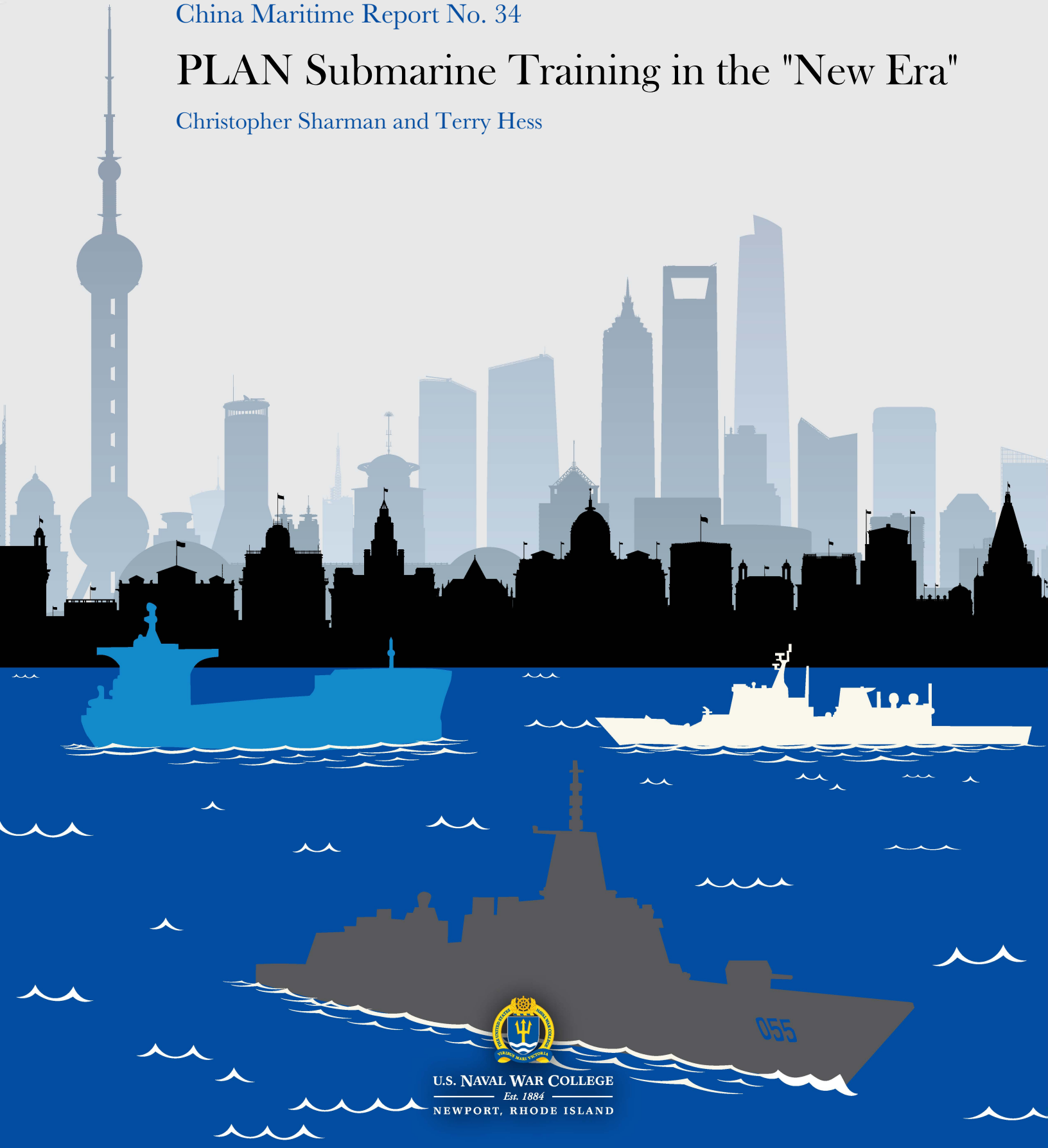
中国海事研究所
China Maritime Studies Institute

January 2024

China Maritime Report No. 34

PLAN Submarine Training in the "New Era"

Christopher Sharman and Terry Hess



U.S. NAVAL WAR COLLEGE
Est. 1884
NEWPORT, RHODE ISLAND

Summary

Since 2018, there have been significant changes to People's Liberation Army Navy (PLAN) submarine force training, and these changes have been driven by important revisions to strategic guidance and subsequent directives that focused PLA efforts to enhance its capabilities to operate in the maritime domain. While this guidance is applicable to all services, improving PLAN submarine force capabilities appears to have been of particular interest to senior Chinese leadership. This guidance expanded the PLA's maritime domain requirements, which demanded that China's submarine force improve its capabilities to operate independently or along with other PLAN assets at greater distances from coast and in the far seas. This has resulted in submarine training that is more realistic, rigorous, and standardized across the fleet. Though stressful on submarine equipment and crews, these changes to training may ultimately yield a more combat-capable submarine fleet operating throughout the western Pacific.

Introduction

On the afternoon of June 11, 2018, People's Republic of China (PRC) President and Central Military Commission (CMC) Chairman, Xi Jinping, climbed through the hatch of a Type 093 (*Shang* class) submarine moored at Qingdao Submarine Base—his second visit aboard a People's Liberation Army Navy (PLAN) nuclear submarine since assuming his role as CMC Chairman in November 2012. While aboard, he encouraged the crew to "train to excel in the skills for winning."[1] After disembarking, he toured the comprehensive simulation building at the nearby PLAN Northern Theater Command Headquarters, where he learned how simulator improvements helped make submarine training more realistic. His day culminated with a speech to the assembled PLAN leadership, where he stated:

> It is necessary to earnestly implement the new generation of military training regulations and military training programs, increase the intensity of training, innovate training modules, and strictly strengthen the supervision of training. It is necessary to launch mass training exercises in the new era, strengthen targeted training, training in actual cases, and training for commanders, and strengthen military struggle for frontline training [*sic*].[2]

While Xi could have delivered his remarks to an army unit or issued guidance through a written order from Beijing, his itinerary and comments suggest his visit was deliberately choreographed to convey a strategic focus on training—and that submarine training was of particular interest to the highest levels of PLA leadership.

Xi's direction to improve training was not new, but a continuation of previous strategic guidance. For instance, the 18th Party Congress work report issued in November 2012 highlighted the need to "revitalize the research style of combat problems and strengthen practical training."[3] Rather, Xi's

---

4[1] Zhao Lei, "Navy urged to boost combat readiness", *China Daily Asia-Pacific*, 16 June 2018, https://www.chinadailyasia.com/articles/69/207/65/1529133204693.html.

[2] "Xi Jinping Inspects Navy's Submarine Unit in Northern Theater Command", *China Daily Asia-Pacific*, 16 June 2018, https://govt.chinadaily.com.cn/s/201806/16/WS5cd8dad0498e079e6801fec4/xi-stresses-building-elite-maritime-force-during-navy-inspection.html.

[3] 刘建伟 [Liu Jianwei], 牢固立起新时代备战打仗指挥棒——军委联合参谋部战略战役训练局领导就发布《中国人民解放军联合作战纲要（试行）》答记者问 ["Firmly Standing the Baton for Preparing for War in the New Era—The leader of the Strategic Campaign Training Bureau of the Joint Staff Department of the Central Military Commission

June 2018 speech reflects a renewed CMC emphasis on PLA training in order to advance capabilities necessary to address additional operational requirements driven by changes in strategic guidance. This report argues that the PLA began a concerted effort to adopt new tactical and operational concepts to address these requirements starting in 2018 and that these efforts have significant implications for submarine doctrine and how the submarine force trains.

