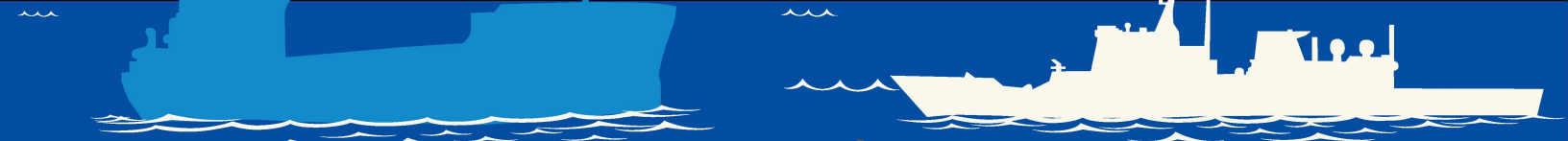




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## Summary

This report provides a comprehensive assessment of Chinese civilian shipping support to the People's Liberation Army (PLA), examining civil maritime-military activities in 2023. As of 2023 and probably through at least 2030, the PLA's reserve fleet of civilian ships is probably unable to provide the amphibious landing capabilities or the over-the-shore logistics in austere or challenging environments necessary to support a major cross-strait invasion of Taiwan. However, 2023 activity has demonstrated significant progress toward that end. In addition to the extensive use of civilian ferries, this report identifies the first use of large deck cargo ships to support PLA exercises. While not as capable as large, ocean-going ferries, China's civil fleet boasts dozens of large deck cargo ships and may provide the PLA with the lift capacity necessary to eventually support a large cross-strait operation. This report also discusses other civil maritime-military activities including "surge lift events," coordination and synchronization of multi-theater events, floating causeway developments, and the dedicated use of civilian ships for intra-theater military logistics.

## Introduction

This report is a follow-on to China Maritime Report No. 16 and China Maritime Report No. 25, which assessed PLA use of civilian shipping for logistics over-the-shore (LOTS) and amphibious landings between 2020 and 2022.<sup>1</sup> Like its predecessors, this report analyzes commercially available ship tracking data, satellite imagery, media reporting, and other open-source materials to assess the capabilities of PLA logistics troops and supporting civilian ships.

This report on 2023 activity provides a comprehensive examination of a second full year of Chinese civil maritime-military events. Examining these civil maritime-military events over time offers a greater understanding of the diversity of civil maritime-military events and how they may be prioritized by the PLA. This analysis of another complete year of activity lays a foundation for future studies of Chinese civil maritime-military training activities.

Civil maritime-military training in 2023 appeared to build on 2022 port-to-port lift training to include a greater diversity of RO-RO ships, specifically large deck cargo ships. Summer 2023 training with these ships was marked by what this report calls "surge lift events," i.e., events or logistics exercises that involve a relatively large number of civilian ships conducting significant lifts over just a few days. As in years past, the PLA continued to train with civilian vessels as auxiliary amphibious assault ships for offshore beach landings. Training with the PLA's floating causeway system for over-the-shore logistics continued in 2023 and was noted for the first time on Hainan Island.

As in previous years, 2023 military training involving merchant ships culminated in the PLA's annual large-scale amphibious landing exercise. Satellite imagery identified several PLA Navy (PLAN) amphibious ships that probably participated in the civil maritime-military event. The substance and scale of the 2023 capstone exercise suggests that the PLA remains limited in its ability to employ civilian RO-RO ferries and deck cargo ships as part of a major assault against Taiwan.

Of note, 2023 did see increased inter-theater coordination including synchronized civil maritime-military events across the PLA's military theaters. Many of the ships, and presumably crews, that participated in 2023 events had not previously supported military activity, indicating the PLA may be

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<sup>1</sup> J. Michael Dahm, "Chinese Ferry Tales: The PLA's Use of Civilian Shipping in Support of Over-the-Shore Logistics," China Maritime Report No. 16, China Maritime Studies Institute, November 2021, <https://digital-commons.usnwc.edu/cmsi-maritime-reports/16/>; J. Michael Dahm, "More Chinese Ferry Tales: China's Use of Civilian Shipping in Military Activities, 2021-2022," China Maritime Report No. 25, China Maritime Studies Institute, January 2023, <https://digital-commons.usnwc.edu/cmsi-maritime-reports/25/>.

attempting to increase the level of military experience across China's civil fleet. The PLA continues to advance core capabilities for the large-scale lift of PLA troops and equipment into undefended, captured ports, capabilities that may be leveraged in a cross-strait invasion of Taiwan.

Other findings include:

- The first detected use of large deck cargo ships to support military activity was in July 2023. (See pages 10-12)
- Surge lift events appeared to dominate the 2023 summer training cycle. (See pages 12-22)
  - Surge Lift Event One consisted of fourteen ships—five large RO-RO ferries, two general cargo ship, and seven deck cargo ships—in a one-way lift of as many as 1,000 military vehicles and 2,000 personnel over just three days. This event was probably synchronized with a RO-RO ferry military event in the Southern Theater.
  - Surge Lift Event Two consisted of eight ships in the PLA's Eastern Theater—four large RO-RO ferries and four deck cargo ships conducting two rapid round-trip lifts over three days. This activity appeared to be synchronized with a Northern Theater surge lift event involving seven ships—five large RO-RO ferries and two general cargo ships.
- A deck cargo ship-mounted “variable height loading ramp” was identified; it may allow for offloading RO-RO ships in austere ports regardless of tidal variations. (See pages 14-17)
- The PLA continued exercising an improved floating causeway system, used by RO-RO ships to deploy forces directly into a beach landing area. A new-construction barge was also identified that may eventually serve as a dedicated offload platform for the causeway. (See pages 25-29)
- The annual amphibious landing capstone exercise held in September 2023 was more complex than the 2022 exercise with the addition of a third civilian ship group. (See pages 30-38)
  - The number of civilian vessels involved in the 2023 exercise increased to sixteen, up from eight in 2021 and ten in 2022.
  - Three RO-RO ferries conducted offshore launches of amphibious vehicles or assault boats, down from four RO-RO ferries that deployed forces at sea in the 2022 exercise.
- The annual Tianjin loading exercise was executed in October 2023, but on a much smaller scale than was observed in 2022. (See pages 38-39)
- A RO-RO ferry has been identified that likely provides fulltime support for Southern Theater logistics. Two civilian ships also continued to provide dedicated logistics support for the PLA's artificial island outposts in the South China Sea. (See pages 39-42)
- A large deck cargo ship observed participating in military events in 2023 was modified and employed as an offshore space launch platform in December 2023. (See pages 42-43)

This report comprises five sections and two appendices. Section one provides a brief overview of events observed in 2023. Sections two through five present detailed analysis of four categories of observed events: (2) The use of deck cargo ships and surge lift events, (3) amphibious landing training and floating causeway developments, (4) the 2023 amphibious landing capstone exercise, and (5) other notable civil maritime-military developments in 2023. The report concludes with Appendix A, a listing and description of Chinese merchant ships observed participating in civil-military activity, and Appendix B, describing Chinese ports that support civil-military activity.

## Section 1. 2023 Civil Maritime-Military Activity

A total of thirty-three civil maritime-military events were observed in 2023, with ten categorized as “significant,” i.e., involving multiple ships in coordinated activities. Six “major” events or exercises involving five or more ships also occurred in 2023. Figure 1 shows 2023 activity and breaks out the number of deck cargo ships observed in each event. Figure 2 shows 2022 events.

