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### **China Maritime Report No. 23: The Type 075 LHD: Development, Missions, and Capabilities**

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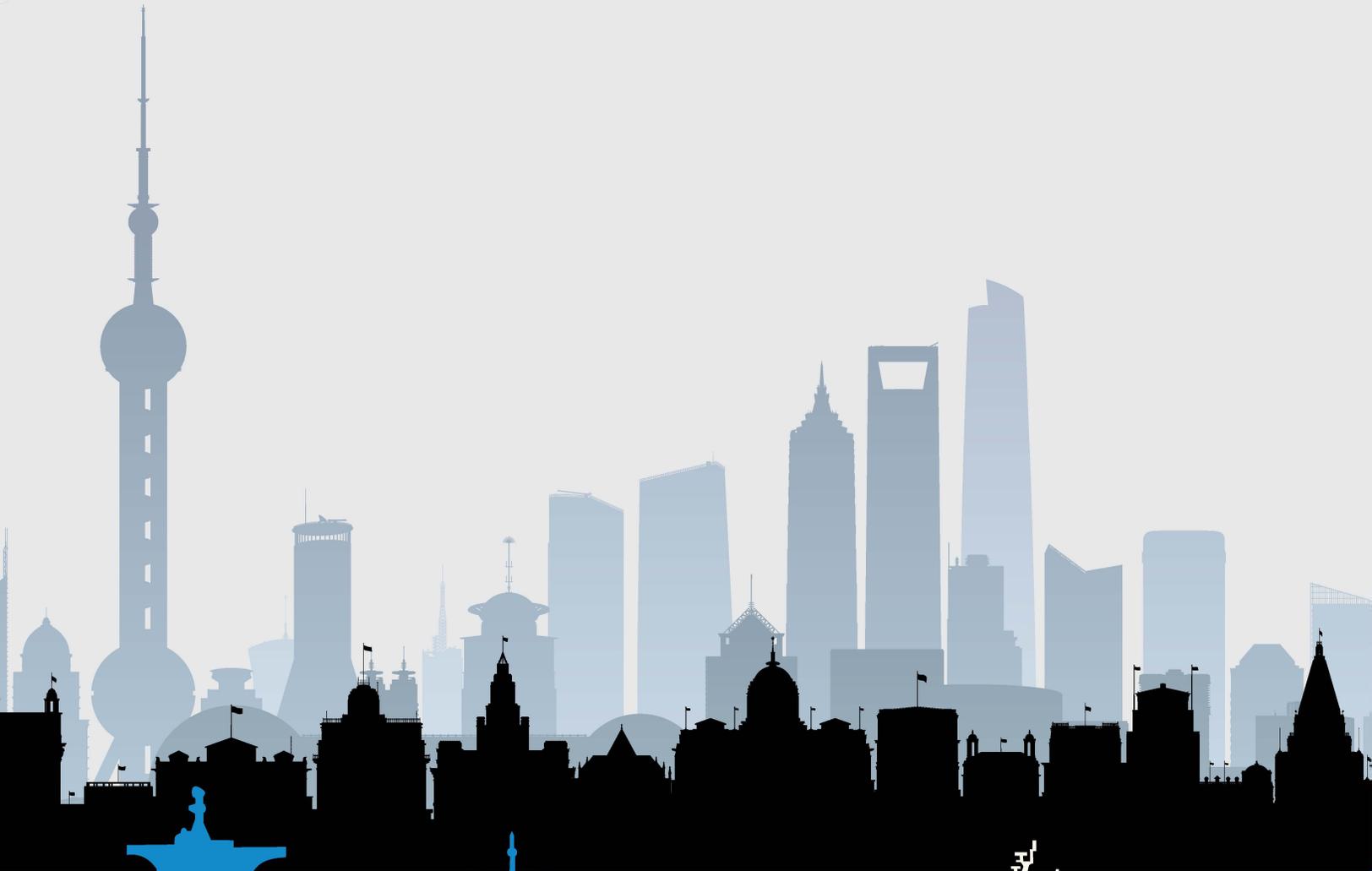
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## Summary

When the People's Liberation Army Navy (PLAN) commissioned its first Type 075 class Landing Helicopter Dock (LHD) in April 2021, it represented an important advance in power projection capability for China's maritime forces. For the first time, the PLAN had an amphibious warship capable of hosting significant rotary wing forces while acting as the flagship for an amphibious task force. Now with three Type 075 class ships either in or soon to be in service, the PLAN has expanded its amphibious capability even further. The Type 075's dedicated aviation support capability, ability to conduct wet well operations, and expanded command and control and medical facilities reflect capabilities that previously did not exist within the PLAN amphibious fleet. With the Type 075 LHD, the PLAN clearly intends to bolster its ability to project power from the sea in order to protect China's overseas interests, but will require time for amphibious task forces to become fully proficient.

## Introduction

With the 2007 commissioning of the Type 071 Landing Platform Dock (LPD), the Peoples Liberation Army Navy (PLAN) sought to attain an amphibious platform capable of power projection operations far from Chinese shores. The construction of the Type 075 Landing Helicopter Dock (LHD)—the first of which was commissioned in April 2021—is further evidence of the PLAN's desire to incorporate a truly first-rate amphibious capability into its force structure.

Although a number of nations developed, constructed, and deployed modern amphibious forces throughout the 20<sup>th</sup> Century, it was the United States Navy (USN) along with the United States Marine Corps (USMC) during the Second World War that set the standard of amphibious doctrine, capacity, and capability. Since the mid-2000s, the PLAN has sought to emulate the success of the USN/USMC team and has made remarkable strides in this direction with the construction of major amphibious platforms, the most impressive of which is the Type 075 LHD.

In the post-World War II era, the USMC explicitly made the connection between ground and air arms with the development of the Marine Air Ground Task Force. The doctrine that was developed relied on the integration of helicopters for the insertion of troops as well as fixed-wing attack aircraft to provide close air support to landing forces. Beginning in the mid-1950s, the USMC began developing requirements for a ship that would be capable of carrying up to two thousand Marines (including aviation personnel) and supporting an air component of up to twenty helicopters. This concept culminated in the early 1990s with the development of the *Wasp* class LHD.

As the centerpiece of the Amphibious Ready Group concept, LHDs are extremely capable platforms that incorporate both a well deck for the employment of landing craft, including Landing Craft Air Cushion (LCACs), and a flight deck to support both fixed wing and rotary wing operations. For the PLAN, having observed the USN/USMC amphibious operations for decades, the need to develop its own LHD-type vessel as the centerpiece of its amphibious forces was clear. However, although its design was largely inspired by western counterparts, the Type 075 has a number of characteristics particular to the requirements of the PLAN.

This report discusses the development of the Type 075 class LHD, the capabilities it is expected to provide, and the way in which the PLAN may incorporate such a platform into the current force structure and future operations. In particular, it examines the Type 075's role as the flagship of PLAN future amphibious task forces operating in the far seas.



Exhibit 1: The first ship of its class, the *Hainan*, is shown here in Zhanjiang, Guangdong with its first captain Lü Yongjun during a television program where he stated “As long as the Party and the people need it, we will show up in any sea area of the world.”<sup>1</sup>

### **Influences and Perspectives on Program Development**

The PLAN has long studied the construction and operations of modern amphibious fleets. In recent years, PLAN experts have published dozens of analyses of foreign ships, technical systems, and operations.<sup>2</sup> These analysts have debated the future missions the amphibious fleet and the ways in which it and the PLAN Marine Corps (PLANMC) would achieve them. While some believed China’s near-seas commitments would preclude anything similar to what the USN fields abroad, they nonetheless saw amphibious assault ships as a crucial element to modernizing the PLAN’s amphibious capabilities.<sup>3</sup> Even while the Type 071 program was getting started, some Chinese

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<sup>1</sup> 《开讲啦》 闫勇军: 海南舰 – 两栖作战尖刀 [“《Voice》 Lü Yongjun: The *Hainan* – A Sharp Dagger in Amphibious Combat”], 央视网 - 《开讲啦》 [CCTV - Voice], February 26, 2022, <https://www.youtube.com/watch?v=ERv2lJvMB-o>; Lü Yongjun is now a senior captain serving as deputy captain of the aircraft carrier Shandong. 山东舰“作战指挥中心”画面疑似曝光 副舰长揭秘歼-15 首次夜间着舰全过程! [“Scenes of the Shandong’s Combat Command Center Seemingly Exposed, Deputy Captain Reveals the Entire Process of the J-15’s First Night Landing”], CCTV-1, September 30, 2022, <https://www.youtube.com/watch?v=UsCLY-sTBWc>.

<sup>2</sup> For one example from the 2000s, see 刘占荣 [Liu Zhanrong], 两栖攻击舰作战系统 [“Combat System of Amphibious Assault Ship”], 情报指挥控制系统与仿真技术 [Information Command Control System & Simulation Technology], no. 4 (2004), 16-21.

<sup>3</sup> 美国两栖战转型对中国的借鉴意义 [“The Implications of the U.S. Transformation in Amphibious Warfare for China”], 现代舰船 [Modern Ships], no. 11A (2014), 42-44.

observers believed it insufficient to meet the needs of future amphibious operations.<sup>4</sup> Others simply referred to the Type 071 as the first step in China's distant ocean projection capabilities.<sup>5</sup>

Official PLAN publications have discussed amphibious assault ships for over twenty years.<sup>6</sup> In 2008, the official PLAN magazine *Modern Navy* examined regional trends of amphibious assault ship development not just by the USN and other western navies, but also across Northeast Asia as Japan and South Korea built such capabilities.<sup>7</sup> In January 2010, *People's Navy*, the PLAN's official newspaper, published an interview with the dean of the PLAN Equipment Research Academy discussing the future of amphibious warship development, noting the ability of amphibious assault ships to attack enemy shores at any time and any place around the world. The dean stated that amphibious ship design promised vessels that could exceed 20 knots with straight flight decks for launching helicopters and vertical takeoff and landing aircraft (VTOL).<sup>8</sup> Such discussions made it increasingly clear that the lack of this platform in China's arsenal was becoming a glaring gap.

The USN's development of amphibious assault ships was a core reference. According to a 2010 interview with a former PLAN military representative in Shanghai, where all of China's blue-water amphibious ships are built, the USN's development of expeditionary strike groups and maritime prepositioning forces has acted as a "weathervane" in amphibious warship development. Without specifying its implications for the PLAN, the officer argued that the theories of over-the-horizon and vertical landing operations have driven the evolution of amphibious fleets of both major and smaller powers.<sup>9</sup> Almost ten years later, an article in the September 1, 2020 edition of *People's Navy* states that maritime powers still prefer the USN model of amphibious assault ship development to build powerful amphibious combat groups.<sup>10</sup>

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<sup>4</sup> 我国未来两栖攻击舰可为滑跃式斜角飞行甲板 ["China's Future Amphibious Assault Ships Can Be a Ski Jump-type Angled Flight Deck"], 航空世界 [*Aviation World*], August 13, 2008, <http://mil.news.sina.com.cn/p/2008-08-13/0852516292.html>.

<sup>5</sup> Author wrote under a pseudonym. 铁钩船长 [Captain Hook], 中国两栖攻击舰猜想 ["Conjecture on China's Amphibious Assault Ships"], 现代舰船 [*Modern Ships*], no. 2B (2012), 14.

<sup>6</sup> For a couple of examples, see: 李杰 [Li Jie], 面向未来的海军主战装备之八 后来居上的“水陆战星”——两栖攻击舰 ["The Eighth Naval Main Battle Equipment of the Future, The Up and Coming 'Amphibious Celebrity' – Amphibious Assault Ships"], 当代海军 [*Modern Navy*], no. 4 (1998), 15-16; 叶颀 [Ye Qi], 遥望‘小平顶’ – 浅谈中国大型两栖作战舰艇的未来 ["Looking Toward the 'Small Flattop' – A Brief Discussion on the Future of China's Large Amphibious Combat ships"], 当代海军 [*Modern Navy*], no. 11 (2011), 42-43.

<sup>7</sup> 李杰 [Li Jie], 两栖攻击舰发展焦点在哪? (上) ["Where is the Focus of Amphibious Assault Ship Development? (Part 1)"], 当代海军 [*Modern Navy*], no. 9 (2008), 38.

<sup>8</sup> 张军红 [Zhang Junhong], 两栖战舰艇, 未来海战利器 – 就两栖战装备发展专访海军装备研究院院长赵永甫 ["Amphibious Warships, the Weapons of Future Naval Warfare – An Interview with Dean of the PLAN Equipment Research Academy Zhao Yongfu on the Development of Amphibious Warfare Equipment"], 人民海军 [*People's Navy*], January 8, 2010, 4.

<sup>9</sup> 顾雪晨, 黄兴, 赵东 [Gu Xuefeng, Huang Xing, Zhao Dong], 两栖战舰驶向何方 ["What Direction are Amphibious Warships Heading?"], 人民海军 [*People's Navy*], December 15, 2010, 4.

<sup>10</sup> 王亚茁, 任子鉴, 陈毅 [Wang Yazhuo, Ren Zijian, Chen Yi], 立体登陆的主心骨 – 两栖攻击舰发展趋势前瞻 ["The Pillar of Multidimensional Landings – An Outlook of Amphibious Assault Ship Development Trends"], 人民海军 [*People's Navy*], September 1, 2020, 4.

PLAN discussions over the last decade reflect a consensus on the need to project greater amphibious combat power into the far seas and to construct amphibious assault ships.<sup>11</sup> For example, in March 2013, Liang Xu, a PLAN delegate at the 12<sup>th</sup> National People’s Congress, noted that China’s “far-seas projection combat forces” would be key to protecting overseas interests. To that end, Liang argued that China should develop large amphibious assault ships and transport dock ships and strengthen its amphibious combat forces and civilian transport forces.<sup>12</sup> Indeed, after a March 2014 PLAN collective study session on Xi Jinping’s guidance, the former deputy leader of the PLAN Equipment Department explained in *People’s Navy* that the service is working hard to construct main battle equipment, including amphibious assault ships.<sup>13</sup> By 2019, official reports routinely cited the need to strengthen China’s amphibious forces to fulfill an expanding mission set abroad.<sup>14</sup>

### **Type 075 Roles and Missions**

The roles the Type 075 will play must be put in the context of the PLAN’s larger strategic transformation and requirements. The PLAN’s new strategic concept, captured by the phrase “near seas defense, far seas protection, oceanic presence, and expansion into the two poles” (近海防御、远海防卫、大洋存在、量及拓展), has made the surface fleet the lead service arm in “going abroad” and helping China “move toward the center of the world stage.”<sup>15</sup> Along with aircraft carriers and large destroyers (such as the Type 055 cruiser), amphibious assault ships are key surface platforms in this strategy.<sup>16</sup> The Type 075 is likely intended to serve roles in far seas protection and oceanic presence, doing so at the center of amphibious task forces deployed abroad. Moreover, it will provide key strategic support for the protection of overseas interests and the advancement of the Belt

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<sup>11</sup> The “far seas” (远海) are “sea areas beyond the near seas [i.e. Yellow Sea, East China Sea, and South China Sea].” 中国人民解放军军语 [*Dictionary of Military Terms*] (Beijing: Academy of Military Science Press, September 2011), 952.

<sup>12</sup> Liang Xu is the former deputy dean of the Naval Aeronautical University and later became deputy commander, Eastern Theater Command Naval Aviation. 蔡正华, 孙国强, 李高健 [Cai Zhenghua, Sun Guoqiang, Li Gaojian], 汇聚改革共识 共筑强军梦想 – 专访部分海军人大代表和政协委员 [“Gathering Consensus on Reforms and Building the Dream of a Strong Military – Interview with Some of the Navy’s Delegates to the People’s Congress and Members of the Chinese People’s Political Consultative Conference”], 人民海军 [*People’s Navy*], March 12, 2014, 2; 岳怀让 [Yue Hairang], 海军航空兵学院原副院长梁旭出任东海舰队航空兵副司令员 [“Former Deputy Dean of Naval Aviation University Assigned to Deputy Commander of East Sea Fleet Naval Aviation Forces”], 澎湃新闻 [*The Paper*], March 14, 2016, [https://www.thepaper.cn/newsDetail\\_forward\\_1443648](https://www.thepaper.cn/newsDetail_forward_1443648).

<sup>13</sup> This session was organized by the Naval Command Academy and the Dalian Naval Academy, and involved nearly 1,000 corps-grade leaders, headquarters second-level department heads, and officers in charge of division, brigade, and regimental units. See 魏刚 [Wei Gang], 适应转型建设需要 优化装备体系结构 [“Adapting to the Needs of Transformation and Construction and Optimizing the Structure of the Equipment System”], 人民海军 [*People’s Navy*], March 19, 2014, 3; 丁光辉 [Ding Guanghui], 把握根本遵循 建设强大海军 [“Grasp the Fundamentals and Build a Powerful Navy”], 解放军报 [*PLA Daily*], July 7, 2014, <http://mil.news.sina.com.cn/2014-07-07/0440788806.html>.

<sup>14</sup> 薛玉峰, 张铂 [Xue Yufeng, Zhang Bo], 学思悟贯通 知行信统一 汇聚全面建成世界一流海军的智慧力量 – “深入贯彻习近平强军思想, 建设强大的人民海军” 理论研讨会综述 [“Learn, Reflect, and Understand. Unify Knowledge, Trust, and Practice. Comprehensively Gather the Wisdom and Strength of Building a World-Class Navy: Summary of the Theoretical Seminar on ‘Deeply Implementing Xi Jinping’s Thought on Strengthening the Army and Building a Strong People’s Navy’”], 人民海军 [*People’s Navy*], April 24, 2019, 3.

<sup>15</sup> Many thanks to our CMSI colleague Ryan Martinson’s identification of this new formulation. 喻文兵 [Yu Wenbing], 乘势而上建设一流军事指挥院校 [“Taking Advantage of the Momentum in Building a World Class Military Command Academy”], 人民海军 [*People’s Navy*], July 13, 2018, 3.

<sup>16</sup> *Ibid.*, p. 3.

and Road Initiative, an urgent requirement of the PLAN.<sup>17</sup> During deployments, the Type 075 will conduct a range of operational tasks, such as forward presence, deterrence, escort, overseas defense, and humanitarian assistance/disaster relief missions.<sup>18</sup> The blend of capabilities provided by the ship is well suited to various non-war military operations, from diplomatic missions and combined training to hostage rescue, evacuations, and counterterrorism.

The Type 075 is a needed platform for greater power projection in the far seas. Experts at the Naval Command Academy describe the PLAN's roles as "regional sea control and trans-oceanic projection" (区域控海、跨洋投送). Regional sea control means the PLAN should be capable of establishing temporary effective sea control in limited areas to ensure freedom of maneuver. Trans-oceanic projection refers to the ability of naval forces to cross the ocean and conduct military operations in seas and on land near relevant regions to ensure the security of China's overseas interests.<sup>19</sup> This entails the projection of combat power in international maritime space and, if necessary, into foreign lands—missions which the Type 075 directly supports. Additionally, that the bulk of its fleet is stationed at home has become a glaring problem for the PLAN: when crises erupt, overseas interests are left isolated. The PLAN is thus seeking greater strategic prepositioning and forward deployment of scalable amphibious formations comprising LHDs, LPDs, Marines, and aviation forces into hot zones to provide a rapid response force and offshore presence to deter threats to those interests.<sup>20</sup>

The Type 075's ability to provide air support is its main purpose. PLAN amphibious doctrine has come to emphasize rapid, precise, and long-range projection of combat power from offshore into objective areas ashore. The phrase "surface to objective maneuver" (由舰到目标机动) is often repeated to describe PLAN amphibious task force delivery of ground forces onto objectives while forgoing the buildup of combat power on the coast and reducing the exposure of landing ships and forces to adversary fires. Seemingly adopted from the USMC tactical concept, the PLAN views surface to objective maneuver as a logical approach that best leverages the Type 075's air detachment. As such, PLAN experts describe the launch of amphibious operations from over-the-horizon to achieve objectives on land, or deep within an adversary's defensive depth. Deployed forward, these operations have tactical utility across an expanding range of PLAN military operations, highlighting low-intensity and smaller-scale special operations and military operations

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<sup>17</sup> 杨晓丹, 杨志荣 [Yang Xiaodan and Yang Zhirong], 人民海军所处的历史方位与战略要求 ["On the Historical Position and Strategic Requirements of the People's Navy"], 海军工程大学学报 [*Journal of Naval University of Engineering*], 16, no. 4 (December 2019), 50.