Exhibit 1. Xi Jinping visits a Northern Theater Command Navy submarine training facility (11 June 2018).[4]

New Strategic Guidance, New Training Requirements

Strategic guidance provides the context necessary for military commanders to identify operational requirements for their subordinate military units. These requirements determine the doctrine and force structure, and influence how units train. When strategic guidance changes, unit and operational-level training often must adjust. In 2014, the PLA modified its strategic guidance by revising the military strategic guidelines. Issued under the authority of the Central Military Commission, the military strategic guidelines are the highest level of national guidance and direction to the armed forces.[5] They contain the essence of China's military strategy at a given point in time. The 2014 guidelines are particularly important. Not only did they foreshadow the 2015 PLA structural reforms,

answered a reporter's question on the issuance of the "Outline of Joint Operations of the Chinese People's Liberation Army (for Trial Implementation)"], 解放军报 [*PLA Daily*], 26 November 2020, p. 2.

[4] 习主席视察北部战区海军多幅独家照片发布 ["Multiple Photographs Released of Chairman Xi's Visit to Northern Theater Command Navy"], 中国军网 [*China Military Online*], 3 July 2018, https://military.cnr.cn/ztch/1234/12/20180703/t20180703_524289506_11.html.

[5] David Finkelstein, "China's National Military Strategy: An Overview of the 'Military Strategic Guidelines'" in Roy Kamphausen and Andrew Scobell, eds, *Right Sizing the People's Liberation Army: Exploring the Contours of China's Military*. (Carlisle, PA: U.S. Army War College Press, September 2007), p. 85.

they also identified new requirements that would impact submarine force training. Unfortunately, the guidelines are not publicly available, which requires readers to discern their content from reflections of their content in PLA journals, newspapers, books, and other documents.

Defense white papers in particular offer a valuable window into understanding the guidelines. Defense white papers are official statements of government policy that explain details of policies previously promulgated. The juxtaposition of the 2014 strategic guidelines with the 2015 defense white paper suggests coherence and consistency between the two documents and that the public-facing white paper can be used to validate and expound on concepts deduced from commentary about the strategic guidelines.

The 2014 military strategic guidelines, as reflected in the 2015 defense white paper, identify several requirements that impact how PLAN submarines train and prepare for operational missions. These include expanding PLA requirements in the maritime domain, advancing informatization, and an emphasis on joint operations.

The PRC's military strategy, as detailed in past military strategic guidelines, traditionally focused on preparing the PLA for continental wars or wars on China's periphery. Between 1956 and 1980, the PLA adopted five strategies that focused on how to defeat an American or Soviet invasion of China. The four strategies, adopted between 1988 and 2014, addressed how to prevail in local wars over limited aims on China's periphery.[6] It is noteworthy, therefore, that the 2014 strategic guidelines emphasized the maritime domain. The guidelines expanded the primary strategic direction (the area in which the military must prepare for military conflict) to include parts of the western Pacific that would be relevant for a Taiwan conflict.[7] This was the first time a domain was singled out in a guideline at the strategic level.[8]

The 2015 defense white paper amplifies these new maritime domain requirements. According to the white paper, "great importance has to be attached to managing the seas and oceans and protecting maritime rights and interests." As a result, the PLAN "will gradually shift its focus from 'offshore waters defense' to the combination of 'offshore waters defense' with 'open seas protection.'"[9] The increase in maritime strategic requirements expands the navy's functional and geographic responsibilities, which likely requires operational commanders to consider submarine operations further from the mainland, develop tactics that maximize weapons system lethality, and improve coordination between submarines and other assets. These requirements have substantial implications for PLAN submarine organization, structure, operations, and perhaps most significantly, training.

In addition to the expansion of maritime requirements, the 2014 strategic guidelines emphasized advancing "informatization." Informatization is the concept of collecting, processing, and using information in all aspects of warfighting to link units across the services to gain an advantage on the battlefield.[10] Although informatization was cited in earlier strategic guidance, the 2014 guidelines were unique because informatization was not just a condition under which wars would be fought, but

[6] Joel Wuthnow and M. Taylor Fravel, "China's Military Strategy for a 'New Era': Some Change, More Continuity, and Tantalizing Hints," *Journal of Strategic Studies*, (March 2022), p. 6.

[7] Wuthnow and Fravel, "China's Military Strategy for a 'New Era,'" p.7.

[8] Ibid., p.8.

[9] "China's Military Strategy," *Xinhua*, 27 May 2015, www.china.org.cn/china/2015-05/26/content_35661433.htm.

[10] Wuthnow and Fravel, "China's Military Strategy for a 'New Era,'" p. 7.

the "dominant feature or characterization of war."[11] The 2015 White Paper points out that informatization accelerates the character of war because, "long-range, precise, smart, stealthy and unmanned weapons and equipment are becoming increasingly sophisticated … World major powers are actively adjusting their national security strategies and defense policies, and speeding up their military transformation and force restructuring."[12] The white paper suggests, therefore, that informatization is the foundation for future tactics and operations and that the PLA must advance informatization to identify, classify, and target threats at greater distances. An implicit requirement of informatization for submarines is that they must provide intelligence and use information from external sources to identify and classify targets beyond the range of a submarine's onboard sensors. Advancing informatization would likely require the submarines to more regularly train with other military units in an informatized operational environment.

A third requirement identified by the 2014 strategic guidelines was an increase in the emphasis on joint operations. Calls to improve PLA joint capabilities are not new. Military strategic guidelines since 1993 have called on the PLA to be capable of conducting joint operations.[13] Despite this long-term focus, it appears the PLA had not achieved the desired results in joint operational concepts at the time of the guidelines' release in 2014. According to a statement by Xi Jinping at an enlarged meeting of the CMC in 2013, "we have extensively explored the command system for joint operations, but the problem has not been fundamentally solved."[14] Xi's acknowledgment of problems with PLA command of joint operations suggests the PLA may have been rethinking joint operational concepts in the 2013-2014 timeframe.

A review of the frequency that the term "joint operations" (联合作战) has appeared in published white papers supports this assertion. See the table below. In the 2010 White Paper, the Chinese characters for "joint operations" appear thirteen times. The 2013 White Paper, however, includes them just once. The single reference in the 2013 document suggests that authoritative public discussions about the nature and character of joint operations may have been deliberately muted while internal debate about them was underway. By the time the 2015 White Paper was published, the term appears six times—a notable increase, suggesting consensus amongst leadership and that the CMC was prepared to reemphasize joint operations to the PLA and to the world. By the time of the publication of the most recent white paper in 2019, "joint operations" is featured prominently and mentioned nineteen times.

[11] Ibid., p.8.

[12] "China's Military Strategy."

[13] Wuthnow and Fravel, "China's Military Strategy for a 'New Era,'" p. 26

[14] Ibid., p. 8.

Exhibit 2. Appearance of the Term "Joint Operations" in Recent National Defense White Papers[15]

White Paper	Instances
2004 Defense White Paper	10
2006 Defense White Paper	13
2008 Defense White Paper	11
2010 Defense White Paper	13
2013 Defense White Paper	1
2015 Defense White Paper	6
2019 Defense White Paper	19

The 2014 modifications to the strategic guidelines had significant implications for the PLAN. Not only did they influence *where* navy units operate by expanding operational requirements in the western Pacific, they also directed changes to *how* the navy trains by making informatization the foundation for operations and by emphasizing joint operations, thereby modifying operations and tactics. These changes did not merely pertain to the PLAN, but were applicable to the entire PLA and thus general in nature. Therefore, supplemental CMC guidance was necessary to help focus PLA training on how best to address these requirements.

