of conflict.”⁹² The exercise builds both confidence among partner nations that they can operate effectively in a combined effort and interoperability between the forces. RIMPAC events include cooperative training operations, such as multinational antisubmarine warfare, maritime intercept operations, and live-fire training events.⁹³

RIMPAC’s structure can vary from combat scenarios designed to test joint and combined responses and interoperability to operating another nation’s equipment from indigenous platforms and giving other nations command responsibility over the combined forces. For example, during RIMPAC 16, the Australian landing helicopter dock ship HMAS *Canberra* launched and recovered U.S. amphibious assault vehicles and U.S. Marine Corps MV-22 Osprey and CH-53E Super Stallion helicopters in interoperability trials that validated the Australian Navy’s ability to work closely with U.S. forces.⁹⁴ During RIMPAC 14, a non-U.S. senior officer commanded a major portion of the combined forces. Australian Air Commodore Westwood of the Royal Australian Air Force acted as the Combined Force Air Component Commander, adding a human element to interoperability goals.⁹⁵

RIMPAC exercises often involve detailed crisis scenarios designed to test the ability of coalition forces to work together. RIMPAC 98 involved a scenario in which the Hawaiian Islands were split into two countries, one a democracy aligned with the West without substantial military forces and the other an authoritarian government with a larger, more modern military, including a substantial submarine force. The non-Western-aligned country attacked the Western-aligned country and the participants in the exercise practiced naval and air responses to the crisis. RIMPAC 2000 involved responding to a humanitarian crisis

⁹² “Multinational Exercise Rim of the Pacific 2020 Concludes,” U.S. Indo-Pacific Command, September 1, 2020.

⁹³ “Multinational Exercise Rim of the Pacific 2020 Concludes,” 2020.

⁹⁴ Honae Cuffe, “Semaphore: 50 Years of Exercise RIMPAC,” *Sea Power Semaphore*, No. 8, 2021.

⁹⁵ Benjamin Sakrisson, “RIMPAC Air Commander: ‘Relationships Are Key to Interoperability,’” 15th Wind Public Affairs, July 16, 2014.

that involved the U.S. Marine Corps establishing a refugee center and included nondefense representation from the Red Cross and United Nations (UN).⁹⁶

Apart from the larger scenario design, tactical-level events aid interoperability. Many RIMPAC exercises contain live-fire events. RIMPAC 20 contained a sinking exercise that integrated the land-based coastal defense capabilities of Japan with the U.S. Army and Navy. In the first exercise of this kind, the land-based antiship capabilities of the Japanese Ground Self-Defense Force (JGSDF) Western Artillery were integrated with U.S. Army assets to strike a sea-based target. Via the Link-16 communication network, U.S. Army antiship capabilities were also linked with a U.S. Navy submarine firing antiship missiles and included target-spotting by unmanned aerial vehicles.⁹⁷

The Keen Exercise Series

The Keen series of exercises primarily focuses on cooperation between the U.S. military and the Japanese Self-Defense Force (JSDF). This annual series alternates between Keen Edge command post exercises and Keen Sword field training exercises and is considered an important component to improving interoperability and combat readiness between the two long-standing Pacific allies.⁹⁸ All U.S. military services, along with their Japanese counterparts, participate in the exercises.

Recent Keen exercises have practiced forward-deploying units to Japan from Hawaii to act as forward command posts, executing C2 functions throughout the area of operations, integrating air and missile defense capabilities, and conducting joint naval operations. Keen Edge 2018 trained on integrating JSDF and U.S. air and missile defense around Japan and included the 94th Army Air and Missile Defense Command forward-deploying personnel to Japan and linking training scenarios to the main unit operations in Hawaii.⁹⁹

The Keen Sword 21 exercise was a field training exercise involving substantial naval assets, including the USS *Ronald Reagan* CSG and units from the Japanese Maritime Self-Defense Force, along with air defense assets from multiple U.S. services. Keen Sword 21 included the operation of Japanese F-35 aircraft from the USS *America* to improve interoperability.¹⁰⁰ The 2022 Keen Edge iteration included American and Japanese elements located along the West

⁹⁶ Gregg K. Kakesako, "This Year's RIMPAC Participants Use Real-World Experience to Set Up a Refugee Camp on the Big Isle," *Honolulu Star-Bulletin*, June 15, 2000.

⁹⁷ Steven Stashwick, "'Multi-Domain' Demonstration at RIMPAC: Target Ship Struck from Sea, Air, and Land," *The Diplomat*, July 26, 2018.

⁹⁸ "Exercise Keen Edge 22 Enhances Enduring U.S.-Japan Alliance," Indo-Pacific Defense Forum, February 16, 2022.

⁹⁹ Thomas Flores, "Keen Edge 2018 Exercise Tests U.S., Japan Integrated Air and Missile Defense Interoperability," U.S. Army, February 15, 2018.

¹⁰⁰ Diana Stancy Correll, "US, Japan Militaries Launch Keen Sword 21 Exercise," *Navy Times*, October 26, 2020.

Coast of the United States, Hawaii, and mainland Japan. This exercise included networked computer simulations that emulated crisis response and contingencies.¹⁰¹

Defender Pacific

The Defender Pacific exercise series provides training on deploying joint forces through major Pacific bases to more-remote locations and demonstrates strategic readiness by “deploying credible combat-ready forces across the Indo-Pacific theater.”¹⁰² During Defender Pacific 2020, U.S. Army forces from Hawaii, Alaska, and Washington deployed to the island of Anguar in Palau. The exercise included 125 Army personnel of Task Force Oceania and a logistics support vessel deploying two HIMARS to demonstrate the ability to move fires elements to austere locations.¹⁰³ The exercise also included assets to clear and improve the local airfield on Anguar to deploy C-130 transport aircraft. Palau, located in the Pacific Ocean’s Second Island Chain, has only one usable airfield, and the exercise validated the ability to add a second airfield in a limited time frame.¹⁰⁴

Defender Pacific 2021 featured cooperation between U.S. and JSDF special forces units. Members of the U.S. 1st Special Forces Group and the JGSDF performed a simulated air assault on Guam to destroy enemy air defense assets, then reconsolidated and destroyed a simulated enemy C2 facility.¹⁰⁵ The 2nd Brigade Combat Team of the 25th Infantry Division deployed via Naval Supply System Command assets to multiple Indo-Pacific locations.¹⁰⁶

Joint Multinational Training Group-Ukraine

One example of U.S.-provided training to build partnership capacity is the Joint Multinational Training Group-Ukraine (JMTG-U). JMTG-U, an international coalition of trainers overseen by the U.S. 7th Army Training Command and provided at the Yavoriv Combat Training Center (CTC), is tasked with providing mentorship and advice to the Ukrainian Armed Forces to increase the capabilities of the Ukrainian military and bring them further in line with Western standards.¹⁰⁷ JMTG-U brings in U.S. Army National Guard battalions

¹⁰¹ U.S. Marine Corps, “KEEN EDGE 22,” courtesy story, February 3, 2022.

¹⁰² U.S. Army Pacific, “Defender Pacific 2020 Expands Across Breadth of the Theater,” U.S. Army, September 10, 2020.

¹⁰³ U.S. Indo-Pacific Command, “Task Force Oceania Plays Pivotal Role in Defender Pacific 2020,” U.S. Army Pacific, September 30, 2020.

¹⁰⁴ U.S. Indo-Pacific Command, 2020.

¹⁰⁵ Anthony Bryant, “Defender Pacific 21: Special Forces Soldiers, JGSDF Conduct Bilateral Operations in Guam,” U.S. Army, August 5, 2021.

¹⁰⁶ Daniel Mayberry, “NAVSUP FLC Pearl Harbor Projects U.S. Army Combat Power for Exercise Defender Pacific 21,” Defense Visual Information Distribution Service, September 22, 2021.

¹⁰⁷ Because of the Russian invasion of Ukraine on February 24, 2022, the JMTG-U relocated to Grafenwoehr training facility in Germany in August 2022. See Avery Schneider, “New York National Guard Unit Assumes Command of Joint Multinational Training Group-Ukraine,” U.S. Army, August 10, 2022.

on nine-month rotations to institute a train-the-trainer program that has the end goal of Ukrainian personnel running their own training centers.¹⁰⁸ The overall objective of the program is to reinforce defensive skills to increase self-defense capabilities and interoperability with NATO.¹⁰⁹

The Yavoriv CTC program rotates Ukrainian units in 55-day periods and focuses on decisionmaking capabilities at the company, battalion, and brigade levels, culminating in a battalion-level field exercise for the unit.¹¹⁰ A key element of the program is the development of the Ukrainian NCOs. Historically, the Ukrainian armed forces have employed the Soviet model, which relies on officers to be the focal point of professionalism and decisionmaking. Staff work was emphasized less than in Western armies. NCOs were generally younger and less experienced and were not relied on to exercise initiative, make decisions, or employ critical-thinking processes.¹¹¹ Ukrainian NCOs were poorly paid and generally left the service after their conscription period ended.

The Western model employed by the United States relies on NCOs to be a cadre of professionals with significant operational and management experience who can aid officers in decisionmaking and management of their units. After years of corruption that plagued the Ukrainian military, the goal of professionalizing the Ukrainian NCO corps was a significant task. The U.S. mentors provide suggestions and recommendations to improve decisionmaking and critical-thinking capacity and relay how the experiences of the U.S. military reinforced the U.S. system.

One method of increasing NCO and junior officer effectiveness was the creation of Mobile Training Teams and the Joint Leader Academy Training. These programs focus on NCO development and evaluate Ukrainian NCOs on critical-thinking abilities and the ability to train and lead their own troops before training at Yavoriv, allowing them to practice the skills learned at their home station. This design is meant to enable units to arrive at the CTC ready to jump into squad- and platoon-level training.¹¹² To provide continuity from one training cycle to another, representatives of the Joint Multinational Readiness Center, initially embedded at JMTG-U, regularly travel to Yavoriv CTC to discuss training curricula and maintain relationships.¹¹³

The goal of the JMTG-U mission is to increase Ukrainian capabilities by training a cadre of personnel that can take over the training of their own forces. By 2018, three years

¹⁰⁸ Ben Watson, "In Ukraine, the US Trains an Army in the West to Fight in the East," *Defense One*, October 5, 2017.

¹⁰⁹ Stuart Gallagher, "Mission Ukraine: U.S. Army Leads Multinational Training Group to Counter Russian Threats," Association of the United States Army, May 19, 2020.

¹¹⁰ Meg Jones, "Far from U.S. Politics, Wisconsin Troops Work with Ukrainian Military in War with Russia," *Milwaukee Journal Sentinel*, February 12, 2020.

¹¹¹ Jones, 2020.

¹¹² Kayla Christopher, "Junior Leader Training in Ukraine," U.S. Army, May 25, 2017.

¹¹³ Gallagher, 2020.

into the program, the bulk of the training was given by Ukrainian instructors stationed at Yavoriv CTC.¹¹⁴

Experimentation

Lightning Carrier Concept

Since World War II, the aircraft carrier has been the central focus of U.S. Navy capabilities and a critical component of U.S. military and diplomatic policy. Drawdowns in the U.S. carrier fleet and maintenance issues and delays in new carrier deployment have caused concern that the current carrier force cannot meet the obligations of the global U.S. defense posture. Since 2019, the U.S. Marine Corps and Navy have experimented with deploying fifth-generation combat aircraft on U.S. Navy amphibious assault ships to test the possibility of augmenting the carrier force with air power from smaller ships designed to embark amphibious forces and helicopters. This experiment is considered a path to increase the utility of the amphibious assault ships, providing fifth-generation air assets to more locations globally and providing amphibious forces with more-potent air capabilities.

Several challenges have caused diminishing aircraft carrier availability for the U.S. Navy. First, since the retirement of several older carriers, including USS *Enterprise* in 2012, no new carriers have entered service. The first ship of its class, USS *Gerald R. Ford*, was originally supposed to join the fleet in 2018, but suffered multiple technical issues, pushing the date of its first operational deployment to 2022.¹¹⁵ Second, the pace of deployments has increased and forced the Navy, operating with fewer ships, to conduct double-pump deployments, or back-to-back deployments without maintenance in between. Delays at U.S. Navy repair and service yards have caused subsequent delays in maintenance cycles.¹¹⁶

A concept developed to address this issue is the Lightning Carrier. This concept involves deploying 20 U.S. Marine Corps fifth-generation F-35B aircraft, up from the normal complement of six, on amphibious assault ships. These are “carrier-type” warships that normally operate multiple types of helicopter and tilt-rotor aircraft.¹¹⁷ Drawing on an older “Harrier Carrier” concept in which these types of ships operated U.S. Marine Corps AV-8B Harrier

¹¹⁴ Alexander Rector, “N.Y. Army Guard Soldiers Mentor and Learn in Ukraine,” U.S. National Guard, June 22, 2018.

¹¹⁵ Diana Stancy Correll, “New in 2022: USS *Gerald R. Ford* Expected to Deploy for the First Time This Year,” *Navy Times*, January 4, 2022. Subsequent to the writing of this report, the *Gerald R. Ford* initiated its first operational deployment in October 2022.

¹¹⁶ Megan Eckstein, “No Margin Left: Overworked Carrier Force Struggles to Maintain Deployments After Decades of Overuse,” *United States Naval Institute News*, November 12, 2020b.

¹¹⁷ David Axe, “A U.S. Navy Amphibious Assault Ship Just Set Sail with a Whopping 13 Stealth Fighters,” *National Interest: The Reboot*, blog, October 18, 2019.

V/STOL aircraft,¹¹⁸ the modern F-35B would bring advanced strike capabilities and a technologically advanced sensor and electronic warfare capability to the ships. These capabilities allow amphibious assault ships to act as sea bases and provide naval and joint forces with significant strike and collection capabilities when aircraft carriers are unavailable.

This capability increases the mission flexibility of the vessels, giving joint force commanders more options, whether employed independently, as part of an expeditionary strike group, or to augment CSGs. As the 2017 Marine Aviation Plan stated, “[a]mphibious assault ships serve predominantly to project [Marine Expeditionary Units] ashore but, as required, will be prepared to ‘reconfigure’ to provide ready decks for 16-20 F-35Bs and 4 [V-22 aerial refueling system]-equipped MV-22s for a high-end fight or a mix of MV-22s, CH-53Es/Ks and UH-1Ys for humanitarian or disaster relief missions.”¹¹⁹

The concept would complement, not replace, large carriers and could free them for missions in vital areas or provide additional air defense assets to the CSG.¹²⁰ This flexibility could contribute to the Navy concept of DMO by providing a greater number of assets with strike capabilities at different locations inside the area of operations. The concept has been tested in sea trials several times; the USS *Wasp* and USS *America* operated ten and 13 F-35Bs, respectively, in deployments in the Pacific Ocean in 2019. After initial proof-of-concept experiments, USS *Tripoli* expanded on the initial tests by deploying with 20 F-35As in 2022.¹²¹ The test focused on integrating Marine Air Group–level air operations while at sea,¹²² launching and recovering a larger number of F-35Bs than in previous deployments, and determining both the maximum and optimal number of aircraft that could operate from the ship.

Multidomain Task Forces

Along with experimenting with force structures and tactical operations, the U.S. military has experimented with different command and unit organization structures to incorporate new JWCs. The Multidomain Task Force (MDTF) is one such example and the central organization structure of the Army’s conceptualization of ADO/MDO. As shown in Figure 6.1, the MDTF is composed of Multidomain Effects Battalions that integrate “traditional signals and military intelligence with capabilities in space, cyberspace, information space and the electromagnetic spectrum,”¹²³ a strategic fires battalion, an air defense battalion, and a

¹¹⁸ Gidget Fuentes, “Marines Load Record 16 F-35Bs Aboard USS *Tripoli* Test of ‘Lightning Carrier’ Concept,” *United States Naval Institute News*, April 5, 2022.

¹¹⁹ United States Marine Corps, *2017 Marine Aviation Plan*, Office of the Deputy Commandant for Aviation, 2017, p. 11.

¹²⁰ Audrey Decker, “Navy, Marine Corps Demonstrate ‘Lightning Carrier’ Concept,” *Inside Defense*, April 13, 2022.

¹²¹ Decker, 2022.

¹²² Fuentes, 2022.

¹²³ McEnany, 2022.

brigade support battalion. Multidomain Effects Battalions provide information to the Air Defense Battalion for force protection and to the Strategic Fires Battalion, which employs highly maneuverable and survivable fires, including hypersonic weapons, while the Brigade Support Battalion “plans, directs and supervises supply distribution and logistics—including field maintenance and medical capabilities.”¹²⁴

MDTFs are designed to be deployed as an inside force operating in an adversary’s A2/AD system by being maneuverable and distributed. To integrate the diversion components of an MDTF, the Army has created All-Domain Operations Centers (ADOCs) to serve as command nodes that allow commanders to see and analyze data from the field. These data integrate the MDTF units, are distributed to other joint forces, and contribute to the cloud environment envisioned by JADC2.¹²⁵

Experimentation with the MDTF concept began in 2017 with the creation of an experimental unit based at Joint Base Lewis-McChord and a second unit activated in Germany in 2021.¹²⁶ Since their inception, the units have participated in multiple training exercises that focus on interoperability and transferring information between MDTFs, ADOCs, and other participating units. In 2021, the MDTF at Joint Base Lewis-McChord took part in Lightning Edge 21. This exercise validated over-the-horizon targeting integration between the 25th Infantry Division, the MDTF, and ADOCs. The 25th Infantry Division was able to remotely connect to the MDTF via the ADOC, exchange data, create a common operating picture, and engage simulated targets on Oahu. Lightning Edge 21 also trained on the integration of electronic warfare and signals intelligence equipment into tactical operation.¹²⁷

Also in 2021, the European-based MDTF took part in testing long-range precision fires as part of Exercise Thunder Cloud. In this exercise, the MDTF deployed from Germany to Norway, demonstrating its mobile capability, and drilled with the 41st Artillery Brigade on the sensor-to-shooter cycle, making novel use of high-altitude balloons as target sensors.¹²⁸ The use of high-altitude balloons experimented with connecting the land and space domains. The balloons were launched into the stratosphere and provided weather and targeting data to the Guided Multiple Launch Rocket System launch unit via the MDTF.¹²⁹ A third experi-

¹²⁴ McEnany, 2022.

¹²⁵ McEnany, 2022.