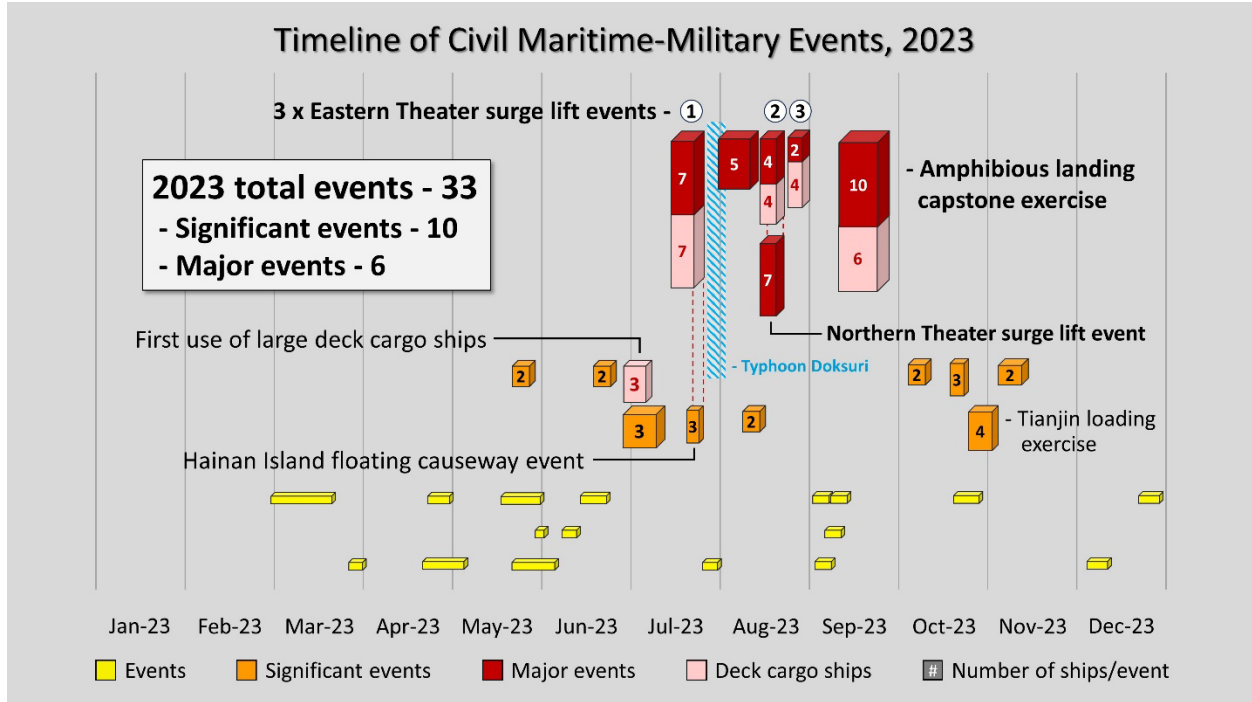


Figure 1. Timeline of Civil Maritime-Military Events, January-December 2023

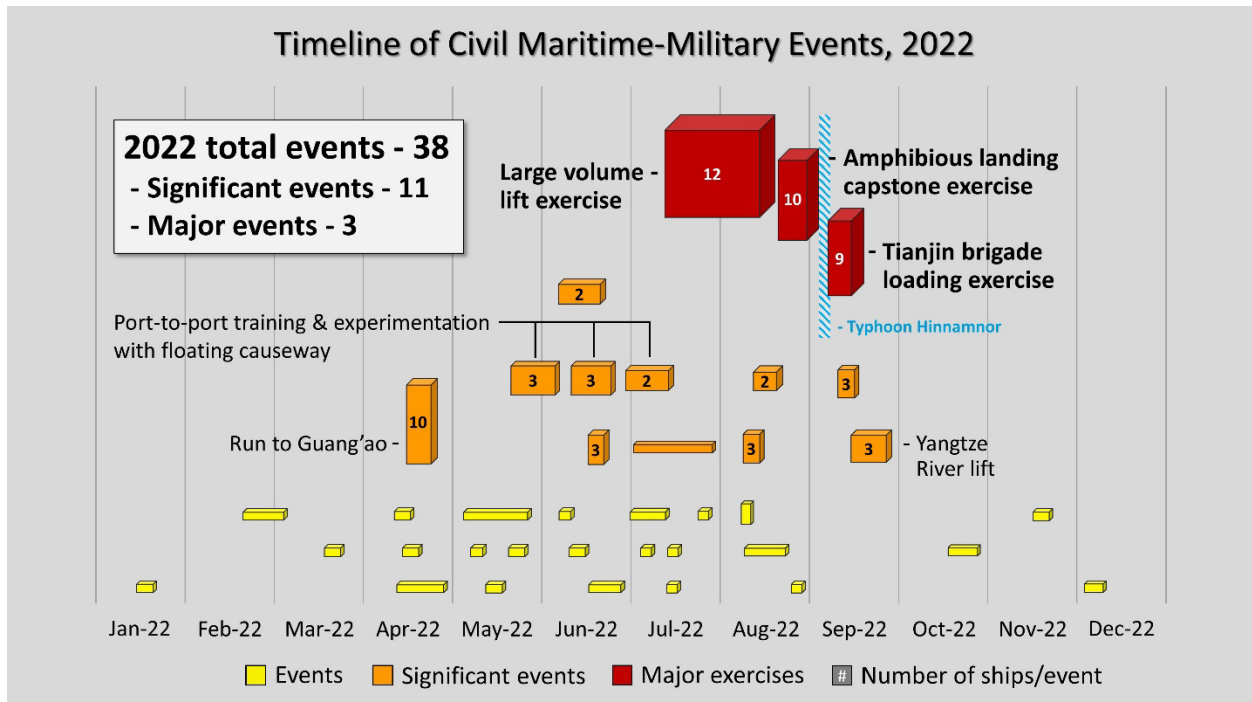


Figure 2. Timeline of Civil Maritime-Military Events, January-December 2022

While 2023 saw only limited civil maritime-military activity in the spring, there was a substantial increase in major events during the summer months. The year featured what are described here as “surge lift events,” i.e., events involving relatively large numbers of civilian vessels—between six and fifteen ships—in operations that took place over just a few days. In 2022, there had been more significant events earlier in the year featuring more experimentation, especially with operations involving the PLA’s new floating causeway system. The main event identified in 2022 training was a large-volume lift exercise that involved twelve ships operating over several weeks. Training in 2023 appeared much more focused and intense.

Civil maritime support to military events and exercises appears to follow a pattern consistent with the PLA’s annual training cycle. Coordinated training events in 2023 increased significantly during July, August, and September. Activity in 2021 and 2022 culminated in a large-scale amphibious exercise in early September; the 2023 exercise was executed at the end of September. Also, 2023 saw what appeared to be a smaller iteration of the 2022 heavy combined armor brigade loading exercise.

The end of COVID restrictions in China seems to have resulted in a return to normalcy on ferry routes in 2023. From 2020-2022, the PLA may have exploited opportunities to charter and train with underemployed ferries due to COVID-19 pandemic lockdowns. The return to normal in 2023 may be responsible for the shorter surge lift events compared to the sometimes weeks-long events in 2022.

Thirty-nine Chinese civilian ships spent a combined total of 812 ship-days in support of PLA activities in 2023 (see Figure 3). A comparison of 2022 and 2023 ship days appears in Figure 4.

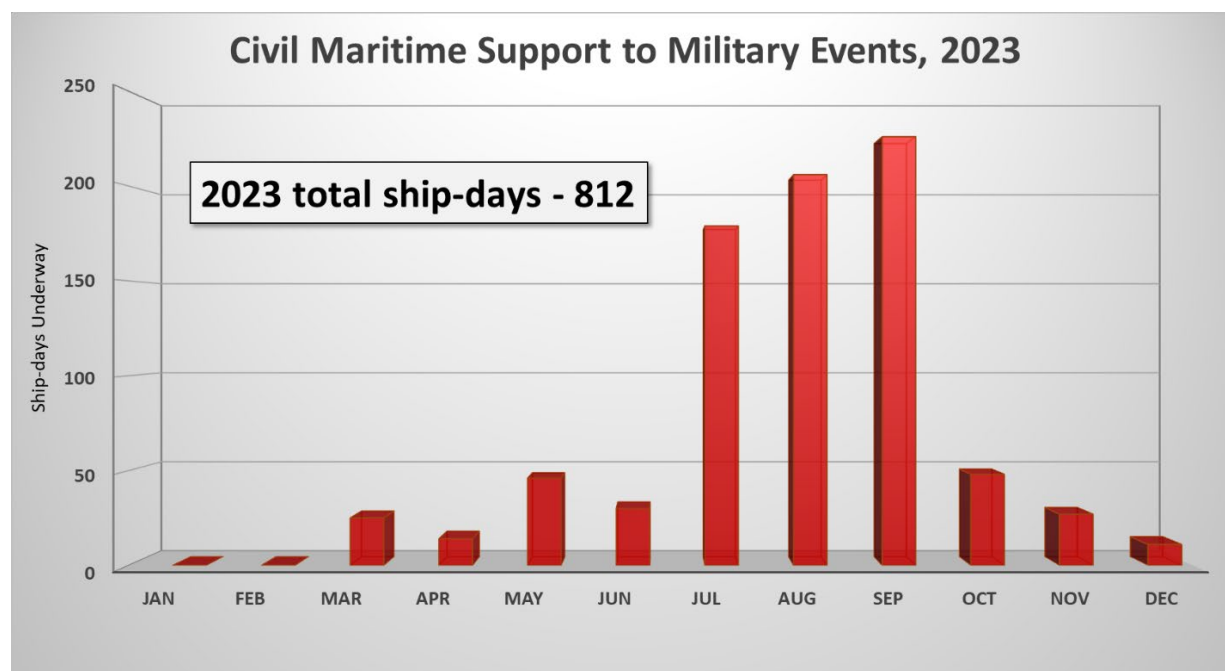


Figure 3. Civil Maritime Support to Military Events by Month, January-December 2023<sup>2</sup>

<sup>2</sup> “Total ship-days” equals the total number of days for all ships actively supporting military events to include transit time to and from homeports or the ships’ last likely commercial port call. “Ship-days” also includes time spent in port during on-going military activities (i.e., loading/unloading or in-port training). The numbers in Figure 2 do not include operating days for the semi-submersible barge SAN HAN GONG 8 (59 days) or the barge E SHAN (83 days), which transited to/from and operated in Hainan Bay and Dacheng Bay to support floating causeway operations. The sums also do not include days underway for tugboats supporting the barges or other activities. Numbers do not include South China Sea logistics support provided year-round by general cargo ships CHANG XIONG (76 days) and CHANG ZAN (294 days).