2018: A Strategic Training Turning Point

Starting in 2018, Xi Jinping issued a series of training orders intended to shape how the PLA trains to support requirements identified in the 2014 strategic guidelines. While Xi has addressed PLA training since first becoming CMC Chairman, he did not begin issuing training directives until 2018—four years after the updates to the strategic guidelines. While there are many potential reasons for the apparent delay, it is likely that PLA-wide structural reforms, which took effect the last day of 2015, were necessary before the PLA could turn its focus to addressing the training concepts necessary to support these requirements. The military reforms introduced new organizational structures, command and control mechanisms, and operational requirements that impacted how units operate.[16] Not until the structural reforms were firmly established could the CMC begin training the newly restructured force on requirements identified in the strategic guidelines.

The first of these orders was Xi's training mobilization order (开训动员令), which was issued on January 3, 2018, following the CMC training mobilization conference. Upon issuing the mobilization order, Xi stated that "all levels of the army should strengthen the clear guidance of training and preparation for war [and] unswervingly put training in a strategic position."[17] PLA press singled out this order as one of the major events in the years following the 19th Communist Party Congress (October 2017), which underscores its significance. Specific details of the order are unknown to

[15] "China Defense White Papers—1995-2019," Andrew S. Erickson, 23 July 2019, https://www.andrewerickson.com/2019/07/china-defense-white-papers-1995-2019-download-complete-set-read-highlights-here/.

[16] Zhao Lei, "Xi's thought guides reform of armed forces," *China Daily*, 21 September 2022, www.chinadaily.com.cn/a/202209/21/WS632a4ab9a310fd2b29e78c6d.html.

[17] 李学勇 [Li Xueyong], "领航强军 铁流浩荡——习近平主席领导推进新时代军事训练纪实" [Leading the Strong Army, the Iron Flow is Vast—A Documentary of President Xi Jinping's Leadership to Promote Military Training in the New Era], 新华网 [Xiunhua Net], 24 November 2020, http://www.xinhuanet.com/politics/2020-11/24/c_1126781125.htm.

outsiders, but PLA authors describe the order as the first time the CMC unified the training and organization of the entire PLA and marked the debut of PLA efforts to strengthen military training.[18]

This order was issued six months prior to Xi's speech in Qingdao addressing military training. Promulgating the order in such close proximity to Xi's Qingdao speech suggests the order served as the bureaucratic backdrop for Xi's comments and that the speech is consistent with the content of the training order. In addition, the reference to this training order as a "debut" suggests 2018 marked the start of a renewed national focus on military training.

Xi Jinping signed a training and mobilization order each January from 2018-2022.[19] Issued on the first working day of each year, these orders are intended to shape, or "guide," the year's training emphasis.[20] For example, PLA authors indicate that the 2022 order focused on Xi's "three changes"—i.e., integrating changes in science and technology into combat training, changing training so that training is similar to actual combat, and changing training to incorporate the tactics and doctrine of an opponent.[21] Similarly, the 2021 training order focused on preparing for war, the transformation of military training, building a new military training system, and improving combat capabilities.[22] While the orders are similar year to year, they provide a mechanism for PLA leadership to adjust the focus of training to best support strategic requirements. Although they may focus on diverse concepts, they highlight a concerted effort to use training to develop combat capabilities that support strategic requirements.

President Xi Jinping did not issue a training mobilization order at the start of 2023. Despite its absence, Xi appears to have conveyed his guidance through his actions. On November 7, 2022, Xi inspected the CMC Joint Operations Center—his third visit to the Joint Operations Center since 2012.[23] During the afternoon visit, Xi instructed the military to "study, publicize and implement the guiding principles of the 20th CPC National Congress."[24] By visiting the senior-most joint operations center and pointing to the CPC Work Report issued days earlier, Xi's actions conveyed the message that joint training for war preparedness should remain the primary training focus and that the CPC Work Report contained relevant guidance to drive training.

---

[18] 中共中央党史和文献研究院 [Institute of Party History and Literature of the Central Committee of the Communist Party of China], 党的十九大以来大事记 ["Timeline of major events since the 19th National Congress of the Communist Party of China"], 解放军报 [*PLA Daily*], 14 October 2022, p. 6.

[19] 本报评论员 [Newspaper Commentator], 全面提高训练实战化水平和打赢能力——认真学习贯彻习主席向全军发布的 2021 年开训动员令 ["Comprehensively Improve the Level of Actual Training and the Ability to Win—Conscientiously Study and Implement the 2021 Training Mobilization Order Issued by President Xi Jinping to the Whole Army"], 解放军报 [*PLA Daily*], 5 January 2021, p. 1.

[20] 三军开训风雷动 号令如山砺精兵 ["The Three Armies Began Training and Thundered, and the Orders Were Like Mountains and Crack Soldiers"], 解放军报 [*PLA Daily*], 7 January 2022, p. 2.

[21] Ibid.

[22] Newspaper Commentator, "Comprehensively Improve the Level of Actual Training and the Ability to Win—Conscientiously Study and Implement the 2021 Training Mobilization Order Issued by President Xi Jinping to the Whole Army," p. 1.

[23] 丁来富 [Ding Liafu], 练强指挥能力 练好战斗本领——在强军伟业征程上昂扬奋进④ ["Strengthen Command Ability and Combat Skills—Work Hard on the Journey of Strengthening the Army 4"], 解放军报 [*PLA Daily*], 16 January 2023, p. 6.

[24] "Xi Focus: Xi Inspects CMC Joint Operations Command Center, Stressing Troop Training, Combat Preparedness," *Xinhua*, 8 November 2022, https://english.news.cn/20221108/9c3ee201f1b146dda91f5f2d89e6f4cf/c.html.

In the years since the promulgation of the first annual training order, the CMC has issued additional training directives that further refined the content, structure, and organization of training. These included the "Regulations on the Supervision of Military Training of the PLA (Trial)", the "Joint Operations Outline of the Chinese People's Liberation Army (Trial)" and the "Decision on Building a New Military Training System." These CMC directives detail training concepts and provide guidance for how subordinate units must train to support strategic requirements. Unit level training, therefore, must reflect the content of these orders. While these directives are not available to outsiders, authoritative PLA press descriptions provide insights into their contents and help to illustrate the application of these concepts in the submarine force.

The first set of guidelines, the "Regulations on the Supervision of Military Training (Trial)" (中国人民解放军军事训练监察条例（试行)), was issued in early February 2019.[25] These regulations consist of 10 chapters and 61 articles that clarify the responsibilities, authority, and priorities of military training supervision.[26] These regulations are noteworthy in that they changed PLA training by formally incorporating oversight and supervision into training. This directive empowers external training monitors to make training corrections and uphold training standards—a concept the PLA had experimented with since 2014.[27] Oversight prevents units from grading themselves on training evolutions, which ensures training accountability by mitigating the risk of units falsifying capabilities and validates capabilities to execute operational requirements. Moreover, it addresses two problems that existed in PLA training: inconsistency between how similar units train and incorrect training techniques.[28]

The next year, the CMC issued the "Joint Operations Outline of the Chinese People's Liberation Army (Trial)" (中国人民解放军联合作战纲要（试行)), or "Outline," which took effect on November 7, 2020.[29] The Outline is authoritative "top-level" guidance issued in the name of Xi Jinping containing a series of training laws and combat regulations designed to organize joint operations and joint training and to improve the joint combat command structure.[30] It standardizes how units from different theaters integrate with each other.[31] The Outline highlights joint command training, cross-disciplinary and cross-service training, and local training, and it accelerates efforts to

[25] 本报评论员 [Newspaper Commentator].加强训练监察提高军事训练实战化水平 ["Strengthen Training and Supervision to Improve the Level of Military Training"], 解放军报 [*PLA Daily*], 12 February 2019, p. 1.