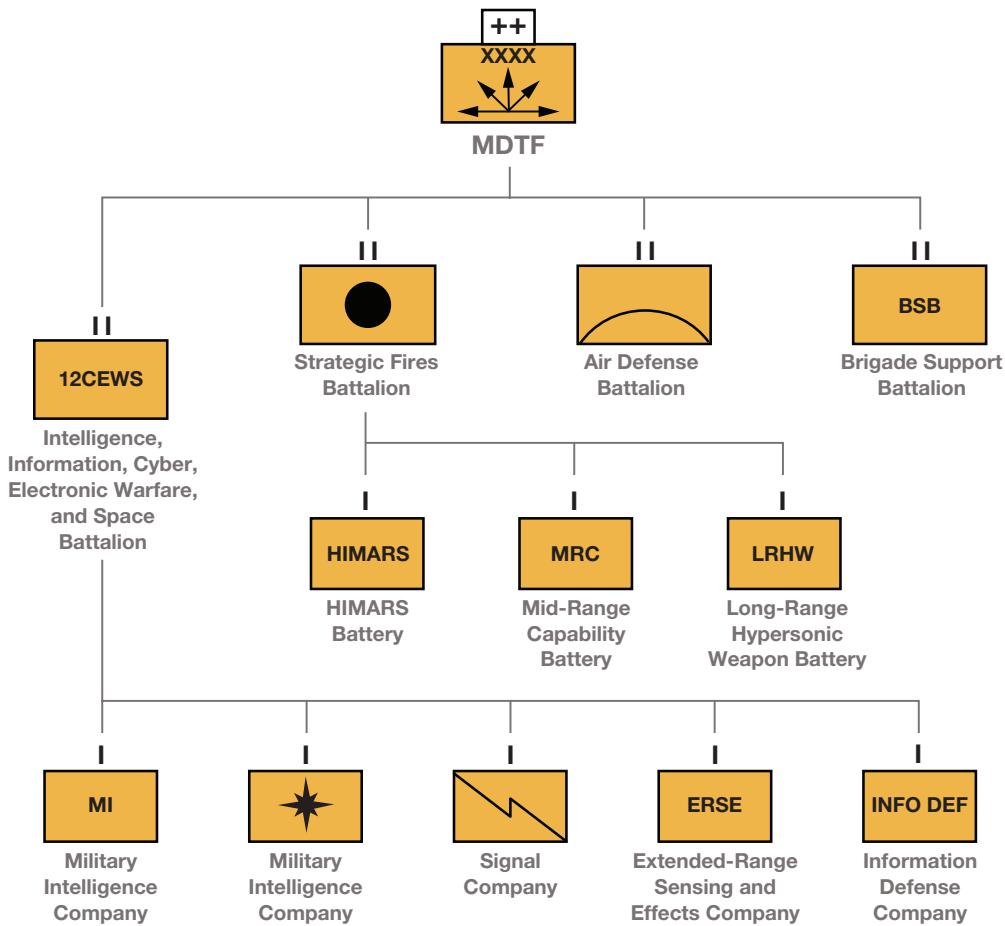
¹²⁶ Andrew Feickert, *The Army’s Multi-Domain Task Force (MDTF)*, Congressional Research Service, IF1179, November 5, 2021b, p. 1.

¹²⁷ Tania Donovan, “Lightning Edge 21: 25th Infantry Division Exercises Multi-Domain Task Force Capabilities,” U.S. Army, May 14, 2021.

¹²⁸ Jen Judson, “Europe’s First Multidomain Task Force Tests High-Altitude Balloons for Targeting in Norway,” *Defense News*, September 17, 2021.

¹²⁹ Joshua Thorne, “US Army Partnerships in the Arctic Circle Result in Success of Exercise ‘Thunder Cloud,’” U.S. Army, September 21, 2021.

FIGURE 6.1
Multidomain Task Force Composition



SOURCE: Adapted from McEnany, 2022.

mental MDTF battalion is scheduled to be activated in Hawaii in fiscal year 2023 to support Indo-Pacific Command operations.¹³⁰

Expeditionary Cyber-Electromagnetic Activities Teams

Conflicts in Iraq and Afghanistan have pitted U.S. forces against technologically inferior enemies who have little or no ability to use cyber capabilities to either negatively affect U.S. operations at the tactical level or use information technology links and networks to control their own forces. Current near-peer competitors, however, possess offensive cyber capabili-

¹³⁰ Feickert, 2021b.

ties that can be used to attack U.S. tactical C2 networks, Concurrently, these adversaries use information technologies to control their own forces. In response, the U.S. Army has experimented with tactical cyber teams, with the intention of deploying these team with ground forces to provide a tactical cyber capability.

In 2015, U.S. Army Cyber Command began deploying Expeditionary Cyber-Electromagnetic Activities Teams to support units rotating through NTC and simulate real-world cyber electromagnetic activity (CEMA).¹³¹ CEMA is an initiative to provide tactical commanders with integrated cyber operations, and the CEMA teams at NTC experimented with supporting tactical units. Through the exercises, U.S. Army Cyber Command refined the optimized force structure and identified the logistical burden to provide the expeditionary capability placed on the rotational units.¹³²

From this experimentation, the Army stood up the first dedicated cyberwarfare battalion in 2019. The 915th Cyber Warfare Battalion is “designed to provide nonlethal capabilities such as cyber, electronic warfare and information operations in support of Army Service Component Commands and their subordinate elements.”¹³³ It is constructed to work in the gray area before a conflict begins, identify targets, provide nonlethal effects, and characterize enemy networks.¹³⁴ The 915th, composed of expeditionary cyber and electromagnetic activities teams (ECTs), is meant to expand Army MDO and increase the information advantage concept. The 915th acts in coordination with MDTF units but as an Army component-level organization at the theater level, providing support to lower-echelon units as requested. The unit is still experimental, however, and its innovation and experimentation are meant to be used to write doctrine for MDO.¹³⁵

The first ECT of the 915th began conducting validation exercises in late 2021. ECT-01, the first of 12 proposed ECTs to be created by 2026, experimented as an independent unit, unlike previous iterations of similar units that trained with tactical units at NTC.¹³⁶ This independent exercise was designed to allow the unit to more directly control the scenario to better experiment with the following three primary objectives:

- Conduct expeditionary deployment activities, including everything the team needs to administratively and logistically plan, organize, and deploy a team.

¹³¹ Steven Stover, “Army Developing Expeditionary Cyber-Electromagnetic Teams to Support Tactical Commanders,” U.S. Army, February 8, 2018.

¹³² Stover, 2018.

¹³³ Mark Pomerleau, “New US Army Cyber Unit Is Building Concepts for Tactical Cyber Operations,” *C4SIRNET*, December 29, 2021b.

¹³⁴ Pomerleau, 2021b.

¹³⁵ Pomerleau, 2021b.

¹³⁶ Pomerleau, 2021b.

- Establish infrastructure operations that the team needs to integrate into a network of higher command to conduct their operations.
- Provide information advantage, which is not completely defined, as the Army is developing the related doctrine.¹³⁷

The scenario provided commanders with multiple digital options, including nonkinetic options.

Another ECT, ECT-05, was scheduled to participate in the Defender Europe exercise in 2022 to further refine tactics and processes.

Black Flag

Black Flag, an offshoot of the Red Flag series of exercises, is an Air Force exercise that focuses on testing and integrating new systems and weapons. Large exercises, such as Red Flag, do not provide the best environment to test new equipment and technologies because personnel might not have extensive training or because of the new systems might have undergone individual testing instead of being tested in large-scale operational exercises. The Black Flag exercise, hosted by the 53rd Wing based at Nellis Air Force Base, is a singular event that allows for “multiple areas of test and tactics development.”¹³⁸ This exercise creates the opportunity to learn how new communications equipment might interact with navigation systems or about the bandwidth of new satellite links.¹³⁹

Black Flag uses large force test events to provide an additional layer of testing on top of the initial airworthiness testing and training of personnel on the new system and foster a culture of “test as we fight.”¹⁴⁰ Exercise participants can present Tactics Improvement Proposals at annual Weapons and Tactics Conferences for inclusion in the exercise. The creation of Black Flag has allowed participants at those conferences to plan, discuss Tactics Improvement Proposals and how to integrate them into different systems, and implement the proposals into upcoming Black Flag exercises without having to wait for resources.¹⁴¹

Large force test events, in which multiple units from multiple services participate, provide the environment for such integration and experimentation with tactics for the new systems.¹⁴² One Black Flag exercise, conducted in November 2020, focused on Destruction of Enemy Air Defenses operations. It included EC-130H Compass Call electronic warfare aircraft with

¹³⁷ Pomerleau, 2021b.

¹³⁸ Savanah Bray, “The Future of Test: ACC Establishes ‘Black Flag,’” U.S. Air Force, December 28, 2020.

¹³⁹ Brian Hudson, “This Is Why Black Flag Is One of the Air Force’s Most Important Exercises,” SOFREP, October 25, 2021.

¹⁴⁰ Bray, 2020.

¹⁴¹ Jamie Hunter, “Black Flag Rises: New ‘Super Bowl of Test Exercises’ Pushes USAF’s Top Weapons to Their Limit,” *The Warzone*, blog, January 13, 2021.

¹⁴² Bray, 2020.

F-15E Strike Eagles equipped with Eagle Passive Active Warning Survivability System, which was still in its development stages but mature enough to be included in a large-scale event.¹⁴³ The exercise involved experimenting with new features for electromagnetic geolocation and electronic attack in high-density, high-threat environments.¹⁴⁴

Service-Specific Training Centers

The U.S. military services operate a variety of training centers to provide realistic combat experiences based on insights from past combat operations and potential future threats. Many of these centers were initiated toward the end of or after the Vietnam War to reorient military branches to current threats and incorporate lessons learned from the Vietnam experience. As mentioned previously, the U.S. Army's NTC focused on reorienting land forces toward the Soviet threat. The U.S. Navy and Air Force also created training centers to improve on tactical performance by providing realistic exercises that were backed up by reviews from expert instructors, who identified and corrected deficiencies.

Air Warfare Centers

The Air Force and Navy operate air warfare centers designed to provide realistic combat training for a diverse set of modern air missions. The Naval Aviation Warfighting Development Center (NAWDC) and the Air Force Warfare Center (AFWC) act as Centers of Excellence by providing training that fosters the development of tactics in both academic and simulated combat settings. Both centers are grounded in the lessons learned in air combat from the Vietnam War and operate well-known training programs, such as the TOPGUN Navy Fighter Weapons School, better known as "Top Gun," and the Red Flag exercise series.

NAWDC provides U.S. Navy aviators with "flight training, academic instructional classes, and direct operational and intelligence support."¹⁴⁵ NAWDC focuses on advanced TTP at the individual, unit, integrated and joint levels.¹⁴⁶ NAWDC consists of three schools for mission-specific instruction: the Naval Strike Warfare Center, the Carrier Airborne Early Warning school and, the best-known of the three, the Navy Fighter Weapons School.

The Navy Fighter Weapons School, colloquially known as Top Gun, was created in response to the decline in effectiveness of U.S. Navy fighter tactics during the Vietnam War. A heavy reliance on engaging targets with air-to-air missiles led to a degradation in the ability of naval aviators to perform air combat maneuvers, or dogfighting. In previous wars, U.S.

¹⁴³ Hunter, 2021.

¹⁴⁴ Hunter, 2021.

¹⁴⁵ Naval Aviation Warfighting Development Center, "About Us" webpage, undated.

¹⁴⁶ Robbin Laird and Ed Timperlake, "NAWDC and Shaping a 21st Century Combat Force: The Perspective of Admiral 'Hyfi' Harris," *Second Line of Defense*, August 9, 2017.

Navy kill ratios were 10:1 or higher. Reliance on missiles, which were often unreliable or employed incorrectly, led to a drop in the kill ratio to 2.5:1.¹⁴⁷

To rectify the situation, the Navy commissioned an audit of air-to-air missiles, aircraft, radars, and the training and tactics of aircrews.¹⁴⁸ Conducted by Captain Frank Ault, the Ault Report made several recommendations to improve air-to-air combat effectiveness, including the establishment of an advanced fighter weapons school. The proposed school would be staffed by a core of experienced instructors who would revise and disseminate new doctrine and tactics. The implementation of TOPGUN led to an increase in the kill ratio by the end of the war.¹⁴⁹

Each instructor was required to be an expert in at least one relevant mission area, such as radar-guided missiles or air-to-air maneuvers, and able to deliver information effectively in a lecture setting. Training incorporated intelligence on the equipment, capabilities, and doctrine of potential adversaries, and instructors acted as adversaries during flight exercises. TOPGUN's instrumented ranges provided detailed flight data that were then analyzed in after-action reviews. The goal was to train aviators to such a degree of expertise that they could go back to their units and impart their knowledge and experience to other aviators.¹⁵⁰

The current course consists of basic fighter maneuvers, air-to-surface, section, and division exercises.¹⁵¹ Modern TOPGUN training has retained most of the original instruction methods. In the 1990s, however, instructors began acting as adversaries and flying as part of student formations to get a better sense of student strengths and weaknesses.¹⁵² Additionally, the basic fighter maneuver section of the course rotates through different fleet training areas to give instructors the opportunity to give guest lectures, allowing for a greater training reach throughout the fleet.¹⁵³

Like NAWDC, AFWC focuses on training for integrated combat operations. Located at Nellis Air Force Base, AFWC reports directly to the Air Force's Air Combat Command and maintains "collaborative relationships with Joint, interagency, ally and partner organizations."¹⁵⁴ AFWC is tasked with providing professionals to control the air domain

¹⁴⁷ Baranek, 2019. It is important to note that accounts of specific kill ratios vary among sources and differ by year and combat operation.

¹⁴⁸ Baranek, 2019.

¹⁴⁹ Baranek, 2019.

¹⁵⁰ Baranek, 2019.

¹⁵¹ Dario Leone, "All You Need to Know About Today's TOPGUN: Why the US Navy Fighter Weapons School Is Recognized Worldwide as the Center of Excellence for Fighter Tactics Training," *Aviation Geek Club*, blog, December 10, 2020.

¹⁵² Baranek, 2019.

¹⁵³ Leone, 2020.

¹⁵⁴ Nellis Air Force Base, "U.S. Air Force Warfare Center," fact sheet, 2022.

and perform the Air Force's five core functions of air superiority, global strike, mobility, ISR, and C2.¹⁵⁵ This task is mainly accomplished through the Red Flag exercise series.

Like TOPGUN, Red Flag has its origins in the lack of performance of Air Force fighters in the Vietnam War. The kill ratio of Air Force fighters in the Korean War, more than a decade earlier, was reported as 10:1.¹⁵⁶ That ratio dropped significantly during Vietnam, bottoming out at 1:1 in 1972. North Vietnamese tactics played a part in the drop, as did the underestimation of North Vietnamese aircraft, such as the MiG-17. In addition, peacetime safety training rules prohibited realistic air-to-air combat training.¹⁵⁷ After Vietnam, Red Flag was created to solve the problem.

Instituted in 1975, Red Flag is a series of annual exercises that seek to maximize the combat readiness and survivability of aircrews by providing realistic training and the ability to exchange ideas in pre- and postflight training forums.¹⁵⁸ Taking place at an instrumented range that allows pilots to simulate combat missions against a Red force trained in adversary tactics and doctrines, Red Flag uses the Red Flag Measurement and Debriefing System (RFMDS), which combines hardware and software to provide "real-time monitoring, postmission reconstruction of maneuvers and tactics, participant pairings and integration of range targets and simulated threats."¹⁵⁹

The Red Flag series typically consists of Green Flag ground support exercises with U.S. Army units and Red Flag exercises consisting of interdiction, strike, air superiority, and Suppression of Enemy Air Defense missions.¹⁶⁰ Postmission review and critique is provided using information from the RFMDS for students to learn from their mistakes. These exercises give aircrews the ability to fly their "first 10 combat missions insulated from the imminent threat of death" but under realistic conditions.¹⁶¹

Red Flag provides both joint and combined forces training opportunities. Annual iterations include participation by all U.S. military services and, often, units from partner nations. Three rotations occur annually, one that is U.S.-force only, a second that includes Five Eyes allies (Australia, Canada, New Zealand, and the United Kingdom), and an expanded exercise that includes a larger set of international allies.¹⁶² These rotations allow Air Force aircrews to train jointly with other U.S. services and practice combined operations with allies.

¹⁵⁵ Nellis Air Force Base, 2022.

¹⁵⁶ Walter J. Boyne, "Red Flag," *Air & Space Forces Magazine*, November 1, 2000.

¹⁵⁷ Boyne, 2000.

¹⁵⁸ Eran Malloch, "Exercise Red Flag (USAF)," *Fight's On!* blog, July 24, 2019.

¹⁵⁹ Malloch, 2019.

¹⁶⁰ Malloch, 2019.

¹⁶¹ Joseph Locke, "Air Superiority at Red Flag: Mass, Technology and Winning the Next War," thesis, Air University, Maxwell Air Force Base Research Institute, October 1, 2009, p. 13.

¹⁶² Nellis Air Force Base, "Red Flag-Nellis," fact sheet, undated.

U.S. Navy Surface and Mine Warfare Development Center

The U.S. Navy's Surface and Mine Warfare Development Center (SMWDC) is tasked with increasing the "lethality and tactical proficiency of the Surface Force across all domains" by providing advanced tactical training, doctrine and tactical guidance development, operational support, capability assessment, experimentation, and support for the development of future requirements.¹⁶³ SMWDC, headquartered at Naval Base San Diego, conducts training to provide forces to combatant commander and numbered fleets in support of the Optimized Fleet Response Plan (FRP). The FRP includes several training phases to prepare naval units for deployment.

The Navy conducts training during several phases of the FRP. The basic phase focuses on the "development of unit core capabilities and skills."¹⁶⁴ The integrated phase integrates individual units into strike groups by providing multidimensional threat training. This training includes both in-port and at-sea exercises designed to simulate near-peer threat conditions. The advanced phase applies to independent forces outside the strike group and focuses on mission-specific training.¹⁶⁵ SMWDC supports these phases with training events to simulate realistic operational environments.

SMWDC introduced an innovative training technique called Surface Warfare Advanced Tactical Training (SWATT). These exercises take place between the basic and integrated phases of the FRP and provide "multi-ship, multi-platform, multi-warfare area training at sea to increase combat capability, lethality and interoperability" and additional air defense, antisubmarine, antisurface, information warfare, and live-fire events to increase the proficiencies of individual units before the integrated training with strike groups begins.¹⁶⁶ As of 2023, the Navy plans to implement SWATT 2.0, which will expand the program to the advanced phase and add a wider array of elements, including an 18- to 24-hour capstone event with multidomain and multiwarfare events.¹⁶⁷

A key element of the SWATT program is the incorporation of Warfare Tactics Instructors (WTIs). WTIs participate in SWATT and apply their operational experience to "training and assessing individuals, units, and staffs on [TTP]."¹⁶⁸ WTIs have expertise in four functional areas: Integrated Air and Missile Defense, antisubmarine and antisurface warfare, mine war-

¹⁶³ Naval Surface and Mine Warfighting Development Center, "SMWDC Mission Vision Value," vision statement, undated.

¹⁶⁴ OPNAV Instruction 3000.15A, *Optimized Fleet Response Plan*, Office of the Chief of Naval Operations, November 10, 2014.

¹⁶⁵ OPNAV Instruction 3000.15A, 2014.

¹⁶⁶ "East Coast Warships Complete Surface Warfare Advanced Tactical Training," Defense Visual Information Distribution Service, July 20, 2020.

¹⁶⁷ Megan Eckstein, "Surface Warfare Training Growing More Complex with Tougher Scenarios," *United States Naval Institute News*, August 26, 2020a.

¹⁶⁸ SMWDC Instruction 1402.2D, Warfare Tactics Instructor Program Application Guidance, Naval Surface and Mine Warfare Development Center, July 27, 2020, p. 1.

fare, and amphibious warfare.¹⁶⁹ These instructors deploy with ships during the training exercises and provide expert instruction, critique, and recommendations for doctrinal development to enhance the training experience. The Navy has also started a pilot program for the WTI and Naval Postgraduate School to add academic theory to the real-world experience of the WTI cadre.¹⁷⁰

Global Force Posture

Since the end of World War II, U.S. security interests have required the creation and maintenance of logistics and communications systems that can rapidly move troops, equipment, and supplies to key regions around the globe. These systems include a network of bases and facilities located in allied countries. This posture has provided decades of experience in working alongside allies and responding to crises in regions important to U.S. interests. To maintain the capabilities provided by this experience, the U.S. military routinely conducts extensive training exercises with allies to practice logistics, C2, and combat operations with the goal of enhancing interoperability and the ability to move forces into a region quickly.