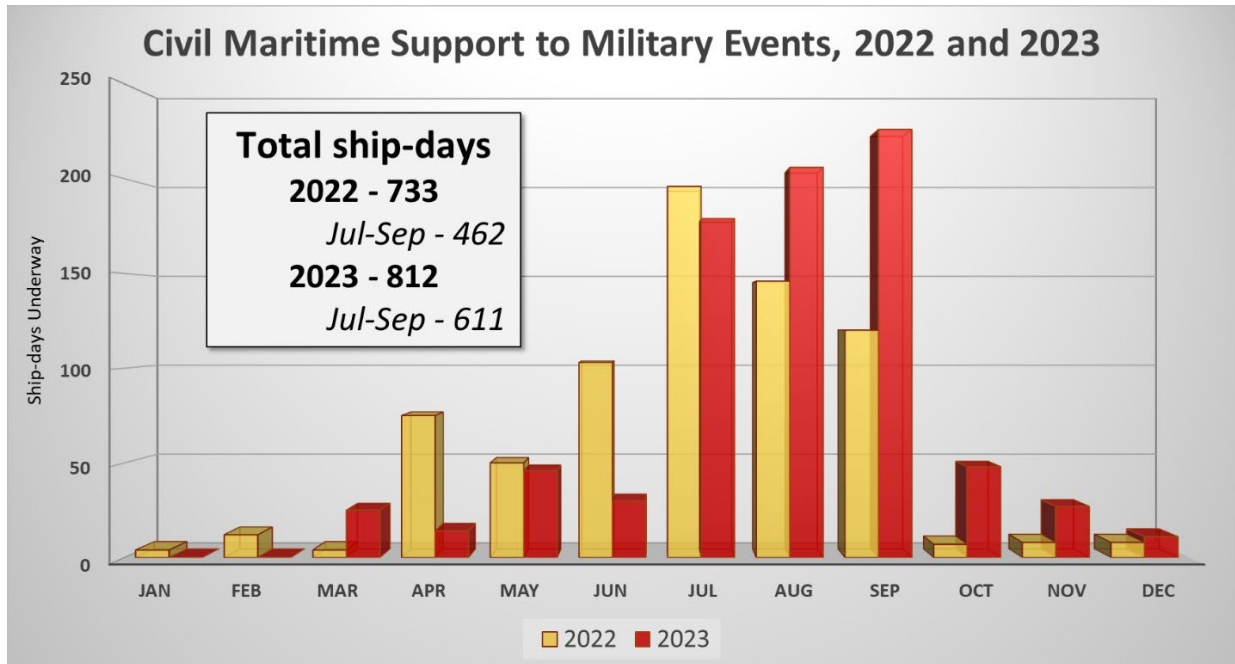


Figure 4. Civil Maritime Support to Military Events by Month, 2022-2023 Comparison

Using “ship days” as a metric, 2023 saw a modest 11 percent increase in dedicated military support—a combined total of 812 days supporting military activity compared with the 733 days observed in 2022. However, the PLA’s use of civilian shipping in 2023 was more concentrated. Civilian ships supported military activity for 611 ship days between July and September 2023 compared to 462 ship days for the same period in 2022, a 32 percent increase.

Thirty-nine Chinese-owned and flagged merchant ships were observed supporting military events in 2023. This was on-par with 2022 activity involving thirty-six merchant ships. Large, ocean-going RO-RO ferries built to Chinese national defense standards again provided most of the military lift capacity in civil maritime-military events in 2023.<sup>3</sup> Fifteen of these large RO-RO ferries were involved in multiple events throughout 2023, representing 54 percent of the available Chinese fleet of twenty-eight large, ocean-going RO-RO ferries.<sup>4</sup> The year also saw the first use of deck cargo ships in support of military activity. These ships are discussed in the next section.

Civilian ships observed supporting military activities during 2023 fall into three ownership categories: 1) RO-RO ferries owned by the publicly traded Bohai Ferry Group corporation, 2) privately-owned deck cargo ships, and 3) ships that are ultimately owned by large Chinese state-owned enterprises (SOEs) such as the China Ocean Shipping Company (COSCO) or China Merchants Group. Ships that participated in 2023 civil maritime-military events are listed in Table 1. Appendix A lists ships owned, operated, or managed by companies observed participating in PLA activities since 2020 and provides additional details and specifications for each ship.

<sup>3</sup> RO-RO ships in China’s civilian “strategic projection support ship fleet” were built to national defense standards beginning in the early 2010s. See Conor M. Kennedy, “Civil Transport in PLA Power Projection,” China Maritime Report No. 4, China Maritime Studies Institute, December 2019, pp. 8-9, <https://digital-commons.usnwc.edu/cmsi-maritime-reports/4>.

<sup>4</sup> China’s fleet of large, ocean-going RO-RO ferries was reduced following the sale and/or disposal of three older ships, SHENG SHENG 1, BO HAI MING ZHU, and BO HAI YIN ZHU, all belonging to Bohai Ferry Group subsidiaries. No new large, ocean-going RO-RO ferries entered service in 2023.

Table 1. Civilian Ships Observed Supporting Military Events, 2023

Ship Name	Name (Chinese)	Ship Name	Name (Chinese)
<b>Bohai Gulf RO-RO Ferries</b>			
BO HAI BAO ZHU	渤海宝珠	BO HAI ZHEN ZHU	渤海珍珠
BO HAI CUI ZHU	渤海翠珠	BANG CHUI DAO	棒捶岛
BO HAI FEI ZHU	渤海翡珠	PU TUO DAO	普陀岛
BO HAI HENG DA	渤海恒达	CHANG SHAN DAO	长山岛
BO HAI HENG SHENG	渤海恒生	JI LONG DAO	吉龙岛
BO HAI JIN ZHU	渤海金珠	LONG XING DAO	龙兴岛
BO HAI MA ZHU	渤海玛珠	XIANG LONG DAO	祥龙岛
BO HAI YU ZHU	渤海玉珠		
<b>Qiongzhou Strait (Hainan Island) RO-RO Ferries</b>			
HAI TANG WAN	海棠湾	SHUANG TAI 26	双泰 26
ZI JING JIU HAO	紫荆九号	SHUANG TAI 36	双泰 36
ZI JING SHI YI HAO	紫荆十一号	YIN ZI JING	银紫荆
<b>Vehicle Carriers and RO-RO Passenger Cruise Ships</b>			
CHANG FA LONG	长发隆	QI ZI WAN	棋子湾
<b>General Cargo Ships</b>			
CHANG XIONG	长(長)富	SHENG TAI	盛泰
CHANG ZAN	长赞	TIAN ZHU SHAN	天柱山
<b>Deck Cargo Ships</b>			
BO RUN JIU ZHOU	博润九州	ZHEN XIN 69	振新 69
BO MAO	博茂	HENG DA FA ZHAN	(?)
BO RUN	博润	HUAYI003	铎慧 003
JINGZHOUHAI	靖舟海	HUAYI008	铎慧 008
YOU JIAN JI XIANG	友建吉祥	HUAYI009	铎慧 009
<b>Barges</b>			
SAN HANG GONG 8	三航工 8	E SHAN	峨山

*Analytic Assumptions.* This report assumes RO-RO ferry activity that occurred away from normal ferry routes was probably military-related activity. In the absence of satellite imagery or other confirmation, it is certainly possible that some off-ferry route activity was commercial activity, but that has proven unlikely. In each case where commercial satellite imagery or other sources were available, military activity was confirmed. In no case between 2020 and 2023 has satellite imagery revealed RO-RO ferries conducting commercial activity when off their normal routes.

In contrast, RO-RO vehicle carriers, general cargo ships, and deck cargo ships observed supporting military activity do not always have established voyage routes and have, in fact, been observed conducting commercial activity before or after military events. In the absence of imagery confirmation, activity by these types of ships is only assumed to be military-related if there are other sources to confirm such activity or it occurs in conjunction with other probable civil-maritime activity such as off-route RO-RO ferry events.

Thirty-two ports and terminals were used by civilian ships to support military activities in 2023. Ports and terminals associated with civil maritime-military activity dating from 2022 are shown in Figure 5.

Beyond observed activity between 2020-2022, new ports utilized in 2023 include Jinzhou and Huludao (Liaoning) in the northern Bohai Gulf, Dandong (Liaoning) on the China-North Korea border, Damaiyu (Zhejiang) near Wenzhou, Fangcheng (Guangxi) on the northern Gulf of Tonkin/Beibu Gulf, and Nantan (Hainan) in northwestern Hainan Island. In each case, new ports were limited to a single use in 2023 to support probable military activity. Appendix B provides additional details about ports and terminals used for civil maritime-military activity, including coordinates and information about co-located facilities and port infrastructure.



Figure 5. Civil Maritime-Military Ports and Terminals, 2022-2023



## Section 2. Integration of Deck Cargo Ships and Surge Events

The first use of large deck cargo ships in support of civil maritime-military activity was observed in 2023.<sup>5</sup> This report uses the term “deck cargo ship” (甲板货船); however, these types of ships are known by several different terms in both English and Chinese, including “large deck ship” (大型甲板船), “deck transport ship” (甲板运输船), “heavy lift ship” (重吊船), “deck barge” (甲板驳), “self-propelled deck barge” (自航甲板驳), “multi-functional deck barge” (多功能甲板驳), “forward piloted deck ship/barge” (前驾驶甲板船/驳), or “rear-piloted deck ship/barge” (后驾驶甲板船/驳).