<sup>18</sup> The term "overseas defense" (海外防卫) is described in one source. The authors of this report interpret it to refer to actions to protect PRC citizens and interests, such as evacuations, hostage rescue, and other security actions to protect PRC facilities and institutions. See 陈卫东 [Chen Weidong], 透视两栖作战新特点 ["A Perspective on the New Features of Amphibious Operations"], 人民海军 [*People's Navy*], October 8, 2021, 3.

<sup>19</sup> According to the experts, regional sea control refers to uncontested sea control by the joint forces within the First Island Chain in order to protect core interests. In areas containing major national interests, such as the Western Pacific and Northern Indian Ocean, the navy independently seeks effective sea control to secure maritime strategic passages. Other sea areas involving general national interests will feature the navy conducting "diverse non-war military tasks," such as presence to assert China's international influence. See 史常勇, 陈炎 [Shi Changyong and Chen Yan] 试论新时代海军战略定位 ["On the Navy's Strategic Positioning in the New Era"] 国防 [*National Defense*], no. 5 (2018), 36.

<sup>20</sup> *Ibid.*, 36; Chen, "A Perspective on the New Features of Amphibious Operations," 3; 安卫平 [An Weiping], 发展建设世界一流海军陆战队 ["Developing a World-Class People's Liberation Army Navy Marine Corps"], 湘潮 [*Xiangchao*], no. 2 (2017), 9-12.

other than war.<sup>21</sup> While vertical landing operations were a capability introduced by the Type 071 LPDs, the delivery of the Type 075 has scaled up the aviation component of amphibious forces, allowing for increased air assault capabilities. Even with LCAC-capable well decks, the provision of air support will serve as the primary function of the Type 075.

The Type 075 will serve as the flagship of future amphibious task forces operating in distant waters. These task forces will be expected to operate as a modular, tailored, self-contained combat force that operates without shore-based joint support from the homeland.<sup>22</sup> The rapid response capability envisioned for these forces requires the swift delivery of combined arms forces into objective areas without an initial logistical buildup. Most of what the task force needs to carry out these missions, such as efficient C4ISR and sustainment, will thus need to be enabled or onboard from the outset. Additionally, the task force can disaggregate to carry out multiple tasks simultaneously when required, such as in asserting presence in regions through port calls and joint patrols as part of PLAN military diplomacy.

The PLAN will likely deploy amphibious task forces to areas most vital to the protection of China's overseas interests. A logical first area of deployment would be the Gulf of Aden and the surrounding region, where the PLAN has sustained operations since 2008 and constructed its first overseas support base. At the far end of its most important sea line of communication, the country's so-called "lifeline" (生命线), the Red Sea, Persian Gulf, and Northern Indian Ocean are waters crucial to the PRC's interests.<sup>23</sup> China is strategically dependent on energy imports from the Middle East, where it acquires around 40 percent of its crude oil.<sup>24</sup> Chokepoints along trade routes and other threats present a serious vulnerability to PRC interests, causing a gradual increase in PLA presence in the region.<sup>25</sup>

The PLA support base in Djibouti can offer significant in-theater support for amphibious task forces. The base is equipped with fueling support detachments, rotary wing aviation support facilities, warehousing for spares and munitions, barracks for personnel, a hospital, and an over 320-meter long pier likely deep enough to berth ships of the task force. Moreover, the base currently supports

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<sup>21</sup> These concepts are present across a variety of writings, both official and unofficial. For an excellent example discussing various aspects of "new" amphibious operations, see Chen, "A Perspective on the New Features of Amphibious Operations," 3; 史益星, 吴志丹 [Shi Yixing, Wu Zhidan], 两栖作战, 战争舞台的“长青树” [“Amphibious Operations, an ‘Evergreen’ on the Stage of Warfare”], 解放军报 [PLA Daily], October 3, 2018, <https://baijiahao.baidu.com/s?id=1613284803403428638&wfr=spider&for=pc>.

<sup>22</sup> Shi and Chen, "On the Navy's Strategic Positioning in the New Era," 36; Chen, "A Perspective on the New Features of Amphibious Operations," 3.

<sup>23</sup> This lifeline runs from Mainland China across the South China Sea, through the Malacca Strait, and through the Northern Indian Ocean, terminating at both the Persian Gulf and the Suez Canal. 肖晞 [Xiao Xi], 中国国家安全面临的挑战与战略选择 [“China's National Security Challenges and Strategic Choices”], in 薄贵利 [Bao Guili], ed., 强国宏略: 国家战略前沿问题研究 [Grand Strategies for Strengthening the Nation: Research on the Forefront Issues of National Strategy] (Beijing: People's Press, 2016), 505.

<sup>24</sup> Christian Le Miere, "Increasing Mutual Dependence in Sino-Gulf Relations is Changing the Strategic Landscape," *Atlantic Council*, May 11, 2020, <https://www.atlanticcouncil.org/blogs/energysource/increasing-mutual-dependence-in-sino-gulf-relations-is-changing-the-strategic-landscape/>; "Factbox: Asia Region is Most Dependent on Middle East Crude Oil, LNG Supplies," *Reuters*, January 8, 2020, <https://www.reuters.com/article/asia-mideast-oil-factbox/factbox-asia-region-is-most-dependent-on-middle-east-crude-oil-lng-supplies-idINKBN1Z71VW>.

<sup>25</sup> Joel Wuthnow, "The PLA Beyond Asia: China's Growing Military Presence in the Red Sea Region," *Strategic Forum* – National Defense University, January 2020, 1-4.

PLANMC forces deployed there and stores combat vehicles in underground facilities.<sup>26</sup> Ships of an amphibious task force can easily roll-on/roll-off combat forces by landing on the pier's ramp, an operation recently performed by the *Changbaishan* (LPD No. 989).<sup>27</sup> With prepositioned stocks in Djibouti, task forces may be able to reconfigure loadouts in theater for specific missions or surge additional troops, armaments, and materials on board in response to crises. Shore-based support in the Horn of Africa could also enable fleet replenishment ships to cycle fuel and materials to amphibious task forces, further extending their operational reach.



Exhibit 2: With perfect weather and traffic patterns, an amphibious task force leaving the Gulf of Aden could range most of the Red Sea and reach the Persian Gulf within 72 hours of departure, a multi-week endeavor from the Mainland.

Despite the general hype over the Type 075's future use overseas, it also offers the PLAN and the joint forces a useful aviation support platform for operations closer to home, such as in supporting and potentially enforcing PRC claims with military force in the South China Sea. An amphibious task force could leapfrog infantry across numerous islands and features rapidly with the Type 075's air detachment. Any such operations would benefit from PLAN/PLANMC assets already deployed to the Spratlys, as well as land-based air support flying out of the bases constructed there. An amphibious task force centered on the Type 075 would far outclass most rival claimants in the region and thus provide a strong deterrent to activities that would seek to erode PRC advantages in the South China Sea. The Type 075 also has certain utility in a joint island landing campaign across the Taiwan Strait but is not the type of vessel optimized for large-scale delivery of combat forces in high-intensity contested and confined battlespace.

<sup>26</sup> Peter A. Dutton, Isaac B. Kardon, and Conor M. Kennedy, "Djibouti: China's First Overseas Strategic Strongpoint," China Maritime Report No. 6, China Maritime Studies Institute, April 2020, <https://digital-commons.usnc.edu/cgi/viewcontent.cgi?article=1005&context=cmsi-maritime-reports>.

<sup>27</sup> Vishnu Som, "Exclusive Satellite Pics: China's New 'Mission Indian Ocean' Targets India," Ndtv.com, August 18, 2022, <https://www.ndtv.com/world-news/chinas-indian-ocean-base-in-djibouti-fully-operational-warship-docked-in-satellite-pics-3264696>.

## Design and Fabrication

Despite the PLAN's early interest in amphibious assault ships, several years passed before the Type 075 program began in full. This delay is likely due to the complexity of the platform. The PLAN's military representative in Shanghai (cited above) noted that amphibious assault ships are significantly harder to construct than Type 071 class LPDs.<sup>28</sup> Some argued China should instead focus on development of its amphibious transport docks, which could fulfill short-term requirements and allow the PLAN the important first step of mastering well deck and limited flight operations. Indeed, the Hudong Zhonghua Shipyard in Shanghai began construction of the Type 071 around 2006.<sup>29</sup>

Concept and design work reportedly began in 2011 by the Marine Design and Research Institute of China (708 Institute) of China State Shipbuilding Corporation.<sup>30</sup> The final design features a straight full flight deck over 230 meters long with a starboard offset island superstructure and a displacement significantly larger than the Type 071, between 30,000 and 40,000 tons.<sup>31</sup> The ship has two aircraft elevators positioned inside the hull on the stern and forward section of the flight deck. One analysis notes the enclosed hangar, unlike the open hangars on USN carriers or amphibious assault ships, improves the ship's structural integrity but occupies precious flight hangar space.<sup>32</sup> The Type 075 design features measures to reduce radar cross-section reduction, most clearly seen in the five-degrees flaring throughout the hull's surfaces as well as a five-degrees slope in the superstructure, except for a reported thirteen-degrees angle of inclination for the forward navigation bridge and the aft aviation tower.<sup>33</sup>

An anonymous insider told Chinese media there were some differences in design approach between the Central Military Commission's Equipment Development Department and the PLAN in 2016. The Equipment Development Department apparently recommended adopting a large stern-deck design with a full superstructure, while the PLAN sought an offset superstructure design.<sup>34</sup> The competing design essentially was an enlarged Type 071 with extra hangar space. Some claim there were legitimate concerns about whether the existing propulsion plant would be adequate for the larger flat

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<sup>28</sup> Gu, Huang, and Zhao, "What Direction are Amphibious Warships Heading," 4.

<sup>29</sup> 吴戈, 车福德 [Wu Ge, Che Fude], 071 型两栖船坞登陆舰是远远不够的 ["The Type-071 Amphibious Transport Dock is Not Nearly Enough"], 现代舰船 [Modern Ships], no. 09A (2013), 10.

<sup>30</sup> Xavier Vavasseur, "China Launches First Type 075 Big Deck Amphibious Warship," *USNI News*, September 27, 2019, <https://news.usni.org/2019/09/27/china-launches-first-type-075-big-deck-amphibious-warship>; 布蓝 [Bu Lan], 中国 075 舰试航团队获奖 三号舰关键进展披露 ["Sea Trial Team for China's 075 Warship Wins Award, Third Ship's Critical Progress Revealed"], 多维新闻 [DW News], January 15, 2021, <https://www.dwnews.com/%E4%B8%AD%E5%9B%BD/60226390/%E4%B8%AD%E5%9B%BD075%E8%88%B0%E8%AF%95%E8%88%AA%E5%9B%A2%E9%98%9F%E8%8E%B7%E5%A5%96%E4%B8%89%E5%8F%B7%E8%8%B0%E5%85%B3%E9%94%AE%E8%BF%9B%E5%B1%95%E6%8A%AB%E9%9C%B2%E5%9B%BE>.

<sup>31</sup> The Type 075 is somewhat smaller than its American counterparts, such as the *Wasp* class that displaces over 40,000 tons. See 银河 [Yin He], 075 型两栖攻击舰 ["The PLA-Navy's Type 075 Amphibious Assault Ship"], 舰载武器 [Shipborne Weapons], no. 3 (2020), 12.

<sup>32</sup> 龙猫 [Long Mao], 075 型两栖攻击舰的舰载武器与升级方向 ["Type 075 Amphibious Assault Ship Armaments and Upgrade Paths"], 现代舰船 [Modern Ships], no. 24 (2019), 33.

<sup>33</sup> 温雨 [Wen Yu], 细说 075 型两栖攻击舰 ["Details on the Type 075 Amphibious Assault Ship"], 兵工科技 [Ordnance Industry Science Technology], no. 9 (2020), 23.

<sup>34</sup> 褚文 [Chu Wen], 被称台海直通车 075 两攻舰成型真容曝光 ["Known as the Taiwan Strait Direct Train, the Type075 Amphibious Assault Ship is Revealed"], 多维新闻 [DW News], August 21, 2019, <https://www.dwnews.com/%E4%B8%AD%E5%9B%BD/60146052/%E8%A2%AB%E7%A7%B0%E5%8F%B0%E6%B5%B7%E7%9B%B4%E9%80%9A%E8%BD%A6075%E4%B8%A4%E6%94%BB%E8%88%B0%E6%88%90%E5%9E%8B%E7%9C%9F%E5%AE%B9%E6%9B%9D%E5%85%89%E5%9B%BE>.

top design of the Type 075. A smaller design, as proposed by the Equipment Development Department, would reduce the ship's tonnage and thus better conform to existing propulsion systems.<sup>35</sup> It is unclear if these differences actually impeded the program's progress. Ultimately, the ships' final design reflects the PLAN's preferences. The final contract was signed and construction began in 2018.<sup>36</sup>

The speed at which the Hudong Zhonghua Shipyard has constructed and launched the Type 075 has surprised many. These ships quickly drew attention inside and outside of China as photos of them taking shape spread across the internet. In July 2019, a shipyard worker leaked photos of the ship's construction on the social media platform Weibo, bringing in an official of the Shanghai National Administration of State Secrets Protection to educate and warn shipyard workers of the consequences of leaks.<sup>37</sup> Nonetheless, photos from ship watchers continued to circulate online showing the ship's rapid assembly. Exhibit 3 lists key milestones for each of the three Type 075 hulls.

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<sup>35</sup> Sohu account of Chinaxiaokang.com (中国小康网): 075 小平顶实锤了? 建造道路充满坎坷, 差点变成加长直升机平台 ["Is the 075 Flat Top Definite? The Road to Construction was Full of Bumps and it was Almost Turned into an Extended Helicopter Platform"], 搜狐 [Sohu], August 26, 2019, [https://www.sohu.com/a/336466115\\_426502](https://www.sohu.com/a/336466115_426502); 万幸, 075 差点变成 071 放大版, 最后关头果断选择直通甲板方案 ["Fortunately, the Type 075 was Almost Turned into an Enlarged 071 but the Straight Deck Plan was Finally Chosen"], 163.com, August 12, 2020, <https://www.163.com/dy/article/FJRP4K4U0535013N.html>.

<sup>36</sup> 差点不是小平顶 – 075 型两栖攻击舰研制始末 ["It was Almost Not a Flat Top – The Development of the Type 075 Amphibious Assault Ship"], 凤凰网 [Phoenix News], August 25, 2019, <https://news.ifeng.com/c/7pQ1xxhGsXY>.

<sup>37</sup> Efforts to stop the leak of photos likely focused on preventing exposure of the ship's internal spaces and sensitive systems. 褚文 [Chu Wen], 中共军企紧急会议证 075 泄密 保密机构介入 ["CCP's Military Enterprise Holds Emergency Meeting Confirming the 075 Secrets Leak and Secrets Protection Agencies Intervene"], 多维新闻 [DW News], July 3, 2019, <https://www.dwnews.com/%E4%B8%AD%E5%9B%BD/60139751/%E4%B8%AD%E5%85%B1%E5%86%9B%E4%BC%81%E7%B4%A7%E6%80%A5%E4%BC%9A%E8%AE%AE%E8%AF%81075%E6%B3%84%E5%AF%86%E4%BF%9D%E5%AF%86%E6%9C%BA%E6%9E%84%E4%BB%8B%E5%85%A5%E5%9B%BE>.

Exhibit 3. Major Milestones in the Construction of the Type 075<sup>38</sup>

Ship	Milestones
<i>Hainan</i> , No. 31	Launched on September 25, 2019. Began sea trials on August 5, 2020. Commissioned on April 23, 2021.
<i>Guangxi</i> , No. 32	Launched on April 22, 2020. Began sea trials on December 22, 2020. Likely commissioned in April 2022.
<i>Anhui</i> , No. 33	Launched in January 2021. Began sea trials on November 25, 2021. Commissioning imminent.

The naming scheme for the Type 075 will be done according to the “Navy Ship Naming Regulations.” Accordingly, China’s largest ships, such as aircraft carriers, cruisers, and amphibious assault ships, will be named after provinces and direct-administered municipalities.<sup>39</sup>

The first batch of three Type 075s was launched within the span of a year and half. Modules from the second hull could already be seen in the adjacent assembly dock as the first hull was being launched.<sup>40</sup> The launch of the first and second hulls would be just over half a year apart, with the third launched less than a year after the second. Outfitting the first hull reportedly took about 239 days after its launch, while the second hull required only 100.<sup>41</sup> Chinese observers found the second and third hulls came out of the drydock in a more complete state than the first hull, and expect the third hull to begin sea trials in as quickly as the second.<sup>42</sup> While this pace of construction is

<sup>38</sup> 我国两栖攻击舰首舰下水 [“China’s First Amphibious Assault Ship Launched”], 新华网 [Xinhua], September 25, 2019, [http://www.xinhuanet.com/politics/2019-09/25/c\\_1125037399.htm](http://www.xinhuanet.com/politics/2019-09/25/c_1125037399.htm); 中国首艘 075 两栖攻击舰进行海试 [“China’s First 075 Amphibious Assault Ship Conducts Sea Trials”], 观察者网 [Observer], August 5, 2020, <https://mil.news.sina.com.cn/china/2020-08-05/doc-iivhuipn6997638.shtml>; Xavier Vavasseur, “China Commissions a Type-055 DDG, a Type 075 LHD, and a Type-094 SSBN in a Single Day,” *Naval News*, April 24, 2021, <https://www.navalnews.com/naval-news/2021/04/china-commissions-a-type-055-ddg-a-type-075-lhd-and-a-type-094-ssbn-in-a-single-day/>; 王世纯 [Wang Shichun], 075 三号舰下水 或于年内试航 [“Third 075 Launched and May Have Sea Trial Within the Year”], 观察者网 [Observer], January 29, 2021, [https://www.guancha.cn/military-affairs/2021\\_01\\_29\\_579667.shtml](https://www.guancha.cn/military-affairs/2021_01_29_579667.shtml); 王世纯 [Wang Shichun], 075 两栖攻击舰二号舰首次试航 [“First Sea Trials for the Second 075 Amphibious Assault Ship”], 观察者网 [Observer], December 22, 2020, [https://www.guancha.cn/military-affairs/2020\\_12\\_22\\_575394.shtml](https://www.guancha.cn/military-affairs/2020_12_22_575394.shtml); 央视官宣! 075 两栖攻击舰 “广西舰” 入列 [“CCTV Official Announcement! Type 075 Amphibious Assault Ship ‘Guangxi’ Commissioned”], 央视网 [CCTV], April 21, 2022, <https://v.cctv.com/2022/04/21/VIDEHEnIavo4mhOSFVgQv3Ag220421.shtml>; Wang, “Third 075 Launched and May Have Sea Trial Within the Year”; Xavier Vavasseur, “China’s Third Type 075 LHD Starts Sea Trials,” *Naval News*, November 28, 2021, <https://www.navalnews.com/naval-news/2021/11/chinas-third-type-075-lhd-starts-sea-trials/>; 9 个月十万吨, 075 型三号舰刷号后, 海军已拥有 11 艘两栖登陆舰 [“100,000 Tons in 9 Months, the Navy Has 11 Amphibious Landing Ships with the Third Type 075’s Pennant Painted On”], 搜狐-北雁自南归 [Sohu –Bei Yan Zi Nan Gui], September 15, 2022, [https://mil.sohu.com/a/585214452\\_121083281?scm=9010.8000.0.0.3069||1102.1.2.0.0&spm=smc.channel\\_230.block3\\_4\\_1\\_mjVMiL\\_2\\_fd.2.1663225200010DA5oXoZ\\_269](https://mil.sohu.com/a/585214452_121083281?scm=9010.8000.0.0.3069||1102.1.2.0.0&spm=smc.channel_230.block3_4_1_mjVMiL_2_fd.2.1663225200010DA5oXoZ_269).