One of the best-known global logistics exercises was the Return of Forces to Germany (REFORGER) exercise conducted from the 1960s to the 1990s. This exercise practiced rapidly deploying forces from the United States and other NATO countries to link up with permanently stationed troops and prepositioned equipment in Germany in response to a potential conflict with the Soviet Union.¹⁷¹ The exercise offered the opportunity to practice rapid deployment and increase the effectiveness of cooperation between the branches, especially the U.S. Army and Air Force. The exercise eventually grew from the requirement to rapidly deploy just one U.S.-based brigade in 1969 to ten divisions in ten days in 1980.¹⁷² The lessons learned during these exercises formed the backbone of deployment for Operation DESERT SHIELD, which moved nearly 600,000 military personnel to the Middle East between August 1990 and January 1991.¹⁷³

More recently, the attacks of September 11, 2001, prompted a military response directed at Taliban and al Qaeda forces in Afghanistan. Although the United States maintained bases in the Middle East and Indian Ocean, a support infrastructure was needed closer to Afghanistan

¹⁶⁹ Eckstein, 2020a.

¹⁷⁰ Taylor Vencill, "Program Takes Warfare Tactics Instructors to Next Level at Naval Postgraduate School," press release, U.S. Navy, November 24, 2020.

¹⁷¹ Andrew Feickert and Kathleen J. McInnis, *Defender 2020-Europe Military Exercise, Historical (REFORGER) Exercises, and U.S. Force Posture in Europe*, Congressional Research Service, IF11407, January 14, 2020.

¹⁷² Matthew Morton, "We Were There: REFORGER Exercises Designed to Counter Soviet Threat," Association of the United States Army, March 24, 2022.

¹⁷³ U.S. Army Center of Military History, "Operation Desert Storm," webpage, undated.

to begin operations. The experience obtained through maintaining a global network aided in quickly moving forces into the region once basing rights had been secured. By mid-October 2001, U.S. Special Forces deployed to Karshi Kandabad air base in Uzbekistan to begin clandestine operations inside Afghanistan. Task Force Dagger, composed of U.S. Army and Air Force Special Forces, helicopter units of the 160th Special Operations Aviation Regiment, and elements of the 10th Mountain Division, conducted operations to provide assistance to Northern Alliance elements with the goal of overthrowing the Taliban.¹⁷⁴ The United States and other NATO allies continued to use the base in Uzbekistan to varying degrees, as well as bases in Tajikistan and Kyrgyzstan, to support operations in Afghanistan until 2014.¹⁷⁵

The experience of operating expeditionary forces and a global force posture came into play in the run-up to Operation Iraqi Freedom in March 2003. Initial invasion plans called for the introduction of U.S. armored forces to northern Iraq from Turkey in conjunction with operations in southern Iraq. However, Turkey's refusal to allow U.S. forces to stage from its soil for the invasion forced the United States to reroute the 4th Infantry Division from ships off the Turkish coast to Kuwait, where they arrived in mid-April 2003.¹⁷⁶ Though too late to take part in the main operation, these units were available as follow-on forces as U.S. logistical capabilities were able to merge the forces originally destined for northern Iraq into the operations taking place in southern Iraq.

The U.S. global force posture has also aided in HADR operations. One of the most important examples of this aid is the U.S. military response to the earthquake and tsunami disaster in the Indo-Pacific region in December 2004, Operation Unified Assistance. Major U.S. Navy assets, USAF airlift capabilities, and U.S. Army troops were deployed to the hardest-hit areas of Sri Lanka, Thailand, and Indonesia. In Sri Lanka, a total of 1,500 personnel were deployed, including U.S. Navy engineers tasked with clearing debris, Air Force helicopter rescue squadrons airlifting supplies, and Air Force and Marine Corps communication teams. Eventually, the 15th Marine Expeditionary Unit would deploy from Iraq to provide additional assistance.¹⁷⁷

The Thai air base at U-Tapao served as the central logistics and communications hub for the region, facilitating the flow of supplies in the theater and providing a base for coordination between U.S. teams and Thai engineers to clean debris and make repairs. The Cobra Gold exercise series was widely seen as providing the basis for the rapid influx of resources and coordination between U.S. and regional partners. U-Tapao was the site of these exercises

¹⁷⁴ Richard W. Stewart, *The United States Army in Afghanistan, October 2001–March 2002: Operation ENDURING FREEDOM*, United States Army Center of Military History, CMH Pub. 70-83-1, 2004.

¹⁷⁵ Bruce Pannier, "Will Central Asia Host U.S. Military Forces Once Again?" *Radio Free Europe Radio Liberty*, April 23, 2021.

¹⁷⁶ Sharon Otterman, "Iraq: U.S. Deployments at the War's Height," Council on Foreign Relations, February 3, 2005.

¹⁷⁷ Bruce A. Elleman, *Waves of Hope: The U.S. Navy's Response to the Tsunami in Northern Indonesia*, Naval War College, February 2, 2007, p. 30.

in the past, which made it a natural location to set up command and coordination functions. The advanced team for the 2005 Cobra Gold exercise, scheduled for May of that year, was able to push their timetable forward because infrastructure was already in place to support their arrival.¹⁷⁸

The U.S. military response in Indonesia was also substantial. The CSG centered on the USS *Abraham Lincoln* and the expeditionary strike group centered on the USS *Bonhomme Richard* were deployed from stations in Hong Kong and the central Pacific to provide aid and rescue capabilities and coordination for relief efforts coming into the region. U.S. Air Force response teams were able to quickly certify the airport at Banda Aceh as capable of receiving flights, and the first USAF C-17 transport landed with supplies just two weeks after the tsunami struck the country.¹⁷⁹

Maintaining the Global Force Posture

The reemergence of near-peer competition has reinforced the need to maintain the global force posture and logistical and communications capabilities to respond to potential crises in Europe and the Indo-Pacific region. To do this, the U.S. military has continued to conduct substantial exercises to test and train for deployment to multiple regions and operations with new allies. The Defender series of exercises was implemented to test strategic deployment capabilities in Europe, Africa, and the Pacific regions. Whereas the REFORGER exercises were designed to move troops and equipment to one country, Germany, Defender practices moving assets across multiple countries against less defined threats and requires cooperation across U.S. military branches and with allied nations.¹⁸⁰ Defender 2020 was a division-sized exercise that involved 18 nations and moved U.S.-based Army National Guard and Reserve units from 11 states.¹⁸¹ Defender 21 involved 25 nations and moved approximately 29,000 U.S. and allied troops to more than 30 training facilities across the Baltic nations, Black Sea region, Balkans, and Africa, requiring coordination between the U.S. Army, U.S. Navy Military Sealift Command, and terminal operators.¹⁸² In the Pacific, Exercise Forager 21, an offshoot of Pacific Defender, deployed 4,000 troops, including airborne and special forces units, across the islands of the Oceania region of the Pacific and included an airborne drop on Guam.¹⁸³

¹⁷⁸ Elleman, 2007, p. 9.

¹⁷⁹ Elleman, 2007, p. 34.

¹⁸⁰ Jen Judson, "REFORGER Redux? Defender 2020 to Be 3rd Largest Exercise in Europe Since Cold War," *Defense News*, October 7, 2019.

¹⁸¹ Judson, 2019.

¹⁸² William King, "Army Materiel Enterprise Exercises Strategic Readiness Capabilities During DEFENDER Series," U.S. Army, November 3, 2021.

¹⁸³ Todd South, "Trio of Exercises Had Soldiers and Airmen Island-Hopping in the Pacific This Summer," *Army Times*, August 2, 2021a.

Conclusion

During the Vietnam War, U.S. naval and air forces adapted to inadequacies in air-to-air combat by creating new training programs to teach air-to-air combat tactics, which led directly to improvements. After Vietnam, the U.S. military assessed its failures and reoriented training toward its most likely future enemy, specifically a war in Europe against the Soviet Union. The attacks of September 11, 2001, however, forced the U.S. military to change its training again and adapt to the new experience of urban warfare against insurgents. The U.S. Army adapted the NTC to provide real-time lessons learned in the most accurate environment possible to units preparing for deployment. As the wars in Iraq and Afghanistan wound down, near-peer adversaries, specifically Russia and China, rose in competition with the U.S. global security position. In response, the U.S. military has experimented with new operating concepts and unit structures in new domains and without traditional U.S. advantages, such as information superiority.

While confronting threats from strategic competitors, the U.S. military has gained a wide array of operational experience that encompasses varied types of combat against diverse adversaries and in different environments. These experiences have affected how the forces are trained, leading to innovative changes that provide realistic situations and environments to prepare the forces for both current and future threats. Training incorporates the lessons learned from the past and the current potential threat environment by focusing on operation with joint and combined forces and in all domains. Experienced instructors act both as coaches and mentors and as OPFOR trained in the tactics and doctrines of potential adversaries. These innovations demonstrate how the U.S. military has embraced its direct and indirect experience and incorporated it into training programs.

China's Experience and Training

The China case study discussed in Chapter 2 provides a picture of the cultural and technological obstacles China faced in importing foreign military concepts to meet perceived national security imperatives in the late 19th and early 20th centuries. The accompanying discussion of operational models and innovation in Chapter 3, as applied to the development of People's War concepts, provides insight into endogenous Chinese military adaptation in the Mao years leading up to and immediately following the establishment of the PRC. Since the 1990s, the evolution of China's military strategy and doctrine, and the resultant training and force development programs, have been driven by efforts to both learn from and import foreign—mainly U.S., Soviet, and Russian—concepts and adapt homegrown military thought to the requirements of the modern battlefield. In terms of the experiential models discussed in this report, China's current model is hybrid in nature—built on a foundation of Mao's People's War experiences and concepts but focused on learning to conduct information-era warfare as practiced by the United States beginning in the early 1990s.

As the military arm of the CCP, the PLA implements change based on senior party leadership theories about the changing nature of warfare. Through five generations of leadership from Mao to Xi, the Party General Secretary has also served as Chairman of the CCP CMC and has formulated “military guiding theory” to drive changes in military strategy, doctrine, training, and all aspects of force development.¹ This guiding theory translates more concretely to CCP Military Strategic Guidelines, which are developed and promulgated when senior leader thought identifies a change in the nature or form of warfare. Such change encompasses perceptions about specific threats to PRC security and strategic objectives, theories regarding the development of new technologies and weapons that fundamentally alter the nature of conflict, and identification of shifts in the tangible (physical or geographic) and intangible (electromagnetic or cognitive) domains involved in warfare.

Although CCP Military Strategic Guidelines are not published openly, references to them in numerous authoritative PRC sources indicate that the party has issued ten guidelines since the establishment of the PRC in 1949. Three of these—issued in 1956, 1980, and 1993—majorly changed PRC military strategy. The remaining seven were minor revisions to exist-

¹ For a more detailed discussion of the hierarchy of PRC military thought and theory, see Edmund J. Burke, Kristen Gunness, Cortez A. Cooper III, and Mark Cozad, *People's Liberation Army Operational Concepts*, RAND Corporation, RR-A394-1, 2020.

ing strategy, including three issued in 2004, 2014, and 2019.² References to strategic guidelines in defense white papers and other authoritative documents reveal the hybrid nature of PLA experiential learning; to meet the demands of a changing strategic environment, China's military is clearly expected to incorporate concepts and capabilities adapted from more technologically advanced and combat-experienced forces while retaining and modernizing legacy concepts associated with mass mobilization and the People's War model.

Strategic guidelines are the starting point for a bureaucratic process that drives change, inculcates experience, and builds combat capability across the PLA.³ Party strategic guidelines identify the overarching military strategy for the PLA, then various actors in the PLA bureaucracy operationalize the strategy by either revising existing or developing new doctrine (combat regulations), training and evaluation plans, and acquisition programs. The institution at the pinnacle of the PLA military research and education system, the AMS, is heavily involved in both strategy formulation and the development of more-detailed doctrine and concepts of operation to meet that strategic intent. Joint institutions, such as the NDU and National University for Defense Technology, and numerous service-specific institutions are responsible for adapting military education curricula to these evolving doctrinal concepts.

Beyond the theoretical and educational sphere, 16 functional departments directly subordinate to the CMC to ensure that operational planning, acquisitions programs, training directives, and other force development activities are clearly linked to the military strategy. The CMC and its Joint Staff Department disseminate guidance to the services, as force providers, to adapt train-and-equip programs and to the five theater commands, as warfighters, to adapt joint planning and training activities.

Analysis of the PLA as a learning institution reinforces the importance of many of the factors in the logic model developed for this report; it also provides the basis for adapting the model to the specific realities of the restructured PLA taking shape in the Xi Jinping era. China's current Active Defense military strategy to win local informatized war, and the doctrinal concepts that underpin that strategy, are heavily rooted in CCP strategic military thought, theory, and guidance promulgated in 1993 and revised in 2004, 2014, and 2019.⁴ This guidance, in turn, reflects analysis of the military science and theory underpinning modern conflict from the perspective of the CCP and informs a set of inputs that drive PLA training approaches and activities. These drivers include ideological precepts about the PLA as a "party army," CCP threat perceptions and development of campaigns to deter or defeat

² Joel Wuthnow and M. Taylor Fravel, "China's Military Strategy for a 'New Era': Some Change, More Continuity," *Journal of Strategic Studies*, March 2022.

³ Cortez A. Cooper III, "PLA Military Modernization: Drivers, Force Restructuring, and Implications," testimony before the U.S.-China Economic and Security Review Commission, RAND Corporation, CT-488, February 15, 2018.

⁴ See Timothy R. Heath, Kristen Gunness, and Cortez A. Cooper III, *The PLA and China's Rejuvenation: National Security and Military Strategies, Deterrence Concepts, and Combat Capabilities*, RAND Corporation, RR-1402-OSD, 2016; Burke et al., 2020, pp. 34–35.

threats, international partner inputs, emulation of world-class military characteristics, service component interests, and reactive or existential shock drivers. In this chapter, we examine these inputs to PLA experience, assess their influence on training programs and outputs, and conclude with a look at these drivers and outcomes as proxies for assessing PLA military effectiveness in the context of the wars CCP leadership might direct it to fight.

Political and Threat-Based Foundations for PLA Experience

Analysts often note that the PLA has not conducted major combat operations since its incursion into Vietnam in the late 1970s and assess the implications of this lack of combat experience on PLA readiness and capabilities. CCP leadership recognizes the inherent challenges associated with this lack of direct experience and has formulated various “problem statements” to frame the issue for resolution—from the “two incompatibles” to the “five incapables.”⁵ Strategic guidelines, strategy, and doctrine underpin a training logic designed to address these compatibility and capability problems. Through the broad bureaucratic process described earlier, the PLA conceives of and develops its capabilities over time via a sequence of theoretical examinations of warfighting principles, concept development and experimentation, evaluation, and concept approval and dissemination. The bottom line is to develop an army fully dedicated to party objectives and capable of winning on a modern battlefield.

As a party army, the foremost requirement for building experience in the PLA at the individual and unit levels is to ensure loyalty to the CCP. Professional military education, individual training and education programs, and unit training schedules all include political components directed by the CMC Political Work Department (PWD) and carried out by Party Committees and political commissars in units. Secondly, PLA experience is directed and bound by CMC guidance to train and exercise on key warfighting missions and to conduct specific, noncombat mission deployments. Warfighting missions are delineated in doctrinal documents that describe the campaigns the CMC believes the PLA will need to conduct to defeat threats to CCP objectives and defend “core interests.”⁶ Although service-specific unit training and exercises and joint training within China focus on these campaign missions, PLA exercise activity outside China is focused more generally on noncombat missions, such as counterterrorism, and occasionally on combat missions that comport at least loosely with

⁵ The *two incompatibles* refers to an assessment first made by Hu Jintao in 2006 that (1) the level of PLA modernization did not meet requirements for modern warfare and (2) its military capabilities could not meet assigned missions. The *five incapables* refers to Xi Jinping’s 2015 observation that PLA officers were unable to (1) correctly judge situations, (2) understand higher command intent, (3) make operational decisions, (4) deploy troops, or (5) deal with unexpected battlefield developments. See Dennis J. Blasko, “The Chinese Military Speaks to Itself,” *War on the Rocks*, February 18, 2019b.

⁶ Cooper, 2018, p. 5.

PLA campaign tasks and objectives.⁷ Finally, PLA noncombat deployments both within China and externally support party objectives that have little to do with warfighting missions—such as UN peacekeeping operations, noncombatant evacuation missions, counterpiracy patrols, and HADR operations—but do provide opportunities for the PLA to practice combat support and service support tasks that apply to the full variety of campaign missions.

Loyalty and Reliability First: Political Work and PLA Experience

China’s “red versus expert” debate, focused on the extent to which cadre and conscripts should be politically reliable versus technically or operationally capable, manifests itself in the evolution of political control and education in both administrative and operational aspects of PLA modernization over the past few decades. At the foundational level, however, the debate presents a false dichotomy. Party leaders have always expected the PLA to bend to party will and believed that adherence to general scientific principles associated with Marx, Lenin, Mao, and subsequent CCP Chairmen lends itself to the development of both fealty to the party and combat capability.⁸ As with other components of PLA restructuring under Xi Jinping’s leadership, however, political work in the PLA has undergone profound structural reorganization and substantive reform beginning with the Gutian Conference in 2014 and the dissolution of the PLA General Political Department (GPD) in 2016. At Gutian, Xi Jinping laid the foundation for attacking corruption within the PLA and reinvigorating the role of Party Committees and commissars at all levels. Although they are first and foremost aimed at strengthening the control of the party, Xi’s directives also aimed to incorporate metrics by which political organs and commissars could evaluate their contributions to combat effectiveness.⁹

The PWD replaced the GPD in the 2016 restructuring and operates directly under the CMC in the Chairman Responsibility System, which places major organizational functions directly under CMC Chairman Xi. Various component bureaus under the PWD handle the propaganda and personnel management duties previously managed under the GPD; judicial, security, and counterintelligence functions once carried out by the GPD have been passed to the Political and Legal Affairs Commission (PLAC) directly under the CMC.¹⁰ Both the PWD and PLAC (and their service and theater component organizations) have roles to play in individual and unit training activity, but the Party Committees and political commissars

⁷ Joel Wuthnow, Arthur S. Ding, Phillip C. Saunders, Andrew Scobell, and Andrew N. D. Yang, eds., *The PLA Beyond Borders: Chinese Military Operations in Regional and Global Context*, National Defense University Press, 2021.

⁸ James Mulvenon, “Hotel Gutian: We Haven’t Had That Spirit Here Since 1929,” *China Leadership Monitor*, No. 46, March 19, 2015.

⁹ “With the Approval of Xi Jinping the GPD Issues Opinions on Implementing the Combat Power Standards in the Leadership Work of Party Committees,” *Jiefangjun Bao*, April 3, 2018.