Many of the deck cargo ships observed supporting military activity in 2023 feature bow loading ramps, which afford access from a pier, quay, ferry ramp, or even beach to the deck through the forward superstructure. Examples of deck cargo ships appear in Figure 6. The calculated deck space is approximate. Vehicle capacity is estimated based on observed loading activity and assumes tied-down vehicles occupy a four-meter vehicle lane running fore-to-aft on the deck. Vehicle capacity may vary depending on the weight and size of vehicles, especially heavy armor. Limited commercial satellite imagery of deck cargo ships engaged in military support activity did not reveal armor embarked on any of these vessels in 2023. A 2021 video of 72<sup>nd</sup> Group Army training showed twenty-two armored infantry fighting vehicles embarked on a smaller deck cargo ship.<sup>6</sup>

Deck cargo ships carry a wide variety of cargos in normal commercial activity. They may carry stacks of standard shipping containers but are often employed to transport oversized cargo as shown in the image of the BO MAO, below. Large-deck cargo ships have been seen working on projects such as offshore oil fields or offshore wind turbine installations. In an example of how dynamic these ships are, as described in Section 5, large-deck cargo ships have been outfitted with gantries to support offshore launches of rockets carrying satellites into orbit. Rear-piloted deck barges such as the HUAYI009, below, are normally employed as sea-going dump trucks, carrying loads of dirt, gravel, debris, or other material in port construction or land reclamation projects.

Large deck cargo ships that supported military activity in 2023 appear to be owned and operated by privately held shipping companies. Few details are readily available on these shipping companies, including details about what other ships they may own. Deck cargo ship owners and operators involved in 2023 civil maritime-military activity include Anhui Borun Shipping Co., Ltd (安徽博润航运有限公司), which owns and operates at least three deck cargo ships involved in 2023 military activity; Guangdong Yaqing Shipping Co., Ltd. (广东亚庆海运有限公司); Taizhou Youjian Shipping Co., Ltd. (台州市友建船务有限公司); and Shanghai Zhenxin Shipping Co., Ltd. (上海振新船务有限公司). Ownership for several deck cargo ships involved in 2023 activity could not be identified for this report.

Deck cargo ships, large and small, are listed in most commercial shipping databases simply as “cargo ships.” How many of these types of large, versatile ships are in the PRC civilian shipping inventory is difficult to estimate. They almost certainly outnumber large RO-RO vehicle ferries several times over. While deck cargo ships with their open decks may not be suited for long-distance voyages with military vehicles and personnel embarked, they may be an adequate and plentiful choice for the PLA to lift military forces short distances, such as across the Taiwan Strait. Larger deck cargo ships could also support helicopter operations acting as “lily pads” where helicopters could refuel and rearm.

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<sup>5</sup> Smaller deck cargo ships that appear to accommodate 20-30 military vehicles were apparently used in PLA training as early as 2021. See Conor M. Kennedy, “CMSI Note #4: Deck Cargo Ships: Another Option for a Cross-Strait Invasion” (2024), *CMSI Notes*, 4, pp. 2-3 <https://digital-commons.usnwc.edu/cmsi-notes/4>.

<sup>6</sup> Ibid.



### BO RUN JIU ZHOU

- 505 ft (154 m) x 138 ft (42 m)
- ~62000 ft<sup>2</sup> (5800 m<sup>2</sup>) deck space
- Approx. 140 trucks/armored vehicles or equivalent
- No front loading ramp



### BO MAO

- 436 ft (133 m) x 105 ft (32 m)
- ~40000 ft<sup>2</sup> (3700 m<sup>2</sup>) deck space
- Approx. 90 trucks/armored vehicles or equivalent
- Drive-through front loading ramp



### YOU JIAN JI XIANG

- 358 ft (109 m) x 72 ft (22 m)
- ~22000 ft<sup>2</sup> (2000 m<sup>2</sup>) deck space
- Approx. 50 trucks/armored vehicles or equivalent
- Drive-through front loading ramp



### HUAYI009

- 305 ft (93 m) x 72 ft (22 m)
- ~15000 ft<sup>2</sup> (1400 m<sup>2</sup>) deck space
- Approx. 40 trucks or equivalent
- Drive-through front loading ramp

Figure 6. Examples of Deck Cargo Ships<sup>7</sup>

<sup>7</sup> Ship dimensions from MarineTraffic, <https://www.marinetraffic.com>, accessed January 19, 2024; deck space and capacities calculated based on dimensions and imagery mensuration; BO RUN JIU ZHOU (image), 博润九州 (BO RUN JIU ZHOU), video, 0:28, Douyin, May 18, 2023, <https://www.douyin.com/video/7234497358300482873>; BO MAO and HUAYI009 (images), MarineTraffic, <https://www.marinetraffic.com>, accessed January 29, 2024; YOU JIAN JI XIANG (image), 109m 甲板运输船“友建吉祥”顺利上水 (109 m Front-Piloted Deck Transport Ship Successfully Launched), 船海装备网 [Ship & Marine Equipment Network], August 19, 2021, <https://www.shipoe.com/news/show-45298.html>.

*First Observed Use of Large Deck Cargo Ships, July 2023*

**Activity:** Between 2-8 July 2023, three large deck cargo ships participated in a lift of military vehicles from Quanzhou (Fujian) to Jiangyin (Fujian) (see Table 2 and Figure 7).<sup>8</sup> These three deck cargo ships were observed in commercial satellite imagery offloading military vehicles in Jiangyin (see Figure 8). The ships may have returned these or other military vehicles to Quanzhou before departing the event for their homeports or other commercial activity. Concurrent with the 2-8 July lift event, two RO-RO ferries and a general cargo ship likely moved vehicles and personnel from Lianyungang (Jiangsu) to Xiamen (Fujian) and then from Xiamen to Guang’ao (Guangdong) and back to Xiamen (see Table 3 and Figure 7). Following this coordinated activity, the two RO-RO ferries and cargo ship traveled north between 9-12 July for a port call in Ningbo (Zhejiang) before the two RO-RO ferries then reversed course south to the small port of Damaiyu (Zhejiang).<sup>9</sup> This was the first and only noted use of the port of Damaiyu by RO-RO ferries in support of probable military activity since observations began in 2020 for this series of reports.

Table 2. Deck Cargo Ship Port-to-Port Activity, 2-8 July 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>Deck Cargo Ships</b>			
BO RUN	博润	YOU JIAN JI XIANG	友建吉祥
JINGZHOUHAI	靖舟海		
<b>Ports</b>			
Quanzhou Port	泉州港	Jiangyin Port	江阴港

Table 3. RO-RO Ferry and Cargo Ship Port-to-Port Activity 2-8 July 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
BO HAI BAO ZHU	渤海宝珠	BO HAI ZHEN ZHU	渤海珍珠
<b>General Cargo Ships</b>			
TIAN ZHU SHAN	天柱山		
<b>Ports</b>			
Lianyungang Port	连云港港	Xiamen Xiangyu Wharf	厦门象屿码头
Guang'ao Port	广澳港		

**Assessment:** This first observed use of large deck cargo ships in a coordinated lift of military equipment is a significant development. Even large deck cargo ships cannot carry as many vehicles or personnel per ship as ocean-going RO-RO ferries that feature multiple vehicle decks and passenger accommodations. However, many more deck cargo ships are likely available to the PLA than RO-RO ferries.

<sup>8</sup> AIS position data: BO RUN (MMSI 413556960), JINGZHOUHAI (MMSI 413492320), and YOU JIAN JI XIANG (MMSI 413289660), July 2-8, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>9</sup> AIS position data: BO HAI BAO ZHU (MMSI 412330020), BO HAI ZHEN ZHU (MMSI 413409000), and TIAN ZHU SHAN (MMSI 412076010), July 2-12, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