[26] "中央军委主席习近平签署命令发布《中国人民解放军军事训练监察条例（试行）》" [Xi Jinping, Chairman of the Central Military Commission, Signed an Order to Issue the Regulations on the Supervision of Military Training of the Chinese People's Liberation Army (Trial)], 新华网 [Xinhua Online], 11 February 2019. http://www.xinhuanet.com/politics/2019-02/11/c_1124101234.htm.

[27] 本报评论员 [Newspaper Commentator].加强训练监察提高军事训练实战化水平 ["Strengthen Training And Supervision to Improve the Level of Military Training"], 解放军报 [*PLA Daily*], 12 February 2019, p. 1.

[28] Ibid.

[29] Liu, "Firmly Set Up a War Preparation Baton in the New Era," p. 2.

[30] 经中央军委主席习近平批准 中央军委印发《中国人民解放军联合作战纲要（试行) ["With the Approval of Xi Jinping, Chairman of the Central Military Commission, the Central Military Commission issued the 'Outline of Joint Operations of the Chinese People's Liberation Army (for Trial Implementation)'"], 解放军报 [*PLA Daily*], 14 November 2020, p. 1.

[31] 韩林 [Han Lin], 推动联合作战训练迈向更高水平——《中国人民解放军联合作战纲要（试行）》施行一周年综述 ["Promoting Joint Combat Training to a Higher Level: A Summary of the First Anniversary of the 'Implementation of the Joint Operational Outline of the Chinese People's Liberation Army (Trial)'"], 解放军报 [*PLA Daily*], 5 January 2022, p. 8.

improve integrated joint combat capabilities.[32] Rather than serving as a dogmatic training order that must be strictly followed, the Outline appears to recognize the complexity of future warfare and empowers units to execute its concepts with greater flexibility.[33] Significantly, the publication of this document just a few years after the apparent reemphasis of joint operations in the 2015 Defense White Paper suggests it articulates the consensus of senior CMC leadership on joint operations that was reached during earlier internal debate on the topic.

The Outline's focus on integrated joint operations also advances the PLA concept of "systems confrontation" (体系对抗). Systems confrontation is a contest between numerous adversarial operational systems, such as command and control, reconnaissance, intelligence, or firepower capabilities. [34] PLA publications have addressed systems confrontation for years, but the Outline's guidance to advance integrated joint operations helps to create the type of military force that is capable of executing this approach. It also supports the concept of intelligentization (智能化), which was formally incorporated into the Chinese Communist Party (CCP) 14th Five-Year Plan—one month prior to publication of the Outline.[35] Intelligentization encompasses how new technologies, such as artificial intelligence, increase the speed and tempo of warfare by improving information processing and reducing battlefield uncertainty.[36] By advancing integrated joint operations, which incorporates both systems confrontation and intelligentization, the Outline supports Xi Jinping's 2027 armed forces modernization goals. [37]

The CMC then issued the "Decision on the New Training System" (关于构建新型军事训练体系的决定) following the conclusion of the CMC Military Training Conference in February 2021.[38] While PLA journals suggest this guidance addressed several training issues, one of its primary functions was to closely link training in peacetime to how units will fight in war.[39] The PLA refers to this linkage as "coupling" (耦合). Borrowed from physics, the term coupling describes when two or more systems or two or more forms of motions affect each other or unite through interaction with each other.[40] According to this concept, the more realistic training is, the more effective units are.

---

[32] 胜战——大型电视纪录片《锻造雄师向复兴》解说词（第四集 ["Victory—Commentary on the Large-scale TV Documentary "Forging Heroes to Revival" (Episode 4)"], 解放军报 [*PLA Daily*], 30 September 2022, p. 12.

[33] Liu, "Firmly Set Up a War Preparation Baton in the New Era," p. 2.

[34] Jeffrey Engstrom, *System Confrontation and System Destruction Warfare* (Santa Monica, CA: RAND, 2018), p. ix, https://www.rand.org/pubs/research_reports/RR1708.html.

[35] "Military and Security Developments Involving the People's Republic of China (2022)," U.S. Department of Defense, 29 November 2022, p. 86, https://media.defense.gov/2022/Nov/29/2003122279/-1/-1/1/2022-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF.

[36] "Report on Military and Security Developments Involving the People's Republic of China (2021)," U.S. Department of Defense, 3 November 2021, p. 89, https://media.defense.gov/2021/Nov/03/2002885874/-1/-1/0/2021-CMPR-FINAL.PDF.

[37] Part of PRC goals for modernizing its armed forces in the "New Era" include to "accelerate the integrated development of mechanization, informatization, and intelligentization" by 2027. See "Military and Security Developments Involving the People's Republic of China (2022)," p. 37.

[38] 欧灿 [Ou Can], 在党的旗帜下奋斗强军——写在庆祝中国共产党成立 100 周年之际 ["Struggle to Strengthen the Army Under the Banner Of The Party—Written on the Occasion of the Celebration of the 100th Anniversary of the Founding of the Communist Party of China"], 解放军报 [*PLA Daily*], 1 July 2021, p. 5.

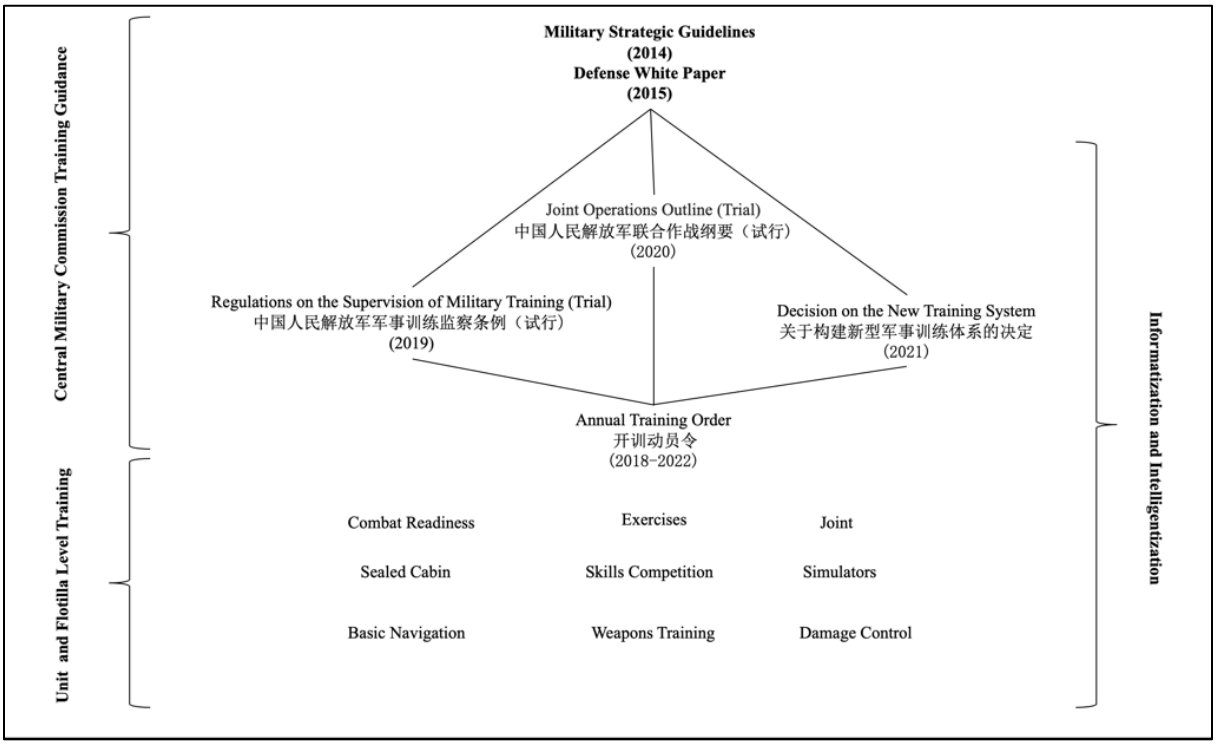
[39] 经中央军委主席习近平批准 中央军委印发《关于构建新型军事训练体系的决定》 ["With the Approval of Xi Jinping, Chairman of the Central Military Commission, the Central Military Commission issued the 'Decision on Building a New Military Training System'"], 解放军报 [*PLA Daily*], 21 February 2021, p. 2.