<sup>39</sup> 就山东舰入列有关问题答记者问 [“Answering Reporters’ Questions Regarding the Commissioning of the Shandong”], 人民日报海外版 [People’s Daily Overseas Edition], December 19, 2019, 2, [http://paper.people.com.cn/rmrbhwb/html/2019-12/19/content\\_1962268.htm](http://paper.people.com.cn/rmrbhwb/html/2019-12/19/content_1962268.htm).

<sup>40</sup> Yin, “The PLA-Navy’s Type 075 Amphibious Assault Ship,” 11.

<sup>41</sup> Wang, “First Sea Trials for the Second 075 Amphibious Assault Ship.”

<sup>42</sup> 王世纯 [Wang Shichun] 中国第 2 艘 075 两栖舰下水 完成度明显高于一号舰 [“China’s Second 075 Amphibious Warship Launched and is Clearly More Complete than the First Ship”], 观察者网 [Observer], April 22, 2020,

impressive, Chinese commentators believe that even greater efficiencies can be achieved by adopting the construction methods used in American and French amphibious warship construction. These include greater consolidation of modules into supermodules and potential module construction in different locations to reduce construction time.<sup>43</sup>

Optimistic observers anticipate the first batch of three Type 075s will finish joining the fleet by the end of 2022.<sup>44</sup> In addition to the three hulls of the “first batch,” online observers report a second batch of five Type 075s is planned or has begun fabrication. Some suggest eight ships could be delivered by 2025 based on the pace of construction in the past few years.<sup>45</sup> PLAN commentator Li Jie suggests the PLAN may need six Type 075s in order to deploy up to two “amphibious strike groups” at any time. This would require another three ships as well as an additional batch of Type 071 LPDs.<sup>46</sup>

## Ship Capabilities

China has never built or fielded a vessel like the Type 075. It enables significant new capabilities for the PLAN and forms the heart of its future over-the-horizon amphibious fleet. Despite being a new design, the ship itself does not feature many dramatically new individual systems. How it operates and supports PLAN and PLAN Marine Corps aviation elements will likely be the most critical new features. This section will first examine each of the Type 075’s capabilities. Due to the lack of officially released descriptions of the ship’s systems, this section will draw heavily on detailed analyses by observers in Chinese-language “navalist” publications and discussions posted online.

### *Propulsion*

The ship’s power plant is a critical factor in its operational endurance, speed, and overall performance. It is widely reported the Type 075 is powered by four 16-cylinder Pielstick PC 2.6B diesel engines in a CODAD configuration, built under licensed production by Shaanxi Diesel Heavy Industry, Ltd.<sup>47</sup> The size and number of air intake pipes and grates as well as the exhaust ducts exiting through a singular structure built into the center of the island indicate less demand for air

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<https://mil.news.sina.com.cn/china/2020-04-22/doc-iircuyvh9230425.shtml>; Wang, “Third 075 Launched and May Have Sea Trial Within the Year.”

<sup>43</sup> 肖武, 蔡斯渊, 彭营豪, 刘序辰 [Xiao Wu, Cai Siyuan, Peng Yinghao, Liu Xuchen], 国外两栖攻击舰建造综述 [“A Summary of Foreign Amphibious Assault Ship Construction”], 现代舰船 [Modern Ships], no. 12 (2021), 76-80.

<sup>44</sup> See 我军 075 两栖攻击舰最新动态: 一艘演习一艘试航 [“The Latest on the PLA 075 Amphibious Assault Ship: One Ship in Exercises and One Ship in Sea Trials”], 兵工科技 [Ordnance Industry Science Technology], January 8, 2021, <https://mil.news.sina.com.cn/zhengming/2021-01-08/doc-iiznctkf0777405.shtml>; 第二艘国产两栖攻击舰下水 两舰 2022 年前均能服役 [“Second Domestically-Produced Amphibious Assault Ship Launched, Both Ships Can Be Commissioned Before 2022”], 凤凰网 [Phoenix News], April 22, 2020, <https://3g.china.com/act/news/10000169/20200422/38122681.html>.

<sup>45</sup> 075 型两栖攻击舰首舰海试 [“First Type 075 Amphibious Assault Ship in Sea Trials”], 观察者网 [Observer], August 6, 2020, <http://www.nanhai.org.cn/info-detail/20/9730.html>; 好汉防务 [Haohan Fangwu], 国产两栖攻击舰快速建造, 据称有 8 艘之多, 啥时可以全部服役? [Domestic Amphibious Assault Ship Constructed Quickly and It is Said There Will be 8 Ships, When Can All of Them Enter Service?], 腾讯网 [Tencent], November 19, 2020, <https://xw.qq.com/cmsid/20201125a0111s00>.

<sup>46</sup> 李杰 [Li Jie], 贺中国远洋两栖打击部队将成军! [“Congratulations to the Formation of China’s Distant Ocean Amphibious Strike Forces!”], 现代舰船 [Modern Ships], no. 17-18 (2020), 20.

<sup>47</sup> Wen, “Details on the Type 075 Amphibious Assault Ship,” 28; “It was Almost Not a Flat Top – The Development of the Type 075 Amphibious Assault Ship”.

flow, further confirming the ship's diesel configuration.<sup>48</sup> The earlier generation 16 PC 2.6 diesel engines used on the Type 071s provided around 47,000 horsepower to its twin-screws, allowing them to reach a speed between 19-22 knots.<sup>49</sup> The more advanced engines on the Type 075 can deliver around 65,000 horsepower to the twin-screw ship, and it is expected to be capable of 22-24 knots.<sup>50</sup> The ship also has bow thrusters to improve maneuverability at slow speeds and during docking procedures.<sup>51</sup>

The Type 075 is not the fastest platform in the PLAN. It does not need to be. Reliability and economy in power plant performance are likely the more important requirement.<sup>52</sup> Designed for prolonged deployments in distant waters, China's distant ocean amphibious fleet would benefit from efficiency over speed and lower breakdown rates. Diesel engines offer lower fuel consumption at slower cruising speeds, requiring fewer fuel replenishments compared to some of the gas turbine driven destroyers.<sup>53</sup> There are very few discussions of the Type 075's range, but one estimates 8,000 nautical miles at 18-knots.<sup>54</sup> Additionally, it would make sense for the ships of a PLAN amphibious task force, chiefly the Type 075 and Type 071, to be built with similar propulsion performance levels.<sup>55</sup>

### *Sensors & Control*

The Type 075 has a forward enclosed main mast that rises quite high at 27 meters off the flight deck. One observer explains the geometric stealth design of the main mast helps offset a larger radar reflection due to its height, and allows for greater effective range for the ship's radar and electronic warfare equipment. This can increase protection of the amphibious task force, which will likely lack fixed-wing airborne early warning support.<sup>56</sup> Mounted atop the main mast is a "Sea Eagle S/C" Type 382 3D dual-band radar (海鹰 S/C), commonly used on the Type 054A frigates (and potentially

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<sup>48</sup> 天一制图 [Tian Yi Drafting], 中国海军 075 型两栖攻击舰图示 (一) ["The PLA-Navy's Type 075 Amphibious Assault Ship Drawing (1)"], 舰载武器 [Shipborne Weapons], no. 3 (2020), 6; Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 15.

<sup>49</sup> Wen, "Details on the Type 075 Amphibious Assault Ship," 15; Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 28; 薛跋 [Xue Ba], 走进护航巨舰 "昆仑山" ["Entering the Great Escort Warship 'Kunlunshan'"], 党员干部之友 [Friends of Party Members and Cadres], No. 8, 2010, 42.

<sup>50</sup> Some PRC authors base this on the performance of the Type-901 fast replenishment ship, which reportedly uses the same configuration. They argue the Type 075 can attain higher speed due to its smaller displacement compared to the Type-901. See, for instance, Wen, "Details on the Type 075 Amphibious Assault Ship," 15; Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 28; 陈弋泽 [Chen Yize], 国产两栖攻击舰的历史使命和能力需求 ["Historical Missions and Capability Requirements for the Domestically Produced Amphibious Assault Ship"], 现代舰船 [Modern Ships], no. 24 (2019), 22.

<sup>51</sup> Wen, "Details on the Type 075 Amphibious Assault Ship," 22.

<sup>52</sup> Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 15.

<sup>53</sup> Daniel Caldwell, Joseph Freda, and Lyle J. Goldstein, "China's Dreadnought? The PLA Navy's Type 055 Cruiser and Its Implications for the Future Maritime Security Environment," China Maritime Report No. 5, China Maritime Studies Institute, <https://digital-commons.usnwc.edu/cmsi-maritime-reports/5>; Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 16.

<sup>54</sup> The Type-071 LPD reportedly has maximum cruising range of 10,000 nautical miles at 18 knots and a top speed of 25 knots. Tian, "The PLA-Navy's Type 075 Amphibious Assault Ship Drawing (1)," 6; "Chinese Navy Conducts Naval Exercises with Three Type-071 Yuzhao-class Amphibious Transport Dock Vessels," *Naval Recognition*, November 27, 2020, <https://www.navyrecognition.com/index.php/news/defence-news/2020/november/9335-chinese-navy-conducts-naval-exercises-with-three-type-071-yuzhao-class-amphibious-transport-dock-vessels.html>.

<sup>55</sup> Wen, "Details on the Type 075 Amphibious Assault Ship," 28.

<sup>56</sup> *Ibid.*, 24.

could be an improved version).<sup>57</sup> It provides air warning, guidance, and tracking, and can detect 100 targets (precision tracking for 20 targets) out to 250 kilometers (135 nautical miles). It is well suited for guidance of shipborne aircraft.<sup>58</sup>

The Type 075 has a complete electronic warfare system. Below the ship's data link antennae on the main mast and on both sides of the hull is the Type 726 shipboard electronic warfare suite. This comprises Type 726-1/2 electronic support measures mounted on the main mast, the Type 726-3 active electronic jamming system amidships port and starboard, and the Type 726-4 decoy launching system hull-mounted in four locations of the ship (two on both quarters and two port and starboard forward of the island). This system protects the ship by monitoring electromagnetic emissions several hundred kilometers out and jamming incoming threats. Positioning aids in preventing interference between ship sensors; thus, the active electronic jamming system is placed on each beam away from the superstructure.<sup>59</sup> The four 18-tube Type 726-4 decoy launchers can deliver a chaff cloud in a two-to-three-kilometer radius of the ship, as well as infrared and other decoys.<sup>60</sup>

Atop the aft mast above the aviation tower is a new active phased array radar. This surprised some observers expecting a Type 364 low altitude search radar. Instead, this new dual-sided rotating phased array radar likely uses X-band and is expected to be capable of airborne detection from horizon to zenith and operating normally under strong electromagnetic and weather interference. This radar can improve tracking of multiple airborne and sea-skimming targets and feed targeting data to the ship's air defense weapons.<sup>61</sup> One analysis notes the radar's position is suboptimal but is a tradeoff for the more important mission of air control by the Type 382 radar. Additionally, the blind spot of the main mast may not be large if enclosed in wave-permeable fiberglass materials.<sup>62</sup>

A precision approach radar is mounted on the rear face of the flight control tower, providing a more accurate all-weather short-range approach navigation guidance system for landing aircraft. This radar is more commonly found on PLAN aircraft carriers, so observers were surprised to see it on the Type 055 cruiser and the Type 075. They suggest this more accurate system is not entirely required for regular helicopter flight operations, but could rather be meant to support the PLAN's developing VTOL UAV systems.<sup>63</sup>

The Type 075 has been described as a "cross-generational" ship, featuring a high-degree of networked, informatized, and automated systems. It is claimed that most equipment can be monitored and managed through the ship's network, and maintained, protected and operated by network

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<sup>57</sup> Ibid., 25.

<sup>58</sup> Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 16-17.

<sup>59</sup> Ibid, 18; Tian, "The PLA-Navy's Type 075 Amphibious Assault Ship Drawing (1)," 6.

<sup>60</sup> Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 18.

<sup>61</sup> 褚文 [Chu Wen], 075 将下水新设备超意料 北京借机警告台独 ["075 To Launch with Unexpected New Equipment, Beijing Takes the Opportunity to Warn Taiwan Separatists"], 多维新闻 [DW News], September 17, 2019, <https://www.dwnews.com/%E4%B8%AD%E5%9B%BD/60149529/075%E5%B0%86%E4%B8%8B%E6%B0%B4%E6%96%B0%E8%AE%BE%E5%A4%87%E8%B6%85%E6%84%8F%E6%96%99%E5%8C%97%E4%BA%AC%E5%80%9F%E6%9C%BA%E8%AD%A6%E5%91%8A%E5%8F%B0%E7%8B%AC%E5%9B%BE>; Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 17.

<sup>62</sup> 舰闻杂谈: 三大法宝上舰, 075型的空管水平远胜云级 ["Warship News: Three Magic Weapons On Board, the Type 075's Air Traffic Control is Far Better than the *Izumo* Class"], 搜狐 [Sohu], September 21, 2019, [https://www.sohu.com/a/342394538\\_100142741](https://www.sohu.com/a/342394538_100142741).

<sup>63</sup> Ibid; Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 17.

information specialists.<sup>64</sup> However, this does not tell us much about how the ship's systems can specifically support a task force commander post's functions in intelligence processing, command decision making, and fire control while integrating Type 075 sensors with inputs from the various nodes across other platforms of the task force, other friendly forces in operational areas, higher-level commands, and air or space-based sensors.

### *Ship Defense Weapons*

As a large, slow-moving target with a full flight deck, the Type 075 devotes a significant portion of shipboard weapons on platform defense against incoming threats. The ship is defended by four primary close-in weapon systems, two gatling mounts, and two short-range missile mounts. Two H/PJ-14 (11 barreled-30mm) gatling mounts provide high volume fire with close to 10,000 rounds per minute against incoming missiles or aircraft. One is mounted on the forward port side (180-degrees of coverage) and another on the starboard stern (greater than 240-degrees coverage).<sup>65</sup> Two HQ-10 short-range surface-to-air missile mounts in a 24-tube configuration provide protection against incoming missiles out to nine kilometers.<sup>66</sup> One is mounted on the weapons platform forward of the bridge (approximately 260-degrees coverage) and another is mounted on the port stern (greater than 240-degrees coverage). This configuration is a significant improvement over the ship defense systems aboard the Type 071 LPDs, which is equipped with four Type 630 mounts.<sup>67</sup> Exhibit 4 below provides a comparison of installed mounts and coverage between the Type 002 carrier, Type 071 LPD, and the Type 075.

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<sup>64</sup> “《Voice》 Lü Yongjun: The *Hainan* – A Sharp Dagger in Amphibious Combat.”

<sup>65</sup> Yin, “The PLA-Navy’s Type 075 Amphibious Assault Ship,” 18; “Chinese Navy Liaoning Aircraft Carrier’s H/PJ-14 (Type-1130) New Generation CWIS,” *Navy Recognition*, March 21, 2013, <https://www.navyrecognition.com/index.php/news/defence-news/year-2013-news/march-2013-navy-world-naval-forces-maritime-industry-technology-news/951-chinese-navy-liaoning-aircraft-carriers-hpj-14-type-1130-new-generation-ciws-.html>.

<sup>66</sup> 苏米 [Su Mi], 075 首舰试航归来突然“变样”惹关注 [“First 075 Suddenly ‘Changed’ When it Returned from Sea Trials, Attracting Attention”], 多维新闻 [DW News], August 24, 2020, <https://www.dwnews.com/%E4%B8%AD%E5%9B%BD/60208980/075%E9%A6%96%E8%88%B0%E8%AF%95%E8%88%AA%E5%BD%92%E6%9D%A5%E7%AA%81%E7%84%B6%E5%8F%98%E6%A0%B7%E6%83%B9%E5%85%B3%E6%B3%A8%E5%9B%BE>; Yin, “The PLA-Navy’s Type 075 Amphibious Assault Ship,” 18.

<sup>67</sup> Wen, “Details on the Type 075 Amphibious Assault Ship,” 26.

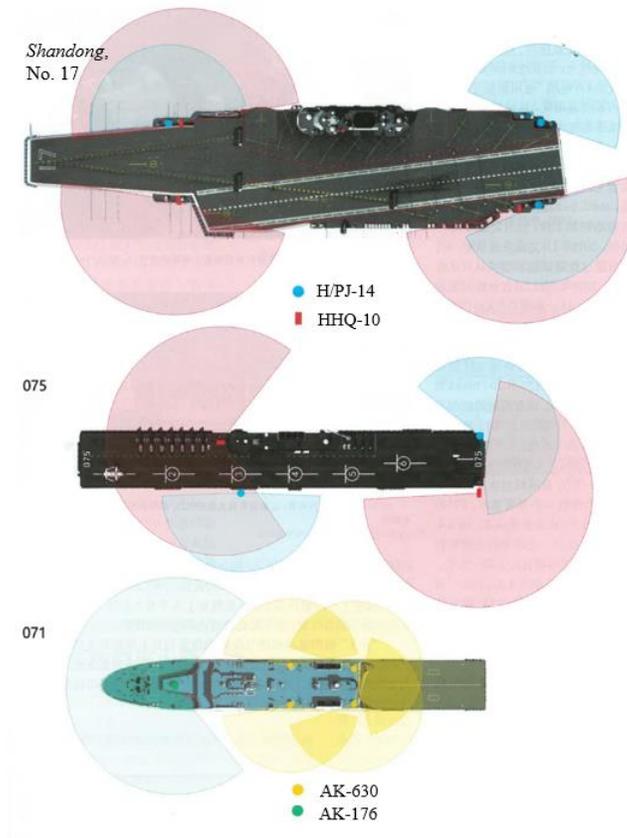


Exhibit 4: “Diagram of Close-in Defense Systems Allocated to Large Chinese Navy Surface Ships.” Field of fire for each weapon mount identified by color.<sup>68</sup>

The Type 075’s close-in defense system also includes the CS/AR1 55mm anti-frogmen rocket launchers mounted on the sides of the ship. Video footage shows one of these mounts located next to the Type 726-4 decoy launcher on the port-side of the *Hainan*.<sup>69</sup> Mounted on many other PLAN vessels such as the *Liaoning* and the Type 055 cruiser, this system launches rockets against small underwater threats to protect ships while moored or at anchor.<sup>70</sup>

### Capacity

The Type 075’s carrying capacity is more difficult to observe than external features of the ship. The precise size of the well deck is yet to be officially confirmed; however, it is not as long as the Type 071’s. Analysis of the ship’s stern indicates a 20-meter-wide gate suited to the Type 726 LCAC.<sup>71</sup> In addition to LCACs, the PLAN’s recently publicized landing craft utility (LCU) is likely capable of

<sup>68</sup> Ibid., 27.