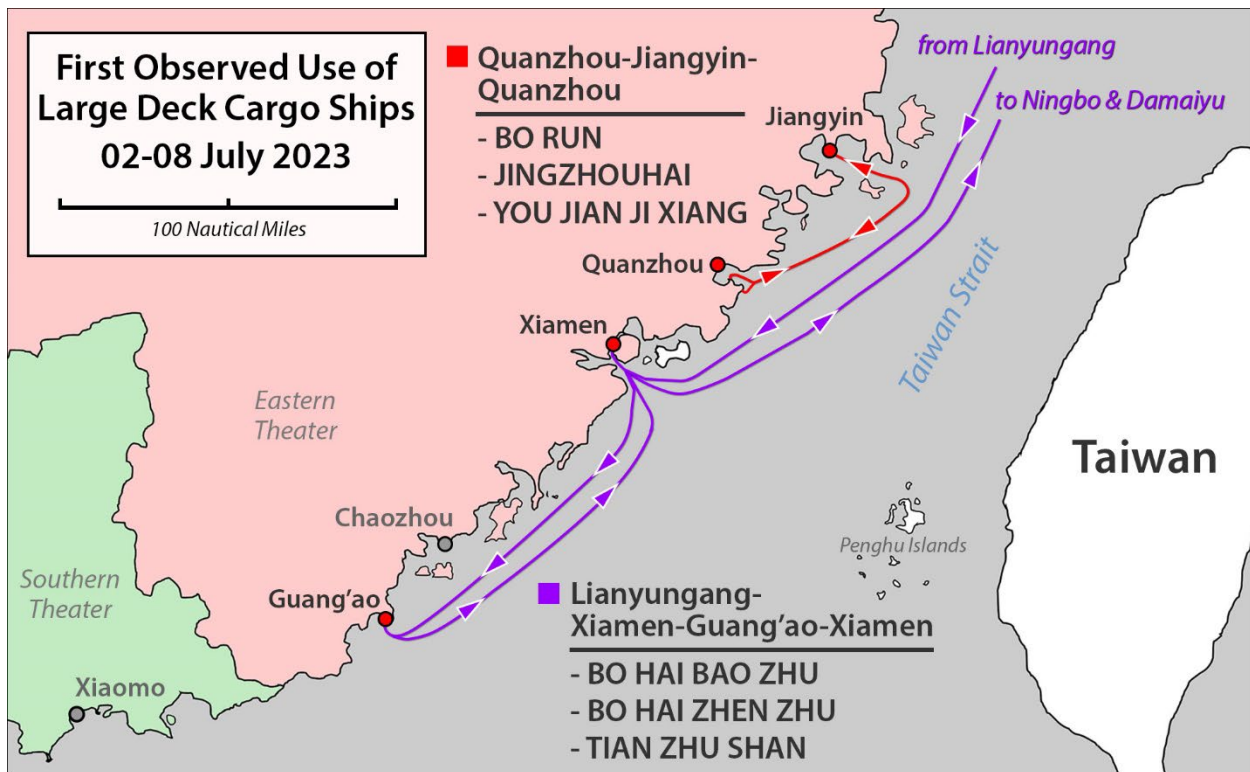


Figure 7. First Observed Use of Large Deck Cargo Ships

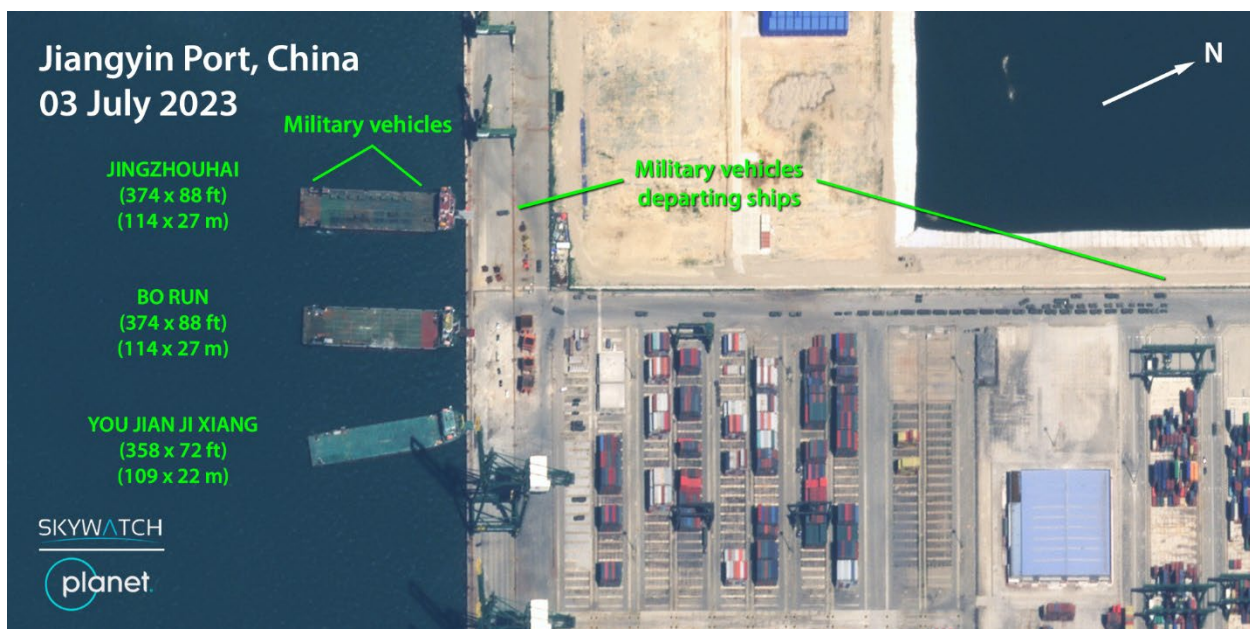


Figure 8. Deck Cargo Ships at Jiangyin, China, 03 July 2023 (© 2024 Planet)<sup>10</sup>

In a very limited sample of commercial satellite imagery available for this report, only trucks and possibly light armored vehicles were noted embarked on deck cargo ships. There are examples of

<sup>10</sup> Planet, SkySat, Image ID: 20230703\_021833\_ssc16\_u0002, July 03, 2023, Jiangyin, China, 25.417N, 119.286E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

deck cargo ships transporting armored infantry fighting vehicles.<sup>11</sup> There is no evidence supporting or refuting the possibility that the PLA would use these types of vessels to transport large, armored vehicles such as main battle tanks. Considering the demonstrated commercial load capability of these vessels, these ships are almost certainly capable of carrying tanks and other heavy armor.

The RO-RO ferries and general cargo ship involved in this exercise did not visit the same ports as the deck cargo ships. However, the fact that the RO-RO activity was geographically proximate and time-coincident with the deck cargo ship activity indicates that the two events were likely connected and part of a larger Joint Logistics Support Force (JLSF) evolution in the Eastern Theater.

#### *Surge Lift Event One, 22-24 July 2023*

In addition to the use of deck cargo ships to support military events and exercises, another significant development in 2023 was what is being described in this report as “surge lift events.” These events or logistics exercises involve a relatively large number of civilian ships—between six and fifteen ships—in coordinated activity over just a few days.

**Activity:** Surge Lift Event One consisted of fourteen ships—five large RO-RO ferries, two general cargo ships, and seven deck cargo ships (see Table 4 and Figure 9). Twelve of these ships were involved in a one-way lift of probably military vehicles and personnel from Jiangyin to Chaozhou (Fujian). Two RO-RO ferries, the BO HAI HENG SHENG and BO HAI JIN ZHU, and all the deck cargo ships likely loaded and departed from Jiangyin on 22 July 2023 and offloaded in Chaozhou at a bulk coal quay on 23 July.<sup>12</sup> The general cargo ship TIAN ZHU SHAN as well as the RO-RO ferries BO HAI ZHEN ZHU and BO HAI BAO ZHU followed the same route, departing on 23 July and offloading in Chaozhou on 24 July.<sup>13</sup>

The deck cargo ship ZHEN XIN 69 arrived in Chaozhou before all the other ships and remained in port as other ships arrived and departed one at a time. ZHEN XIN 69 likely had a variable height loading ramp embarked. This ramp allows hosted ships to moor parallel to a quay wall and use bow and stern ramps to offload vehicles onto the ZHEN XIN 69’s deck. The ramp installed on the deck curves onto the quay wall. Its variable height allows for round-the-clock operation regardless of the rise and fall of tides. Images of the variable height loading ramp onboard the ZHEN XIN 69 appear in the next section on port-to-port lift events.

Concurrent with the surge lift, on 20 July 2023, the RO-RO ferry BO HAI YU ZHU, probably with military personnel and vehicles loaded at the ferry terminal in Weifang (Liaoning) on the Bohai Gulf, traveled 1,200 nautical miles (2,200 km) to Guang’ao. BO HAI YU ZHU likely offloaded in Guang’ao on 24 July, synchronized with the end of this surge lift event.<sup>14</sup> Also on 24 July, the BO HAI HENG SHENG and the general cargo ship CHANG ZAN transited to Xiamen (Fujian) to dock at a commercial wharf known to support military activity.<sup>15</sup>

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<sup>11</sup> Conor M. Kennedy, “Deck Cargo Ships: Another Option for a Cross-Strait Invasion,” p. 3.

<sup>12</sup> AIS position data: BO HAI HENG SHENG (MMSI 413384000), BO HAI JIN ZHU (MMSI 413305960), ZHEN XIN 69 (MMSI 413233460), BO RUN JIU ZHOU (MMSI 413536970), BO MAO (MMSI 413244720), BO RUN (MMSI 413556960), YOU JIAN JI XIANG (MMSI 413289660), HUAYI003 (MMSI 413233790), and HUAYI009 (MMSI 413237840), July 22-24, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>13</sup> AIS position data: BO HAI ZHEN ZHU (MMSI 413409000), BO HAI BAO ZHU (MMSI 412330020), and TIAN ZHU SHAN (MMSI 412076010), July 22-24, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>14</sup> AIS position data: BO HAI YU ZHU (MMSI 413408000), July 20-24, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>15</sup> AIS position data: BO HAI ZHEN ZHU (MMSI 413409000) and CHANG ZAN (MMSI 413307520), July 24, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

Table 4. Surge Lift Event One, 22-24 July 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
BO HAI HENG SHENG	渤海恒生	BO HAI BAO ZHU	渤海宝珠
BO HAI JIN ZHU	渤海金珠	BO HAI YU ZHU	渤海玉珠
BO HAI ZHEN ZHU	渤海珍珠		
<b>General Cargo Ships</b>			
TIAN ZHU SHAN	天柱山	CHANG ZAN	长赞
<b>Deck Cargo Ships</b>			
ZHEN XIN 69	振新 69	YOU JIAN JI XIANG	友建吉祥
BO RUN JIU ZHOU	博润九州	HUAYI003	铎慧 003
BO MAO	博茂	HUAYI009	铎慧 009
BO RUN	博润		
<b>Ports</b>			
Weifang Port	潍坊港	Xiamen Xiangyu Wharf	厦门象屿码头
Jiangyin Port	江阴港	Guang'ao Port	广澳港
Chaozhou Port	潮州港		