¹⁰ Morgan Clemens and Benjamin Rosen, “The Impact of Reform on the PLA’s Political Work System,” in M. Roy Kamphausen, ed., *The People of the PLA 2.0*, United States Army War College Press, 2021.

in PLA units at all levels have the most direct and substantial influence on development of individual and unit experience through training.¹¹

Experimenting and Training to Win Local Informatized War

Jiang Zemin's 1993 strategic guidelines to the military marked the PLA's recognition of the need to adapt to information-era warfare realities, primarily focused on learning from and incorporating U.S. operational concepts as processed by party leaders and PLA strategists. Jiang's directive for the PLA to prepare for "local wars under high-tech conditions" recognized the revolution in military affairs evident in Operation DESERT STORM, which was characterized by network-enabled precision strike and synergies created by joint operations.¹² It took an additional six years, however, for the PLA to release its first joint doctrine in 1999, and two years beyond that for associated high-level training guidance to emerge. The 2001 Outline for Military Training and Evaluation (OMTE) provided guidance for the establishment of training programs across the PLA service components based on force-wide experimentation efforts following the 1993 strategic guidelines. However, joint training was still nascent and hampered by nonjoint C2 structures.¹³ Some progress was made during this period, as marked by the culmination of joint training experimentation efforts with the Sharp Sword exercises held in 2005. Sharp Sword illustrated that the PLA could coordinate, albeit with geographically dispersed units, key missions associated with joint precision strike and integrated air-land operations—missions that would apply across a variety of potential campaigns that might be in play in several regional contingencies.¹⁴

As these developments begun under Jiang's guidance moved forward, Hu Jintao came to power and released revised strategic guidelines to the military in 2004. These guidelines did not alter China's overarching active defense strategy but did specify that the so-called high-tech conditions under which the PLA would operate were, in fact, informatized conditions. To prepare the PLA to achieve victory in a local war (i.e., on China's periphery) under informatized conditions, Hu emphasized a combination of two principles that PLA strategists called "integrated joint operations" and "information-based system-of-systems warfare."¹⁵ The former characterized joint operations as multiservice in nature, but also with joint operational elements fully and seamlessly networked (or integrated) for C2 and combat operations across all domains of warfare (including newer strategic domains in space and cyberspace).

¹¹ Clemens and Rosen, 2021.

¹² Wang Yongnan, *Exploring the Essentials of Gaining Victory in System Warfare*, National Defense University Press, 2015, p. 23.

¹³ Cooper, 2018.

¹⁴ Mark Cozad, "Toward a More Joint, Combat Ready PLA?" in Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow, eds., *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, National Defense University Press, 2019.

¹⁵ Wang, 2015.

The latter introduced newer, but related, Chinese military thinking about how information-era warfare is a contest not only between opposing forces but between complex joint operational systems-of-systems.

Although these developments indicate a focused approach to building a networked force with capabilities to conduct joint operations in a regional crisis, Hu Jintao also complicated things for the PLA by including “New Historic Missions” in the 2004 guidance. While retaining the requirement for an informatized force to win fights on China’s periphery, the “New Historic Missions” included a diversified set of global missions. Hu’s strategic guidance dictated that “the army must use its power to make sure the party’s ruling status is consolidated, provide solid strategic support for defending national interests, and bring into full play the army’s role in maintaining world peace and promoting common development.”¹⁶ At the same time, the PLA was grappling with the shift from mechanized to informatized operations and doing so before the force had even mastered comprehensive mechanization. A seminal January 2006 PLA media editorial noted that PLA capabilities were “incompatible” with the “demands of . . . winning informatized war.”¹⁷

PLA training and exercise activity following Hu’s 2004 guidelines (during the 11th Five-Year Plan from 2006 to 2010) focused to a great extent on experimentation with IJO and systems concepts such as transregional mobility, joint precision-strike operations, multiservice C2, and joint logistics, as well as conducting symposia, working groups, and demonstrations on joint training processes and approaches.¹⁸ In 2006, Hu directed the PLA to overhaul its training at a PLA-wide conference, setting in motion several major exercises focused on joint mission area training.¹⁹ In subsequent years, the PLA also carried out measures to improve professional military education, including efforts to standardize and update course curricula to reflect the new focus on joint integration. After a series of meetings to review the results, the CMC issued a new OMTE in 2009 that delineated training standards tied to joint operations, albeit still in a largely coordinated, rather than integrated, sense.²⁰ Regulations issued the same year standardized a joint operations theoretical framework.²¹

The PLA conducted Stride, Joint Firepower, and Mission Action transregional joint exercises in 2009 and 2010, which were capstone events in the development of PLA joint training

¹⁶ “The New Mission of the People’s Army,” *Liaowang*, January 2007, pp. 26–28.

¹⁷ “Strategic Guidance Establishes Basis for Expanding PLA Activity,” *Jiefangjun Bao*, February 6, 2008.

¹⁸ Cozad, 2019.

¹⁹ “Transformation of PLA Military Training in the Past Five Years,” *Jiefangjun Bao*, November 3, 2010.

²⁰ “PLA General Staff Department Approves Release of Newly Amended ‘Military Training, Examination Outline,’” *Jiefangjun Bao*, July 25, 2008.

²¹ Wanda Ayuso and Lonnie Henley, “Aspiring to Jointness: PLA Training, Exercises, and Doctrine, 2008–2012,” in Roy Kamphausen, David Lai, and Travis Tanner, eds., *Assessing the People’s Liberation Army in the Hu Jintao Era*, Army War College, 2014, pp. 174–175.

experimentation and provided foundations for major joint activity to follow.²² The OMTE issued in 2009 as this experimentation and discourse took shape mandated training that would occur in the 12th Five-Year Plan (2011–2015) and beyond to ostensibly produce a PLA capable of conducting IJO beyond China's borders, even if only locally. In 2010, a General Staff Department official stated that adjustments to joint training underway at that time would also set the stage for system-of-systems training across the force after 2015.²³

PLA exercises undoubtedly improved at this juncture in terms of learning basic joint concepts on sovereign territory, especially with the introduction of more competitive PLA Blue Team opposition forces in 2012.²⁴ These OPFOR units became a standard feature of maneuver exercises within the PLA's regional training centers (RTCs); PLA media reports indicated that the force had achieved a higher level of training realism than had previously been the case when blue forces prevailed over PLA red units in most exercises at the tactical level.²⁵

The 12th Five-Year Plan, however, was marked by a significant change in the path mapped out for the PLA by CCP leadership between the beginning of the 1990s and the end of the 2010s. Xi Jinping's ascension to power in 2012 presaged a consolidation of power that would enable Xi to transform the PLA. In 2014, the CMC promulgated *Opinions on Raising the Level of the Realistic Battle Orientation of Training* to reinforce the priority of training for joint combat missions across the force, indicating that, although Xi reaffirmed the general direction of PLA doctrine and training, he assessed efforts in that direction to be failing.²⁶ In 2013, AMS published *The Science of Military Strategy*, which discussed the basic principles of organizing joint theater commands and operational methods between joint forces. The book defines IJO as "integrated, completely linked operations that rely on a networked military information system, employ digitized weapons and equipment, and employ corresponding operational methods in land, sea, air, outer space, and cyber space."²⁷ The book also urges the PLA to "break through the hierarchical differentiation between strategic, operational, and tactical levels," suggesting a focus on developing integration down to the tactical level. This text explained the evolution in doctrine by contrasting the vision of IJO with the previous focus on "coordinated joint operations." It stated that, in terms of operational activities, the former requires "concurrent" activity while the latter relies on "sequential" activities.²⁸

²² Cozad, 2019.

²³ "PLA GSD Officer on Training Transformation in '11.5,' Looks After '12.5,'" *Jiefangjun Bao*, November 2, 2010.

²⁴ Liang Jun, "China's First Blue Army Gives PLA Some Bitter Lessons," *Jiefangjun Bao*, July 24, 2015.

²⁵ Dennis J. Blasko, "The Biggest Losers in Chinese Military Reforms: The PLA Army," in Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow, eds., *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, National Defense University Press, 2019a.

²⁶ Blasko, 2019a, p. 215.

²⁷ Shou Xiaosong, *The Science of Military Strategy*, 1st ed., Military Science Press, 2013, p. 123.

²⁸ Shou, 2013, p. 124.

The Science of Military Strategy also addresses the nuclear, space, and cyber domains in far greater detail than previous sources. It discusses how modern war had become “five dimensional,” spanning the ground, sea, air, space, and information domains, which raised the imperative for the military to operate as an integrated force.²⁹ It also emphasized the importance of combining services and branches in a manner that “developed their collective strengths and minimized shortcomings,” and warned against “emphasizing the position and role of a single service within operations.”³⁰ Training regulations and other documents at the time, however, lacked clear guidance on how to integrate forces across all domains of conflict.

In late 2015, Xi achieved the radical restructuring of the PLA that had eluded his predecessors—an effort to strengthen Xi’s control over the PLA while providing a joint-theater C2 structure that would be capable of executing the joint campaign operations that had previously been aspirational. The restructuring placed other services on an equal footing with the previously dominant ground forces and clearly placed responsibility for specific geographic mission sets on each of the five theater commands (strategic directions encompassing likely conflicts on China’s periphery; one in each cardinal direction and a fifth around Beijing). Joint training responsibility was also largely relegated to the new theater commands.

In 2015, a defense white paper entitled *China’s Military Strategy* was released and, in turn, drove leaders across the PLA services to issue new training guidance.³¹ This guidance uniformly called for reduction in scripted training in favor of more-challenging OPFOR events, increased realism via training in “complex electromagnetic and nuclear, biological, and chemical environments,” and improved joint training at the campaign (theater) level.³² Immediately following the restructuring directive and the stand-up of five theater commands, theater-level training primarily focused on command post exercises involving the commanders and staff from service elements now under the direction of Joint Operations Command Centers in each theater.³³ In subsequent years, joint campaign training under the theaters has rapidly evolved to include major joint exercise activity directly corresponding to campaign missions in each of China’s strategic directions. These exercises include joint air defense exercises such as Blue Shield, joint PLA Air Force (PLAAF) and PLA Navy (PLAN) exercises around Taiwan, joint PLA and PLAN island landing campaign training, numerous joint maneuvers in the South China Sea, and joint mountain warfare training in Tibet.³⁴

²⁹ Shou, 2013, p. 169.

³⁰ Shou, 2013, p. 126.

³¹ PRC Defense Ministry regular press conference, January 29, 2015.

³² Defense Intelligence Agency, *China Military Power Report*, 2015, p. 95.

³³ Sugiura Yasuyuki, *The PLA’s Pursuit of Enhanced Joint Operations Capabilities*, National Institute for Defense Studies, 2022, p. 64.

³⁴ See Rajeswari Pillai Rajagopalan and Pulkit Mohan, “PLA Joint Exercises in Tibet: Implications for India,” Observer Research Foundation, February 26, 2020; and Sugiura, 2022, p. 66.

The PLA implemented a new OMTE in January 2018, intending to better integrate service training programs with joint campaign training objectives at the theater level.³⁵ In 2020, the CMC followed this with release of a new generation of long-awaited joint doctrine, *Trial Guidelines on PLA Joint Operations*. This trial doctrine is not publicly available, but reports indicate that it directs joint campaign training and a full shift away from mechanization to “intelligentization”—a step further down the road to fully networked and information system-enabled joint operations.³⁶ At this time, PLA strategists began writing about the need for the PLA to not only focus on joint operations as the basic form of war but also develop capabilities to conduct multidomain integrated joint operations (with an inherent nod to U.S. concepts of multidomain warfare).

Under Xi Jinping’s guidance and control, joint C2 is certainly emphasized and improved under the theater command structure; however, training is still driven by political, service-specific, and joint staff imperatives and directives that are not necessarily moving in the same direction. The PLA remains in the throes of transition in this regard. It continues to build an experiential model that imports U.S. concepts of network-centric joint warfare and merges them with Chinese ideas of societal mobilization for conflict and scientific solutions to operational challenges via a system-of-systems approach. Thrown into this mix are CCP-driven requirements for political indoctrination to inculcate loyalty through training, service-specific training programs for large cohorts of conscripts to fill the ranks, and dependence on a national mobilization system that harkens back to the days of “People’s War” but with new imperatives to support technologically complex wartime functions. Although the roots of all these experiential priorities predate the Xi era, the nature of the restructuring under Xi is so profound that the experiences of PLA personnel prior to that watershed will likely be dissonant with future requirements and the experiences of younger cadre growing in the new system.

Joint operations and systems warfare have been central to PLA experimentation and operational planning for nearly two decades but have dealt mainly with establishing the approaches and methods needed for joint training and exercises at various levels. Experimentation prior to restructuring laid the groundwork for joint experience but was confined to a few designated military regions (the ground force-dominated, pre-theater command structure), confined to a limited number of service components within these military regions, and often conducted by geographically dispersed units. They were coordinated, rather than integrated, joint activities. In the 13th Five-Year Plan (2016–2020) that immediately followed restructuring, however, the PLA reportedly conducted more than 100 joint training events that involved “integrated” activity, especially focused on C2 connectivity and information-sharing.³⁷

³⁵ Sugiura, 2022, pp. 64–65.

³⁶ Sugiura, 2022, p. 66.

³⁷ Sugiura, 2022, p. 68.

As illustrated in the film *Target Locked*, training prior to the 2016 reforms exhibited maladies that have plagued the PLA for decades. Problems run the gamut, from officers who are unable to make decisions when training situations veer off established scripts or communications links are severed, to complacency on the part of service members who do not appreciate the link between training and survival in combat, to training scenarios that fail to incorporate newly adopted operational concepts or stress the full capabilities of new equipment. Reports summarizing training events after 2016 (discussed in more detail in Chapter 8) indicate that, although training realism has improved in the years following restructuring, these same issues persist across the force.

Training realism and standardization of joint training activity across the force will likely improve as RTCs adapt to more-sophisticated training and evaluation tools and methods, training events against OPFOR units become ubiquitous, and theater commands begin to slowly meet joint training and evaluation responsibilities. Brakes on this progress are likely to result, however, from disconnects between services and theaters regarding division of responsibility and the increased operational tempo required of all services, especially the PLAN and PLAAF, to respond to CMC demands to conduct deployments around Taiwan and in peripheral waters. Although these activities represent opportunities to exercise combat mission-related skills, they also potentially interfere with and complicate scheduled training activity focused on the full range of joint campaign missions associated with PLA preparation for regional contingencies.

Gaining Operational Experience Abroad

Although Xi has clearly prioritized the local war, campaign mission-focused aspect of experience through training, the broader mission sets delineated by Hu's 2004 guidance are still represented in CCP official statements and objectives. The PLA's improved ability to deploy military units and modern systems farther and farther from China's borders has been accompanied by a growing portfolio of experiences training with foreign partners, exercising on China's maritime periphery and in open ocean areas, and deployments for noncombat missions. Past studies of PLA military experience have categorized these experiences into two distinct portfolios: noncombat deployments of military assets for varying lengths of time and military exercises with partners at all echelons.³⁸ While PLA exercises across echelons, service components, and theater commands do not risk confrontation with regional neighbors and do not carry explicit risk to participating units (apart from training accidents), overseas operations and operations along China's maritime and land periphery offer a different kind of experience that entails risk to PLA operators who might have to contend with hostile elements or unexpected obstacles.

³⁸ Roy Kamphausen, David Lai, and Travis Tanner, eds., *Learning by Doing: The PLA Trains at Home and Abroad*, Strategic Studies Institute, U.S. Army War College, 2012, p. 2.

Noncombat Deployments

As in the events surrounding China's NEOs in Libya in 2011 and Yemen in 2015, PLA operations abroad are unique in that dynamic threats, man-made or possibly imposed by nature, force PLA operators to contend with uncertainty at a distance from sovereign territory at which equipment and personnel are stressed and placed in danger. Additionally, some operations, perhaps by design, introduce geopolitical risk by potentially provoking reactions from other nations. The PLA's operations in the Western Pacific, the Indian Ocean, and the South China Sea occur across common and disputed maritime and air boundaries. China's de facto basing across approximately 30 installations in the South China Sea is one example of this dynamic, with PLAN and PLAAF operational experience concomitant with military incidents or friction involving foreign militaries, such as the armed forces of the Republic of Vietnam and the Philippines.

Analysis of the disparate PLA overseas experiences by primary mission set, as shown in Table 7.1, establishes a level of maturity by continuous years of effort. Estimating unit participation by echelon (Figure 7.1) provides a rough summary of the scope of experience gained by PLA units in deployments since the PLA last conducted major combat operations in Vietnam. Categories of PLA participation also include non-PLA security forces, such as China's Coast Guard in the South China Sea and the People's Armed Police multinational riverine patrol, which has participated in joint or out-of-area deployment alongside the PLA.

Although most PLA experience is indirect in nature, small-scale use-of-force incidents also figure into the PLA experience calculus. There is not a fine line between combat operations in war and lower-level military incidents, such as Sino-Vietnamese maritime clashes in 1988 or the more recent Sino-Indian Doklam Plateau brawl between Indian and PLA soldiers.³⁹ These PLA deployments, however, fit into a portfolio with more-clearly noncombat deployments. The PLA describes these efforts as focused initiatives or programs to promote and protect Chinese interests in peacetime. The PLA's efforts to support UN peacekeeping missions since 1990 and the PLAN's counterpiracy missions since 2008 are emblematic of a deliberate but flexible deployment of PLA forces abroad. In the case of crisis response, including NEOs and HADR, the timing of these PLA operations is not predictable because coups, terrorist threats, and natural disasters are episodic in nature; however, the PLA's eventual response is increasingly predictable. For that reason, crisis response is included in addition to nine other categories covering PLA noncombat operational experience since 1979.

Depicted across a timescale and mapping the noncombat experience categories against the PRC participating units' likely echelon yields Figure 7.1.

Quantifying noncombat experience by time and unit echelon offers several insights. First, most of the efforts to generate PLA experience—especially international experience—seem to be relatively recent phenomena and have occurred largely since 2007. There are long-standing

³⁹ Joshua Lipes, "Vietnam Marks Anniversary of Naval Clash with China over Spratly Island Reefs," *Radio Free Asia*, March 13, 2018; Jonathan Marcus, "China-India Border Tension: Satellite Imagery Shows Doklam Plateau Build-Up," BBC News, January 26, 2018.