<sup>69</sup> 两栖攻击舰海南舰究竟有多强? 一起来长“舰”识! [“How Strong is the Amphibious Assault Ship *Hainan*? Let’s Learn About the ‘Ship’ Together!”], 中国军视网 – 军事纪实 [js7tv.cn – Military Documentary], April 22, 2022, [https://www.js7tv.cn/video/202204\\_275928.html](https://www.js7tv.cn/video/202204_275928.html).

<sup>70</sup> CS/AR1 型 55 毫米反蛙人火箭炮 [CS/AR1 55mm Anti-Frogmen Rocket Launcher], 兵器知识 [Ordnance Knowledge], No. 1, 2015, cover image; 官方首次公开 055 大驱一新式武器 让“水鬼”有来无回 [“First Official Release of the Type-055 Destroyer’s New Weapons, Ensuring Approaching ‘Water Ghosts’ Do Not Return”], 新浪军事-寰球前沿观察 [Sina Military-Global Frontier Observation], January 23, 2020, <https://mil.news.sina.com.cn/jssd/2020-01-23/doc-iihnzhha4243352.shtml>.

<sup>71</sup> Wen, “Details on the Type 075 Amphibious Assault Ship,” 22.

deploying from the Type 075's well deck.<sup>72</sup> Air vents along the hull suggest the layout of the well deck and vehicle compartments. If the second set of air vents along the hull from the stern feeds the well deck, then it could be 80 to 90 meters in length and probably capable of carrying two, maybe three Type 726 LCACs.<sup>73</sup> Capacity for well deck operations will be necessary due to persistent limitations in PLAN helicopter lift capabilities: for the foreseeable future, PLAN helicopters will probably only be able to move personnel, materials, and possibly light vehicles.



Exhibit 5: An evening view of the Type 075's well deck, false beach, and hangar spaces.<sup>74</sup>

<sup>72</sup> Liu Xuanzun, "PLA Holds Landing Drills in E. China Sea with New Landing Craft," *Global Times*, February 24, 2022, [https://www.globaltimes.cn/page/202202/1253145.shtml#:~:text=The%20Chinese%20People's%20Liberation%20Army%20\(PLA\)%20recently%20conducted%20landing%20drills,in%20large%2Dscale%20landing%20missions](https://www.globaltimes.cn/page/202202/1253145.shtml#:~:text=The%20Chinese%20People's%20Liberation%20Army%20(PLA)%20recently%20conducted%20landing%20drills,in%20large%2Dscale%20landing%20missions); See graphic contained in 中国海军新型登陆艇 ["Chinese Navy's New-Type Landing Craft"], *舰船知识 [Naval and Merchant Ships]*, No. 10, 2021.

<sup>73</sup> 天一制图 [Tian Yi Drafting, 中国海军 075 型两栖攻击舰图示 (二) ["The PLA-Navy's Type 075 Amphibious Assault Ship Drawing (2)"], *舰载武器 [Shipborne Weapons]*, no. 3 (2020), 7.

<sup>74</sup> Twitter user @KaguraKonata posted this image on August 5, 2020. Original post of this image appears to be from Weibo user @开心包子铺.

Only unofficial estimates of the internal cargo space capacities of the Type 075 are available. The side ports located on both sides of the ship one-third back from the bow are similar to those on the Type 071s. These enable dockside roll-on/roll-off loading of armor and vehicles into the vehicle compartment. The ship's well deck and vehicle deck are one continuous space and, according to one analysis, is likely around 80 meters long accounting for the false beach.<sup>75</sup> Others claim there are upper and lower vehicle compartments, with the upper vehicle compartment being over 100 meters long and no more than 20 meters wide, and the lower vehicle compartment being smaller.<sup>76</sup> Footage of other vehicle compartments have thus far not been observed.



Exhibit 6: The *Guangxi*'s vehicle compartment.<sup>77</sup>

Dimensionally, the Type 075's vehicle compartment can accommodate all PLANMC ground vehicles. Video footage of loading operations into the vehicle deck demonstrates three Type 05 vehicles parked abreast.<sup>78</sup> There is sufficient vehicle space for PLANMC company-sized units, such as an amphibious mechanized infantry company as shown in training footage.<sup>79</sup> This would also permit vehicle loading of additional platoon-sized elements, such as an attached tank platoon

<sup>75</sup> HSH, 075 型两栖攻击舰航空部队和两栖突击力量搭载能力猜析 [“Speculation and Analysis on the Type 075 Amphibious Assault Ship's Aviation Force and Amphibious Assault Carrying Capabilities”], 兵工科技 [*Ordnance Industry Science Technology*], no. 24 (2021), 66.

<sup>76</sup> Yin, “The PLA-Navy's Type 075 Amphibious Assault Ship,” 14-15.

<sup>77</sup> 两栖攻击舰广西舰舰歌《旗舰战歌》首发 [“Debut of the Amphibious Assault Ship *Guangxi*'s Ship Song ‘Flagship Battle Hymn’”], 中国军视网 – 军事报道 [*Js7tv.cn – Military Report*], May 11, 2022, [https://www.js7tv.cn/video/202205\\_277525.html](https://www.js7tv.cn/video/202205_277525.html).

<sup>78</sup> 外形似航母的海南舰究竟有多气派? 这个亮点值得一提 [“How Stylish is the Aircraft Carrier-looking *Hainan*? This Highlight is Worth Mentioning”], 中国军视网 – 军事科技 [*Js7tv.cn – Military Technology*], December 30, 2021, [https://www.js7tv.cn/video/202112\\_266668.html](https://www.js7tv.cn/video/202112_266668.html).

<sup>79</sup> 海南舰: 多课目多兵种协同训练 [“Naval Ship *Hainan*: Multi-Subject and Multi-Service Arm Coordination Training”], 中国军视网 – 国防军事早报 [*Js7tv.cn – Morning Report on Defence*], August 12, 2022, [https://www.js7tv.cn/video/202208\\_284860.html](https://www.js7tv.cn/video/202208_284860.html).

consisting of several Type 15 light tanks, or self-propelled howitzers from an attached artillery battery.

Without seeing a loading plan or having direct observation of the cross-deck loadout of an amphibious task force, it is difficult to predict what types of units will be embarked on the Type 075 specifically. Unofficial or amateur estimates state the Type 075 can carry 10 main battle tanks, 20-35 Type 05 amphibious assault vehicles, 20 infantry fighting vehicles, and 50 field mobile trucks.<sup>80</sup> This could be overly optimistic. Nonetheless, vehicle decks will accommodate the PLANMC's various tracked and wheeled combat and support vehicles, the ultimate loadout of which will depend on the overall loading scheme of a PLAN amphibious task force and the embarked task-organized PLANMC force.<sup>81</sup> In terms of personnel, the number of expected embarked Marines ranges from 900 to over 1200.<sup>82</sup>

Living conditions aboard are reportedly improved over older amphibious ships, with central air conditioning, laundry facilities, shops, postal services, and recreational spaces. Among its thousand-plus compartments are also medical and dental spaces, barber shops, ship offices, conference space, and various other compartments for managing a floating city. The ship's hospital is rated as a "secondary first-class hospital" (二甲医院) containing over 100 beds (can be expanded if required), an intensive care unit, X-ray equipment, and telehealth services.<sup>83</sup> The ship's berthing and mess layout is likely concentrated in the forward and central spaces. In order to maximize valuable shipboard space, the large slab-shaped bow provides additional square footage for berths or storage.<sup>84</sup>

Without blueprints or a tour of the ship, total cargo stowage is difficult to assess. The Type 075 will necessarily have shop spaces; flammable liquid holds; magazines for aircraft, vehicles, and small arms; and various other cargo holds. A *Wasp* class LHD has 24,000 sq. ft. of vehicle space and 145,000 cubic feet of cargo space.<sup>85</sup> Smaller than the *Wasp* class, the Type 075 is likely to have less space. However, the PLANMC for the time being may have less to bring compared to the USMC, which fields a more diverse array of capabilities.

As with any large naval ship, taking on supplies will be a regular task. The Type 075 has multiple stations for receiving and delivering supplies. A "medium lift" telescopic crane is mounted just forward of the island and can lift dockside supplies or equipment directly onto the ship's forward elevator to be brought inside the ship.<sup>86</sup> The ship will take replenishment on the starboard side. A kingpost with sliding block appears to be mounted at a dry cargo replenishment station on the aft

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<sup>80</sup> 075 型两栖攻击舰: 首舰已开始海试, 作战能力究竟如何 ["The Type 075 Amphibious Assault Ship: The First Ship Has Begun Sea Trials, How are its Combat Capabilities"], 搜狐 – 国平军史 [Sohu – Guoping Military History], August 18, 2020, [https://www.sohu.com/a/413689002\\_100122108](https://www.sohu.com/a/413689002_100122108); Tian, "The PLA-Navy's Type 075 Amphibious Assault Ship Drawing (1)," 6.

<sup>81</sup> Chen, "Historical Missions and Capability Requirements for the Domestically Produced Amphibious Assault Ship," 30.

<sup>82</sup> Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 15; Matthew P. Funaiolo, Joseph S. Bermudez Jr., "China's New Amphibious Assault Ship Sails into the South China Sea," Center for Strategic & International Studies, November 24, 2020, <https://www.csis.org/analysis/chinas-new-amphibious-assault-ship-sails-south-china-sea>.

<sup>83</sup> The captain of the *Hainan* noted there are over 1,000 small and large compartments within the ship. "《Voice》 Lü Yongjun: The *Hainan* – A Sharp Dagger in Amphibious Combat"; The ship's intensive care unit has been shown on television footage; however, it is unknown how many beds and medical staff the ship will have on board. "How Strong is the Amphibious Assault Ship *Hainan*? Let's Learn About the 'Ship' Together!"

<sup>84</sup> Wen, "Details on the Type 075 Amphibious Assault Ship," 22.

<sup>85</sup> Marine Corps Reference Publication 3-31B, Amphibious Ships and Landing Craft Data Book, February 2, 2015, 7.

<sup>86</sup> Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 14.

starboard side of the island. One analysis claims the ship can conduct two-way replenishment to supply other ships of the task force.<sup>87</sup> Starboard fuel transfer stations are located below the bridge and just aft of the island.<sup>88</sup> It is possible each fuel station could be dedicated to diesel or aviation fuel. Both the *Hainan* and the *Guangxi* have developed initial proficiency in regular replenishment tasks.<sup>89</sup> Replenishment training by both ships with the Type 901 replenishment ship suggests that vessel's inclusion in future amphibious task forces. The delivery of three Type 075s and the construction of new aircraft carriers further highlights the very urgent demand for additional fleet oilers, which could become a restraining factor in far-seas deployments.<sup>90</sup>

Estimates of the ship's hangar capacity range from 20-35 aircraft, most often determined to be around 30 aircraft.<sup>91</sup> Of course, this range depends on the hangar dimensions and the balance of space allocated for each type of aircraft. Based on the elevator positions, the hangar should be at least 150 meters long, 20 meters wide, and 6 meters high, providing between 3,000 to 3,750 square meters of space.<sup>92</sup> The stern elevator is approximately 15 meters wide and 18 meters long with a lift capacity of at least 20 tons. It can lift two Z-8s simultaneously with their rotors folded.<sup>93</sup> The forward elevator takes up less deck space and can lift one medium or light helicopter with rotors folded.<sup>94</sup>

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<sup>87</sup> Wen, "Details on the Type 075 Amphibious Assault Ship," 25.

<sup>88</sup> This can be seen in July 2022 training footage of the *Guangxi's* (No. 32) replenishment exercises with the Type 901 replenishment ship *Chaganhu* (No. 905). 程嘉豪, 冯丽滢, 曾慧康, 吴松波, 李泊, 金佳佳, 李珂嘉贺, 周鹏程 [Cheng Jiahao, Feng Liying, Wu Songbo, Li Bo, Jin Jiajia, Li Kejiahe, Zhou Pengcheng], 海军广西舰: 加速新质作战能力生成 ["Naval Ship *Guangxi*: Accelerate the Generation of New-Type Combat Capabilities"], 中国军视网 – 军事快播 [*Js7tv.cn* – *Junshi Kuaibo*], August 1, 2022, [https://www.js7tv.cn/video/202208\\_284137.html](https://www.js7tv.cn/video/202208_284137.html); Also seen in cover images contained in 现代舰船 [*Modern Ships*], no. 9 (2021).

<sup>89</sup> Ibid. The *Hainan* was also seen taking on fuel from the *Chaganhu* while underway in the South China Sea in April 2022. 陈运鹏, 殷征, 余智俐 [Chen Yunpeng, Yin Zheng, She Zhili], 巨舰出航 护卫海疆! 海南舰在南海某海域开展舰机协同训练 ["Huge Warships Set Sail to Protect the Maritime Frontier! The Warship *Hainan* Conducts Ship-Aircraft Coordination Training in an Area of the South China Sea"], 解放军报 [*PLA Daily*], May 3, 2022, <https://www.workercn.cn/c/2022-05-03/6966845.shtml>.

<sup>90</sup> 方寸 [Fang Cun], 075 也来了, 我们需要更多的 901 型远洋综合补给舰 ["The 075's Have Also Arrived, We Need More Type-901 Distant Ocean Comprehensive Replenishment Ships"], 兵工科技 [*Ordnance Industry Science Technology*], no. 24 (2021), 83-88.

<sup>91</sup> 周晓宇 [Zhou Xiaoyu], 它比航母更加灵活有效, 中国制造第三艘已下水 ["More Flexible and Efficient than an Aircraft Carrier, A Third Ship is Built and Launched in China"], 新华融媒 [*Xinhua Fusion Media*], February 1, 2021, <http://www.dabaixinwen.com/index.php?m=content&c=index&a=show&catid=32&id=1648>; 王笑梦 [Wang Xiaomeng], 两栖攻击舰上的新宠 – 新型舰载无人直升机应用展望 ["The New Favorite on the Amphibious Assault Ship – Prospects for the Application of a New Shipborne Unmanned Helicopter"], 舰船知识 [*Naval & Merchant Ships*], no. 9 (2020), 37-43.

<sup>92</sup> Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 14; 075 型两栖攻击舰: 以搭载各类直升机为主, 未来不排除上舰载战斗机 ["Type 075 Amphibious Assault Ship: Primarily for Carrying Various Helicopters, but Future Shipborne Fighters Cannot Be Ruled Out"], 搜狐-国平军史 [*Sohu- Guoping Military History*], January 30, 2021, [https://www.sohu.com/a/447493701\\_100122108](https://www.sohu.com/a/447493701_100122108).

<sup>93</sup> —登场就吸引了无数军迷! 来看有 15 层楼那么高的海南舰 ["As Soon as It Debuted, It Attracted Countless Military Enthusiasts! Let's Take a Look at the 15-Story Ship *Hainan*"], 中国军视网 – 军事纪实 [*Js7tv.cn* – *Military Documentary*], January 14, 2022, [https://www.js7tv.cn/video/202201\\_267992.html](https://www.js7tv.cn/video/202201_267992.html).

<sup>94</sup> Yin, "The PLA-Navy's Type 075 Amphibious Assault Ship," 13.



Exhibit 7: The *Hainan*'s stern elevator.<sup>95</sup>

#### *Air Detachment*

The Type 075's embarked air detachment serves the core function of this ship and therefore deserves significant attention. Its air detachment will comprise a number of helicopters and unmanned VTOL aircraft. Unlike USN LHDs, which operate a more diverse arsenal of VTOL aircraft, the Type 075 is unlikely to field advanced aircraft akin to the CH-53E/K, MV-22 Osprey, or F-35B in the near term. Transport helicopters available to the PLAN are quite limited. Nonetheless, the current aircraft available to the PLAN are sufficient for basic landing operations.<sup>96</sup>

<sup>95</sup> "As Soon as It Debuted, It Attracted Countless Military Enthusiasts! Let's Take a Look at the 15-Story Ship *Hainan*."

<sup>96</sup> 075型的舰载机 ["Aircraft of the Type 075"], 舰载武器 [*Shipborne Weapons*], no. 3 (2020), 21.

Exhibit 8: Reported Characteristics of Assault Transport Helicopters<sup>97</sup>

	Z-8C	Z-20	Z-18
Troop capacity	24	12-15	24-27
Max takeoff weight (tons)	13	10	13.8
Internal/external payload	4 / 5	1.5 / 4.5	4/ 5
Range (km)	700	400	9,000
Endurance (hrs)	4	N/A	N/A
Max Speed (km/hr)	315	300	336
Service Ceiling (meters)	3,050	5,000	Over 8,000

Transport helicopters are a limiting factor. One assessment says that transport helicopters will make up 80 percent or more of the aircraft aboard the Type 075.<sup>98</sup> However, there are currently only a few types available to the PLAN/PLANMC. An improved PLANMC-version of the Z-8 series, referred to as the Z-8C, is the primary shipborne transport helicopter, retaining the Z-8J's boat hull and pontoon design in anticipation of potential water landings.<sup>99</sup> Another option is the Z-18. Based on the Z-8 design, it has already been observed training on the *Hainan*.<sup>100</sup> The Z-18 could offer improved performance and greater lift capacity, but its troop-carrying capacity is likely not much greater than the Z-8. Limited cabin and ramp dimensions of the Z-18 and the Z-8s make it difficult to deliver materials or light vehicles to objective areas. A wide body Z-8 design is reportedly under development, with a 2.2 to 2.5-meter-wide cargo space and ramp capable of at least transporting the

<sup>97</sup> 直-8C: 海军舰载运输直升机: 海上任务“多面手” [“Navy’s Shipborne Transport Helicopter: An ‘All-Rounder’ for Maritime Tasks”], 科普中国-军事科技前沿 [*China Science Communication – Frontiers of Military Technology*], April 26, 2019, [https://junshi.gmw.cn/2019-04/26/content\\_32781286.htm](https://junshi.gmw.cn/2019-04/26/content_32781286.htm); “Changhe Z-8 Transport Helicopter,” *Airforce Technology*, undated, <https://www.airforce-technology.com/projects/changhez8transport/>; “Helicopters I,” *Chinese Military Aviation*, updated August 1, 2020, <http://chinese-military-aviation.blogspot.com/p/helicopters-i.html>; 江滨, 何欢 [Jiang Bin, He Huan], 直 8 直升机的蓝天航迹 [“Tracks of the Z-8 Helicopter in the Blue Sky”], 军工文化 [*Military Industry Culture*], no Z2 (2019), 66; “Aircraft of the Type 075,” 19-20; 刘维杰 [Liu Weijie], 直-18A: 助力中国空中突击旅 [“Z-18A: Assisting China’s Air Assault Brigades”], 学习时报 [*QS Theory*], July 4, 2018, [http://www.qstheory.cn/defense/2018-07/04/c\\_1123078185.htm](http://www.qstheory.cn/defense/2018-07/04/c_1123078185.htm); “Z-18,” *www.Military-Today.com*, undated, <http://www.military-today.com/helicopters/z18.htm> (accessed September 13, 2022); 石宏 [Shi Hong], 2019 中国陆军装备“威武雄壮” [“2019 Chinese Army Equipment ‘Mighty and Majestic’”], 新民晚报 [*Xinmin Evening News*], December 2, 2019, <http://www.chinanews.com/mil/2019/12-02/9022631.shtml>; 直-20 飞向高原, 国产直升机发动机取得重大突破 [“Domestic Helicopter Engines Make a Major Breakthrough as the Z-20 Flies to the Plateau”], 网易新闻 [*Wangyi News*], November 23, 2020, <https://www.cncopter.com/news/show-25946.html>.