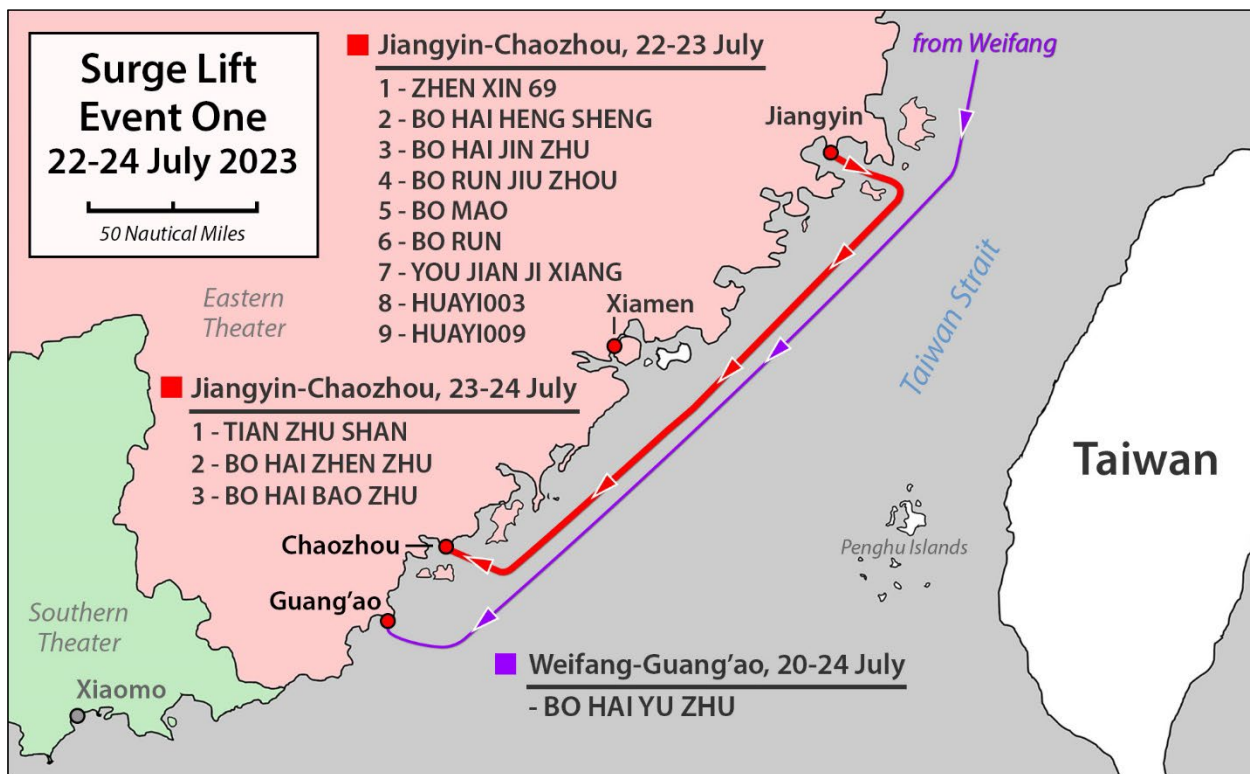


Figure 9. Surge Lift Event One, 22-24 July 2023

**Assessment:** Surge Lift Event One occurred at the same time as a three ship lift event on Hainan Island involving the PLA's floating causeway. This concurrent event was almost certainly synchronized with Surge Lift Event One and may have been part of a larger inter-theater exercise.

The 22-24 July 2023 Hainan Island floating causeway event is discussed in Section 3, Amphibious Landing Training, *Floating Causeway Events & Developments*.

Again, ZHEN XIN 69 likely had a variable height loading ramp embarked to facilitate offload from other ships to the quay. All other ships, except for the largest deck ship, BO RUN JIU ZHOU, and the general cargo ship, TIAN ZHU SHAN, pulled up behind the ZHEN XIN 69 to offload, according to AIS data. BO RUN JIU ZHOU may have offloaded with its own vehicle ramp to the quay but also may have been offloaded using cranes available at the port.

As numbered in Figure 9, RO-RO ferries and the deck cargo ships arrived in order of size and capacity—first the ferries (capacity ~150 vehicles each), which spent between 2 and 3 hours docked, then the larger deck cargo ships (between ~50 and 90 vehicles each) that each spent between 1.5 and 2 hours docked, and then HUAYI003 (~40 vehicles) that spent 1.5 hours docked. Detailed AIS data for the final arrival in Chaozhou, HUAYI009, was not available. In each case, the observed time should have been enough to offload the maximum number of vehicles possibly embarked on each ship. If the largest deck ship, BO RUN JIU ZHOU, was, in fact, offloaded by crane, it is very unlikely it carried its maximum calculated load of 140 vehicles. Just before dawn on 24 July, the general cargo ship TIAN ZHU SHAN arrived to be offloaded by cranes in the port. The two RO-RO ferries that then arrived on 24 July spent significantly more time in port, approximately 5 hours each. This may indicate they carried larger vehicles, possibly tracked armor, that were more complicated to unload using the ZHEN XIN 69's variable height ramp.

This first observed surge lift event represents an evolution in civil maritime-military training and potentially a significant capability to support PLA over-the-shore logistics in amphibious operations. Commercial satellite imagery was not available for this event to confirm the numbers of vehicles moved in this single lift. However, based on calculated maximum capacities, these ships could have moved as many as 1,000 vehicles through the port of Chaozhou, perhaps as many as 700 vehicles on the first day. Previous civil maritime-military logistics evolutions have either involved fewer ships offloading in a single port or a handful of ships making several roundtrips between ports. This surge of a dozen ships through the relatively small port of Chaozhou while relying on little more than the quay itself to offload is probably a more realistic representation of what the PLA may require in a future cross-strait operation.

If follow-on events to this first lift were planned, they were interrupted by Typhoon Doksuri, which slammed into the event area on 28 July 2023. AIS data indicates that exercise ships scattered either north or south of the typhoon's path and remained far from the exercise area for several days.

#### *Port-to-Port Lift Events, 4-13 August 2023*

**Activity:** Surge Lift Event One participants that had retrograded to the south away from Typhoon Doksuri's path were involved in a series of port-to-port lift events between 4-13 August 2023 (see Table 5 and Figure 10). Except for ZHEN XIN 69, no other deck cargo ships were involved in this event. Two RO-RO ferries and two general cargo ships made a combined total of five one-way lifts and seven round-trip lifts between various Taiwan Strait ports over the nine-day exercise.<sup>16</sup>

Of note, commercial satellite imagery captured ZHEN XIN 69 docked with the RO-RO ferry BO HAI ZHEN ZHU in both Gulei and Chaozhou. Figures 11 and 12 illustrate how the loading ramp is

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<sup>16</sup> AIS position data: BO HAI BAO ZHU (MMSI 412330020), BO HAI ZHEN ZHU (MMSI 413409000), ZHEN XIN 69 (MMSI 413233460), CHANG ZAN (MMSI 413307520), and TIAN ZHU SHAN (MMSI 412076010), August 4-13, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

used to allow ships to dock parallel to the quay behind the ZHEN XIN 69 and then use bow or stern ramps to offload vehicles onto ZHEN XIN 69. The vehicles then proceed up the ramp and onto the quay. The variable height of the ramp allows for variation in tides as the ship rises and falls.

Table 5. Port-to-Port Lift Events, 4-13 August 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
BO HAI BAO ZHU	渤海宝珠	BO HAI ZHEN ZHU	渤海珍珠
<b>Deck Cargo Ships</b>			
ZHEN XIN 69	振新 69		
<b>General Cargo Ships</b>			
CHANG ZAN	长赞	TIAN ZHU SHAN	天柱山
<b>Ports</b>			
Jiangyin Port	江阴港	Quanzhou Port	泉州港
Xiamen Xiangyu Wharf	厦门象屿码头	Gulei Wharf	古雷码头
Chaozhou Port	潮州港	Guang'ao Port	广澳港
Xiaomo Port	小港港		