TABLE 7.1

PLA Overseas Military Operations Other Than War (MOOTW), 1985–2021

Operational Experience ^a	Experience Remit	Initial Year	Service Emphasis
Joint naval patrols	Patrols of the Sea of Japan and Western Pacific with the Russian Navy and contributions of five PLAN vessels^b	2021	PLAN
Joint border aerial patrols	- Patrols of the Sea of Japan and East China Sea with Russian Air Force - Three iterations through late 2021, with PLAAF contributions of two or four H-6 Bombers^c	2019	PLAAF
Formal overseas basing	- As of 2021, the PLA's only formally acknowledged and permanent overseas base is at Doraleh, Djibouti^d - Logistics hub that might support several hundred PLA personnel and multiple out-of-area (OOA) deployers^e	2017	PLAN, PLAN Marine-Corps
Long-range aviation (LRA), overwater flights	- Multiaircraft platform patrols by PLAAF assets to a variety of locations covering regions outside the first island chain and the South China Sea^f - Missions include crossing Air Defense Intercept Zones, circumnavigation of Taiwan, and crossing defined median lines^g	2015	PLAAF
De facto overseas basing ^h	As of 2021, the PRC has developed and improved 20 locations in the Parcel Islands, seven locations in the Spratly Islands, and one area in Scarborough Shoal from which numerous air, naval, and land assets operate in a near-continuous (but internationally disputed) presenceⁱ	2013	PLAN, PLAAF, PRC Coast Guard and Maritime Militia
Joint border riverine patrols	- Patrols of the Mekong River Delta for counternarcotics and maritime border enforcement with the nations of Laos, Myanmar, and Thailand 112 iterations through late 2021^j	2011	PRC Coast Guard
Counterpiracy missions	- Patrols of the Red Sea, Gulf of Aden, East Indian Ocean, and some maritime interdiction - Special Operations Force support primarily led by one to two PLAN vessels and support ships^d	2008	PLAN
International crisis response	- A variety of responses, including HADR and NEOs - Formal and ad-hoc unit composition	2004	PRC response package can vary by event, often includes PLAN
UN peacekeeping operations	- China contributes to UN-approved peacekeeping operations in Africa and the Middle East^k - Deploys around 2,000 peacekeepers out of a reserve of 8,000^d	1990	PLA ground forces, or PLA Army (PLAA)

Table 7.1—Continued

Operational Experience ^a	Experience Remit	Initial Year	Service Emphasis
Out-of-area, show-the-flag deployments	International port visits conducted by PRC vessels, often one to two PLAN vessels with an accompanying oiler or support vessel^l	1985	PLAN

NOTES:

^a Experience categories do not include domestic or international exercises.

^b Vasco Cotoio, "Russia and China Hold First Joint Patrol in the Western Pacific, Russian Defense Ministry Says," CNN, October 23, 2021.

^c Yang Jin, "China-Russia Joint Air Patrols a Strong Signal for Regional Stability," *Global Times*, December 9, 2021.

^d Wuthnow et al., 2021.

^e Andrew Tate, "China Sends First Troop Contingent to Djibouti Base," *Jane's Defence Weekly*, July 12, 2017.

^f Mark R. Cozad and Nathan Beauchamp-Mustafaga, *People's Liberation Army Air Force Operations over Water: Maintaining Relevance in China's Changing Security Environment*, RAND Corporation, RR-2057-AF, 2017.

^g Akhil Kadidal, "Under Pressure: Amid Russia-Ukraine Conflict, China Slowly Ramps Up Air Incursions over Taiwan," *Janes International Defence Review*, May 10, 2022.

^h *De facto basing* refers to South China Sea bases or facilities and does not include other possible unacknowledged or disputed PLA bases outside China's western and southwestern land borders.

ⁱ Asia Maritime Transparency Tracker, "China Island Tracker," webpage, Center for Strategic and International Studies, undated.

^j "106th Mekong River Joint Patrol Begins," Xinhua, June 23, 2021.

^k United Nations, "Troop and Police Contributors," dataset, undated.

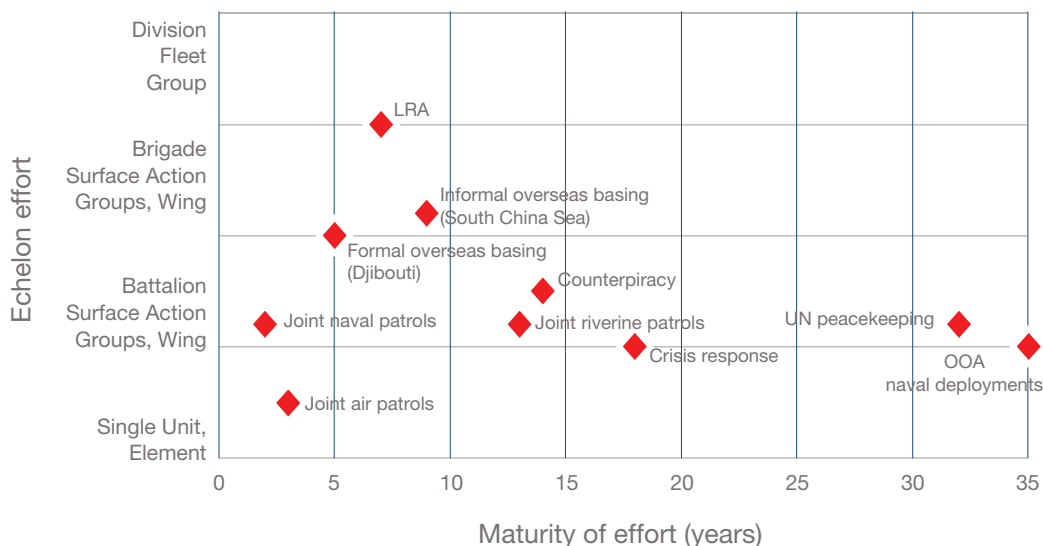
^l Michael McDevitt, "PLA Naval Exercises with International Partners," in Roy Kamphausen, David Lai, and Travis Tanner, eds., *Learning by Doing: The PLA Trains at Home and Abroad*, National Defense University Press, 2012.

PLA efforts, such as show-the-flag port visits (since 1985) and PLA-UN peacekeeping contingents (since 1990), but the burst of activity in the past decade gives credence to the argument that PLA activity and the search for international experience have been driven by high-level guidance from PRC leadership in 2004 and 2019. There is thus continuity between Hu Jintao and Xi Jinping in this regard, despite Xi's clear prioritization of preparing for local war.⁴⁰ An additional element of the more temporal aspects of PLA activities would also seem to be technology-dependent; a PLA unit without sustainment for materiel and personnel support is unlikely to be supporting operations far from China's borders. These issues have only been addressed by the PLA's acquisition of long-range platforms such as aircraft carriers, big-deck amphibious transport vessels (Type-075 LHA), and long-range transport aircraft (Il-76, Y-20).

Second, most of these activities could be described as low throughput in terms of personnel and assets conducting these activities on a regular basis, at least in terms of the proportion of participating units compared with the size of the PLA. That observation does not dimin-

⁴⁰ James Mulvenon, "Chairman Hu and the PLA's 'New Historic Missions,'" *China Leadership Monitor*, No. 27, Winter 2009; M. Taylor Fravel, "Hearing on 'a 'World-Class' Military: Assessing China's Global Military Ambitions,'" testimony before the U.S.-China Economic and Security Review Commission, June 20, 2019.

FIGURE 7.1
PLA Overseas Experience Between 1985 and 2021



NOTE: Echelon groupings assigned by highest echelon or element reported to have participated in that activity, years marked from inaugural effort. Overseas experience excludes international exercises. Crisis response category includes NEOs and HADR.

ish the PLA's opportunities for incremental learning; logistics and command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) operational lessons that are learned at an individual level can also be applied at scale. However, if these activities are meant to generate operational veterans, a few thousand soldiers per year gaining experience out of a standing army of 1.3 million soldiers and several ships deployed each year out of a fleet of 350-plus ships likely falls short of that end. Even China's more substantial and persistent overseas presence at its military base in Doraleh, Djibouti, consists of only a few hundred PLA military personnel on-site per year.⁴¹

PLAAF multiplatform flights in the vicinity of Taiwan and into the Western Pacific are a notable exception. Since 2020, these LRA operations seem to be occurring at a much higher volume and operational echelon than other PLA experience categories, with hundreds of PLAAF aircraft participating over the course of each year.⁴² Additionally, this analysis is not meant to diminish the ways in which the PLA might leverage select units and cadre for challenging deployments; it is possible that these activities might scale to greater PLA echelons in the future, in an incremental approach that would be in keeping with PLA tradition.

⁴¹ Joel Wuthnow, Phillip C. Saunders, and Ian Burns McCaslin, *PLA Overseas Operations in 2035: Inching Toward a Global Combat Capability*, National Defense University Press, May 17, 2021.

⁴² For elaboration on the hundreds of sorties and PLAAF platforms that have participated, see Kadidal, 2022.

Third, a review of the PLA's portfolio of noncombat military experience suggests that the PLAN remains the greatest beneficiary (or most common participant) among the various services. The People's Liberation Army Rocket Force (PLARF) and People's Liberation Army Strategic Support Force (PLASSF) were not mentioned in overseas operations by PLA public sources. As others have previously observed, overseas operations—partly by design of the theater command structure—allow greater freedom for the individual services to pursue their own interests.⁴³ The PLAN has also historically possessed greater transportation means to respond to PRC leadership needs, as in the case of its dedicated counterpiracy mission.

Finally, the review of noncombat military experience activities found no example of an activity that, once started, was allowed to lapse or sunset. Mission inertia or perceived utility might account for the persistence of multidecade operations or might be evidence of long-standing CCP strategic commitment to pursue a broadening portfolio of military experience opportunities.

Exercising with Foreign Partners

A CMC training conference in 2020 reportedly stressed several key means for the PLA to improve joint training methods. One of these was to increase the level of joint training with foreign partners.⁴⁴ Although China eschews formal military alliances, the PLA engages in various training and exercise programs and events with foreign partners. By and large, the focus of these exercises has been in MOOTW mission areas, but these exercises nonetheless provide participating PLA units with opportunities to deploy and interface with an array of foreign counterparts. The PLA is also increasingly involved in military competitions, such as *Aviadarts* in Russia, that require intensive train-up periods and provide an opportunity for the PLA to evaluate basic tactical prowess in a comparative environment. Both foreign exercises and competitions involve small numbers of units relative to the size of the force, but, in the aggregate and over time, these activities include a reasonably large number of units (particularly from the PLAA, as discussed in the following section).

From the perspective of China's leaders, these events support larger PLA military diplomacy objectives while offering, in some cases, opportunities for the PLA to achieve the operational experience needed to address shortfalls associated with lack of combat experience. Most notable in this latter category are PLA exercises with Russia under the rubric of the Sino-Russian strategic partnership. As this partnership has strengthened over the past decade, primarily because of shared threat perceptions of the United States, exercise activities have increased and evolved in mission focus.⁴⁵ Historically, Russia figures prominently in the professional education of PLA senior leaders and development of Chinese military strategy, doctrine, training, and force development. In the absence of formal alliances, Beijing contin-

⁴³ Wuthnow, Saunders, and McCaslin, 2021.

⁴⁴ Sugiura, 2022, p. 87.

⁴⁵ Richard Weitz, *Assessing Chinese-Russian Military Exercises: Past Progress and Future Trends*, Center for Strategic and International Studies, July 9, 2021.

ues to rely on Moscow to provide PLA units across the force with external inputs to operational and tactical experience through joint exercise activity.

Assessing the extent to which PLA overseas experience and foreign exercise activity affect China's approach to conducting campaign-specific missions and operations is largely speculative in nature. However, there is little to no indication that the PLA has revised or developed concepts of operations or campaign missions based on overseas deployments or contact with foreign militaries. Exercises with Russian forces reinforce lessons learned from study of Russian operations and tactics; other deployments provide experience in fundamental logistics and maneuver for most PLAN and PLAAF forces and some PLAA troops. The multidomain IJO that provide the theoretical underpinning for regional warfighting concepts remain nascent in the PLA's experience playbook and, at that, do not feature in training with partners or in overseas deployment activity.

PLA Training, Exercises, and Noncombat Deployments: Drivers and Activities

Built on the foundational PLA experience categories discussed above are a variety of national strategic and military-specific means to pursue such experience. Most of these drivers for PLA experience follow directly from the CCP-directed categories described above, although some represent legacy efforts or responses to perceived emerging threats. The following section identifies several of these drivers of PLA operational experience, culled from a combination of PRC national defense white papers, the annual CMC military orders given to the PLA, and the justifications offered by official PLA sources for specific mission sets (i.e., the need for counterpiracy patrols or Sino-Russian Joint Patrols). Although PLA and PRC official justifications for pursuing operational experience routinely engage in bureaucratic doublespeak regarding their activities and true intentions (Xi Jinping's 2015 claim that China is not "militarizing" the South China Sea is an oft-cited example), these sources nonetheless provide a good lens through which to evaluate PLA efforts to gain the operational experience required to meet CCP strategic objectives.⁴⁶

Inculcating Party Loyalty: Political Work Reflected in PLA Training

Although most drivers of PLA experience have some direct link to the campaign missions captured in PLA doctrinal writings, political training is both a separate requirement for personnel and units and a pervasive element in exercise activity at every level. China's leaders do not see a bifurcation between operational and political objectives in training. In the view of the CCP, party loyalty and the application of Marxist-Leninist scientific determinism to mili-

⁴⁶ Shannon Tiezzi, "China Won't 'Militarize' the South China Sea—But It Will Build Military Facilities There," *The Diplomat*, October 16, 2015.

tary planning are consistent with, and perhaps essential to, effectiveness in combat. Therefore, Xi Jinping has directed a triad training system to develop military personnel who are politically reliable and professionally competent.⁴⁷ The triad consists of education at military institutes, unit training, and military professional education. At the unit level, the theater commands have each developed curricula for developing cadre with joint operational education.⁴⁸ At the operational level, joint campaign exercises also include aspects of political work. In one recent reported event, for example, the PLA and PLAN established a joint Party Committee to provide guidance during a joint island landing exercise.⁴⁹

Political education and training is clearly one of the highest priorities in the postreform PLA, although it is not possible to accurately determine the percentage of time an average conscript, NCO, or officer in the PLA spends on this training. According to one report, such training might consume as much as 40 percent of total basic training time for service members across the force.⁵⁰ It is also difficult to assess the results of this training in terms of improving intangible aspects of soldier or unit performance, such as willingness to follow orders under conditions of duress. Although it is certainly possible for military personnel to be both “red” and expert, metrics for correlating political training with combat effectiveness are speculative at best.

Renewed political work includes Xi’s high-level attack on corruption in the PLA, which likely has cleaned up promotion processes to some extent and improved professionalism in the ranks. Additionally, recent programs requiring political cadre to fill operational command positions might, over time, reduce friction between political- and combat mission-focused training.⁵¹ The CCP’s own stated imperative for the PLA to fight and win informatized war, however, raises questions about the efficacy of intensive political work for the force. The continuing—even strengthened—system of dual political and operational command potentially complicates speed of decisionmaking in information-era warfare. Building a training program for individuals and units that balances requirements for development of technical expertise, complex joint operational capability, and political reliability is a tall order for a PLA in the throes of a major restructuring effort since 2016.

⁴⁷ Sugiura, 2022, p. 69.

⁴⁸ Sugiura, 2022, p. 73.

⁴⁹ Sugiura, 2022, p. 66.

⁵⁰ Wang Yuwei, ed., “The General Political Department Issued a Notice Requesting the Whole Army and Armed Police Forces Strengthen the Ideological and Political Education of Recruits,” *China Military Online*, September 30, 2013.

⁵¹ Sugiura, 2022, p. 66.

CCP Threat Perceptions and Doctrinal Drivers (Campaigns and Scenarios)

After party loyalty, perhaps the most foundational of drivers for PLA training programs and activities are the doctrinal missions that follow from CCP threat perceptions, as delineated in strategic guidelines to the military and other official party documents. PLA doctrinal thinking and documents set how-to-fight instruction to the military in terms of campaigns and campaign tasks that correspond to fighting the local wars highlighted in strategic guidance. These campaigns include both joint and service-specific operations, with joint campaigns dominating PLA attention.⁵² Service-specific campaigns generally feature as subcampaigns of the larger joint campaigns. These joint campaigns, in turn, correspond to scenarios that represent conflict in the strategic directions corresponding to theater command areas of responsibility, including Taiwan, the Korean Peninsula, the Indian border, and the South and East China Seas.

PLA joint campaigns provide a unified command for operations conducted by two or more services in one or multiple theaters. In particular, regardless of the functional purpose behind a specific campaign (e.g., joint island landing, firepower strike, blockade, island offensive, border counterattack, air defense, antilanding), a core set of principles and operational activities is common across all campaigns. As the PLA has modernized and built its operational system, PLA leaders and strategists have attempted to build a common joint campaign framework capable of providing a foundation for the different types of campaigns required for potential local war scenarios.

A 2013 defense white paper states that, “[t]he PLA takes scenario-based exercises and drills as the basic means to accelerate the transition in military training and raise combat capabilities.”⁵³ Along these lines, the section of the document that outlines the “fundamental tasks of China’s armed forces . . . to firmly safeguard China’s core national interests” emphasizes homeland defense, scenario-based training, and combat readiness as essential components across campaigns and mission areas.⁵⁴ The same document parses out the advances of each of the PLA services by delineating new and improved organizational designs for broad mission areas defined by doctrinal principles, such as mobile operations, multidimensional offense and defense, offshore defense, and strategic deterrence.⁵⁵ These are not specifically linked to individual scenarios, but the PLA has clearly designed joint campaigns and operational concepts for use in a variety of operational scenarios, against any adversary, and across all domains. The PLA trains for specific regional scenarios but, regardless of the operational scenario, there are common IJO and system destruction characteristics and imperatives that

⁵² Li Yousheng, *Lectures on the Science of Joint Campaigns*, 2nd ed., Military Science Press, 2012.

⁵³ State Council of the People’s Republic of China, *The Diversified Employment of China’s Armed Forces*, April 2013.

⁵⁴ State Council of the People’s Republic of China, 2013.

⁵⁵ State Council of the People’s Republic of China, 2013.

guide PLA operational planning across all its theater commands and associated strategic directions.

Island landing scenarios are a dominant theme in joint exercise activity. The three-part Mission Action-2013 exercise, in which the PLA went on the offensive with beach and vertical amphibious assault methods to secure campaign objectives while defending against adversary counterattacks on the Chinese homeland, established a framework for subsequent joint drills and exercises with clear implications for a Taiwan contingency.⁵⁶ Although official descriptions of the exercise were focused on operational objectives and were neutral about the scenario's broader context, CCTV images of the event showed maps of Taiwan behind exercise participants.⁵⁷ The exercise likewise established a pattern of scenario-based training to counter the threat of U.S. intervention in a Taiwan scenario; air units from the PLAAF and PLAN, naval units, and ground forces executed "far-distance maneuvers, joint air defense, air confrontation and joint aid in strange terrains and war environments."⁵⁸ In aggregate, the pieces of the exercise provide a picture of PLA training for in-depth defense against a modern adversary such as the U.S. military. Subsequent exercise activity reinforces these training objectives, in both single-service and joint events.

China's 2019 defense white paper highlights the need "to improve the capabilities of joint operations command to exercise reliable and efficient command over emergency responses, and to effectively accomplish urgent, tough and dangerous tasks."⁵⁹ Since 2012, according to the white paper, the PLA has conducted extensive campaign task-oriented training, including 80 joint exercises at and above the brigade or division level. At the center of these exercises are systems warfare-oriented concepts, including target-centric warfare and its tactical counterpart, vital point-controlled annihilation warfare, which focuses on joint precision strikes against critical nodes.⁶⁰ A key objective is to train on joint C2 to generate and employ the force groupings and systems necessary to execute specific targets within the operational window resulting from the commander's intent and objectives. PLA experimentation and subsequent training has attempted to apply concepts such as target-centric warfare to coastal defense operations, seizure of C2 facilities and airfields, and precision strike operations.⁶¹ During these exercises, the PLA has focused its efforts on developing a "combat power gen-

⁵⁶ See "PLA 'Mission Action 2013' Cross-District Mobility Drill: Ground-Sea Heavy Armor Transporting Forces," *Global Times*, September 17, 2013; Jonathan D. Pollack and Dennis J. Blasko, "Is China Preparing for a 'Short, Sharp War' Against Japan?" Brookings Institution, February 25, 2014.