<sup>98</sup> “Aircraft of the Type 075,” 19.

<sup>99</sup> 小米 [Xiao Mi], Z-8 改进型突击运输直升机 (海军陆战队办) [“The Improved Z-8 Assault Transport Helicopter (PLAN Marine Corps Version)”], 舰船知识 [*Naval & Merchant Ships*], no. 9 (2018).

<sup>100</sup> 马玥, 陈运鹏, 殷征, 孙逸凡, 木逢春 [Ma Yue, Chen Yunpeng, Yin Zheng, Sun Yifan, Mu Fengchun], 酷! 带你近距离感受海南舰舰机协同训练 [“Cool! Taking You to Experience Ship and Aircraft Coordination Training of the Warship Hainan”], 中国军视网-军事快播 [*Js7tv.cn – Junshi Kuaibo*], May 24, 2022, [https://www.js7tv.cn/video/202205\\_278521.html](https://www.js7tv.cn/video/202205_278521.html).

“Lynx” all-terrain vehicle, recently delivered to some units of the PLANMC.<sup>101</sup> However, a PLANMC version of the wide body Z-8 has not been observed.

Images of mock-up helicopters on the Type 075’s deck for facilities testing provide a good indication of the type of helicopters the PLAN intends to handle on the platform. In mid-2020, photographs showed full-scale mockups of a Z-8, Z-20, and an unidentified vertical takeoff and landing unmanned aerial vehicle (VTUAV).<sup>102</sup> PLANMC Z-8Cs will likely form the backbone of the PLANMC’s air assault forces and occupy significant hangar space. Thus far, publicized flight training has shown only the Z-8Cs of a PLANMC flight group.<sup>103</sup> Interestingly, most analyses of the Type 075 do not include the Z-9, despite PLANMC training with the platform and its appearance in training footage aboard the *Hainan*.<sup>104</sup> It is also likely the PLANMC will use the more capable Z-20 utility helicopter to augment air assault forces and provide a flexible medium lift platform to fulfil multiple mission roles in the future.<sup>105</sup>

Initial air operations can be surmised from footage of Z-8s operating from the six spots on the main flight deck during aircraft coordination training aboard the Type 075.<sup>106</sup> Capable of carrying up to 24 troops per aircraft, a single sortie of six Z-8s could get a company-sized force in the air. If 24 Z-8Cs are embarked (80 percent of an estimated 30 aircraft embarked air detachment), it could enable four sorties each carrying an air assault company of a Marine air assault battalion. This echoes one analysis that claims the air detachment could deliver a PLANMC battalion of infantry in a single wave, that is with the entire ship’s complement of aircraft aloft.<sup>107</sup> The remaining 20 percent of aircraft could comprise armed escort, airborne early warning, search and rescue, or other utility helicopters. However, this leaves little space for other helicopter types and a fourth sortie may not be

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<sup>101</sup> 天一制图 [Tianyi Drafting], 中国海军两栖攻击舰尚的舰载机-中国海军直-8 宽体运输直升机 [“Shipborne Helicopter for the PLAN’s Future Amphibious Assault Ship – Chinese Navy’s Z-8 Wide Body Transport Helicopter”], 舰载武器 [Shipborne Weapons], no. 2 (February 2019); “Aircraft of the Type 075,” 19-20; 直 8 宽体型直升机曝光 [“Z-8 Wide Body Helicopter Revealed”], 观察者 [Observer], August 19, 2020, [https://m.guancha.cn/military-affairs/2020\\_08\\_19\\_562137.shtml](https://m.guancha.cn/military-affairs/2020_08_19_562137.shtml); 马亚飞, 尚文斌 [Ma Yafei, Shang Wenbin], “猛虎”突击 [“Tiger’ Assaults”], 人民海军 [People’s Navy], June 27, 2018, 4.

<sup>102</sup> 不再羡慕科曼奇, 075 型配套隐身无人机现身, 形似隐身黑鹰 [“No Longer Envious of the Comanche, the Stealth Unmanned Aerial Vehicle Allocated to the Type 075 Appears and Looks Like a Stealth Black Hawk”], 腾讯网 – 河东三叔 [Tencent – San Shu], August 25, 2020, <https://new.qq.com/rain/a/20200825A09QP000>.

<sup>103</sup> “How Strong is the Amphibious Assault Ship *Hainan*? Let’s Learn About the ‘Ship’ Together!”

<sup>104</sup> Z-9 helicopters are observed in the PLANMC’s aviation brigade. The Z-9 could be selected as a search and rescue aircraft for the Type 075. See “How Strong is the Amphibious Assault Ship *Hainan*? Let’s Learn About the ‘Ship’ Together!”; 胶东半岛某机场战鹰轰鸣 猛虎添翼立体突击 [“The Roar of War Eagles at an Airport on the Jiaodong Peninsula, Tigers Get Wings for Multi-dimensional Assault”], 半岛网 [Bandaowang], July 31, 2020, <http://news.bandao.cn/a/393107.html>; 零距离! 直击海军陆战队直升机着舰训练 [“Up Close! Witnessing Navy Marine Corps Helicopter Ship Landing Training”], 凤凰网视频 [v.iFeng.com], March 2, 2020, <http://news.ifeng.com/c/7uTub6uzuJY>.

<sup>105</sup> 荏苒 [Ren Ran], 中国陆军空中突击集群成型 直 20 成陆海空三军新宠 [“The Chinese Army’s Air Assault Groups Take Shape and the Z-20 Has Become the New Favorite of the Land, Sea, and Air Forces”], 多维新闻 [DW News], January 16, 2021, <https://www.dwnews.com/%E4%B8%AD%E5%9B%BD/60226368/%E5%A4%A9%E9%99%8D%E7%A5%9E%E5%85%B5%E4%B8%AD%E5%9B%BD%E9%99%86%E5%86%9B%E7%A9%BA%E4%B8%AD%E7%AA%81%E5%87%BB%E9%9B%86%E7%BE%A4%E6%88%90%E5%BD%A2%E7%9B%B420%E6%88%90%E9%99%86%E6%B5%B7%E7%A9%BA%E4%B8%89%E5%86%9B%E6%96%B0%E5%AE%A0>.

<sup>106</sup> “Naval Ship *Hainan*: Multi-Subject and Multi-Service Arm Coordination Training.”

<sup>107</sup> “Aircraft of the Type 075,” 19.

possible as helicopters go down for maintenance. Type 071s operating in a task force with the Type 075 could also contribute an additional eight helicopters to the total air assault or air support mission. The above prediction is likely too simplistic as the transport of weapons, air defense, and recon companies and other support, such as underslung light vehicles, will likely shift various loading plans for air movement. The PLAN's Z-8s can conduct light sling load operations until heavier lift capabilities are available.<sup>108</sup>



Exhibit 9: PLAN Marines board a Z-8C on the *Hainan* in April 2022.<sup>109</sup>

The Type 075's air detachment might also include VTUAVs. Based on photos of a mock-up, the Type 075 could embark a large UAV at 9-10 meters long and over 2.5 meters tall.<sup>110</sup> One PRC analysis suggests this UAV could reflect advances in real-time data transmission of measurement and control systems, and perhaps advances in automated landing guidance and control capabilities that account for marine environmental effects and the impact of other aircraft rotor wash on deck.<sup>111</sup> The specific type this model represents is yet to be revealed. Multiple PRC assessments find it resembles the WZ-6B, a shipborne UAV produced by the Nanjing Research Institute of Simulation Technology.

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<sup>108</sup> 中国海军两栖攻击舰载机的选型 [“Selecting Shipborne Helicopters for the Chinese Navy’s Amphibious Assault Ship”], 舰载武器 [Shipborne Weapons], no. 2 (February 2019), 31.

<sup>109</sup> Chen, Yin, She, “Huge Warships Set Sail to Protect the Maritime Frontier! The Warship *Hainan* Conducts Ship-Aircraft Coordination Training in an Area of the South China Sea.”

<sup>110</sup> Wang, “The New Favorite on the Amphibious Assault Ship – Prospects for the Application of a New Shipborne Unmanned Helicopter,” 40; Xavier Vavasseur, “Was a VTOL UAV Spotted Aboard China’s Type 075 LHD?” *Naval News*, July 2, 2020, <https://www.navalnews.com/naval-news/2020/07/was-a-vtol-uav-spotted-aboard-chinas-type-075-lhd/>.

<sup>111</sup> Wang, “The New Favorite on the Amphibious Assault Ship – Prospects for the Application of a New Shipborne Unmanned Helicopter,” 41.

They base this on the WZ-6B's "Harpoon" automated landing anchor system equipped underneath its fuselage, assisting with landing and securing the aircraft to the deck.<sup>112</sup>

This VTUAV could serve multiple supporting roles for the Type 075 and landing forces. According to one PRC analysis, these might include reconnaissance, target designation, signals relay, electronic countermeasures, and maritime strike. They could be particularly useful in exposing enemy defensive positions and supporting air assault waves in coordination with other transport and armed helicopters. The UAV could also perform limited strikes by carrying two YJ-9 anti-ship missiles under attached stub wings. They could hunt smaller surface combatants and potentially expand the defensive early warning radius around the formation, guiding anti-air and interception weapons at greater distances, or using sea search radar to detect periscopes. VTUAVs could be a great tool in PLAN anti-piracy escort operations and other non-war military operations to protect PRC interests in distant waters.<sup>113</sup> More information is required to understand the exact roles a VTUAV will fulfill for the Type 075.

Attack helicopters are expected to eventually join the air detachment to cover landing forces and supplement their firepower. However, a naval variant of the PLA's dedicated attack helicopters has yet to be observed.

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<sup>112</sup> This system is also described in official company brochures obtained in 2019. 无人直升机产品 ["Unmanned Helicopter Products"], 南京模拟技术研究所 [NRIST], undated; Wang, "The New Favorite on the Amphibious Assault Ship – Prospects for the Application of a New Shipborne Unmanned Helicopter," 40.

<sup>113</sup> Wang, "The New Favorite on the Amphibious Assault Ship – Prospects for the Application of a New Shipborne Unmanned Helicopter," 41.

Exhibit 10: Reported Characteristics of Close Air Support Helicopters<sup>114</sup>

	Z-10	Z-19	Ka-52K
<b>Armaments</b>	-4 pylons for ATGMs/AAMs/various caliber rockets and rocket pods -23mm or 30mm chin-mounted autocannon	-4 pylons for ATGMs/AAMs/various caliber rockets and rocket pods/stub wing 23mm gun pods	-4 pylons for ATGMs/rocket pods/AShMs -30mm auto cannon
<b>Max takeoff weight (tons)</b>	8	4.68	13.4
<b>Range (km)</b>	800	700	460 (Ferry 1,100)
<b>Endurance (hrs)</b>	>3	>3	N/A
<b>Max speed (km/hr)</b>	300	280	290
<b>Service Ceiling (meters)</b>	6,000	2,400	5,200

The Z-10 and Z-19 are complementary platforms in the PLA Army, with the Z-19 taking on light reconnaissance and attack roles.<sup>115</sup> They are both likely capable of providing airborne cover for amphibious operations for over two hours at “standard landing operation distances” of 50-60 kilometers.<sup>116</sup> For the Type 075, however, limited hangar space and aircraft support will likely force a decision on a single aircraft for now. The Z-19 could offer a cheaper option for producing more attack helicopters for the PLANMC, reportedly costing half that of the Z-10.<sup>117</sup> Additionally, one observer argues the Z-19 is more readily suited to deployment on the Type 075. Its design is an upgraded form of the Z-9, which was imported for the PLAN and includes features for shipborne use, such as folding rotors and an engine fresh water flushing system. The expert suggests the helicopter could be deployed on ships with less modification.<sup>118</sup> However the Z-19 does have shortcomings in

<sup>114</sup> “WZ-10 or Z-10 Attack Helicopter,” *Air Recognition*, undated, <https://www.airrecognition.com/index.php/world-air-force-military-equipment-aircraft-/asia-air-force-countries-aircraft-military-equipment/china-chinese-pla-plaaf-air-force/china-chinese-air-force-helicopters-data-sheet-specifications-pictures-video/560-z-10-wz-10-attack-fighting-helicopter-technical-data-sheet-specifications-intelligence-description-information-identification-pictures-photos-images-video-caic-china-chinese-pla-air-force-defence-industry-technology-.html>; “Helicopters I,” *Chinese Military Aviation*, updated February 20, 2021, <http://chinese-military-aviation.blogspot.com/p/helicopters-i.html>; 武直-10 改变解放军作战形态 [“Armed Z-10 Changes the Combat Form of the PLA”], 科学大观园 [Grand Garden of Science], No. 5, 2013, 40; 武直-10 [“WZ-10”], 头条百科 [Baik.com], undated, [https://m.baik.com/wiki/%E6%AD%A6%E7%9B%B4-10/760972?baike\\_source=innerlink](https://m.baik.com/wiki/%E6%AD%A6%E7%9B%B4-10/760972?baike_source=innerlink); 直 19 改进版将成为解放军未来主力武装直升机 [“The Improved Version of the Z-19 Will Become the Main Armed Helicopter of the PLA in the Future”], 环球时报公号 [Global Times Official Account], October 4, 2018, <https://mil.huanqiu.com/article/9CaKrNkdGv6>; “Harbin Z-19,” *Military Today*, undated, <http://www.military-today.com/helicopters/z19.htm>; Dmitry Fediushko, “Russian Helicopters Details Ka-52K Shipborne Rotorcraft,” *Janes*, June 16, 2021, <https://www.janes.com/defence-news/news-detail/russian-helicopters-details-ka-52k-shipborne-rotorcraft>; “Ka-52K Alligator Attack Helicopter,” *Air Force Technology*, March 5, 2013, <https://www.airforce-technology.com/projects/ka52-alligator-attack-helicopter-russia/>.

<sup>115</sup> This was demonstrated in an exercise by the air assault brigade of the 83<sup>rd</sup> Group Army in August 2020 as Z-19s provided reconnaissance for Z-10s against armored targets. See 直-19 与直-10 上演完美配合 片尾有彩蛋! [“Z-19 and Z-10 Are Perfectly Matched. Easter Egg at the End of the Video!”], 央视网 [CCTV], August 6, 2020, <https://v.cctv.com/2020/08/06/VIDE16AoDnaxuMHNjtXJviPB200806.shtml>.

<sup>116</sup> “Aircraft of the Type 075,” 21.

<sup>117</sup> “Shipborne Helicopter for the PLAN’s Future Amphibious Assault Ship,” 22-24.

<sup>118</sup> Long, “Type 075 Amphibious Assault Ship Armaments and Upgrade Paths,” 34.

armor, avionics, and weaponry compared to the Z-10, and some Chinese analysts argue the Z-10 is the better choice for desired performance and firepower during landing operations.<sup>119</sup> The Z-10 has been observed training with PLAN amphibious ships since 2014, while the Z-19 was seen more recently in exercises with a civilian semi-submersible ship.<sup>120</sup>



Exhibit 11: A Z-10 from a 73<sup>rd</sup> Group Army aviation brigade exercises with the *Yimengshan* (LPD 988) in August 2020.<sup>121</sup>

These two helicopters are not optimal choices to meet the PLAN's requirements for service aboard the Type 075. One observer finds the PLAN may be stuck waiting too long to receive the Z-10 as it was designed for the PLA Army, which will likely take priority in aircraft delivery. Moreover, the Z-10 will require time-consuming modifications to make it suitable for shipborne operations, while better options are potentially available. Reports suggest PLAN interest in purchasing 36 of the Russian designed Ka-52K, a heavier helicopter designed specifically for operations aboard amphibious assault ships.<sup>122</sup> The Ka-52K could quickly provide the PLAN with improved

<sup>119</sup> "Shipborne Helicopter for the PLAN's Future Amphibious Assault Ship," 22-24; "Aircraft of the Type 075," 21-22.

<sup>120</sup> This exercise occurred in the former Nanjing Military Region in 2014. 王俊程 [Wang Juncheng], 解放军陆航与海军联训 武直 10 降登陆舰? ["PLA Army Aviation and PLAN Jointly Train, Has the WZ-10 Landed on Landing Ships?"], 中国军网 [China Military Online], March 24, 2014, <http://www.chinanews.com/mil/hd2011/2014/03-24/324478.shtml>; Z-19 and Z-8 aircraft can be seen here landing on a civilian semi-submersible: 东部战区陆航多型直升机训练海上民用平台起降 ["Multiple Types of Helicopters of the Eastern Theater Command Army Aviation in Takeoff and Landing Training at Sea Aboard Civilian Platforms"], 军事报道 [Military Report], August 20, 2020, [https://www.guancha.cn/military-affairs/2020\\_08\\_20\\_562254.shtml](https://www.guancha.cn/military-affairs/2020_08_20_562254.shtml).

<sup>121</sup> 好消息, 直-10 上舰高清照来了, 下一步将登上 075 两栖攻击舰 ["Good News, High-Definition Photos of the Z-10 on Warships are Here. Next Step is for it to Go Aboard the 075 Amphibious Assault Ship"], 东方新观察 [Dongfang Xinguancha], August 16, 2020, <https://www.163.com/dy/article/FK6EPNI80515CFQO.html>.

<sup>122</sup> The Ka-52K was originally designed to serve aboard the *Mistral* class amphibious assault ship, including folding rotor blades and stub wings and corrosion-resistant materials. However, Russian actions against Ukraine in 2014 led to the cancellation of the contract. 龙大猫 [Long Damao], 抢滩的‘短吻鳄’ – 卡-52 能否登上 075 型两栖攻击舰? ["Can the PLA Navy's Amphibious Assault Ship Be Equipped with the 'Alligator' Armed Helicopter?"], 舰载武器-军事评论

performance and firepower, relatively less required hanger space, and the potential option to fire Kh-35 anti-ship missiles, an important capability for a task force that will likely operate without aircraft carrier air cover. Furthermore, the Russian-designed helicopters already in service with the PLA, such as the Ka-28 anti-submarine helicopter and the Mi-17, could reduce the logistic burden of fielding the imported Ka-52K.<sup>123</sup> Despite the sorely needed firepower upgrade in close-air support and the PLAN's lack of heavy helicopters, there could still be a number of issues to overcome such as weaponry and electronic compatibility.<sup>124</sup>

Another temporary option is for transport helicopters to take on a limited close air support role through modification to carry armaments. Such armaments could include unguided rockets, gun pods, or more sophisticated guided munitions with the addition of advanced targeting systems. The PLAN has previously modified Z-8s and Z-9s without fire control systems during the Gulf of Aden anti-piracy patrols, but reportedly saw poor results. These would not be sufficient for accurate and effective close air support in a landing operation. However, the Z-20 is likely a suitably flexible platform for this role with its more advanced design and ability to carry 8 ATGMs on stub wings or rocket pods.<sup>125</sup> Nonetheless, dedicated armed escort helicopters that can rapidly address threats along vertical landing routes is likely the preferred approach for future operations.