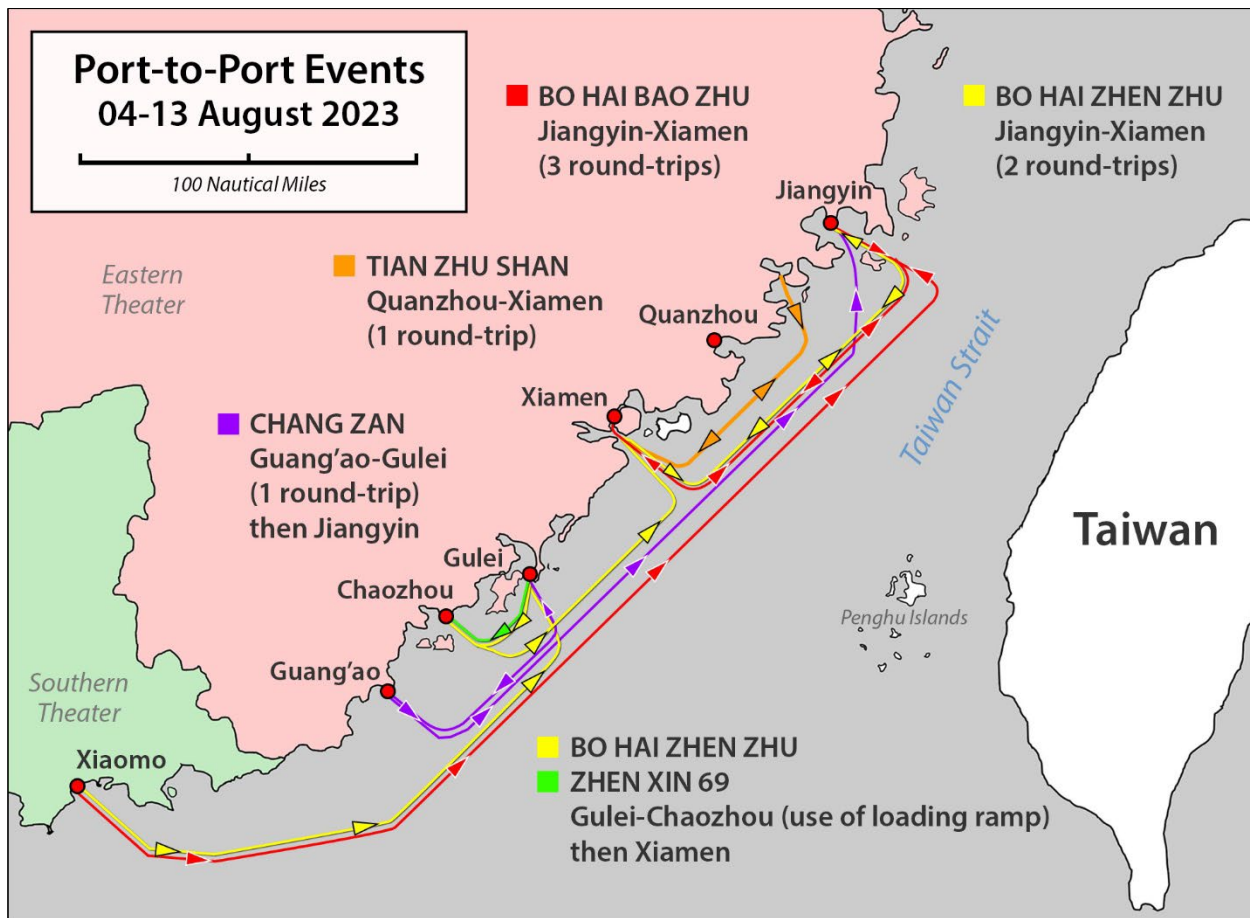


Figure 10. Port-to-Port Events, 04-13 August 2023





Figure 11. Variable Height Loading Ramp, Gulei, China, 06 August 2023 (© 2024 Planet)<sup>17</sup>

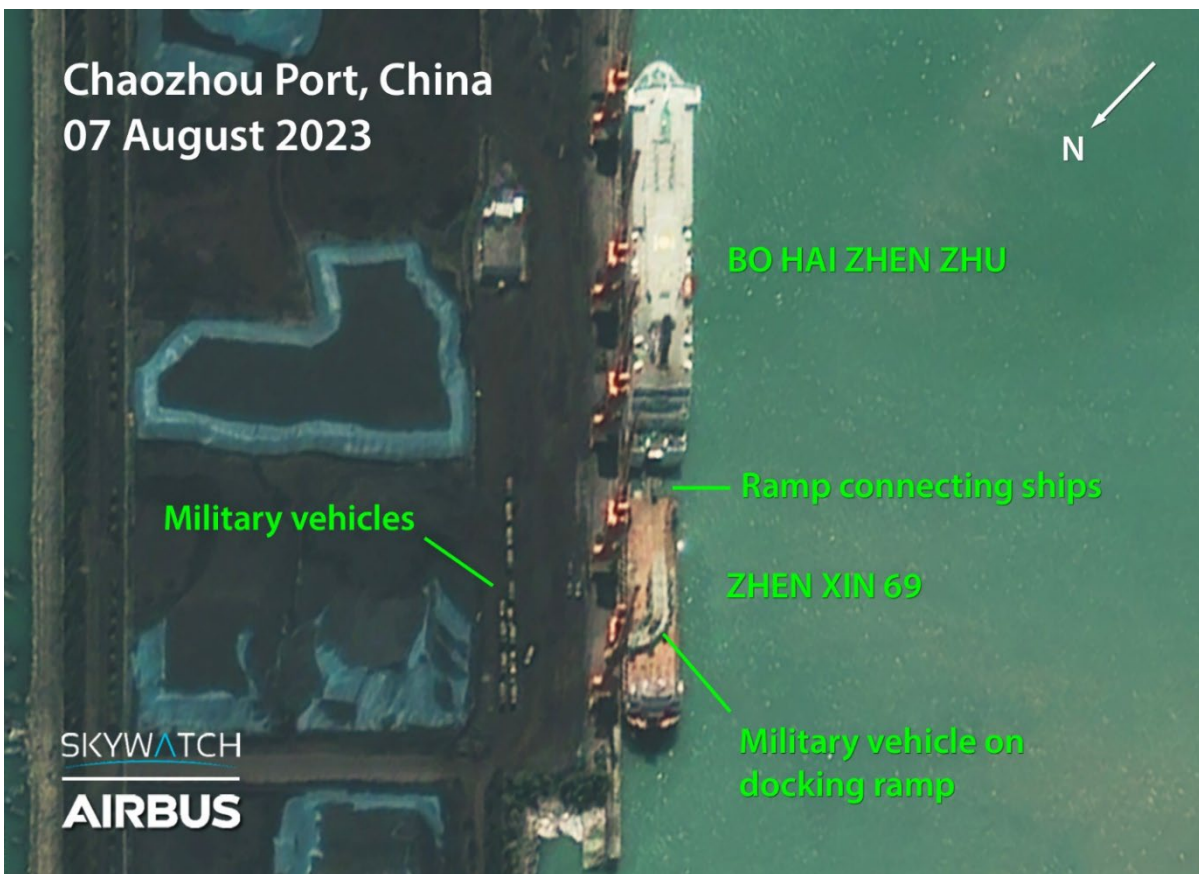


Figure 12. Variable Height Loading Ramp, Chaozhou, China, 07 August 2023 (© 2024 Airbus)<sup>18</sup>

<sup>17</sup> Planet, SkySat, Image ID: 20230806\_022547\_ssc1\_u0001, August 6, 2023, Gulei, China, 23.767N, 117.582E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

<sup>18</sup> Airbus, Pléiades, Image ID: DS\_PHR1A\_202308070313532\_FR1\_PX\_E117N23\_0217\_00247, August 7, 2023, Chaozhou, China, 23.557N, 117.100E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

**Assessment:** This port-to-port lift event may have been a component of the Surge One Lift Event that was interrupted by Typhoon Doksuri. In any case, it is counted in this report as a separate major event involving five ships. It is possible, but unlikely, that the early August port-to-port activity was part of disaster relief efforts in Fujian province following the typhoon. PLA troops were mobilized to aid in disaster relief especially in the PLA’s Central Theater that was hit with significant flooding from the remnants of the storm. These relief efforts were widely publicized in state media.<sup>19</sup> There are no outward indications, however, that the observed August port-to-port activity was related to disaster relief.

For this port-to-port event, there were no satellite imagery indications that ships were fully loaded for each leg of their transits between ports as may have been the case in the PLA’s 2022 large-volume lift exercise.<sup>20</sup> However, to demonstrate potential capacities, if one assumes that ships were fully loaded on each of the five one-way lifts and seven round-trip lifts, these ships could have moved as many as 2,200 vehicles and 14,000 personnel. If the roundtrips were only loaded one way, these ships may have moved approximately 1,300 vehicles and 8,000 personnel, roughly the equivalent of eight PLA heavy combined arms battalions or two PLA heavy combined arms brigades.

*Surge Lift Event Two, 18-21 August 2023*

Surge Lift Event Two involved coordinated lifts in the PLA’s Eastern and Northern Theaters.

**Activity (Eastern Theater):** Between 18-21 August, two RO-RO ferries, BO HAI BAO ZHU and BO HAI ZHEN ZHU, probably moved military vehicles and personnel from Xiamen (Fujian) to Guang’ao (Guangdong) in two round-trips while four deck cargo ships moved vehicles between Xiamen and Gulei (Fujian). Additionally, two RO-RO ferries, CHANG SHAN DAO and LONG XING DAO, arrived from the Northern Theater port of Dandong (Liaoning) to probably deliver military vehicles and personnel in a one-way lift to Xiamen in the middle of the other six ships’ lift events (see Table 6 and Figure 13).<sup>21</sup>

Table 6. Surge Lift Event Two, Eastern Theater, 18-21 August 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
BO HAI BAO ZHU	渤海宝珠	CHANG SHAN DAO	长山岛
BO HAI ZHEN ZHU	渤海珍珠	LONG XING DAO	龙兴岛
<b>Deck Cargo Ships</b>			
BO RUN	博润	YOU JIAN JI XIANG	友建吉祥
JINGZHOUHAI	靖舟海	HUAYI008	铎慧 008
<b>Ports</b>			
Dandong Port	丹东港	Gulei Wharf	古雷码头
Xiamen Xiangyu Wharf	厦门象屿码头	Guang'ao Port	广澳港

<sup>19</sup> See, for example, 解放军和武警部队防汛救灾直击 [“The PLA and the PAP are Directly Involved in Flood Prevention and Disaster Relief”], 新华网 [Xinhua Net], August 4, 2023, [http://www.news.cn/politics/2023-08/04/c\\_1129787120.htm](http://www.news.cn/politics/2023-08/04/c_1129787120.htm).

<sup>20</sup> Dahm, “More Chinese Ferry Tales,” pp. 26-27.