⁵⁷ "Talk of the Day—Map of Taiwan on CCTV Draws Attention," Focus Taiwan News Channel, October 14, 2013.

⁵⁸ "PLA Air Force Kicks Off War Games," Xinhua, September 23, 2013.

⁵⁹ State Council Information Office of the People's Republic of China, 2019.

⁶⁰ Burke, et al., 2020.

⁶¹ Burke, et al., 2020.

eration model” capable of ensuring that “new type operational forces” are brought into the fight and tailored to focused objectives.⁶²

Emulating the Strong Enemy

Evaluations of forms of modern war and the missions that will reinforce joint doctrine and campaign operations are found to a great extent in lessons learned from U.S. combat operations since the First Gulf War. To meet one of Xi’s stated milestones by 2035, the PLA mainly seeks to implement force modernization, new doctrine, and training programs to build a joint, networked precision strike capability like that of the U.S. military.⁶³ The more ambitious 2050 milestone for the PLA to achieve “world-class military” status, as characterized by Xi Jinping, also involves observation of new U.S. concepts of operation, which PLA strategists loosely group under the rubric of distributed operations. Xi likely believes that the Chinese military will take a leading role rather than an emulative one in the next revolution in military affairs; a revolution likely to be fueled by developments in AI and “big data” technologies.⁶⁴ Short of these mid- and long-term goals, PLA strategists still look to learn from U.S. and Russian TTP across a variety of combat and noncombat missions and tasks—particularly in areas to which the PLA is a relative newcomer, such as strategic lift operations and joint logistics.

Service-Specific Drivers: Protecting “Turf” and Obeying Party Directives

CCP evaluations of the forms of modern war and the conflicts that might arise from Chinese strategic interests indicate that joint campaigns should drive PLA training and force development. However, both legacy and new service-specific interests play a role in the direction of PLA training and exercise programs. In many, if not most, cases, the services try to train on new, highly technical equipment with new tactics for basic combat functions while reacting to changing joint doctrine and training guidance.

Even prior to the restructuring, the PLAA experimented with and then adopted a combined arms brigade structure to replace the old division-centric model adopted from the Soviets. The combined arms brigade is expected to serve as the basic combat unit, with capabilities for both independent action and integration into joint operations.⁶⁵ Transregional exercises, such as the Stride series, have provided the primary major exercise venues for

⁶² Li Yun, “PLA Quickens the Pace of Exploring the Innovation of Battle Methods for New-Type Combat Forces,” *Xinhua*, April 26, 2013.

⁶³ Burke, et al., 2020.

⁶⁴ Derek Grossman, Christian Curriden, Logan Ma, Lindsey Polley, J.D. Williams, and Cortez A. Cooper III, *Chinese Views of Big Data Analytics*, RAND Corporation, RR-A176-1, 2020.

⁶⁵ Blasko, 2019a, pp. 366–367.

PLAA joint training. Mission Action and Firepower series exercises also force units to deploy to RTCs outside their home theater to face resident OPFOR units who almost always defeat the red force.⁶⁶ PLA brigades from all theaters have participated in these exercises, although only a very limited number of brigades have participated in more than one transregional exercise since 2006, when the exercises began.⁶⁷

The PLA's RTCs, originally developed to provide dedicated training and maneuver space in each of the former military regions, have been improved to better provide OPFOR training opportunities and advanced exercise control, evaluation tools, and feedback. In 2018, for example, the Zhurihe RTC in Inner Mongolia hosted an exercise in which PRC media reported that an OPFOR defeated one of the army's new-type units, an elite combined arms brigade from the 81st Group Army.⁶⁸ The problem was reportedly that of using new, networked tanks in old ways—indicating that doctrine and tactics still had not caught up with the modernized and restructured force and highlighting the issue of shifting from mechanized warfare to informatized operations.

The PLAAF's four major annual named exercises—Red Sword, Golden Helmet, Golden Dart, and Blue Shield—seek to create more-realistic training environments for a service that has been pilloried in the past both for its political unreliability and its failure to adapt to the tactical standards required for modern combat.⁶⁹ The PLAAF's use of advanced air combat maneuvering instrumentation systems in these exercises is a significant step forward and enables the force to train with more realism and adjudicate specific tactical engagements and operations. Traditionally ground-force-only exercises now incorporate PLAAF participation, and large-scale joint exercises have given the PLAAF opportunities to test its ability to operate in a joint environment. The PLAAF led one of the major joint Mission Action transregional exercises in 2013 and has employed lessons learned from that experience over the subsequent decade.⁷⁰ Although more-recent exercises suggest improvement and increased sophistication, systemic shortfalls such as joint coordination and information-sharing persist as problems for the PLAAF, hampering key functions, such as targeting, battle damage assessment, and close air support.⁷¹

The PLAN conducts year-round training in both near- and far-seas environments, focusing on antisurface warfare and air defense missions. The PLAN also increasingly takes advantage of shore-based simulators and training centers to train on the new systems that have been a top CCP priority as the maritime domain becomes more strategically impor-

⁶⁶ Blasko, 2019a, pp. 366–367.

⁶⁷ Blasko, 2019a, pp. 366–367.

⁶⁸ David Axe, “China's Troops Have a Training Problem,” *The National Interest: The Reboot*, blog, December 13, 2020.

⁶⁹ Axe, 2020.

⁷⁰ Blasko, 2019a, p. 369.

⁷¹ Defense Intelligence Agency, *China Military Power Report*, 2019.

tant.⁷² Of all the services, the PLAN faces perhaps the biggest challenge in meeting internal service desires for increased independent operational capability for blue-water missions and support for joint theater-driven campaign missions.⁷³ The PLAN, to confront this challenge, focuses on major named exercises as opportunities to train on joint campaign tasks, particularly Sharp Sword for joint training with the PLAAF.⁷⁴ Joint training with the PLAA on island landing campaign amphibious operations is also relatively routine, falls under theater direction, and incorporates increased C2 connectivity between the services.

Prior to restructuring, PLARF (then called the Second Artillery) participation in joint exercises was conspicuously low; now all PLA joint training events probably include some level of PLARF involvement.⁷⁵ Integration of the PLARF command structure with that of the theater commands has been slow and uncertain, but recent reports indicate that CMC directives regarding jointness are breaking down traditional barriers.⁷⁶ The PLARF has adapted its annual training schedule to incorporate more-complicated task training prior to and in preparation for PLA joint training events. The PLARF regularly conducts training under realistic combat conditions, including all-weather exercises in disparate geographic locations and complex electromagnetic environments. PLARF training objectives involve scenarios that require operations opposed by enemy special forces and blue OPFOR air attacks, including routine live missile launches that allow missile brigades to train under realistic conditions.⁷⁷

International Partners

China pursues direct PLA involvement in international exercises and other engagements under the general rubric of military diplomacy. Objectives vary based on the partner and exercise. One of the PLA's stated key goals for participation in exercises with foreign partners is to learn about joint operational concepts and practices. The percentage of these exercises that are joint in nature, however, is small (as low as 7 percent between 2003 and 2016, according to one source).⁷⁸ The PLAA is involved in the widest variety of foreign training activities and is the only service to participate in UN peacekeeping deployments. Involvement in international foreign partner training is largely focused on counterterrorism and HADR missions

⁷² Office of Naval Intelligence, *The PLA Navy: New Capabilities and Missions for the 21st Century*, 2015.

⁷³ Ian Burns McCaslin and Andrew S. Erickson, "The Impact of Xi Era Reforms on the Chinese Navy," in Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow, eds., *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, National Defense University Press, 2019.

⁷⁴ McCaslin and Erickson, 2019.

⁷⁵ David C. Logan, "Making Sense of China's Missile Forces," in Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow, eds., *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, National Defense University Press, 2019; Defense Intelligence Agency, 2019.

⁷⁶ Defense Intelligence Agency, 2019.

⁷⁷ Defence Intelligence Agency, 2019.

⁷⁸ McCaslin and Erickson, 2019, p. 140.

and tasks, but an increasing focus on participation in international competitions does afford small units opportunities to compete with foreign forces on tactical tasks that apply generally across a variety of mission areas.

While the PLAAF has less contact abroad than the PLAA, increasing engagement with foreign air forces allows the PLAAF to gain exposure to foreign operational concepts and tactics, such as participation in the Russian-sponsored Aviadarts air-to-ground competition and the Falcon Strike exercise with the Royal Thai Air Force.⁷⁹

Most important in the PLA portfolio of foreign training engagement is joint exercise activity with Russia. PLA forces have been training in Russia with Russian forces since the inaugural Peace Mission exercise in 2005. These exercises are a significant input to PLA experience and a major pillar of the Sino-Russian relationship. The scope of these exercises has grown over time, from ground force-centric operations focused on counterterrorism operations and limited combat missions to major joint strategic exercise activity.⁸⁰ The Russians have been able to showcase specific weapon systems for sale to China, and both sides are able to support strategic deterrence objectives by signaling some level of interoperability to the United States and its allies.⁸¹ For the PLA, joint exercises with Russia are key training opportunities that offer realistic OPFOR conditions to test and learn new TTP.⁸² Naval exercises provide the PLAN with opportunities to learn how a major foreign navy operates against nontraditional threats, such as maritime terrorism and piracy.

Since 2015, the PLAN and PLAAF have participated in the Joint Sea series of exercises with Russia and, since the Russian exercise Vostok-2018 in 2018, China sends forces to participate in annual Russian strategic exercises. Most importantly, China and Russia established their first joint operational command post with commanders and staff from China's Northern Theater and Russia's Eastern Military District and established new strategic joint connectivity between Chinese and Russian General Staffs during Vostok-2018.⁸³ In 2021, Russia sent forces to China to participate in a major Chinese exercise, Joint Western 2021, for the first time. This is a major theater-level exercise; China's willingness to invite Russian participation is a milestone likely anchored in both a growing confidence in Chinese capability to run and showcase a major exercise and a desire to further cement the relationship with Russia at a time of increasing tension with the United States.⁸⁴

⁷⁹ Defense Intelligence Agency, 2019.

⁸⁰ Wang Haiyun, "Military Ties Linchpin of China-Russia relations," *Global Times*, June 4, 2019.

⁸¹ Ethan Meick, *China-Russia Military-to-Military Relations: Moving Toward a Higher Level of Cooperation*, U.S.-China Economic and Security Review Commission, March 20, 2017, p. 6.

⁸² Meick, 2017, p. 35.

⁸³ Sugiura, 2022, p. 65.

⁸⁴ Roderick Lee, "Russian Participation in PRC Strategic Exercise Emblematic of Improving Military Cooperation," China Aerospace Studies Institute, August 2, 2021.

Reacting to Exogenous Shocks

As the principal guarantors of party control across the breadth and depth of the PRC, the PLA gains operational experience from domestic HADR and security operations, as well as limited international deployments, such as NEO, that support general societal stability by protecting Chinese interests abroad. The PLA has played a key role in supporting and carrying out relief operations in the aftermath of typhoons and earthquakes and, more recently, in a deployment of relief supplies by the PLAAF to assist in the aftermath of the 2022 volcanic eruption in Tonga.⁸⁵ Although the PLA has participated in several multilateral disaster relief exercises, these are less obviously tied to any core national objective. Disaster relief exercises are instead an avenue through which the PLA can fulfil its role in meeting CCP objectives to demonstrate international goodwill as a great power.⁸⁶

Although the subsections above are not intended as an exhaustive list of drivers or means for the PLA to gain experience in a way that is in line with foundational CCP guidance and objectives, they do provide a lens through which to delineate and evaluate major PLA training activities. Table 7.2 provides a brief overview of drivers by category, rationale for engaging in certain training activities, and examples.

These drivers are a useful menu of sorts to consider while evaluating PLA activity outside China when the idiosyncrasies of any one operation might seem to dominate deployment rationale. In a broader context, there might be a critical mass of experience drivers that could push CCP and PLA leadership to commit military forces to an endeavor or to sustain an existing operation.

Conclusion

The ends or major goals of the CCP in building PLA experience are found in party strategic guidelines to the military and in other official party documents. These goals cover a wide spectrum of activities that focus on preparations via comprehensive force modernization and training on campaign tasks for regional contingencies and encompass a variety of MOOTW activities and requirements. Furthermore, all activity is accomplished in conjunction with political indoctrination and training at every level to ensure fealty of the PLA to the party. The methods through which CCP goals are met include a triad training system for meeting overarching political training needs; joint and service-specific training programs overseen

⁸⁵ “Rescuers Work Hard at Quake-Hit Area in Sichuan,” Xinhua, April 22, 2013; “PLA Troops in Guangdong Support Local Efforts Against Typhoon Usagi,” *China Military Online*, September 24, 2013.

⁸⁶ These exercises include Cooperative Spirit-2011 and Cooperative Spirit-2012 with Australia and, later, New Zealand; the Balikatan-2013 Disaster Preparedness Forum, hosted by the Philippines; and Prairie Pioneer-2013 with Mongolia (State Council of the People’s Republic of China, 2013; William B. Depasupil, “China Joins U.S.-Philippines Balikatan Exercises for the First Time,” *Manila Times*, April 15, 2013; “Chinese, Mongolian Armed Forces Kick Off Joint Training for Natural Disaster Relief,” Xinhua, September 17, 2013).

TABLE 7.2

PLA Operational Experience Drivers and Activities

Experience Driver	Driver Rationale	Example
Threat-based, doctrinal campaigns and scenarios	• PRC and CCP foreign policy objectives—some of which predate the founding of the PRC—might compel the PLA to continue to seek experiences to prepare for historic conflicts and enhance and assert PRC sovereignty. These might be similar in nature to contingency plans or operational plans practiced by other nations, such as the United States. • Perceived threats from potential internal and external actors might drive strategic, operational, and tactical prioritization of PLA experiences that would help mitigate such threats.	• LRA and amphibious lift efforts across the Western Pacific to generate experience(s) relevant to an armed Taiwan reunification campaign • Deployment of PLAN and PLAAF assets in the South China Sea to respond to perceived threats from claimants
Political work	• Political indoctrination and CCP study requirements have the potential to determine the training calendar and acceptable content of operational experience.	• Establishment of Joint Party Committees on major exercises
Partner influence	• International partners might broaden an exercise or training portfolio, simply out of their own needs, exposing the PLA to experience they otherwise might not consider essential (or perhaps as a concession to a junior partner).	• PLA joint air and maritime patrols with the Russian military conducted since 2019
Emulation	• In line with Xi Jinping's use of the term <i>world-class military</i> (世界一流军队) and through observation of common or best practices, the PLA might attempt to emulate the experiential venues of the United States, Russia, and other major military powers. • PLA units can gain experience by operating at the cusp of materiel and logistical capabilities; learning by doing; and building operational and regional expertise in locations where weather, geography, and human terrain are alien to Chinese operators.	• Overseas military basing in Doraleh, Djibouti, like other nations' major counterpiracy efforts and logistics investments • Show-the-flag, out-of-area naval deployments intended to test logistical needs of PLAN vessels; UN missions in Africa and the Middle East
Service-specific	• PLA service components—PLAA, PLAN, PLASSF, PLAAF, and PLARF—might advocate for experience for their own self-interest that pushes or broadens joint, theater, and service experience portfolios.	• UN peacekeeping missions supported by the PLAA
Reactive or shock	• Exogenous shocks other than war might compel the PLA to build experience in a newer area or at a larger scale than it would have otherwise attempted to master on its own.	• Natural disasters, <i>forces majeures</i>, and pandemics require PLA NEO or HADR efforts (Libya 2011, Yemen 2015, Tonga volcano eruption 2022)

SOURCES: State Council Information Office of the People's Republic of China, 2015; State Council Information Office of the People's Republic of China, 2019; Fravel, 2019; Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China 2021: Annual Report to Congress*, U.S. Department of Defense, November 3, 2021.

by theater commands and service headquarters, respectively; joint and service-specific exercises with foreign partners; and noncombat deployments for a variety of domestic and external operations. Xi Jinping has clearly mapped out requirements and milestones on the path to building a PLA that can bridge the long-standing gap between Chinese core interests and the military capabilities needed to achieve and defend them. Although the theoretical underpinnings of military strategy and doctrine necessary to bridge that gap have been in place for at least two, and arguably three, decades, the practical means to achieve that goal have aligned in a clear and purposeful way only since the major restructuring effort began in 2016.

The PLA is expected to gain the experience needed to fight and win local informatized wars mostly by indirect means and via a hybrid model that incorporates legacy aspects of People's War into concepts from foreign military developments. Gaining experience through indirect means requires learning to use and fielding technologically advanced equipment to conduct joint operations in a highly networked fashion and developing a leadership cadre capable of commanding and controlling such operations under a dual political-military command structure that is unaccustomed to the decisionmaking tempo of modern warfare. Numerous pronouncements from the highest level of the CCP since the early 2010s indicate that the PLA has not overcome many of the obstacles on this path, but the same party leadership under Xi Jinping expresses confidence that the science behind the party's approach is sound.

Joint OPFOR training and exercises have increased significantly in that time to include all services and the Joint Strategic Support and Joint Logistics Support Forces; by all accounts, training is becoming more realistic in content, process, and evaluation. To a great extent, this training activity focuses on mission areas that are consequential to a potential fight against U.S. forces that might respond to a regional conflict. However, this focus is not singular. The PLA must also prepare to contend with forces and capabilities from Japan, Taiwan, India, and other actors on the PRC's periphery.

Beyond this training and exercise activity, and the development of the strategy and doctrine that determines its content, the PLA continues to gain experience from foreign, primarily Russian, partnership activity and from deployments for noncombat operations. Between 1985, when the PLA began initial military ventures with out-of-area port visits for a single service—PLAN—and 2022, the PLA has broadened its military experience to include near-continuous operations in the Indian Ocean, the Horn of Africa, the South China Sea, and the Western Pacific. The PLA's experience portfolio in this area incorporates three of its primary service components—the PLAAF, the PLAN, and the PLAA—and occasionally leverages the Maritime Militia and People's Armed Police in operations outside or adjacent to China's borders. These avenues of PLA experience clearly expand and retain party imprimatur despite the potentially competing demands of joint campaign-focused training. PLA experience across time and by echelon suggests that the PLA has, since the early 2010s, increased the variety of experience activities for its services to participate in while keeping most of these opportunities at lower unit echelon levels. The capacity for knowledge transfer from these units and personnel to other units and services is difficult to assess. These experiences—except

for PLAAF units operating offshore in the Eastern Theater Command and in the vicinity of Taiwan and PLAN formations operating in peripheral and far seas—do not yet seem to be aimed at building a large cadre of experienced military veterans. It might be true that a little yeast leavens the bread and, in the case of the PLA, increasing overseas experience for a few select units and services, along with more campaign and scenario-specific training, might prove to be influential in meeting party objectives for a world-class military.

It is beyond the scope of this report to determine whether the aggregate demands placed on the PLA have developed or will develop the expected capabilities for major power conflict. In the next chapter, however, we examine some of the main implications of the Chinese experiential model for the PLA in terms of its ability to meet its own stated or implied local informatized war missions. We also examine these implications through a comparative lens against the U.S. experiential model. In the final chapter, we will draw conclusions about preparedness for modern conflict for both sides of the major power competition.