Airborne early warning will be required to provide greater protection of amphibious task forces. In the absence of carrier or land-based rotary or fixed-wing early warning aircraft support, the Type 075 will need to fly its own aircraft for this mission. PRC writings suggest the early warning variant of the Z-18, the Z-18Y ("Bat"), could fulfill this role as it does for the aircraft carriers.<sup>126</sup>

VSTOL fixed-wing fighter aircraft is a frequent subject in Chinese discussions about the Type 075. The USN provides the prime example of how to operate such aircraft and many observers recognize the advantages of having AV-8B or F-35B aircraft available to support amphibious and other military operations. However, some Chinese observers argue such a capability is not only beyond China's current development abilities, but also not necessary. One argument suggests the likely warfighting scenarios for the Type 075 will be carried out within range of air power and strike capabilities from other services or the PLAN's future aircraft carriers. Limited close air support from the Type 075

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[*Shipborne Weapons – Defence Review*], No. 12B, 2021, 39; "China to Buy 36 Ka-52K Katran Helicopters from Russia," *Navyrecognition.com*, September 21, 2021, <https://www.navyrecognition.com/index.php/naval-news/naval-news-archive/2021/september/10710-china-to-buy-36-ka-52k-katran-helicopters-from-russia.html#:~:text=According%20to%20information%20published%20by,the%20People's%20Liberation%20Army%20Navy>.

<sup>123</sup> The Z-10 is classified as a light/medium helicopter and without modification, would take up significant hangar and flight deck space. Long, "Can the PLA Navy's Amphibious Assault Ship Be Equipped with the 'Alligator' Armed Helicopter?" 40-41.

<sup>124</sup> 张亦隆 [Zhang Yilong], 卡-52K 有必要买吗? ["Is There a Need to Purchase the Ka-52K?"], *现代舰船* [*Modern Ships*], no. 2 (2022), 30-32.

<sup>125</sup> "Aircraft of the Type 075," 22-23; 武器观察: 直-20 化身武装直升机, 运兵员打坦克两不误 ["Arms Observation: The Z-20 Personifies an Armed Helicopter. Transporting Troops and Hitting Tanks, Both are Correct"], 澎湃新闻 [*The Paper*], January 8, 2021, [http://www.xinhuanet.com/mil/2021-01/08/c\\_1210970422.htm](http://www.xinhuanet.com/mil/2021-01/08/c_1210970422.htm).

<sup>126</sup> "Selecting Shipborne Helicopters for the Chinese Navy's Amphibious Assault Ship," 34; 辽宁舰预警直升机亮相西太 歼 15 感知距离增上百公里 ["The Awareness Distance of the J-15 Increased by Hundreds of Kilometers with the Appearance of the Liaoning's Early Warning Helicopter in the West Pacific"], 新浪军事 [*Sina Military*], April 23, 2018, <http://mil.news.sina.com.cn/jssd/2018-04-23/doc-ifyzefki0715351.shtml>; "Chinese Navy Type-002 Shandong Aircraft Carrier Continues to Strengthen the Research of Tactics and Training Methods," *Navy Recognition*, October 29, 2020, <https://www.navyrecognition.com/index.php/news/defence-news/2020/october/9206-chinese-navy-type-002-shandong-aircraft-carrier-continues-to-strengthen-the-research-of-tactics-and-training-methods.html>.

would be sufficient to mop up or suppress remaining opposition during landings.<sup>127</sup> Other observers argue attempts to give these ships a greater role in air combat, such as with the USN’s “Lightning Carrier” concept, are not sufficient in a major fight. While they may be advantageous against a limited adversary, they may come up short in high-intensity naval air combat compared to the air wing of an aircraft carrier.<sup>128</sup>

Air detachment training is underway. Apart from Z-8Cs shown in training footage, the rest of the air detachment has not yet been observed publicly and thus remains speculative. PLANMC pilots are now working to integrate with the Type 075s. During their initial training, PLANMC pilots practice landing on shore-based deck mockups as well as air-capable PLAN ships.<sup>129</sup> Marine pilots have begun qualification training for flight operations aboard the *Hainan*. After *Hainan*’s first year-end evaluation, a Marine flight group (大队) commander acknowledged issues in flight command and control procedures when they were first tasked to train aboard her several months prior. He does, however, note that repeated training has allowed them to increase the efficiency of landing and takeoff through continued corrective adjustments.<sup>130</sup>

The ship’s aviation support department (航空保障部门) underpins the air detachment’s operations. Video footage shows basic support activities on deck, but only scratches the surface of what is involved in ship aviation support.<sup>131</sup> The air detachment’s performance is enabled and constrained by the performance of aircraft support and maintenance crews. PLAN experts recognize how challenging the implementation of support can be, and in one study they examined the building blocks comprising support performance criteria on amphibious assault ships used to model support evaluation.<sup>132</sup> See the Appendix for a partial translation of criteria for evaluating helicopter support aboard amphibious assault ships. Many technical support capabilities identified are difficult to observe directly, but will involve an immense effort by the crew to get aircraft aloft and keep them operational.

### *Flight Deck Design*

The Type 075 has a straight flight deck approximately 226 meters in length and 36 meters wide, divided port and starboard with helicopter launch and recovery spots along the port side and aircraft

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<sup>127</sup> 075 型配置垂直/短距起降战斗机? [“Will the Type 075 Be Equipped with Vertical/Short Takeoff and Landing Fighter Aircraft?”], 舰载武器 [Shipborne Weapons], no. 3 (2020), 29.

<sup>128</sup> 刘超一 [Liu Chaoyi], 两栖攻击舰: 美远征打击群新支点? [“Amphibious Assault Ship: A New Pivot for the U.S. Expeditionary Strike Group?”], 人民海军 [People’s Navy], September 1, 2020, 4.

<sup>129</sup> 海军陆战队某旅: 加快转型 锻造陆战铁翼 [“A PLANMC Brigade: Accelerate Transformation and Forge Iron Wings in Ground Combat”], 中国军视网 – 军事报道 [Js7tv.cn – Military Report], November 24, 2020, [https://www.js7tv.cn/video/202011\\_235055.html](https://www.js7tv.cn/video/202011_235055.html).

<sup>130</sup> 海南舰南海考核登陆作战! [“Warship *Hainan*’s Landing Operation Evaluation in the South China Sea!”], 央视军事 [CCTV Military], December 7, 2021, <https://www.bilibili.com/video/BV1ML4y1H7bN/>.

<sup>131</sup> 南海某海域 海南舰展开舰机协同训练 [“Naval Ship *Hainan* Conducts Ship and Aircraft Coordination Training in an Area of the South China Sea”], 中国军视网-军事报道 [Js7tv.cn – Military Report], May 25, 2022, [https://www.js7tv.cn/video/202205\\_278630.html](https://www.js7tv.cn/video/202205_278630.html).

<sup>132</sup> 陶俊权, 韩维, 苏析超, 李正阳, 梁洪瑜 [Tao Junquan, Han Wei, Su Xichao, Li Zhengyang, Liang Hongyu], 两栖攻击舰舰载直升机作战与保障能力评估 [“Operations and Support Capability Evaluation of Ship-based Helicopter for Amphibious Assault Ship”], 兵器装备工程学报 [Journal of Ordnance Equipment Engineering], no. 3 (2022), 177.

parking on the starboard side fore and aft of the island.<sup>133</sup> There are six landing spots along the port side of the ship.<sup>134</sup> Also on the port side is an open corridor that runs most of the flight deck's length, containing three fueling and aircraft washdown stations and providing quick flight deck evacuation and access for deck crews.<sup>135</sup> These areas presumably could also contain firefighting stations in the event of accidents on the flight deck.



Exhibit 12: Flight deck coordination training featuring a port-side fueling/defueling station and a Z-8C on approach (May 2022).<sup>136</sup>

Landing spot spacing allows ample rotor clearance for six Z-8s (main rotor diameter: 19 meters; length: 23 meters) to operate simultaneously, as well as other medium and small rotary wing aircraft.<sup>137</sup> One description of landing spot spacing notes it is suited to the whole range of light, medium, and (future) heavy lift helicopters. If there are 30 fully operational aircraft on board, five sorties would be needed to get its full complement airborne.<sup>138</sup> According to one assessment, the forward parking area can accommodate around ten medium aircraft (Z-10, Z-20) or seven larger Z-8s.<sup>139</sup> Both the forward and aft aircraft parking areas are serviced by aircraft elevators. Two weapons elevators can also be seen on the forward section of the flight deck.<sup>140</sup> Weapons elevators connect the flight deck down to the ship's magazines and play a critical supporting role in rapid rearming of

<sup>133</sup> 温雨, 一清 [Wen Yu, Yi Qing], 细说 075 型两栖攻击舰 [Details on the Type 075 Amphibious Assault Ship], 兵工科技 [Ordnance Industry Science Technology], no. 24 (2021), 37.

<sup>134</sup> Based on google earth imagery of the first Type 075 hull docked at Yulin Naval Base. Image date: December 12, 2020.

<sup>135</sup> “Naval Ship *Hainan* Conducts Ship and Aircraft Coordination Training in an Area of the South China Sea”; Wen, “Details on the Type 075 Amphibious Assault Ship,” 23-24; HSH, “Speculation and Analysis on the Type 075 Amphibious Assault Ship’s Aviation Force and Amphibious Assault Carrying Capabilities,” 65.

<sup>136</sup> “Naval Ship *Hainan* Conducts Ship and Aircraft Coordination Training in an Area of the South China Sea.”

<sup>137</sup> Wen, “Details on the Type 075 Amphibious Assault Ship,” 28.

<sup>138</sup> Tian, “The PLA-Navy’s Type 075 Amphibious Assault Ship Drawing (1),” 6.

<sup>139</sup> Ibid.

<sup>140</sup> Funaiole, Bermudez Jr., “China’s New Amphibious Assault Ship Sails into the South China Sea.”

aircraft, which can determine the availability of armed escorts and close air support in landing operations. The position of weapons elevators suggests armed helicopters may operate from the forward spots.<sup>141</sup>

The Type 075 also features a seventh flight spot aft of the island.<sup>142</sup> This could be a dedicated spot for launching and recovering UAVs using the precision approach radar mounted on the aft of the aviation tower.<sup>143</sup> The spot also likely has a deck grid in the center to receive a “Harpoon” anchor from landing UAVs. China’s maritime forces have made use of this technology for some time. A number of such landing grids were delivered by French defense contractor Naval Group (formerly DCNS) to China in the early 2010s.<sup>144</sup>

These operations are coordinated by the ship’s primary flight control center in the aft section of the island superstructure. The island is long and relatively thin (eight meters), occupying only 22 percent of the flight deck width. It narrows inwards by five degrees toward the top of the island.<sup>145</sup> The island’s minimalist design helps accommodate flight operations and increases deck space. The tower protrudes toward the centerline, providing visibility along the flight deck and aircraft movement areas. One analysis suggests the lower level of the tower could have spaces with dedicated control stations for UAV flight operations while the upper level manages manned flight operations.<sup>146</sup> The actual configuration of the flight control spaces has not yet been publicized.

Recent footage shows some initial flight deck and hangar operations. Under visual meteorological conditions, a sortie of six Z-8Cs can be seen taking off from the *Hainan*’s six port spots and conducting standard approach and holding patterns. Aircraft are shown hovering abeam and then “walking” over to their spots with assistance from the tower and landing signalman on deck.<sup>147</sup> Wearing jerseys similar to those seen on U.S. naval aviation ships, teams are shown quickly securing aircraft and conducting fueling tasks.<sup>148</sup> As expected, most of the familiar flight support equipment can be seen on deck and in the hangar bay to facilitate the safe movement and maintenance of helicopters.

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<sup>141</sup> This is also shown in illustrations of the Type 075 and its air detachment. See graphic by 奈特 [Nai Te] in 中国海军首艘两栖攻击舰高精度剖视图 [“High-Precision Cutaway View of China’s First Amphibious Assault Ship”], 现代舰船 [Modern Ships], no. 5 (2020).

<sup>142</sup> Funaiole, Bermudez Jr., “China’s New Amphibious Assault Ship Sails into the South China Sea.”

<sup>143</sup> Wang, “The New Favorite on the Amphibious Assault Ship – Prospects for the Application of a New Shipborne Unmanned Helicopter,” 41.

<sup>144</sup> A contract signed in 2012 notes some landing grids were compatible with helicopters and rotary-wing UAVs. “Helicopter & VTOL UAV Landing Grids: DCNS Wins New Orders in China,” *Navy Recognition*, October 17, 2012, <https://www.navyrecognition.com/index.php/news/defence-news/year-2012-news/october/682-helicopter-a-vtol-uav-landing-grids-dcns-wins-new-orders-in-china.html>.

<sup>145</sup> Wen, “Details on the Type 075 Amphibious Assault Ship,” 24.

<sup>146</sup> Wang, “The New Favorite on the Amphibious Assault Ship – Prospects for the Application of a New Shipborne Unmanned Helicopter,” 41.

<sup>147</sup> “Naval Ship *Hainan*: Multi-Subject and Multi-Service Arm Coordination Training.”

<sup>148</sup> According to an introduction by the captain of the *Hainan*, white jerseys handle safety and command, and are “aircraft takeoff and landing squad leaders;” purple jerseys operate at support stations to handle fueling, electrical, and water support; red jerseys are ordnance and damage control personnel; yellow jerseys guide aircraft during takeoff; and blue jerseys, like in the US Navy, are also aircraft handlers, motorized gear operators, and flight deck elevator operators. “《Voice》Lü Yongjun: The *Hainan* – A Sharp Dagger in Amphibious Combat”; Ma, Chen, Yin, Sun, Mu, “Cool! Taking You to Experience Ship and Aircraft Coordination Training of the Warship *Hainan*.”



Exhibit 13: Flight support teams on the *Hainan* stand ready to remove tiedowns and pull chocks.<sup>149</sup>



Exhibit 14: Deck crew on the *Guangxi* train with the PLAN's version of the MANTIS, a low-profile aircraft tug controlled umbilically by the operator to enable aircraft maneuver in confined spaces.<sup>150</sup>

Given the very recent commissioning of the Type 075, training to date has likely focused on qualifying pilots, support teams, and flight controllers in basic air operations. They will need to master multi-sortie coordination, holding and approach patterns, supporting multiple types of aircraft,

<sup>149</sup> “Naval Ship *Hainan*: Multi-Subject and Multi-Service Arm Coordination Training.”

<sup>150</sup> 重磅官宣！中国海军两栖攻击舰广西舰首次公开亮相 现场画面曝光！[“Major Official Announcement! The Chinese Navy’s Amphibious Assault Ship *Guangxi* Made Its First Public Appearance, On-site Scenes Revealed!”], 央视军事 [CCTV Military], April 21, 2022, [https://www.youtube.com/watch?v=0VA9g\\_trFg8](https://www.youtube.com/watch?v=0VA9g_trFg8).

and control of the air space around the ship. The fast-paced environment of the flight deck during real world missions will leave little margin for error. TV footage has not demonstrated weapons loading and downloading, or flight deck accident response. It is unclear how prepared crews are in carrying out emergency landing procedures involving lost communication, search and rescue, or accidents during regular flight operations.

Future missions could take place at any time or under any condition, unlike the fair-weather conditions shown in publicized footage. The Type 075 can be seen with flight deck center, spot marker, and deck edge lighting.<sup>151</sup> It is unclear how proficient crews are in conducting flight operations at night or in instrument meteorological conditions. Very little footage is present to demonstrate PLANMC pilot proficiency in nighttime flight off the Type 075, leaving further questions regarding whether the ship is equipped with other visual aids, such as deck status lights or glide slope indicators. However, PLANMC pilots are trained to conduct operations and tactical coordination at night and practice nighttime landings on surface ships.<sup>152</sup> While some PLANMC ground combat units are receiving night vision and thermal equipment to improve night combat capabilities, it is unclear if Marine pilots regularly fly aided by night vision goggles.<sup>153</sup> Footage of PLANMC new pilot training ashore and afloat shows pilots flying unaided and relying on instruments, deck lighting, and helicopter search lights.<sup>154</sup> It could take a while for the new ships and air detachments to gradually hit milestones and gain enough experience operating on the high seas in various conditions before full flight operations can be truly demonstrated.

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<sup>151</sup> “How Stylish is the Aircraft Carrier-looking *Hainan*? This Highlight is Worth Mentioning,” *Js7tv.cn – Military Technology*.

<sup>152</sup> 范旭东, 傅原野 [Fan Xudong, Fu Yuanye], 陆战雄鹰闯夜关 – 海军陆战队某舰载航空兵旅下半夜飞行训练见闻 [“Marine Eagles Break Into the Night – Scenes from a Marine Corps Shipborne Aviation Brigade Flight Training Late at Night”], 人民海军 [People’s Navy], July 16, 2020, 1;

<sup>153</sup> 张付华, 茆琳, 蔡盛秋, 尚文斌, 张淦 [Zhang Fuhua, Mao Lin, Cai Shengqiu, Shang Wenbin, Zhang Gan], 未来之战, 我们如何再成“夜老虎” – 海军部队聚焦练兵备战提升夜战能力的调查与思考 [“How Can We Become ‘Night Tigers’ Again in Future Warfare – A Survey and Reflection on Naval Forces Focused Training and Preparation to Improve Night Combat Capabilities”], 人民海军 [People’s Navy], December 24, 2020, 3.

<sup>154</sup> 直击演训场 – 海军陆战队某旅: 新飞行员开展首次夜间飞行 [“Witnessing Training Grounds – A Navy Marine Corps Brigade: First Time for New Pilots to Conduct Nighttime Flight”], 中国军视网 - 军事报道 [Js7tv.cn – Military Report], January 30, 2021, [https://www.js7tv.cn/video/202101\\_240307.html](https://www.js7tv.cn/video/202101_240307.html); 海军陆战队某旅新飞行员完成夜间着舰单飞 [“New Pilots of a Navy Marine Corps Complete Nighttime Solo Ship Landing”], 军事报道 [Military Report], December 24, 2020, <https://haokan.baidu.com/v?vid=18333061043567296546>.



Exhibit 15: A Z-8C taking off from a well-illuminated flight deck.<sup>155</sup>

### Fleet Organization and Management

The Type 075 is subordinate to and managed by the PLAN's landing ship flotillas (支队). Thus far, the ship has joined the two existing landing ship flotillas. These are the 5<sup>th</sup> Landing Ship Flotilla (登陆舰第五支队) in Shanghai with the Eastern Theater Navy (ETN) and the 6<sup>th</sup> Landing Ship Flotilla (登陆舰第六支队) in Zhanjiang with the Southern Theater Navy (STN). Exhibit 16 depicts the current allocation of Type 075 and Type 071 vessel classes to the ETN and STN respectively. The commissioning ceremony of the *Hainan* indicates the Type 075 is a regiment-grade unit, equal with the Type 071s, despite the PLAN's distinction of the class from the rest of the amphibious fleet by assigning two-digit hull numbers and a naming scheme based on provinces rather than mountains.<sup>156</sup>

<sup>155</sup> "How Strong is the Amphibious Assault Ship *Hainan*? Let's Learn About the 'Ship' Together!"

<sup>156</sup> 习近平出席海军三型主战舰集中交接入列活动 ["Xi Jinping Attends the Collective Delivery of Three Types of Main Warships of the Navy"], 新华网 [Xinhua Net], April 24, 2021, [http://www.xinhuanet.com/2021-04/24/c\\_1127370401.htm](http://www.xinhuanet.com/2021-04/24/c_1127370401.htm).