[40] 程荣贵 [Cheng Ronggui], 塑造战训深度耦合格局 ["Shaping the Deep Coupling Qualification Bureau of Combat Training"], 解放军报 [*PLA Daily*], 16 Jan. 2022, p. 2.

Coupling was also cited in Xi's 2022 training mobilization order, underscoring the importance of this concept.[41] While the PLA has addressed wartime requirements in training for years, the explicit requirement to train under conditions that are expected in combat adds an intensity and rigor to training and pushes units to consistently train for war.

The relationship between strategic guidance, operational requirements, and flotilla and unit level training are detailed in Exhibit 3 below. Although the CMC issued its directives over the period of several years, each order appears to complement existing guidance. The 2014 strategic guidelines, as reflected in the 2015 white paper, provide the overarching military strategy. The subsequent CMC directives are shaped by the concepts of informatization and intelligentization and detail specific training requirements necessary to support the guidelines. A review of authoritative PLA journal articles and indicators of relative emphasize by the CMC suggests the Joint Operations Outline is the most important of these directives. Examples of training evolutions used by the submarine force to incorporate this guidance at the flotilla and unit level are detailed at the bottom of the figure. When examined holistically, there appears to be coherence between the military strategy, operational requirements necessary to support it, and the execution of submarine training to address higher level requirements.

Exhibit 3. The Relationship between Strategic Guidance, Operational Requirements, and Flotilla and Unit Level Training



[41] 王晓峰 [Wang Xiaofeng] and 吴旭 [Wu Xu], 加快推进新时代军事训练转型升级 ["Accelerate the transformation and upgrading of military training in the new era"], 解放军报 [*PLA Daily*], 16 September 2022, p. 7.

Operationalizing Strategic Guidance in the Submarine Force

While the strategic guidelines provide the PLA with the highest level of national guidance and contain the essence of China's military strategy, the annual training order, the Regulations on the Supervision of Military Training, the Decision on Building a New Training System, and the Outline prescribe the training requirements the PLA must incorporate to support strategic guidance. Since 2018, the PLAN submarine force has responded to these orders and regulations by formalizing the training and evaluation system, advancing the concept of "coupling" ashore and at sea as well as by taking steps to train jointly.

The guidance to incorporate evaluators into training as directed by the Regulations on the Supervision of Military Training (Trial) significantly impacts how submarines train. External supervision by the naval evaluation training base (海军某试训基地) causes training to "take longer" than similar training in the past.[42] Each Theater has at least one naval evaluation training base. The base is responsible for conducting submarine training assessments and issues submarine "deep sea battlefield 'qualification certificates'" (通往深海战场的'资格证') for submarine crews that successfully pass their tactical evaluations.[43] During the evaluation process, naval evaluation training base evaluators employ a series of increasingly difficult tests to evaluate submarine crew performance.[44] A submarine might face twenty different scenarios that are used to evaluate fifty technical and tactical tasks while operating at sea. For example, during one assessment evaluators directed a submarine to sea in poor weather causing severe sea sickness among the crew. In these conditions, evaluators tested the submarine's ability to dive, avoid anti-submarine ships and aircraft, overcome a rudder hydraulic failure, perform anti-surface and anti-submarine targeting, and launch live torpedoes.[45] Submarine crews are not always successful in these evaluations. In one training evolution a submarine sonar operator detected a high-speed target maneuvering toward the submarine. The submarine's captain assumed the object was an enemy torpedo and began making evasive maneuvers. The target, however, was a decoy. Because the submarine had misidentified the target, the crew failed the exam.[46]

One PLA author describes the stressful training evaluation process as units being "roasted" by fire in order to identify shortcomings and weaknesses. Once shortfalls are addressed, units are "baked" and combat ready. The author contrasts the current training evaluation system to what existed in the past,

---

[42] 东部战区海军某潜艇支队紧贴实战展开模拟训练 专攻精练提升特情处置能力 ["A Submarine Detachment of the Navy In The Eastern Theater Launched Simulation Training Closely In Actual Combat, Specializing In Concision and Improving the Ability of Special Situations"], 解放军报 [*PLA Daily*], 21 March 2022, p. 1.

[43] 高先千 [Gao Xianqian], 乔梓航 [Qiao Zihang], and 马玉彬 [Ma Yubin], 潜行深海砺剑锋——北部战区海军某试训基地潜艇训练考核见闻 ["Stealing Deep-Sea Swordsmen—The Experience of Submarine Training Assessment at a Naval Trial Training Base in the Northern Theate"r], 解放军报 [*PLA Daily*], 21 January. 2021, p. 2.

[44] While the naval evaluation training base appears to have responsibility for certifying a submarine crews' training and readiness, a submarine test and evaluation base (潜艇试验训练基地) has the responsibility to evaluate submarine weapons and equipment. For a discussion of the roles and functions of the submarine test and evaluation base, see: 擦亮"试验先锋"精神底色 ["Polish the Spiritual Background of the 'Experimental Pioneer'"], 民网-军事频道 [*People's Daily Online*], 19 April, 2017, http://military.people.com.cn/n1/2017/0419/c412213-29221948.html.

[45] 乔梓航 [Qiao Zihang] and 马玉彬 [Ma Yubin], 北部战区海军某基地设险局难局锤炼潜艇官兵——惊涛骇浪中的"成人礼" ["A Certain Naval Base in the Northern Theater Set Up A Dangerous Situation and Tempered Submarine Officers and Soldiers—"Bar Mitzvah" In the Stormy Seas"], 解放军报 [*PLA Daily*], 8 September 2020, p. 2.

[46] 茆琳 [Mao Lin], 把潜行航迹标注在远海无声处 ["Sail by Stealth in the Far Seas"], 人民海军 [*People's Navy*], 11 November 2021, p. 3.

referring to the old training structure as "comfortable" where some units would take shortcuts on the requirements resulting in "lax and unrealistic training."[47] The training evaluation system helps to improve the quality of submarine training, upholds training standards, and improves the combat effectiveness of submarines. It also assures higher level operational commanders that units under their authority are trained and capable of executing assigned tasks.