The Effect of Experience and Other Factors on Training

The logic and experiential models developed in this report depict factors that can affect how militaries train their forces, how training programs influence readiness outcomes and military effectiveness, and the influence of biases on decisionmaking regarding the training process. The models examine past research on team decisionmaking, military history, analysis of specific historical cases, and our hypotheses or suppositions about factors that might or should be relevant to the training process. As noted in earlier discussions of the factors, national strategy and military culture are strong drivers of training decisions, requirements, and practices, and military strategy itself is influenced by a variety of inputs, including threat perceptions, geography, national resources, and war experience and related factors. This chapter briefly examines the implications of Chinese and U.S. experiential models and activities in the context of each actor's approach to strategic competition and conflict.

Since the 1990s, the United States and China have both faced watershed moments that drove significant shifts in national strategy and defense policy; their respective military strategies and doctrine have been shaped by sets of direct and indirect experiences related to these shifts. Following the terrorist attacks of September 11, 2001, and the Iraq invasion in 2003, the U.S. military focused on counterterrorism and COIN operations. The end of the Cold War a decade prior to September 11 permitted this strategic shift to be free from the threat of major, existential conflict. U.S. military personnel experienced repeated deployments, mission-focused training, and professional military education that stressed ongoing operations in Afghanistan and Iraq, perhaps at the expense of preparing to fight a peer or near-peer power such as China.

Since 2017, U.S. national strategic documents and directives have driven the development of new operational concepts for countering major power adversaries such as China.¹ Questions remain, however, regarding the ability of U.S. services and the joint forces to shift quickly enough from their previous focus to address force development programs and adapt training to meet the new challenge of near-peer competition.

The PLA, on the other hand, appears to have had a near-singular focus on developing military concepts and capabilities to prevent the United States from blocking China's regional

¹ Clark, 2021a.

objectives, even if China must resort to military force against a U.S. ally or partner to realize those objectives. Events in the 1990s—specifically, the U.S. dispatch of two aircraft carriers to the Taiwan Strait during the 1995–1996 missile crisis and the U.S. bombing of the Chinese Embassy in Belgrade in 1999—clarified a need to revise defense policy and military strategy to meet a growing threat from U.S. forces that were far more technologically and operationally capable than the PLA. Despite stated desires to keep conflicts local, China’s comprehensive military modernization has largely focused on preparing for a major power conflict that might arise from a regional war on China’s periphery.² This modernization effort consists of more than just technological improvements and weaponry upgrades. The PLA’s noncombat experience over the past 30 years represents a critical ingredient for achieving China’s goals of “winning local informatized wars” in the near term and developing a “world-class” military by the middle of the century.³

Very few members of the PLA, if any, have combat experience, and only a small percentage of the force has been involved in the PLA’s operational deployments since the Sino-Vietnam War. Since the 1990s, however, the PLA has conducted an in-depth study of all aspects of the U.S. military’s technological and operational capabilities with an eye to building a similar joint networked precision strike system. Although China increasingly has both qualitative and quantitative military advantages over most of its neighbors, CCP leaders view the possibility of engaging with U.S. forces and allies, such as Japan, with trepidation.⁴ Challenges to the PLA cover the spectrum of force development, doctrine, training, and joint force C2; the PLA is pursuing programs and initiatives to meet these challenges under Xi Jinping’s ongoing PLA reform and restructuring effort.⁵

The PLA gains experience through a structured internal process that is characterized by observation of foreign wars and study of military science through a Marxist-Leninist lens; concept development, experimentation, demonstration, and implementation; and training across the force.⁶ Xi Jinping’s directives ordering the PLA to win local informatized wars are an attempt to improve PLA capability and readiness with a particular focus on improving training. The PLA’s emphasis on preparing to fight these local wars has led to the development of theater commands that are capable of maintaining high readiness for territorial disputes that might arise in any strategic direction.⁷ Although Taiwan remains the PLA’s primary strategic direction, China’s leaders have recognized the need to be ready to fight in an

² Burke et al., 2020.

³ Fravel, 2019.

⁴ Burke et al., 2020.

⁵ For an overview of the broad range of areas that the CCP, under Xi, has directed the PLA to address according to the restructuring effort that began in 2015, see Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow, eds., *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, National Defense University Press, 2019.

⁶ Cozad, 2019.

⁷ State Council Information Office of the People’s Republic of China, 2015.

increasing number of potential contingencies.⁸ CCP directives also require PLA attention on political training and a variety of MOOTW activities. Although it is true that China's focus, as officially stated and demonstrated by developments in force concepts and capabilities, is on a "home game" war that will likely involve U.S. intervention, the singular nature of China's military focus is more diffuse than sometimes assumed. One Chinese military thinker succinctly captured the challenge:

The armed forces need to cope with traditional security threats, and also need to cope with nontraditional security threats; need to safeguard the state's survival interests, and also need to safeguard the state's development interests; need to safeguard the homeland security, and also need to safeguard overseas interests; need to safeguard the overall state interests of reform, development, and stability, and also need to safeguard world peace and promote common development.⁹

The nature of both the U.S. military's and PLA's experiences since the early 2000s raises questions about their preparations for major power conflict and whether the training component of those preparations will be sufficient for operational success. Over this period, the U.S. military has gained significant direct combat experience, albeit in a largely permissive environment that did not involve a peer competitor. In contrast, the PLA lacks direct combat experience and has concepts of operation that are largely derived from indirect observations of U.S. operations since 1991. Over time, both combat experience and in-depth military scientific study have left deep institutional impressions and perspectives that will influence the ways both militaries structure and adapt future training.

Both forces have clearly devoted resources and intellectual capital to understanding the contours of major power conflict in the current age and projecting those contours out to the mid-century. It is beyond the scope of this report to determine which side is betting on the right horses when it comes to concept development. Rather, we seek to address the extent to which each side is prepared to train as it proposes to fight. The question for both militaries remains: To what extent will realistic training on new concepts and with new capabilities become the norm, replacing outmoded routines to produce a force ready to fight a major power war?

Implications of the Chinese Experience for PLA Training

As noted in Chapter 7, the context for PLA experiential activities, and the activities themselves, have been in significant flux. Major restructuring of all services under a theater command structure, reorganization down to the tactical level for the PLAA and PLAAF, new

⁸ Shou, 2013.

⁹ Chen Zhou, "An Analysis of Defensive National Defense Policy of China for Safeguarding Peace and Development," *China Military Science*, June 2007.

doctrine, renewed focus on political work and indoctrination, and other developments mark a turbulent time for the PLA. In this context, the PLA is expected to routinize training with new, technologically advanced equipment on IJO and systems warfare concepts within a few years. Under Xi Jinping, China's leadership is clearly committed to changing outmoded routines and practices in the PLA but still prioritizes party loyalty and political reliability as "job one" in reform and restructuring efforts.¹⁰ The PLA's training, exercises, wargaming, simulation, and experimentation efforts focus on operational concepts that stem from the study of modern combat and the application of advanced technologies and system engineering solutions to problems inherent in large-scale combat. But the force expected to absorb and apply these concepts retains elements of organizational culture and routine steeped in the ground force-centric, mass-mobilization theories of the People's War model. Xi Jinping's anticorruption campaign and theater-based restructuring initiative removed key obstacles to PLA joint force development, but his continued focus on political work, a national military-civil fusion strategy, and a comprehensive National Defense Mobilization System demand herculean effort from a force that already has much on its plate.¹¹

Implications for PLA Lessons Learned, Concept Development, and Experimentation

PLA experience is almost entirely indirect and based on a hybrid model that transposes new Western ideas on a legacy Maoist foundation. The PLA relies on experimentation, gaming, and simulation to provide a laboratory for testing resultant concepts but has been able to build routinized means for testing concepts in opposed force or confrontational settings into this laboratory only since the early 2010s. The PLA has a rich but short history of field experimentation, but OPFOR units were not ubiquitous in PLA training centers until after 2012. One PLA source notes that a 2018 wargame marked the first time that the PLA used gaming tools to test joint operational concepts.¹² China has the technical means and the institutional infrastructure to conduct advanced gaming and simulation to support experimentation with both indigenous and imported ideas and concepts in both academic and field environments.¹³

On the foreign import side of China's hybrid experiential model, the PLA draws most heavily from the United States in terms of military theory. IJO is most clearly influenced by U.S. net-centric warfare thinking, and system destruction warfare concepts are rooted in the

¹⁰ Sugiura, 2022, p. 69.

¹¹ For background on the nature and progress of activities associated with military-civil fusion and mobilization issues, see Brian Lafferty, "Civil-Military Relations and PLA Reforms," in Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow, eds., *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, National Defense University Press, 2019.

¹² Zhao Lin and Wang Yukun, "All-PLA 'Operational Concept War Game-2018' Held," *Guangming Junshi*, December 14, 2018.

¹³ Jiang, 2014.

networked precision strike operations that have characterized the U.S. approach to combat operations since the First Gulf War.¹⁴ Russian doctrinal concepts previously held sway in the PLA, and some Russian concepts concerning noncontact warfare and blending conventional and unconventional operations still figure in Chinese military thought and science. Beyond theory and in the operational experience arena, however, the PLA leans heavily on contact with the Russian military in the military education and joint exercise domains. The effect of the 2022 Russian invasion of Ukraine on Sino-Russian military contact, and thus on PLA experience, remains to be seen. Given the observation and lessons learned approach that is central to the PLA experiential model, however, it is almost certain that the PLA will take the time to critically examine the extent to which Russia's operational and tactical problems in Ukraine might apply to PLA approaches to local war. Because of its system destruction view of modern warfare, the PLA is especially likely to view the extent to which a Russian operational system was confounded by a Ukraine military trained and equipped by a U.S.-backed system with concern. If PLA emulation of U.S. concepts over a three-decade period is any indication, this institutional learning process can be lengthy.

From the perspective of “learning from the strong enemy,” the PLA must also adapt to changing U.S. operational concepts after devoting much of the past 30 years to building an A2/AD capability to counter the U.S. operations seen in Kosovo and Iraq. PLA strategists are examining recent U.S. distributed operations concepts, such as MDO and EABO, from two perspectives: (1) to evaluate whether revisions to PLA operational concepts are needed to counter U.S. operations, and (2) to study them for possible incorporation into PLA operations.¹⁵ This study and evaluation appear to be in nascent stages, but the current inclination of PLA strategists seems to be that the current direction of PLA IJO and systems warfare concepts can meet the challenges of distributed operations.¹⁶ This assessment comes, however, with the assumption that the PLA will have the precision-strike architecture—weapons and fully networked C4ISR for targeting—to meet the increased number of key targets that will characterize the U.S. operational system.¹⁷ The PLA must, in turn, adapt joint training programs to employ that precision strike architecture effectively.

¹⁴ Cozad, 2019.

¹⁵ Huang Junsong, “分布式杀伤是海上战争形态的发展趋势” [“Distributed Lethality Is an Important Factor in the Development of Maritime Warfare”], *Science and Technology Review*, Vol. 36, No. 4, April 2018, pp. 63–64.

¹⁶ Tan Shengjing, Shi Songwei, Zhang Yao, and Zhou Liang, “智能化分布式协同作战体系发展综述” [“Review on the Development of Intelligence-Based Distributed Cooperative Operational System”], *Air and Space Defense*, Vol. 2, No. 1, January 2019.

¹⁷ Burke et al., 2020.

Implications for Strategic and Joint Operational C2 Training

Future PLA training must also consider the reinvigorated focus on party control over the military. Maintenance of party oversight into all aspects of military planning, training, and operations might or might not impede PLA professionalism, but this party oversight likely introduces obstacles in terms of the ability of PLA commanders and staff to perform at the speed and levels of integration required by IJO and systems warfare concepts.¹⁸ Decisions by Party Committees might work in peacetime settings but bog down the PLA in the heat of conflict. The PLA's traditional dual-command and top-down decisionmaking culture likewise impinge on flexibility and autonomy in rapid decisionmaking environments; the number and frequency of new regulations and guidelines on joint training and operations indicate a path of continuing frustration as senior party leaders seek to regulate solutions to the "[p]arty control versus autonomy of action" conundrum. Networked integration of C2 and improved common operating pictures could either empower commanders at lower levels—contrary to prevailing norms in the PLA—or make it more likely that higher-level commanders (including the CMC) will override any such initiative.¹⁹

At the end of 2020, PLA media indicated that, after five years under the theater command structure, disconnects remained between the joint training objectives at the theaters and the service-specific troop training programs.²⁰ Since 2015, PLA media has also highlighted specific problems with unit commanders facing the challenges of operations in a complex joint environment, referencing the five incapables that characterize some PLA leaders who are unable to (1) judge situations, (2) understand higher command intent, (3) make operational decisions, (4) deploy troops, or (5) handle unexpected situations.²¹ The PLA has made some progress in establishing common procedures to codify command requirements into training and education certification programs. According to a 2016 *China Youth Daily* report, the PLA Eastern Theater Command's "Qualification Certification Methods for Joint Operations Command Center personnel" set forth standardized procedures that joint commanders are expected to know.²² Media reports, however, acknowledge that many PLA members do not fully understand these procedures. In a 2017 speech outlining directives to further the PLA's modernization, Xi listed the need to "step up command information and operation procedures that are compatible with joint operations" as a priority.²³

¹⁸ See, for example, Phillip C. Saunders and Joel Wuthnow, "China's Goldwater-Nichols? Assessing PLA Organizational Reforms," *Strategic Forum*, No. 294, April 2016.

¹⁹ Roger Cliff, "Chinese Military Reforms: A Pessimistic Take," *Joint Force Quarterly*, Vol. 83, October 1, 2016.

²⁰ Sugiura, 2022, p. 87.

²¹ Blasko, 2019a.

²² Cheng Yongliang, 能不能指挥联合作战, 需要考证了 ["Certification Required to Command Joint Operations"], *China Youth Daily*, February 23, 2017.

²³ CCP Southern Theater Party Committee, 努力建设过硬联合作战指挥机构 ["Strive to Establish a Tough Command Organ for Joint Operation Command"], *People's Daily*, February 27, 2017, p. 7.

Chinese strategists clearly understand that the threat of regional conflict—particularly involving the United States, Japan, or both nations—will require a much higher level of interservice integration and survivable, multipurpose C2 systems and networks than the PLA has ever managed to reach. Building training programs to accomplish the concepts described here is an extremely tall order for the PLA in the middle of a major restructuring effort and is perhaps made more difficult by the fact that the U.S. military is also undergoing a major service and joint warfare concept transition. Systemic problems related to ingrained PLA routines thus pose impediments both to meeting the requirements of complex joint operations in a systems-based context and to operationally innovating based on a moving target (i.e., emulating U.S. concepts amid transitions for both militaries). Ground force-centric inclination is a key component of ingrained PLA culture that is only slowly changing, but perhaps most glaring is the need to push decisionmaking and autonomous action forward in the battlespace and down in the chain of command—anathema to the top-down culture that has permeated the PLA to this point.

Implications for Joint Informatized Training for War Involving the United States

The PLA recognizes a foundational shift in the transition from mechanized combat to informatized warfare—a move from highly structured and hierarchical operations to “self-organizing collaboration” based on “real-time battlefield information sharing.”²⁴ This shift is an important departure from earlier PLA thinking regarding operations and planning. This shift theoretically jettisons highly scripted plans that left limited room for PLA operational- and tactical-level commanders to adapt to changing situations and instead calls for dynamic plans and command behaviors that leverage high-fidelity, real-time information at every level of the force. A common theme in multiple PLA publications centers on the requirement to maintain information superiority throughout a conflict to ensure that the PLA’s operational command systems can effectively manage a complex joint operation.²⁵

The PLA also continues to face challenges integrating service doctrine into joint doctrine. Like other militaries, each PLA service arm maintains procedures and processes optimized for that service. The fact that doctrine requires integration only at higher levels suggests that military leaders recognize the challenge of blending forces at lower levels, which requires greater harmonization of doctrine between the services and a unifying, joint doctrine. The trial doctrine released in 2020 might provide this, but the force will likely need several years of experimentation and adaptation before training will feature joint processes and operations at the level the CMC has in mind—assuming that decision has been made at all.

Doctrinally, in a fight that involves U.S. forces responding to a regional contingency on China’s periphery, the PLA likely will lead off with kinetic and nonkinetic attacks to gain

²⁴ Wang, 2015, p. 58.

²⁵ Burke et al., 2020.

information superiority. This multidomain effort would encompass attacks on C4ISR networks both in the theater of operations and beyond; senior Chinese civilian and military leaders would weigh escalation concerns against perceived political necessity for any given strike.²⁶ Given the weight CCP leadership places on the unification of Taiwan with mainland China, a more aggressive targeting approach to facilities outside the theater would be more likely in a Taiwan scenario than in other cases. In any contingency, Chinese leaders' perceptions of success in gaining information superiority are likely to be the key determinant in decisions regarding follow-on operations. Counter-C4ISR capabilities across the PLA that could target U.S. C4ISR networks have featured in service and platform-specific training and demonstrations; the priority placed on these operations at the highest level of CCP leadership indicates that this aspect of Chinese training and exercise activity should be a high priority for U.S. and allied intelligence collection and analysis as well.

The stand-up of the PLASSF in 2016 aimed to provide space, cyber, electronic warfare, and targeting support to the force and deliver nonkinetic strike options in the information fight. This combination of "information support" and "information dominance" capabilities into a service-like force indicates the priority Xi and the CMC give to having an integrated information warfare entity; but drawing a widely disparate set of units from across the force to create the PLASSF has undoubtedly created organizational and functional challenges that will require time to resolve.²⁷ There are indications that PLASSF elements are participating with increasing regularity in joint exercises, but the force is likely focused on training to synchronize its internal operations and capabilities prior to integration with a larger PLA operational system.

In a complex joint operation on China's periphery, the PLA would likely follow initial kinetic and nonkinetic information operations with joint MDO to first achieve air superiority then maritime superiority over defined areas. These operations must consider the proximate adversary, such as Taiwan or Japan, and any responding U.S. forces. The PLA would avoid force-on-force combat with the latter as much as possible by engaging U.S. forces as far from the point of conflict as possible and likely would seek temporary rather than long-term superiority in these zones. The PLA's missile inventory is sufficiently robust and long-range to threaten all U.S. forward-deployed forces in the Indo-Pacific, whether in Okinawa, Guam, or Australia. As with kinetic counter-C4ISR operations, PLA training on joint fire-power strike operations to hold these targets at risk is routinized and has been a consistent priority since 2005.

In support of counter-C4ISR and long-range precision strike operations, the PLA has prioritized training programs to support targeting and defense against perceived U.S. dominance in the air and undersea domains. Integrated air defense system training between the

²⁶ Burke et al., 2020.