Exhibit 16: Type 075 and Type 071 Allocation by Theater Command Navy and Unit

The arrival of the Type 075 coincides with an overhaul of PLAN landing ship flotillas reflecting an expanding range of missions. According to the deputy commander of the 6<sup>th</sup> Landing Ship Flotilla, they “must quickly forge a new type of amphibious combat force that is typified by comprehensive and multidimensional [power] projection in distant oceans, far-seas maneuver for deterrence and control, and oceanic deployment and response.”<sup>157</sup> To meet these new requirements, landing ship flotillas are not only receiving new equipment, but also changing longstanding operational and management practices. This transformation focuses on greater use of multidimensional (vertical) landings, operations in distant oceans, and how an amphibious task force operates as a cohesive system.<sup>158</sup>

<sup>157</sup> 探秘解放军新一代海上登陆舰 五指山舰内部细节罕见曝光! [“Exploring the PLA’s New Generation of Landing Ships, Rare Internal Details of the *Wuzhishan* Exposed!”], CCTV-7 – 国防故事 [CCTV-7 – *National Defense Stories*], August 18, 2021, <https://www.youtube.com/watch?v=5lix1FiSPF0>.

<sup>158</sup> One official account describes this as follows: “Compared with the requirements of [the navy’s transformation], [we are] faced with a rapid transformation from surface to multidimensional [landings], from offshore to distant oceans, from individual ships to a system, and from delivery to deterrence and control.” See 龙赞, 张素同, 顾亚根 [Long Zan, Zhang Sutong, Gu Yagen], 点燃奋力强军的激情烈焰 – 南部战区海军某登陆舰支队聚焦 “三力” 加强干部队伍建设 [“Igniting the Passionate Fire of a Striving Strong Military – A Southern Theater Navy Landing Ship Flotilla Focuses ‘Three Forces’ to Strengthen the Building of Cadres”], 人民海军 [People’s Navy], August 23, 2021, 3.

The challenge to meet these requirements revealed problems within existing forces and reportedly drove personnel of the 6<sup>th</sup> Landing Ship Flotilla into a “panic” as there remains a wide disparity between stated goals and actual capabilities.<sup>159</sup> These changes significantly impacted the Type 071s currently in service. In previous years, crews of the Type 071s received limited coordination training and often could only conduct basic training subjects. Embarkation and debarkation exercises with ground forces could not be carried out on a normal basis, restricting training for the basic functions of the Type 071s.<sup>160</sup>

Training also neglected serious elements, manifesting what the PLA refers to as “peace disease” (和平病).<sup>161</sup> For example, crews aboard fighting ships must be prepared to conduct damage control to prevent mission kill or the loss of the vessel. Yet, a study published in 2017 by engineers from the 6<sup>th</sup> Landing Ship Flotilla found serious problems in the management of damage control equipment and practices aboard their ships.<sup>162</sup> Even worse, the *Jinggangshan*’s (LPD No. 999) training outline did not contain procedures for “abandoning ship” (弃船部署) until the beginning of 2020. From the ship’s two commanders on down, all hands only recently created protocols for their respective departments and positions that would benefit their ability to rescue themselves and their cohorts.<sup>163</sup>

These and other issues indicate numerous problems in the previous conduct of affairs aboard amphibious ships, perhaps reflecting a fleet that has long been in service but never truly used. The development of the Type 075, updates to PLAN amphibious doctrine under the banner “new-type amphibious operations,” and transformation of the future orientation of the landing ship flotillas meant greater utilization of the fleet and thus an urgent need to correct longstanding readiness issues.<sup>164</sup>

As landing ship flotillas work to address shortcomings and prepare for future operations, they will need to develop qualified personnel. Greater effort has reportedly been made to assign positions of responsibility to officers that have risen from the ranks and possess critical job experience, as well as

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<sup>159</sup> Ibid.

<sup>160</sup> One article recounts the crew of the *Jinggangshan* (LPD No. 999) using trucks filled with sand and stone to stand in for the loading of actual ground forces. See 王宏博, 马宁, 陈浩天, 陈润楚, 顾亚根 [Wang Hongbo, Ma Ning, Chen Haotian, Chen Runchu, Gu Yagen], 长风破浪济沧海 [“Ambitious and Unafraid to Cross the Vast Sea”], 当代海军 [Navy Today], no. 10 (2020), 27.

<sup>161</sup> Put simply, “peace disease” refers to the lack of psychological preparedness of the PLA to fight future wars. See 陈永义, 刘媛媛 [Chen Yongyi, Liu Yuanyuan], “和平病”亦须心药医 [“Peace Disease’ Also Requires Heart Medicine”], 中国军网 [China Military Online], July 16, 2019, [http://www.81.cn/jfjbmap/content/2019-07/16/content\\_238504.htm](http://www.81.cn/jfjbmap/content/2019-07/16/content_238504.htm).

<sup>162</sup> For more details, see 邓开勇, 尹辉, 舒雄 [Deng Kaiyong, Yin Hui, and Shu Xiong] 舰艇损管器材使用管理存在问题及优化建议 [“Problems with Managing the Use of Warship Damage Control Equipment and Suggestions for Optimization”] 中国修船 [China Ship Repair], no. 2 (April 2017), pp. 23-25.

<sup>163</sup> Wang, Ma, Chen, Chen, Gu, “Ambitious and Unafraid to Cross the Vast Sea,” 28.

<sup>164</sup> For more details on the development of “a theoretical system of new-type amphibious operations” during the 2011-2012 reorganization of the Naval Marine Academy in Guangzhou, see 虞新国, 邱桂华 [Tuo Xinguo, Qiu Guihua], 转型, 闯出一条科学发展之路 – 陆战学院加快适应调整改建纪实 [“Transformation, Forging a Path of Scientific Development – Documenting the Acceleration and Adaptation of the Naval Marine Academy’s Reorganization”], 人民海军 [People’s Navy], June 1, 2012, 3.

strictly implement evaluations, qualifications, and training.<sup>165</sup> Newly arriving personnel to the 6<sup>th</sup> Landing Ship Flotilla are preparing for the greater requirements of future operations. For example, cadet officers (学员干部) assigned to traditional landing ships of the flotilla in 2021 were sent to learn and exchange positions on the Type 071s when they completed predetermined training criteria and demonstrated proficiency. During their training, they reportedly ramped up research on the next generation of equipment, including the Type 075 and UAVs, to explore tactics and methods in advance. Many of these officers have reportedly transferred from traditional landing ships to the Type 075s and have gained initial proficiency in their new positions. Various efforts by flotilla leadership to enhance training and evaluation has resulted in increases in qualified ship captains and political officers, as well as a doubling in qualifying LCAC pilots.<sup>166</sup> To successfully bring the Type 075 online, the 6<sup>th</sup> Landing Ship Flotilla opened up applications for flotilla personnel to serve aboard the new ship in 2019. This entailed a selection process, ensuring the most qualified personnel joined this new team. This newly assembled crew recount the days and nights spent studying, training, and familiarizing themselves with their new positions and equipment, a process referred to as “equipment handover and commissioning” (接装入列).<sup>167</sup> These efforts are critical since an able force of officers and enlisted will likely be the most critical factor in the successful operation of the Type 075 and any future amphibious task force operations in distant waters.

### **Task Force Composition and Command**

The Type 075 will serve as the flagship of future amphibious task forces deployed into distant waters. While unstated, PLA writings indicated early on that this construct will resemble, but not necessarily mirror, the American model of expeditionary amphibious operations.<sup>168</sup> Some capabilities were and still are beyond the PLAN’s reach. Nonetheless, it appears widely accepted in Chinese-language writings that future amphibious task forces will comprise formations centered on the Type

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<sup>165</sup> Long, Zhang, Gu, “Igniting the Passionate Fire of a Striving Strong Military – A Southern Theater Navy Landing Ship Flotilla Focuses ‘Three Forces’ to Strengthen the Building of Cadres,” 3.

<sup>166</sup> *Ibid.*, 3.

<sup>167</sup> 海南舰之大, 镜头里都装不下! [“The *Hainan* is So Big it Cannot Fit in the Camera Frame!”], 环球时报 [*Global Times*], July 15, 2022, <https://finance.sina.com.cn/wm/2022-07-15/doc-imizirav3485384.shtml?cref=cj>.

<sup>168</sup> Academic papers published over the years reflect continual and explicit study of the USN/USMC model of expeditionary operations. Studies out of the Guangzhou-based Naval Service Command Academy (海军兵种指挥学院), later the Naval Marine Academy (陆战学院), and other institutes, used different methods to explore the optimal mix of ships according to various criteria. While openly-published papers are academic in nature, the PLAN would expectedly conduct careful study and design of multi-ship systems and operations prior to final design selection and eventual construction. For example, see 王庆胜, 雷良水 [Wang Qingsheng and Lei Liangshui], 两栖作战装备体系综合效能评估初探 [“The Comprehensive Effectiveness Evaluation of Amphibious Warfare Equipment System”], 国防科技 [*National Defense Science & Technology*], no. 4 (2014), 23-27; 陈松辉, 贾子英, 王印来 [Chen Songhui, Jia Ziying, Wang Yinlai], 基于个体与协同效能的两栖攻击舰编队兵力选择模型 [“Force Choice Model of Amphibious Assault Ship Formation Based on Individual and Cooperation Efficiency”], 舰船电子工程 [*Ship Electronic Engineering*], no. 12 (2013), 7-9; 孟一鸣, 刘永辉, 阳东升 [Meng Yiming, Liu Yonghui, Yang Dongsheng], 两栖编队作战体系的过程建模分析 [“Process Modeling Analysis of Amphibious Formation Combat Systems”], 军事运筹与系统工程 [*Military Operations Research and Systems Engineering*], no. 2 (2011), 43-48.

075 likely accompanied by two or more Type 071 LPDs, naval escorts and support ships, and embarked ground and aviation forces.<sup>169</sup>

The writings of PLAN analysts may shed light on future amphibious task forces centered on the Type 075. According to a 2014 study by engineers at the then Naval Armament Academy (now the Naval Research Academy), amphibious task forces generally comprise elements to conduct missions in landing force delivery, amphibious assault, firepower support, mine and obstacle clearance, logistics equipment support and resupply, and defense against air, surface, and underwater threats. The combined elements should generate a multi-mission, flexible, and self-contained force package that can operate independently. As a whole, task forces will have strong “comprehensive combat capabilities” that enable them to carry out limited air control, sea control, and ground offensive missions.<sup>170</sup> Of course, they and other studies emphasize that the exact task force configuration will depend on various factors and tactical mission requirements, the most important of which is determined by the threat of potential hostile forces.<sup>171</sup>

Alone, Type 075s and Type 071s are large, vulnerable targets. Escorting PLAN destroyers and frigates will enable them to conduct amphibious operations by serving numerous supporting functions, including naval gunfire support, missile strikes against land targets, air-defense, maritime defense, and anti-submarine combat.<sup>172</sup> In addition to acting as escort for PLAN aircraft carrier groups or the lead ship in surface action groups, the Type 055 cruiser would also prove extremely useful in an amphibious task force. Its large universal vertical launch system provides a deep and diverse magazine to both protect the task force and conduct strikes in support of the landing force.<sup>173</sup> There are also wide references to the addition of submarines to a notional amphibious task force to assist in submarine warfare, again, referencing USN practices.<sup>174</sup>

The initial construction of three Type 075s conforms with the general pattern meant to maintain a single task force deployed. Specifically, the two non-deployed Type 075s will likely have one undergoing maintenance and another conducting pre-deployment training, including coordination and joint training with the PLANMC and other ships of the task force.<sup>175</sup> Once up and running, the PLAN will likely aim to deploy the single task force to areas most crucial to PRC national interests until enough ships are constructed to constitute additional amphibious task forces for simultaneous deployment.

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<sup>169</sup> 宝山 [Bao Shan], 从 075 下水展望中国海军未来两栖力量发展 [“Looking Forward to the Future Development of the Chinese Navy’s Amphibious Forces From the Launch of the 075”], 兵工科技 [*Ordnance Industry Science Technology*] no. 9 (2020), 32.

<sup>170</sup> Wang, Lei, “The Comprehensive Effectiveness Evaluation of Amphibious Warfare Equipment System,” 23-27

<sup>171</sup> One study from 2013 suggests a 12-16 ship formation to provide sufficient capability criteria in force delivery, command and control, information transmission, early warning and detection, firepower support ashore, overall defense, and battlefield maneuver/survival. See 李向阳, 黄启来, 金复鑫 [Li Xiangyang, Huang Qilai, Jin Fuxin], 基于多目标决策模型的两栖攻击舰编队编成研究 [“Research on Amphibious Assault Ship Formation Composition Based on Multi-Objective Decision-Making Model”], 海军航空工程学院学报 [*Journal of Naval Aeronautical and Astronautical*], no. 5 (2013), 568.

<sup>172</sup> Wang, Lei, “The Comprehensive Effectiveness Evaluation of Amphibious Warfare Equipment System,” 25.

<sup>173</sup> For a more detailed discussion on the Type-055, see Caldwell, Freda, Goldstein, “China’s Dreadnought? The PLA Navy’s Type 055 Cruiser and Its Implications for the Future Maritime Security Environment,” 11-13.

<sup>174</sup> Wang, Lei, “The Comprehensive Effectiveness Evaluation of Amphibious Warfare Equipment System,” 25.

<sup>175</sup> Chen, “Historical Missions and Capability Requirements for the Domestically Produced Amphibious Assault Ship,” 26.

A very likely constraint on current operations is the number of ship-to-shore connectors available for deployment, both LCAC and LCU, and the number of helicopters delivered to the PLANMC. After a brief three-craft series, LCAC production resumed after 2017 with the Type 726A, featuring an improved, smaller gas turbine.<sup>176</sup> Increased production will eventually fulfill the fleet's requirements, but it may take longer for the PLANMC's helicopter force to catch up. The entire fleet of blue water amphibious ships will likely require well over 100 PLANMC helicopters of varying types. Excluding other helicopter classes, current numbers of Z-8C helicopters delivered to the PLANMC are still unavailable but are probably insufficient to provide enough aircraft for multiple Marine air groups to deploy in succession for now. Thus, construction of additional Type 075 ships may not immediately continue until the existing three come close to fielding full complements of aircraft and landing craft.

The total embarked force is still unknown, although PRC writings provide some interesting estimates. A 2014 (pre-reform) study out of the Naval Marine Academy focused on how to organize a hypothetical force consisting of three infantry companies, three armor companies, one anti-air missile defense company, one anti-tank missile company, and one helicopter squadron (中队).<sup>177</sup> Interestingly, this study excluded artillery and combat support elements, and likely was just an academic exercise. A more recent, unofficial perspective suggests a future "amphibious strike task force" could embark up to a PLANMC brigade's worth of force, including an air assault battalion, an amphibious armor battalion, and other Marine forces such as tank and self-propelled howitzer platoons.<sup>178</sup> Post-reform force structure suggests that future embarked forces could be assembled largely from within individual brigades. For example, video footage has shown the *Hainan* and *Guangxi* training with 2<sup>nd</sup> Marine Brigade. A brief examination of 2<sup>nd</sup> Brigade could offer an illustration of possible embarked forces.

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<sup>176</sup> 兵工科技 [Ordnance Industry Science Technology], 使人民海军真正具备快速重型装备两栖登陆作战能力, 中国气垫登陆艇研制历程 ["Make the People's Navy Truly Have the Capability for Amphibious Landing Operations with Quick and Heavy Equipment, the Development Process of China's Air-Cushion Landing Craft"], 微信 - 兵工科技快讯 [Wechat - Ordnance Industry Science Technology News], August 20, 2022,

<sup>177</sup> 王印来, 陈松辉, 贾子英 [Wang Yinlai, Chen Songhui, Jia Ziying], 基于复杂网络的登陆作战兵力编组效能分析 ["Force Grouping Effectiveness Analysis of Landing Operation Based on Complex Networks"], 火力与指挥控制 [Fire Control & Command Control], no. 8 (2014), 88.

<sup>178</sup> Bao, "Looking Forward to the Future Development of the Chinese Navy's Amphibious Forces From the Launch of the 075," 32.

Exhibit 17: Likely Structure of the 2<sup>nd</sup> Marine Brigade structure

Amphibious Mechanized Infantry 1 <sup>st</sup> Battalion
Amphibious Mechanized Infantry 2 <sup>nd</sup> Battalion
Medium Mechanized Infantry 3 <sup>rd</sup> Battalion
Air Assault Battalion
Reconnaissance Battalion
Artillery 6 <sup>th</sup> Battalion
Air Defense Battalion
Operational Support Battalion
Service Support Battalion

2<sup>nd</sup> Marine Brigade has most of the ingredients to construct a flexible, multi-mission embarked expeditionary force that is “functionally aggregated” (功能聚合).<sup>179</sup> One of the amphibious mechanized infantry battalions could serve as the central organizing unit, potentially cross-decking companies on other ships of the task force while being reinforced by elements across the brigade. Company or platoon-sized elements from the brigade’s nine battalions could provide wheeled armored infantry fighting vehicles, armed and technical reconnaissance capabilities, artillery support with PLZ-07B self-propelled guns or towed howitzers, low-altitude air defense, logistics support, and other supporting capabilities for a wide range of missions in the littorals or ashore.<sup>180</sup> Most important to the Type 075, air assault battalions will provide light infantry companies specialized in heliborne assault/delivery. Additionally, a future amphibious task force may also embark special operations elements from the PLANMC’s special operations brigade as is done for the PLAN’s anti-piracy escort task forces.

The combined capacity of a task force consisting of one Type 075 and two Type 071s is sufficient for such an assembled force. In total, there is capacity for over 2,000 embarked personnel, up to 38 helicopters, and up to 10 LCACs or a mix of LCUs and LCACs.<sup>181</sup> The bringing together of ground combat, aviation, and logistics support units, as well as command and control facilities designed to oversee the force, will likely provide a structure and means for experimentation and learning.

Exact command relationships are yet to be observed for amphibious task forces deployed in the far seas. While it is still unknown exactly how joint command at higher echelons beyond the regional jurisdictions of PLA Theater Commands will work, future amphibious task forces could remain a

<sup>179</sup> In describing force structure evolution, PLANMC deputy chief of staff Chen Weidong stated “Amphibious operations ... can be modularized and matched as needed to form an amphibious combat force that is highly combined, functionally aggregated, capable and efficient, and with powerful support.” See Chen, “A Perspective on the New Features of Amphibious Operation,” 3.

<sup>180</sup> Footage shows 2<sup>nd</sup> Marine Brigade armor conducting loading exercises on the *Guangxi* with Type-05 amphibious armor of 2<sup>nd</sup> Battalion as well as well deck training with PLZ-07B vehicles of the artillery battalion. “Major Official Announcement! The Chinese Navy’s Amphibious Assault Ship *Guangxi* Made Its First Public Appearance, On-site Scenes Revealed!”

<sup>181</sup> The authors base this on a rough figure of 1,000 personnel, 30 helicopters, and two LCACs aboard the Type 075 and 500 personnel, four helicopters, and four LCACs aboard each Type-071.