The Joint Operations Outline's emphasis on developing integrated joint operations to support systematic warfare requires that submarines train with other operational units. PLA articles describe integrated joint training as a theater-wide training evolution under a shared common operational picture that enables the PLA to reduce blind spots.[48] Presumably, submarine's sensors would contribute to overall battlespace awareness. However, communication with other units could potentially jeopardize a submarine's greatest strength—stealth. While submarines may participate in exercises under a joint command structure, there is little evidence to suggest PLAN submarines execute tactical-level coordination with the other arms of the PLA.

PLAN submarines do, however, train with the other arms of the PLAN. One *PLA Daily* article describes how submarines conduct regular "joint" training with navy surface ships and aircraft.[49] Another article from the same newspaper describes how submarines use frigates as "observation posts" that help guide submarines to identify a target at greater distances.[50] Intra-service collaboration is a necessary prerequisite for future inter-service coordination and for the submarine force to be capable of conducting systematic warfare through integrated joint operations.

The concept of "coupling," introduced by The Decision on Building a New Training System, increases the intensity of submarine training both ashore and at sea and provides crews with greater opportunities to train as they will fight. One way the PLAN submarine force embraced this training concept is by increasing the use of simulators to improve sonar recognition capabilities. Simulators allow the submarine crews to train for acoustic recognition on a library of real-world acoustic signatures to build the proficiency of operators while ashore. Incorporating these simulators has reportedly helped submarine crews to improve in basic unit-level skills, in exercises at sea, and in exams.[51] Simulators also help sonar operators to safely train on acoustic signals they might encounter during a conflict. Sonar training is also being used to advance the concept of intelligentization. According to one PLA article, modern intelligent algorithms help sonar operators to better

---

[47] 贺旭勇 [He Xuyong], 训练考核别怕 "烤" ["Don't Be Afraid of 'Baking' In Training Assessment"], 解放军报 [*PLA Daily*], 27 October 2021, p. 6.

[48] 贯彻依法治军战略 提高国防和军队建设法治化水平 为推进强军事业提供坚强法治保障 ["Implement the Strategy of Governing the Army According to Law, Improve the Level Of National Defense and the Construction of the Army According to the Rule of Law, and Provide a Strong Guarantee for the Rule of Law to Promote the Strengthening of the Military Industry], 解放军报 [*PLA Daily*], 8 March 2022, p. 6.

[49] 卫雨檬 [Wei Yumeng], 走近东部战区海军某潜艇艇长薛永鹏——"艇为长剑我为锋" ["Approaching Xue Yongpeng, Commander of a Submarine of the Eastern Theater Navy—'The boat is the Long sword, I am the Front'"], 解放军报 [*PLA Daily*], 2 December 2021, p. 5.

[50] 丁斐煜 [Ding Feiyu], "水面观察哨"引导"水下狙击手"——东部战区海军某潜艇支队潜舰协同训练见闻 ["The 'Surface Observation Post' Guided the 'Underwater Sniper'—the Submarines of a Submarine Detachment of the Eastern Theater Navy in the Coordinated Training of Submarines"], 解放军报 [*PLA Daily*], 15 April 2020, p. 2.

[51] 钱晓虎 [Qian Xiaohu], 背负重托 挺进深海——回访北部战区海军某潜艇基地官兵 ["Carrying Heavy Trust, Advancing Into The Deep Sea—Returning to Visit the Officers and Men of a Certain Submarine Base of the Navy in the Northern Theater"], 解放军报 [*PLA Daily*], 4 July 2022, p. 3.

understand the acoustic environment by helping sonar operators sort noise from signals of interest, which improves the quality of intelligence and improves decision-making.[52]

Sealed cabin training is another training tool used by submarine crews to implement the coupling training concept. In sealed cabin training, crews simulate challenges faced on deployments such as loss of power, damage control, fire, and simulated engineering casualties.[53] Sealed cabin training pier side enables submarines to train to handle difficult simulated wartime scenarios with minimal risk. While submarines may have executed similar training evolutions previously, PLA articles suggest the presence of training evaluators helps to make sealed cabin training more structured than in the past.[54]

A third pier-side coupling technique used by the submarine force involves skills competitions. Skills competitions are used by submarine flotillas to enhance the rigor of training ashore and to make training more realistic. In skills competitions, experts from military colleges and scientific research institutions evaluate the responses of submarine commanders and their teams to combat scenarios, such as how to maintain a submarine's stealth while conducting an attack on a ship that is using an active sonar. The teams compete against each other and some of these competitions can last up to 24 hours.[55] PLA articles suggest innovative approaches to addressing complex situations are encouraged during these stressful exams and the ability of a commander to remain calm during the competition is a prerequisite for success. These competitions are important because they suggest real world submarine tactics continue to evolve and there is a deliberate effort to make training particularly stressful for submarine commanders.

While simulators, sealed cabin training, and skills competitions are pier-side coupling techniques used to improve basic submarine skills, coupling at sea involves greater training complexity. Not only are sea conditions more treacherous, there is greater unpredictability in what submarines may encounter. With expanded operational requirements, submarines must train to operate further from the coast and to respond to encounters with enemy ships and aircraft. Therefore, training at sea must address potential real-world contingencies.

One way the PLAN has embraced coupling at sea is through combat readiness training. In combat readiness training, submarines simulate situations that a boat may experience during a combat deployment. This requires submarine crews to conduct sophisticated training on advanced tactical concepts. For example, while training for a combat readiness patrol in early 2022, a Northern Theater Command Navy submarine simulated an unexpected encounter with an enemy ship, which required the submarine to submerge, navigate to its ambush position, and target the contact.[56] Training evaluators design each of these complex tactical evolutions to be difficult. Mastering these skills and

[52] 张友奎 [Zhang Youkui] and 赵宏伟 [Zhao Hongwei], 水下攻防，"智"胜有先机 ["Undersea Warfare, Opportunities for Victory Through 'Artificial Intelligence'"], 人民海军 [*People's Navy*], 17 June 2021, p. 4.

[53] "A Submarine Detachment of the Navy In The Eastern Theater Launched Simulation Training Closely In Actual Combat, Specializing In Concision and Improving the Ability of Special Situations," p. 1.

[54] Qian, "Carrying Heavy Trust, Advancing Into The Deep Sea—Returning to Visit the Officers and Men of a Certain Submarine Base of the Navy in the Northern Theater," p. 3.

[55] 海军某潜艇支队组织战术作业比武竞赛 专家考评刮起"头脑风暴" ["A Submarine Detachment of the Navy Organizes Tactical Operation Competition Expert Evaluation Blows Up 'Brainstorming'"], 解放军报 [*PLA Daily*], 20 July 2022, p. 2.

[56] 统帅训令如山 三军闻令而动 ["The commander's order is like a mountain. The three armies moved when they heard the order"], 解放军报 [*PLA Daily*], 5 January 2022, p. 2.

increasing training realism improves the crew's ability to prepare for a myriad of potential threats while conducting real-world deployments far from the PRC coast.

Another way the submarine force incorporates the concept of coupling at sea is by making exercises less scripted. Submarines encounter unplanned scenarios in exercises, which helps to improve a crew's combat proficiency by preparing it to address unexpected real-world contingencies in the western Pacific. Recent submarine training has included training on breaking through surface ship blockades, reconnaissance, anti-surface warfare, and confrontations at sea—all without command guidance or stipulated tactical responses.[57] The absence of command guidance during these evolutions suggests submarine crews are afforded greater autonomy to respond to situations as they arise rather than having to adhere to a prescriptive tactical response. Moreover, PLA press lauds submarine crews whose innovative responses to unscripted scenarios help to identify tactical responses other units can adopt to improve their own combat capabilities.[58]

Exhibit 4. The captain of a Northern Theater Command Navy submarine prepares his boat for a simulated torpedo attack.[59]

Mastering Basic Submarine Skills

PLAN submarine training is complex. Being capable of executing basic submarine tasks is the precondition for implementing CMC orders and making training similar to combat, adapting to the new training evaluation system, and improving integrated joint capabilities in support of systems

[57] Mao, "Sail by Stealth in the Far Seas," p. 3.