²⁷ John Costello and Joe McReynolds, "China's Strategic Support Force: A Force for a New Era," in Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow, eds., *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, National Defense University Press, 2019.

services focuses on defending against the various aspects of U.S. airpower over Chinese territory and on its periphery, creating a high-risk operating environment for responding U.S. forces. Training for undersea warfare appears to be less robust. China is working on undersea sensor systems and other improvements to its relatively weak antisubmarine warfare capability to detect, track, and degrade U.S. submarine operations off the Chinese coast, but training necessarily lags as capabilities in this area begin to deploy.²⁸

In practical terms, such Chinese operational concepts as target-centric warfare represent what one PLA source characterizes as “a new operational concept and strategy” that “is subordinate to and a concrete manifestation of systems warfare thought.”²⁹ The PLA’s progress in applying this and related concepts of operation appears to still be in early stages of integration with experimentation and training across the force. The elements of this guiding concept take on added importance as key PLA researchers acknowledge that “there is still a large gap between our forces and those of our adversaries, and it will be difficult for our operational system to meet theirs in open conflict.”³⁰

Additionally, the types of operations required to handle both a proximate adversary and responding U.S. forces require allocation and protection of key assets through various phases of conflict. The PLA recognizes that, because of the size of territory it must defend, the development of enemy long-range strike and maneuver platforms, and the complexity of monitoring a vast theater, it must ensure that elite force groupings, long-range strike capabilities, and ISR platforms are available when most needed. Accordingly, training on suppression of enemy air defenses, air and maritime superiority operations, and port and airport seizure must figure into training and exercise scenarios.³¹ All these elements are visible to some extent in PLA training but feature in an integrated context in only a small number of major joint exercises.

Implications for U.S. Training

The U.S. military, unlike the PLA, has a mostly indigenous experiential model based on direct combat. But indirect experimentation figures prominently in U.S. experience as the global threat picture has changed and near-peer adversaries maneuver to undermine the U.S. global security position. In response, the U.S. military is experimenting with new operating

²⁸ For more information on specific systems, please see Eric Heginbotham, Michael Nixon, Forrest E. Morgan, Jacob L. Heim, Jeff Hagen, Sheng Tao Li, Jeffrey Engstrom, Martin C. Libicki, Paul DeLuca, David A. Shlapak, David R. Frelinger, Burgess Laird, Kyle Brady, and Lyle J. Morris, *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017*, RAND Corporation, RR-392-AF, 2015, pp. 28–35.

²⁹ Wang, 2015, p. 25.

³⁰ Wang, 2015, p. 69.

³¹ Chen, 2007.

concepts and unit structures to conduct MDO in increasingly contested environments. Just as China reacted to the changes in the character of warfare brought about by U.S. operations after the Vietnam War, the United States is reacting to Chinese imposition of an A2/AD architecture in the Western Pacific and improving, yet nascent, joint force C2 and integrated precision strike capabilities throughout the region. Even with U.S. recognition of intensifying strategic competition with China, other national security exigencies across the globe demand DoD attention.

As with the major PLA restructuring that started in 2016, the impetus for changes in U.S. operating concepts is relatively recent and the path from concept development to the joint training environment will take time. The 2018 NDS emphasizes the reemergence of long-term, strategic competition with China and Russia, noting the revisionist desires of these two actors to shape the world according to an authoritarian model to gain “veto authority over other nations’ economic, diplomatic, and security decisions.”³² One of the central challenges posed by these potential adversaries, especially China, is the creation of an A2/AD architecture that delimits and raises costs for U.S. access and freedom of maneuver in areas of vital national interest to the United States and its allies. This architecture depends on capabilities to project military force to deny U.S. access to a region during a crisis.

U.S. efforts to build new operational concepts for the services and a new joint warfighting concept that gives these efforts joint coherence affect force development, doctrine, experimentation, training, and alliance interaction and exercises. In the training and exercise domain, exercises discussed previously, such as Cyber Flag, Black Flag, and new exercises involving Space Command, indicate that the U.S. military is moving rapidly to test new concepts so that those concepts can be integrated into joint constructs. The U.S. military’s extensive direct experience in joint operations provides an experiential roadmap for this effort, and the mature training infrastructure in place at NTC and similar proving grounds either has been or is being rapidly revamped to address the China threat.

The U.S. military’s broad operational experience encompasses different types of combat against diverse adversaries and in different environments, which provides an organizational foundation for learning to adapt to threats from major strategic competitors. These experiences have affected how the forces are trained, increasing the opportunity for realistic training environments to serve as breeding grounds for innovation. Experienced instructors act as coaches and mentors and as OPFOR trained in the tactics and doctrines of potential adversaries. These innovations are linked to the indigenous U.S. military experiential model and are reflected in service and joint training programs.

Advancements in long-range precision fires, information technology, air defense systems, and cyber capabilities have led to an intense debate inside the U.S. military about future operating environments and the capabilities needed to successfully prosecute combat operations under entirely new conditions. U.S. military planning is rapidly moving toward concepts that stress MDO integrated with robust networks that process information more quickly and

³² DoD, 2018, p. 2.

provide an accurate and common operating picture—the pursuit of which represents a first-mover advantage for the U.S. military because of its leading role in creating the foundation for networked precision strike operations.

These same advancements in long-range precision strike capabilities and the ISR and information networks that support them have also rendered major U.S. military assets, such as CSGs and large air bases, vulnerable to attack. Therefore, another core innovative area is the conceptual move to dispersed or distributed operations, in which smaller units operate over larger areas. For example, combat aircraft might move to smaller bases or improvised fields or naval units might operate in smaller groups. This concept is designed to impede enemy targeting by increasing the number of targets and possible attack vectors while decreasing vulnerable large formations. Distributed operations rely on robust information and C2 networks to link the smaller formations and still be able to mass fires for the desired effects and stress logistical support networks. These potential vulnerabilities are not lost on the Chinese, and solutions must not only be developed in concert with the operational aspects of the concepts but be effectively incorporated in the training system.

The objective of A2/AD systems is to create “impenetrable red bubbles that prevent the physical movement of opposing troops.”³³ A2/AD systems leverage time by forcing opposing forces to fight their way into a contested region, increasing the chances that China could achieve a quick victory and make U.S. counterattacks too costly to execute.³⁴ To counter these capabilities, the U.S. military has sought to adapt its own warfighting capabilities to function in multiple domains and with distributed forces over a larger area, breaking away from the concept of massing forces together for more effective fire effects. Training on both the independent actions required by new concepts and exercising joint integration and synchronization at the campaign level is underway throughout the force but has yet to fully mature.

Conclusion

Adaptive capacity and innovative ability largely define how strategic competitions unfold. Should the U.S.-China competition veer into conflict, these factors will almost certainly figure prominently in determining outcomes. Time is also a major factor in the competitive equation. The routines and cultures of large organizations change slowly. Both the PLA and the U.S. military have directives to change and incentives to do so as quickly as possible to prevail in a major power conflict. Both face advantages and disadvantages in that pursuit.

The PLA likely has an advantage in the focus it has been able to bring to bear on concepts and capabilities needed to deter, delay, or defeat a U.S. force entering China’s neighborhood—stressing the home field advantage. In this regard, the U.S. military has been forced to reckon with the potential of a PLA with the means to make such U.S. intervention prohibitively

³³ McEnany, 2022.

³⁴ McEnany, 2022.

costly, and U.S. forces are in reactive mode to develop concepts and capabilities to change that equation. The U.S. military, however, likely has advantages in adaptive and innovative capacity based on direct experience and a head start on operational concepts that stress networked precision strikes against key nodes in a larger system. U.S. forces, and the U.S. defense industrial base supporting them, have been engaged in joint combat operations on a global scale for three decades and have worked regularly with allies and partners in ways that dwarf the PLA's experiences with its limited partnerships.

Time is likely also a U.S. advantage when it comes to conceptual and functional change in the areas of military pursuit that are involved in preparing for major power conflict. The PLA's focus on preparing to fight the U.S. military appears nearly singular in some respects but involves massive revisions in the PLA's command culture. These revisions must occur in an environment already fraught with changing priorities on several other fronts, primarily those revisions related to the major restructuring that began in 2016 but also those related to ongoing (and far from complete) efforts to improve defense industries and strategic logistics through military-civil fusion and national defense mobilization efforts. Perhaps most importantly, the training and exercise approaches, tools, and infrastructure needed for the joint operations that China's leaders say they must conduct are improving but still nascent compared with those of the United States. The cauldron of direct experience that U.S. forces have stewed in for two decades provides the basis for a training system that the PLA has emulated to some extent, but that remains elusive in the absence of similar experiential pressures. The final chapter offers an assessment of the broader implications of this brief comparative discussion in the context of force readiness for a major power war in the short to medium term.

Conclusions and Implications

Change and adaptation in any military organization is a complicated, difficult process filled with uncertainty that frequently culminates in results that fall short of the originally intended objectives. The factors that initiate these calls for change—including the advent of new technologies, foreign military innovations, and major failures—might be well understood by a nation’s political and military leaders. The ability to affect change often depends on those leaders’ determination and skill in navigating complex political, economic, social, and cultural dynamics that might limit the extent to which significant change is possible. Likewise, a military’s success might also hinder its ability to adapt because of a belief that current models and practices do not require adaptation after past successes. In either case, both direct and indirect experience are central factors in how political and military leaders define the need for change and develop plans for implementing new policies and programs.

The examples presented in this report illustrate these complexities. In cases in which national leaders have faced direct threats to their rule and relative power in the international system, the will to change has often been an insufficient determinant of successful change. During the 19th century, China, Egypt, and the Ottoman Empire all faced significant internal and external challenges that spurred their leaders to action; however, an array of factors limited their ability to adapt and implement the foreign operational models they pursued. Similar problems arose in later examples involving Egypt and Iraq. In each of these cases, a mix of competing political priorities, social conditions, and cultural realities presented problems that were either too complex to navigate or required policy solutions that the political leaders involved were unwilling to entertain. Conversely, in cases such as those of Meiji Japan, Israel, India, Singapore, and Cuba, both political and military leaders were able to either make significant changes to the nation’s institutions or build relationships and pursue practical models that suited social and cultural realities.

These same examples show the importance of experience—both recent and historical—in shaping organizational responses and determining the success of these desired reforms. During their tenure advising militaries in the Middle East, Soviet advisers learned just how deeply entrenched Egypt’s and Iraq’s military experiences under British colonial rule really were. Similarly, long-term experiential influences exerted by party or revolutionary politics, foreign military sales relationships, alliances, and combat experiences from the distant past play an important role in many aspects of military reform, particularly in the area of training. Operational models add to this complexity when militaries attempt to adopt models derived

from assumptions and social and cultural conditions that might not apply or might be difficult to reconcile within their own organizations and institutions.

These realities provide perhaps the most significant contrast between the U.S. military and the PLA today as both adapt to meet the challenges of major power conflict. The U.S. military largely operates within a system that is of its own creation, developed from its own experiences, and based on a series of political, cultural, and social precepts that are tailored to its specific operational model in the areas of technology, personnel, strategy, operations, and civil-military and political-military relations, among others. This observation should not be construed as a statement of relative value or effectiveness. Rather, we contend that the operational model that exists in most Western militaries is familiar and requires relatively little, if any, compromise on political, social, or cultural norms to work effectively.

The PLA's situation is markedly different, and perhaps more complex, because of its attempts to fashion an informatized military based on elements of three existing operational models: the Soviet and Russian, Western or NATO, and People's War models. The PLA's lack of operational experience since its last major conflict in 1979 and its reliance on indirect experience make these adaptations even more difficult. In addition, several of the contradictory assumptions and essential principles behind these three models have made reconciling and adapting them a major challenge for the PLA—a factor that has limited the success of their reforms in many areas, especially training. The operational and tactical successes the United States and its allies enjoyed in operations since the First Gulf War make the PLA's desire to emulate key elements of the Western operational model—greater emphasis on tactical proficiency, jointness, initiative, transparency, and adaptive decisionmaking, among others—understandable.¹ The CCP's primary difficulty in its military modernization efforts has been in reconciling and inculcating these attributes in a party army that is based on a conscript model and continues to be dominated by ground force commanders. To date, the CCP and PLA have not been able to reconcile the need for greater innovation, creativity, and initiative with demands of party loyalty and orthodoxy.

Implications

The findings in this report have several implications for how U.S. policymakers and commanders should view the role of experience in the U.S. military and what that means in the future for U.S. preparations for major power conflict. The first implication is that the system of learning within the U.S. military that has helped it develop lessons learned and distill those lessons into updated operational concepts and training is a critical advantage. Since the training revolution that took place following the Vietnam War, the United States has invested

¹ This discussion is focused on the operational use of U.S. and allied forces and not the lack of U.S. strategic success in Iraq and Afghanistan. Beijing recognizes the value of the former while also viewing the second as a pitfall to be avoided in its own strategic decisionmaking.

heavily in a training infrastructure that is second to none. China has attempted to replicate several aspects of this system, but its efforts remain nascent for a variety of reasons. The most prominent reason for the success of the U.S. system of learning is that there has been great effort within each of the services to capture the lessons and experience gained from combat operations and ensure that those lessons find their way into training and are maintained in institutional memory. The U.S. military has also shown a willingness to adapt its training based on changes in the security environment, failures or shortcomings, and new technologies and operational concepts. Ultimately, one of the most significant and enduring advantages enjoyed by the U.S. military has been the quality of its training and the ability to update that training to meet changing conditions and threats.

A second key implication is based on personnel quality and the effectiveness of the AVF. Several examples of militaries in this report demonstrate that reserve or conscript militaries can be effective and attain levels of proficiency necessary to perform highly complex operations and tasks; the militaries of Israel and Singapore are prime examples. However, the most successful conscript militaries in recent decades have been those of countries faced with significant and, at times, existential threats to their viability and survival—Israel with its Arab neighbors and Singapore with Malaysia and Indonesia, for example. Other examples include Taiwan and South Korea. The models for these forces have varied and involved periods of compulsory service followed by designated periods of reserve commitment. Although views regarding compulsory service are changing in some of these countries (e.g., Taiwan has attempted to develop an AVF of its own), each requires a highly proficient, full-time, professional cadre during peacetime. The common factor in each of these countries is a view of the threat that is widely shared among the population and a commonly held belief that the military, as an institution, plays a critical role in shaping national identity.

One of the key challenges for the PLA in recent decades has been the issue of reliability. Reliability includes political loyalty—which is the major element of reliability for the PLA—and other issues related to work style, motivation, and willingness to adhere to institutional guidelines and directives. The question of whether the PLA will fight when the CCP and nation ask is one of four issues Xi described in a 2017 speech about what concerns him most about the PLA. The PLA's lack of combat experience, the development of "peacetime habits" (i.e., a form of negative experience), and concerns about the reliability of the rank and file are compounded by a continued reliance on conscripts to fill the ranks. As a result, the PLA has emphasized political work and ensuring that training is geared not only toward building proficiency but also toward maintaining loyalty and reliability.

Questions of reliability are not unknown to the U.S. military, as demonstrated by concerns about the hollow force that emerged in the 1970s. However, since adopting the AVF, the U.S. military has not had to address these types of concerns. In many respects, the U.S. military has proven extremely reliable in addition to the technical and operational competence that the AVF delivered. For that reason, the U.S. military's ability to maintain its AVF is a distinct advantage, as long as the system can continue.

Recommendations

This report provides two major recommendations.

- Our research provides a baseline or framework for understanding why and how experiential and operational models matter in the evolution of military concepts and capabilities. More focused research and analysis should build on this foundation specific to the U.S.-China military comparison. Further comparative study on U.S. and Chinese experimentation, training, and exercises related to major war concepts and capabilities would benefit U.S. planners and strategists in campaign development. A comprehensive database that quantifies the number, scope, and scale of these activities, along with qualitative assessments of the capabilities and vulnerabilities in evidence, would better inform net assessments and scenario-specific games and analyses.
- U.S. policymakers and senior warfighters should likewise seek additional insight on how China's leadership assesses PLA readiness for major power conflict from the intelligence community and federally funded research and development centers. Understanding how senior CCP decisionmakers evaluate PLA experience as a prerequisite for or factor in decisions to employ military force is a key component in designing U.S. deterrence approaches.

Abbreviations

A2/AD	anti-access/area denial
ABMS	Advanced Battle Management System
ACE	agile combat employment
ADO	all-domain operations
AFWC	Air Force Warfare Center
AI	artificial intelligence
AMS	Academy of Military Science
AVF	all-volunteer force
C2	command and control
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
CCP	Chinese Communist Party
CMC	Central Military Commission
COIN	counterinsurgency
CSG	carrier strike group
CTC	Combat Training Center
DMO	Distributed Maritime Operations
DoD	U.S. Department of Defense
EABO	Expeditionary Advanced Base Operations
ECT	expeditionary cyber and electromagnetic activities teams
FAR	<i>Fuerzas Armadas Revolucionarias</i> (Revolutionary Armed Forces)
HADR	humanitarian assistance and disaster relief
HIMARS	high-mobility artillery rocket system
IAF	Indian Air Force
IDF	Israel Defense Forces
IJO	integrated joint operations
ISR	intelligence, surveillance, and reconnaissance
JADC2	joint all-domain command and control
JGSDF	Japanese Ground Self-Defense Force
JMTG-U	Joint Multinational Training Group-Ukraine
JSDF	Japanese Self-Defense Force
JWC	Joint Warfighting Concept
KSAOC	knowledge, skills, abilities, and other characteristics
LRA	long-range aviation

MDO	multidomain operations
MDTF	multidomain task force
ML	machine learning
MOB	major operating base
MOOTW	military operations other than war
NATO	North Atlantic Treaty Organization
NAWDC	Naval Aviation Warfighting Development Center
NCO	noncommissioned officer
NDS	National Defense Strategy
NDU	National Defense University
NEO	noncombatant evacuation operation
NTC	National Training Center
OMTE	Outline for Military Training and Evaluation
OPFOR	opposing force
PLA	People's Liberation Army
PLAA	Peoples' Liberation Army Army
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
PLARF	People's Liberation Army Rocket Force
PLASSF	People's Liberation Army Strategic Support Force
PRC	People's Republic of China
PWD	Political Work Department
RAF	Royal Air Force
REFORGER	Return of Forces to Germany
RFMDS	Red Flag Measurement and Debriefing System
RIMPAC	Rim of the Pacific
RTC	regional training center
SAF	Singapore Armed Forces
TTP	tactics, techniques, and procedures
UN	United Nations
USAF	U.S. Air Force

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The U.S. and Chinese militaries have been shaped by a distinct set of direct and indirect experiences. The U.S. military has focused its energy and resources on combating terrorism and performing counterinsurgency operations in Iraq and Afghanistan. Even in 2023, U.S. emphasis on major power competition contends with other national security priorities, including current crises and continued deployments around the globe. The People's Liberation Army (PLA), on the other hand, has largely focused its military modernization and restructuring to prepare for a regional conflict that would likely involve U.S. military intervention. Despite having no combat experience since the 1979 Sino-Vietnamese War, the PLA has conducted an in-depth study of all aspects of the U.S. military's technological and operational capabilities—including its organization, command and control, logistics, joint operations, and concepts of operation—since the 1990s.

The dichotomy presented by the experiences of both militaries raises several questions about how they are preparing for the possibility of a major power conflict. Since 2001, the U.S. military has gained significant direct combat experience, but has done so against technologically inferior, nonpeer adversaries. In contrast, the PLA had no direct combat experience. Even though its concepts of operation are designed to fight a major power, these concepts are largely derived from indirect observations and lessons from U.S. operations since 1991. The ways that each side gains and processes experience and incorporates it into training will heavily affect readiness for and performance in a future war.

\$42.00

ISBN-10 1-9774-1054-5
ISBN-13 978-1-9774-1054-2



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