PLAN-centric affair with far-seas deployments overseen by PLAN headquarters.<sup>182</sup> According to a 2013 PLAN study, design of the amphibious task force command and control system should include functions enabling higher echelon command. In a joint context, the command system should receive command from the “joint operations department” (联合作战指挥部) and the “maritime operations group” (海上作战集团). It is unclear which joint operations department would assume command and is likely dependent on the geographic location of operations. When operating independently, the system should enable command by a higher-level PLAN command post.<sup>183</sup>

A task force commander will be designated who must have sufficient support to command and coordinate the operations of multiple service arms, detect and analyze threats, disseminate intelligence, and manage the general operations of the task force. While landing ship flotilla exercises suggest a flotilla commander could assume this role, perhaps similar to a USN PHIBRON Commander, the PLAN could opt for a more senior officer due to the complexity of such future amphibious task forces and their international impact.<sup>184</sup>

Excluding the political commissars, there will likely be two principal commanders in the amphibious task force, the naval task force commander and a Marine landing force commander (登陆指挥员).<sup>185</sup> It is not yet clear if the landing force commander is co-equal or subordinate in grade to the task force command.<sup>186</sup> It is likely the task force command post will only exercise command over the landing force’s main command post (基本指挥所), which will exercise command over its subordinate commands. There will also be an aviation commander to oversee task force air operations, helicopter groups, and manage air control.<sup>187</sup>

While not yet publicized, the Type 075 likely contains significant spaces to support an amphibious task force command post and its regular operations. Like the Type 071 LPDs, the Type 075 will also likely feature dedicated command spaces for the landing force to exercise command and coordinate

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<sup>182</sup> Joel Wuthnow, Phillip C. Saunders, and Ian Burns McCaslin, “PLA Overseas Operations in 2035: Inching Toward a Global Combat Capability,” *Strategic Forum* No. 309 (NDU Press: May 2021), 10.

<sup>183</sup> 黄炳越, 周智超, 冯伟强, 孟一鸣 [Huang Bingyue, Zhou Zhiqiang, Feng Weiqiang], 海军两栖作战编队指挥信息系统的设计 [“The Design for Naval Amphibious Formation’s C4ISR System”], 指挥控制与仿真 [Command Control & Simulation], no. 5 (2013), 76.

<sup>184</sup> For example, the 6<sup>th</sup> Landing Ship Flotilla’s commander senior captain Li Xiangdong served as task force commander aboard the *Jinggangshan* (LPD No. 999) during various exercises in early 2017, including weeklong combat exercises in the “far-seas.” 甘俊 [Gan Jun], 伏波千里, 淬炼登陆劲旅 [“Hiding on the Waves for a Thousand Miles, Tempering a Powerful Landing Force”], 当代海军 [Navy Today], no. 4 (2017), 16-19; 顾亚根 [Gu Yagen], 某登陆舰支队粤西某海域训练 – 120 小时跨海奔袭抢滩登陆 [“A Landing Ship Flotilla Trans in a Sea Area Off Western Guangdong – 120 Hours of Cross-Sea Raids and Beach Landings”], 当代海军 [Navy Today], no. 3 (2017), 44-48.

<sup>185</sup> 顾亚根, 刘健 [Gu Yagen, Liu Jian], 某登陆舰支队注重提高女舰员作战能力 – 舰上“中军帐”有了女兵岗位 [“A Landing Ship Flotilla Focuses on Improving the Combat Capabilities of Female Sailors – There is a Female Soldier Position in the Ship’s ‘Command Post’”], 人民海军 [People’s Navy], March 15, 2017, 1.

<sup>186</sup> Some past exercises suggest coequal commanders could be possible in some circumstances. For example, when the *Jinggangshan* (LPD 999) conducted landing exercises during its far-seas training in March 2013, a Marine Corps deputy brigade commander was embarked as commander of the landing force, likely a co-equal in grade with the ship commander, but perhaps subordinate to a task force commander. 蒋涛, 高毅 [Jiang Tao, Gao Yi], 直击南海舰队远海训练: 陆战分队立体登岛演练 [“Witnessing the South Sea Fleet’s Far-Seas Training: A Marine Detachment in a Multidimensional Island Landing Exercise”], 中国新闻网 [China News Online], March 21, 2013, <http://politics.people.com.cn/n/2013/0321/c70731-20872262.html>.

<sup>187</sup> Huang, Zhou, Feng, “The Design for Naval Amphibious Formation’s C4ISR System,” 75-76.

support while afloat.<sup>188</sup> In the USN, the Supporting Arms Coordination Center (SACC) is located on the LHD. The SACC is “the nerve center for planning, coordinating, and executing the use of supporting arms in an amphibious operation.” The LHD also has a Tactical Air Control Center (TACC) located in the SACC to control supporting aircraft. It stands to reason the Type 075 will provide a SACC-like capability.<sup>189</sup> The creation of a “base at sea” without having to phase landing force command ashore is a desired state for maximizing freedom of maneuver and reducing force footprint on a beachhead in future amphibious operations.<sup>190</sup>

To support this, commanders will need access to a suitable C4ISR system to command and control the task force. As part of a National Defense Science and Technology Advance Research Fund sponsored project, authors from the Naval Marine Academy and the Naval Equipment Academy explained in 2013, “construction of the command information system for amphibious combat task forces is currently a serious problem urgently needing to be solved.” They outlined the various functions and requirements for the system and recommend a design meant for the PLAN’s future amphibious task forces. Exhibit 18 below illustrates all the components internal and external to the system. It portrays early design work across multiple PLAN institutions in anticipation of future requirements.

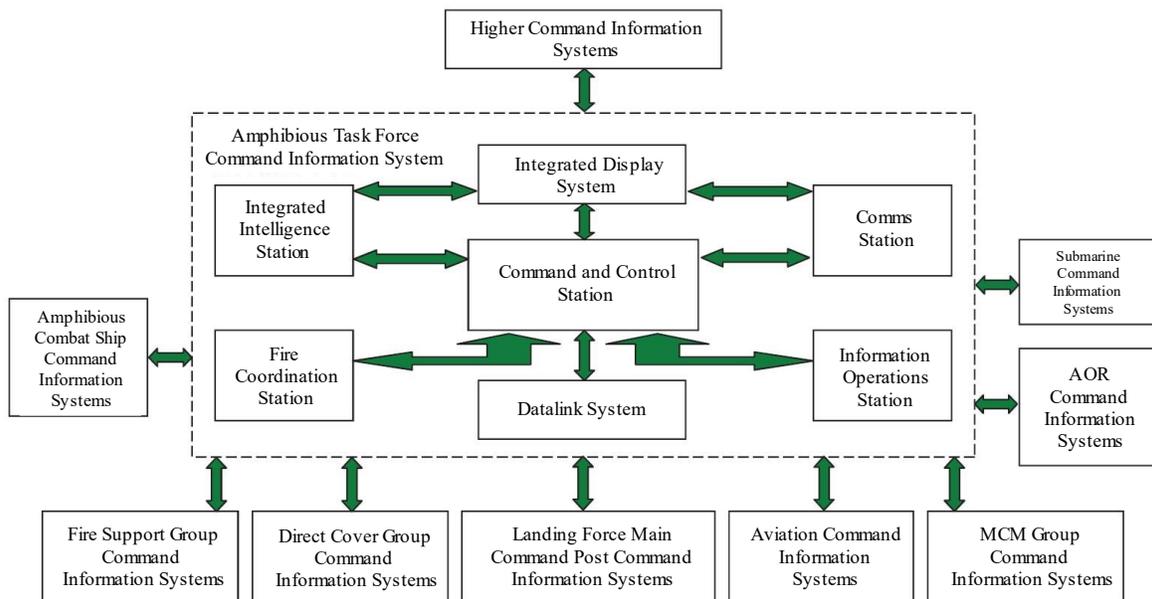


图 1 海军两栖作战编队指挥信息系统的结构组成及内外关系

Exhibit 18: “The Structural Composition and Internal and External Relationships in the Navy’s Amphibious Task Force Command Information System”<sup>191</sup>

<sup>188</sup> The *Jinggangshan* (LPD 999) contains both an operations command center (作战指挥室) and a landing command center (登陆指挥室). 刘文平, 甘俊 [Liu Wenping, Gan Jun], 壮哉! 大洋“蓝玫瑰” [“Magnificent! A ‘Blue Rose’ on the Ocean”], 人民海军 [People’s Navy], April 28, 2013, 4.

<sup>189</sup> Supporting Arms Coordination in Amphibious Operations, NTTP 3-02.2, Department of the Navy Office of the Chief of Naval Operations and Headquarters, U.S. Marine Corps, May 2004, 2.3.

<sup>190</sup> Chen, “A Perspective on the New Features of Amphibious Operations,” 3.

<sup>191</sup> Authors’ translation superimposed onto original. Huang, Zhou, Feng, “The Design for Naval Amphibious Formation’s C4ISR System,” 77.

Another award-winning PLAN study from 2015 also showed close study of integrated command structures and systems used in USN Expeditionary Strike Groups, providing useful reference for a ship class that describes itself as having started from scratch.<sup>192</sup> While we do not know the exact system used today, findings from studies like these may have helped drive the actual construction of the ship's systems. As the then captain of the *Hainan* effusively expressed, the Type 075 has focused on constructing a highly informatized, networked platform.<sup>193</sup> If true, the near real-time sharing of information and data across linked command nodes and weapon systems will enable the task force to achieve operational efficiency greater than the sum of its parts. However, C4ISR equipment for amphibious task forces across services and arms (跨军兵种) with multivariate nodes (多元节点), as some experts describe, is still under development.<sup>194</sup>

Until an observable deployment takes place, the final composition of future PLAN amphibious task forces cannot be known. While the PLAN will adopt some of the best practices of USN expeditionary forces, there may be some differences. Amphibious task forces, as the PLAN aspires to build, are a complex, networked, and integrated assembly of combat systems, platforms, equipment, and personnel, a literal system-of-systems that must be mutually compatible and coordinated. This is an extremely difficult undertaking. As some PRC-based researchers note, simply studying the USN's forces will only limit the PLAN to imitating and referencing their systems, structures, and experiences. As they describe, it will only allow them to “know what something is, but not why it is so.” They recognize the need to improve and enhance such a task force systematically from theory to application.<sup>195</sup> While the manufacture, assembly, and launching of the Type 075s were remarkably quick, the difficult task of systems building across numerous platforms and command relationships will likely take a much longer process to achieve and perfect.

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<sup>192</sup> 冷画屏, 张莉莉 [Leng Huaping, Zhang Lili], 美军两栖编队指挥与控制体系及其指挥控制能力分析 [“American Amphibious Formation's C2 System and Capability Analysis”], 火力与指挥控制 [Fire Control & Command Control], no. 1 (2017), 1-4; The captain of the *Hainan* stated they had “no experience, no materials [to reference], and no specialists” in receiving and preparing the ship for commissioning. “《Voice》Lü Yongjun: The *Hainan* – A Sharp Dagger in Amphibious Combat.”

<sup>193</sup> “《Voice》Lü Yongjun: The *Hainan* – A Sharp Dagger in Amphibious Combat.”

<sup>194</sup> This was claimed by senior engineers at the Wuhan Maritime Communication Research Institute. 廖晶静, 孙刚 [Liao Jingjing, Sun Gang], 递归式两栖编队通信网络仿真试验设计方法 [“A Recursive Simulation Testing Design Method of Amphibious Formation Communication Network”], 舰船电子工程 [Ship Electronic Engineering], no. 4 (2021), 79.

<sup>195</sup> 翟永翠, 胡志强 [Zhai Yongcui, Hu Zhiqiang], 基于 CAS 理论的两栖编队作战体系能力涌现模型 [“Research on Emergence Model of Amphibious Formation Combat System Capability Based on CAS Theory”], 火力与指挥控制 [Fire Control & Command Control], no. 9 (2021), 134-136.

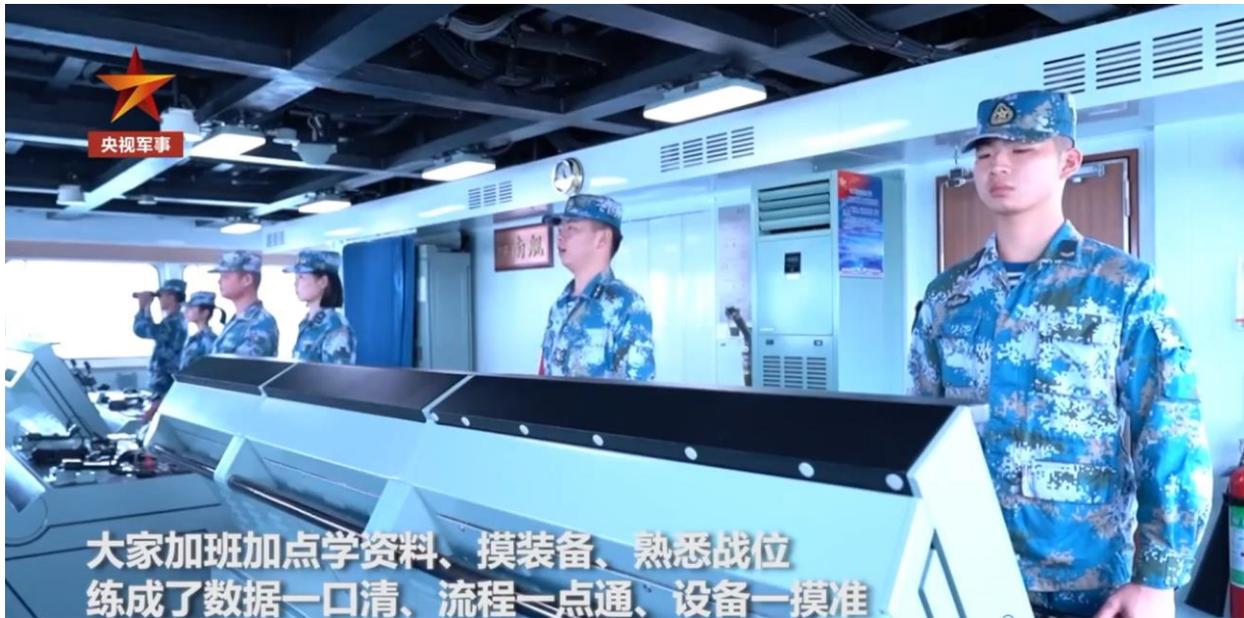


Exhibit 19: A view of the *Hainan*'s bridge.<sup>196</sup>

## Conclusion

The advent of the Type 075 is an important first step toward a future expeditionary force and represents “a new-type of amphibious combat force for the navy.” Its arrival signifies a profound shift in the missions, functional roles, and the structure and scale of the PLAN’s landing ship flotillas.<sup>197</sup> The ship itself provides the PLAN with the hardware to deploy multi-mission amphibious combat forces into distant waters, enabling more credible responses against threats to national interests.

As a new class of ship, the Type 075 program has advanced quickly, as demonstrated by the rapid assembly, launch, and commissioning of the initial batch of three ships. According to the *Hainan*'s Political Commissar in August 2022, the ship has completed training in basic subjects (基础课目训练), multi-service arm joint training (多兵种联合训练), and mission-oriented exercises (使命课题演练) in the year since its commissioning. Accompanied by footage of flight deck operations and well-deck operations with PLANMC forces on the *Hainan*, he claims the ship has reached initial operational capability in carrying out amphibious combat duties.<sup>198</sup> While initial operational capability can be measured differently in other navies, the ship’s progress is overall an impressive feat of efficiency in naval systems development. The ship has included some of the latest technologies in PLAN surface ships, but does not introduce any groundbreaking capabilities vis-à-vis other navies. It is most significant as a completely new capability that will challenge the PLAN/PLANMC like never before to operate effectively together. While not covered in this report, a new generation of amphibious assault ship—the Type 076—is also reportedly under development by

<sup>196</sup> “The *Hainan* is So Big it Cannot Fit in the Camera Frame!”

<sup>197</sup> Long, Zhang, Gu, “Igniting the Passionate Fire of a Striving Strong Military – A Southern Theater Navy Landing Ship Flotilla Focuses ‘Three Forces’ to Strengthen the Building of Cadres,” 3.

<sup>198</sup> 马玥, 王磊, 张素同, 吴桐, 殷征, 余智俐, 栗嘉 [Ma Yue, Wang Lei, Zhang Sutong, Wu Tong, Yin Zheng, She Zhili, Li Jia], 海南舰: 多科目多兵种协同训练 [“*Hainan* Warship: Multiple Training Subjects and Multi-Service Arm Coordination Training”], 中国军视网-国防军事早报 [*Js7tv.cn – Defense and Military Morning Report*], August 12, 2022, [https://www.js7tv.cn/video/202208\\_284860.html](https://www.js7tv.cn/video/202208_284860.html).

the 708 Institute.<sup>199</sup> Additional amphibious assault ship classes will similarly have an important impact on the overall design and use of amphibious forces.

Many challenges still need to be overcome to make this amphibious force effective in the types of missions envisioned. The PLAN has yet to publicize more complex exercises involving other ships of the fleet or what the full air detachment will look like. More importantly, the PLAN has to date not yet deployed larger scale amphibious forces into the far seas. The USN shed blood and spent decades learning and improving the implementation of expeditionary warfare, making it the best possible reference for PLAN development. Study of the USN has likely benefited the development of the Type 075 program. However, the difficulty of expeditionary operations may negate most of the late-mover advantage the PLAN could muster. Expeditionary operations feature a steep learning curve that starts with planning and execution at home ports and bases. To make future amphibious task forces effective and join the club of powers capable of expeditionary warfare, the PLAN will need to learn the hard way by actually deploying forces and planning and executing operations.

This report seeks a deeper understanding of the Type 075 LHD. It has examined the ship's development, its various capabilities, and how it fits within the PLAN's amphibious fleet forces. In this process, a number of PRC/PLA writings were examined, ranging from earlier defense academic studies and official reporting in newspapers to a very active discussion by numerous unofficial experts conducting their own assessments of the final delivered ship. PRC discussions regarding the ship and amphibious task forces are intensely ambitious. Many anticipate deployment anywhere in the world. This report finds that future amphibious task forces centered on the Type 075 will learn to crawl before they can run, a process that will take many years. The current cohort of three ships could sustain a single amphibious task force deployed abroad, and will largely be tasked with lower-intensity, small-scale operations for military diplomacy or to protect national interests.

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<sup>199</sup> For one example of publications containing several articles on the topic, see 兵工科技 [Ordnance Industry Science Technology], no. 14 (2020).

**Appendix: Criteria for Evaluating Helicopter Support Aboard Amphibious Assault Ships.<sup>200</sup>**

Aviation support capabilities	Aviation fuel support	Number of aircraft that can be refueled simultaneously
		Spot refueling coverage
		Refueling flow rate
	Aviation power support	Number of aircraft that can be powered simultaneously
		Spot power supply coverage
		Number of power supply vehicles
	Aircraft weapons support	Number of ordnance loading teams
		On-deck weapon storage capacity
		Number of weapons elevators
	Inertial navigation alignment support	Number of aircraft that can receive inertial navigation alignment
		Inertial navigation alignment availability
		Inertial navigation alignment duration
	Deck transfer support	Number of elevators
		Elevator availability
		Number of aircraft per elevator
	Takeoff and departure support	Number of aircraft that can take off simultaneously
		Number of support vehicles simultaneously driven
		Takeoff interval times
Recovery and landing support	Number of aircraft that can be recovered simultaneously	
	Landing guidance success rate	
	Landing recovery interval times	
Aircraft maintenance support capabilities	Aircraft maintenance capacity	Average time between breakdowns
		Average time for fault location
		Average direct maintenance hours
		Maintenance item coverage
	Maintenance equipment support	Maintenance equipment compatibility rate
		Maintenance equipment availability
		Average delay time for equipment support
	Aviation spare parts support	Fulfilment rate of spares from mothership depot
		Supply time of spares from mothership depot
		Fulfilment rate of spares from formation depots
		Supply time of spares from formation depots

<sup>200</sup> Tao, Han, Su, Li, and Liang, “Operations and Support Capability Evaluation of Ship-based Helicopter for Amphibious Assault Ship,” 177

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