[58] See examples of how PLA press promotes innovative responses in the submarine force in "A Submarine Detachment of the Navy Organizes Tactical Operation Competition Expert Evaluation Blows Up 'Brainstorming,'" p. 2; and Qian, "Carrying Heavy Trust, Advancing Into The Deep Sea—Returning to Visit the Officers and Men of a Certain Submarine Base of the Navy in the Northern Theater," p. 3.

[59] "预备，发射"！海军潜艇模拟鱼雷攻防训练 [" 'Ready, Fire'! A Navy Submarine Conducts Simulated Torpedo Attack Training"], 央视军事微博 [Wechat of CCTV Military], 19 January 2023, http://www.news.cn/mil/2023-01/19/c_1211720183.htm.

confrontation and strategic objectives.[60] For example, submarine crews must master basic navigation and be prepared to encounter dangerous sea conditions. Once a submarine is on station, it must be capable of remaining submerged while launching weapons. Each of these evolutions is complex and demands a high degree of proficiency from a submarine crew, but each skill is vital to the safety of a submarine operating at sea and requires focused training.

Basic navigation consists of several evolutions—each of which requires training. Navigation consists of departing port and transiting to the patrol or training area. During this evolution, submarines must be capable of a surface transit, diving, maintaining depth, course changes, and operating at a depth and speed that enables submarines to complete their objectives. It requires a submarine's crew to know its position, speed, and depth. Moreover, incorporating the CMC guidance to make training similar to wartime operations, submarines must conduct these evolutions covertly. This requires a submarine to minimize its time snorkeling or operating at a shallow depth to minimize the risk of detection by surface ships or aircraft and to carefully calibrate its speed and rudder movements when at depth to avoid acoustic detection.

The ocean environment surrounding China has unique conditions that contribute to the complexity of submarine operations. Internal solitary waves are common to the region. These waves are considered a major hazard to marine engineering and submarine navigation and likely were the cause of Indonesia's loss of a submarine in 2021.[61] Solitary waves can cause a submarine to experience an uncontrollable sinking and influx of seawater. A PLAN submarine likely experienced an internal solitary wave in 2014 when it encountered what PLA authors describe as an "underwater cliff" that caused a "dangerous situation" almost leading to the loss of the boat.[62] Internal solitary waves are just one of many hazards at sea, but crews must spend time training to address these potential threats to be capable of completing assigned missions in wartime operating areas.

The strategic guideline's direction to expand the maritime domain increases the distance submarines operate from the coast, which requires submarines to spend longer time at sea. Submarines appear to be training to deploy for longer durations. A 2021 article discusses a mobilization ceremony for a submarine crew preparing to go to sea. During the ceremony, the Northern Theater Command Navy submarine base leadership shared a story about a submarine that conducted a maximum self-sufficiency test to operate as long as possible at sea without external supplies. Reportedly, the submarine was able to operate for 90 days before returning to port. During the deployment, sailors experienced physiological difficulties such as sensory degradation, eating disorders, and internal clock disorders. [63] Regardless of whether or not the submarine actually remained at sea for the reported duration, the article suggests protracted operations at sea are expected of the submarine

[60] The submarine-specific "Outline on Military Training and Evaluation" (OMTE, 军事训练与考核大纲) provides the PLAN submarine force with fundamental training requirements and appears to serve as the basis for unit training for each phase of unit readiness. See Dale Rielage, "Chinese Navy Trains and Takes Risks," *Proceedings of USNI*, (May 2016), https://www.usni.org/magazines/proceedings/2016/may/chinese-navy-trains-and-takes-risks.

[61] Erwinda Mauila, "Indonesia Says Powerful Underwater Wave Likely Sunk Submarine," *Nikkei Asia*, 27 April 2021, https://asia.nikkei.com/Politics/International-relations/Indonesia-says-powerful-underwater-wave-likely-sunk-submarine.

[62] 中央军委主席习近平签署命令 给 2 个单位授予荣誉称号 ["Xi Jinping, Chairman of the Central Military Commission, Signed an Order to Award Honorary Titles to Two Units"], 解放军报 [*PLA Daily*], 22 August 2016, p. 1.

[63] 刘佩伟 [Liu Peiwei] and 羡崑 [Xian Kun], 海军某潜艇基地举行新艇员首次出征动员仪式——深海长征，追随先辈写忠诚 ["A Naval Submarine Base Held the Mobilization Ceremony for the First Expedition of New Sailors—The Deep Sea Long March, Following His Ancestors To Write Loyalty"], 解放军报 [*PLA Daily*], 8 June 2021, p. 2.

force. In addition, acknowledgment of mental and physical challenges aboard the submarine suggests mental health issues may be an issue the submarine force is working to address.

Another basic submarine operational requirement is to be capable of launching a torpedo or fire an anti-ship cruise missile (ASCM). Launching a torpedo requires a submarine to detect a target and maneuver to develop a fire control solution. Maneuvering requires advanced submarine navigation under potentially stressful wartime conditions. Similarly, launching an ASCM requires targeting information that is typically beyond the range of the submarine's organic sensors. This requires the submarine to navigate at shallow depths to receive targeting information from an external source. During this evolution, a submarine must be prepared to react to sudden unexpected situations. Submarine training, therefore, must exercise these capabilities. PLA press suggests this is occurring with submarines incorporating the latest combat tactics for weapons engagement.[64] Each of these capabilities represents critical combat requirements in support of strategic requirements, but they add to long a list of necessary training requirements the submarine force must address.

Exhibit 5. A boat belonging to a Northern Theater Command Navy submarine flotilla commences a damage control drill.[65]

Implications for Submarine Doctrine and Tactics

Strategic guidance to expand maritime operations, advance informatization and intelligentization, and conduct integrated joint operations has several implications for submarine doctrine and tactics. These strategic requirements, which have been operationalized through the annual training order, the Regulations on the Supervision of Military Training, the Decision on Building a New Training System, and the Joint Operations Outline of the Chinese People's Liberation Army (Trial) required the submarine force to rapidly innovate. The submarine force is required to incorporate this guidance

[64] "A Submarine Detachment of the Navy Organizes Tactical Operation Competition Expert Evaluation Blows Up 'Brainstorming,'" p. 2.

[65] 揭秘潜艇兵损管模拟训练 ["Submarine Damage Control Simulation Training Revealed"], 央广军事 [China National Radio Online], 24 November 2022, http://news.cnr.cn/native/gd/20221124/t20221124_526072496.shtml.

while simultaneously integrating more capable submarine platforms that are equipped with advanced technologies and weapons systems. The combination of these rapid technological advances and changes to training has significant implications for submarine doctrine, manpower, and tactics.

One such implication, is that the PLAN must assume greater risk in submarine training. In order to execute operational guidance, the submarine force must operate at sea for longer durations, operate further from the coast, and train under simulated wartime conditions while ashore and at sea. This places tremendous emotional stress on the crew and physical stress on the submarine platform, increasing the likelihood of a mishap caused by a mechanical malfunction or human error. Any potential mishap in the years leading up to a conflict could adversely affect PLA leadership's confidence in the ability of the submarine force to execute high risk missions during a conflict resulting in more conservative submarine employment during combat.

The submarine force also assumes risk because of its regular equipment upgrades. Equipment must remain relatively consistent to establish standard maintenance procedures and for crews to gain expertise on their platforms. New operational manuals and training plans are necessary each time there are significant equipment changes to a submarine. Attempting to standardize maintenance and training while simultaneously transforming submarine operations to address new operational requirements is inherently difficult. Under these conditions, crews have less time to familiarize themselves with their equipment, and over time there is increased likelihood their lack of familiarization will contribute to an accident or mechanical failure.

The PLA's new strategic guidance may also impede efforts to develop a common doctrine across the fleet. On the one hand, standardization likely provides submarine crews with guidance on how to approach different scenarios as well as instructions for how to execute various tactical evolutions. On the other hand, crews must routinely innovate to address the myriad tactical situations they might encounter under wartime conditions. Such innovation may result in individual units adopting different tactics when addressing similar contingencies. Therefore, while submarine tactical doctrine likely exists, the execution of tactical evolutions may differ from unit to unit.

Another implication is that the PLA is likely to prioritize development of communication systems to more effectively integrate submarines into joint operations. Training under wartime conditions requires submarines to communicate routinely with other joint forces and with command and control elements ashore. Similarly, theater joint operations centers and their subordinate command elements must be able to dynamically re-task submarines when necessary to adjust to rapidly evolving threat conditions. However, existing long-range underwater communications systems may be considered too slow to be tactically relevant during combat.[66] Moreover, requiring a submarine to come to periscope depth to communicate via satellite may be too risky in a contested battlespace. As such, PLAN submarines need to be capable of communicating high capacity data in real time while submerged. This operational requirement may lead to adopting communication systems such as submersible buoys, which are equipped with BeiDou satellite communication systems and take advantage of inductive coupling and underwater acoustic communications technologies to transmit real-time high capacity data.[67] Such systems would allow submarines to rapidly communicate with

[66] Shore facilities can transmit to submerged submarines operating at depths to 150 feet using very low frequency (VLF) radio waves or even greater depths if using extremely low frequency (ELF). However, these transmissions can only be broadcast from the shore to the submarine and have limited bandwidth, which restricts the length of transmitted messages thus limiting its utility in dynamic tactical conditions.

[67] "BeiDou Achieves Real-Time Transmission of Deep-Sea Data," *Xinhua*, 2 February 2019, http://en.people.cn/n3/2019/0202/c90000-9543558.html. See also Rajesh Uppal, "China Developing High Speed And

higher authority or other operational units in real time while fully submerged, which would improve the command and control of submarines and preserve their stealth capabilities.

Another implication of PLAN incorporating this training guidance is that the PLA is likely to increase the integration of artificial intelligence (AI) into submarine training. AI is already used to improve the capabilities of PLAN sonar operators.[68] Increasing its use could support command decision-making by recommending tactical maneuvers to optimize a submarine's approach to a target, thereby enhancing weapons employment for attack while improving timing effectiveness for evasion geometries post attack. Moreover, it could help to improve basic submarine skills such as awareness of underwater hazards and bolster crews' ability to effectively respond for damage control. Further integrating AI into training will likely help to improve the quality of submarine training both ashore and at sea and will expose crews to real-world situations they may encounter during combat patrols.

Exhibit 6. A PLAN sonar technician trains in a shore facility.[69]

Secret Submarine Communication Systems and Technologies Including Quantum Key Cryptography (QKD)," *International Defense Security & Technology*, 25 March 2023, https://idstch.com/geopolitics/militaries-developing-new-technologies-for-high-speed-and-secret-submarine-communication-systems/.

[68] Zhang and Zhao, "Undersea Warfare, Opportunities for Victory Through 'Artificial Intelligence,'" p. 4.

[69] 李娴 [Li Xian], 去远航，中国潜艇兵破浪向前方！["Going on a Long Distance Deploymnt, Chinese Submariners Cut Through the Waves and Advance Forward"], 国防部网 [PRC Ministry of Defense], 19 August 2020, http://www.mod.gov.cn/gfbw/wzll/hj/4869869.html?&tsrkeaywdea.

Conclusion

The PLAN submarine force is rapidly adapting to CMC training directives and requirements issued since 2018 to support the changes to the 2014 military strategic guidelines. In alignment with this guidance, submarines are training more regularly under realistic combat conditions for longer durations while operating under informatized conditions at greater distances from the PRC coast. The submarine force is developing innovative tactics, incorporating intelligentization, and progressing toward the capability to conduct integrated joint operations. Commentary by PLA authors, however, suggests integrated joint operations remain aspirational. While the individual services may operate in proximity to each other during large- and small-scale training exercises, coordination at the unit-level appears primarily to be between units within the same service. Meanwhile, as the PLAN integrates new platforms and technologies into its inventory, crews must also become familiar with the new equipment and develop numerous basic skills necessary to operate a submarine safely at sea.

The multitude of training requirements promulgated since 2018 places tremendous stress on both crews and equipment. The physical stress on equipment and mental strain on submarine crews increases the likelihood of an equipment failure or human error that could result in a catastrophic disaster. Ironically, such an incident could undermine CMC confidence in the submarine force's ability to execute critical missions, jeopardizing the PRC's prospects for "national rejuvenation"—a likely reason the CMC adjusted its strategic guidelines in 2014 and issued follow-on training guidance starting in 2018.

On the other hand, it has been just five years since the CMC began issuing annual training orders. In this short time, the submarine force has implemented protocols that help to ensure training is similar to combat while crews are ashore, pier side, and at sea. Should the submarine force continue on its current training trajectory and improve its intelligentization by integrating new technologies such as AI and improved tactical communications systems, PLAN submarines will be more capable of executing combat operations throughout the near and far seas and present a more potent threat across the western Pacific.

About the Authors

Captain Christopher Sharman, USN (Ret.) has served as the Director of the China Maritime Studies Institute since October 2023. He comes to CMSI following a 30-year active-duty Navy career that included diplomatic postings at U.S. Embassies in both China and Vietnam and multiple operational afloat assignments with the Japan-based Forward Deployed Naval Forces. His afloat assignments included tours aboard the USS Independence (CV 62), with the Strike Group Staff embarked aboard USS Kitty Hawk (CV 63), and with the Seventh Fleet Staff embarked aboard the USS Blue Ridge (LCC 19). He also served as a National Security Affairs Fellow at Stanford's Hoover Institution. His military career culminated with his assignment to the Office of the Director of National Intelligence as the Senior Strategist for the National Intelligence Manager for East Asia with responsibilities for synchronizing the Intelligence Community's China efforts. He has written numerous articles for various journals, is a frequent podcast guest, and published a monograph through the Institute of National Strategic Studies titled, *China Moves Out: Stepping Stones Toward a New Maritime Strategy*.

Mr. Terry Hess is a U.S. Navy submarine warfare analyst with more than ten years' experience developing methodologies and assessments of submarine warfare concepts. He is a retired USN Senior Chief Acoustic Intelligence (ACINT) Specialist with multiple years of operations at sea including an overseas assignment in Sydney, Australia. Hess served aboard three fast attack submarines: the USS *Richard B. Russell* (SSN-687), USS *La Jolla* (SSN-701), and USS *Parche* (SSN-683). He has been married for 32 years to Kathryn Hess with three adult children and seven grandchildren living throughout the United States. Hess has a passion for submarine warfare research and novel concepts of capability employment.