<sup>21</sup> AIS position data: BO HAI BAO ZHU (MMSI 412330020), BO HAI ZHEN ZHU (MMSI 413409000), CHANG SHAN DAO (MMSI 412331000), LONG XING DAO (MMSI 412900000), BO RUN (MMSI 413556960), JINGZHOUHAI (MMSI 413492320), YOU JIAN JI XIANG (MMSI 413289660) and HUAYI008 (MMSI 413237850), August 16-21, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

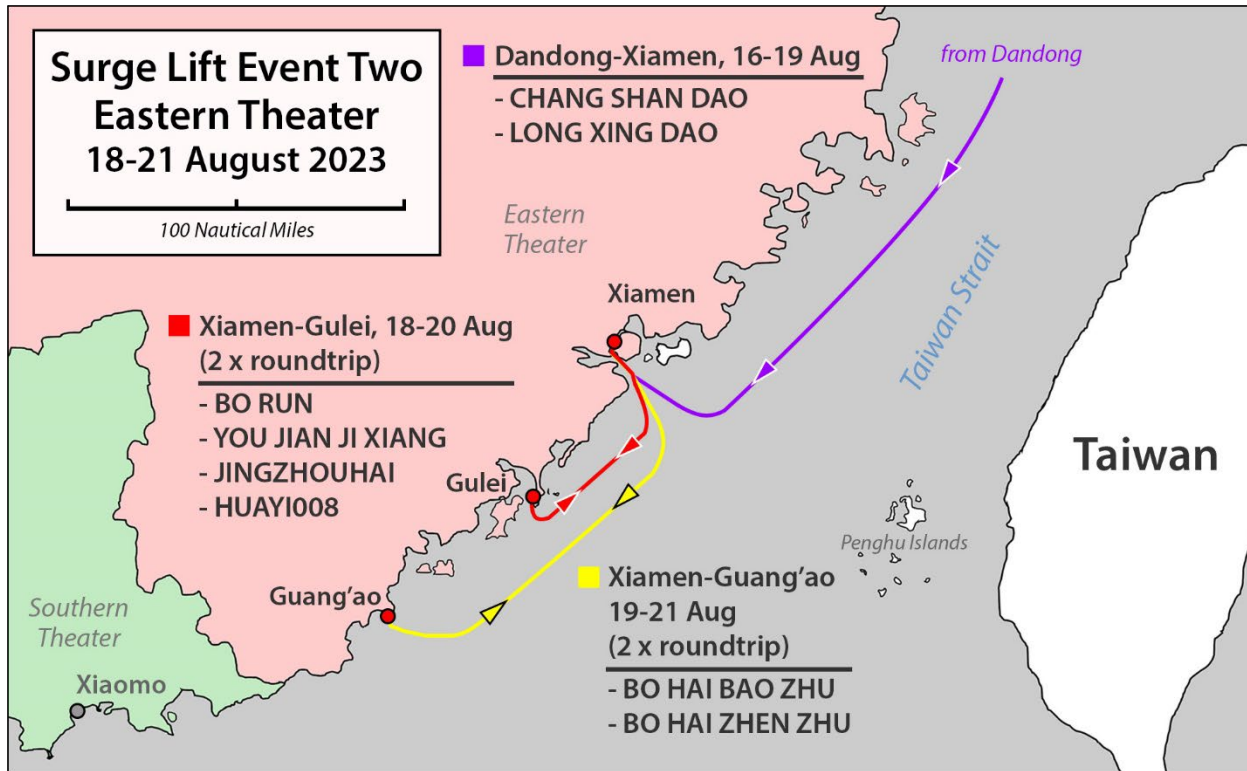


Figure 13. Surge Lift Event Two, Eastern Theater, 18-21 August 2023

**Activity (Northern Theater):** Time coincident with the Eastern Theater activity, four RO-RO ferries probably moved military vehicles and personnel from Bohai Gulf ferry terminals to Qingdao (Shandong), Rizhao (Shandong), and Lianyungang (Jiangsu). Additionally, the RO-RO ferry BANG CHUI DAO likely moved forces from Jingtang (Hebei) to Tianjin and then in and out of Tianjin in a probable loading/unloading exercise based on similar 2022 military activity observed at the Tianjin International Cruise Ship Terminal.<sup>22</sup> At the same time, also concurrent with this activity, two general cargo ships probably moved equipment north from Lianyungang to Dalian (See Table 7 and Figure 14).<sup>23</sup>

<sup>22</sup> Dahm, “More Chinese Ferry Tales,” pp. 28-32.

<sup>23</sup> AIS position data: BANG CHUI DAO (MMSI 412450000), XIANG LONG DAO (MMSI 414556000), JI LONG DAO (MMSI 414510000), BO HAI YU ZHU (MMSI 413408000), BO HAI JIN ZHU (MMSI 413305960), CHANG ZAN (MMSI 413307520), and TIAN ZHU SHAN (MMSI 412076010) August 16-21, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

Table 7. Surge Lift Event Two, Northern Theater, 18-21 August 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
BANG CHUI DAO	棒捶岛	BO HAI YU ZHU	渤海玉珠
XIANG LONG DAO	祥龙岛	BO HAI JIN ZHU	渤海金珠
JI LONG DAO	吉龙岛		
<b>General Cargo Ships</b>			
CHANG ZAN	长赞	TIAN ZHU SHAN	天柱山
<b>Ports</b>			
Jingtang Port	京唐港	Tianjin Int'l Cruise Ship Terminal	天津国际邮轮母港
Dalian Bay Port	大连湾港	Lushun New Port	旅顺新港
Longkou Port	龙口港	Qingdao Port	青岛港
Rizhao Port	日照港	Lianyungang Port	连云港港

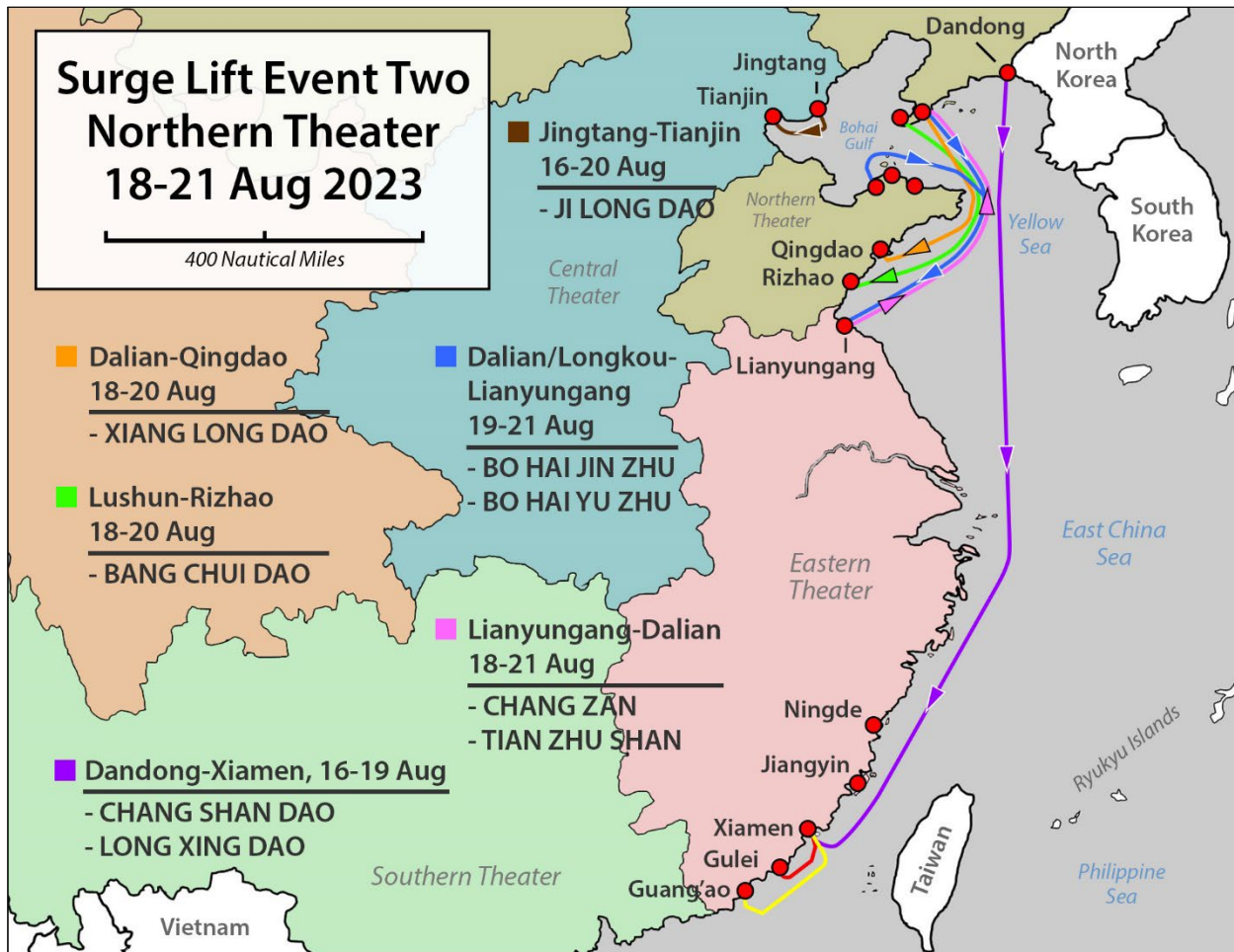


Figure 14. Surge Lift Event Two, Northern Theater, 18-21 August 2023

**Assessment:** In 2022, inter-theater civil maritime-military activity appeared to be limited to long-range movements from one-theater into another, in many cases, in support of in-theater high-

frequency port-to-port lift activity.<sup>24</sup> Surge Lift Event Two represents another apparent evolution in civil maritime training, the synchronized movement of forces in the Eastern and Northern Theaters. In the Eastern Theater, Xiamen may have served as the exercise port of embarkation, with forces projected to Gulei and Guang’ao, possibly simulating Taiwan ports in a cross-strait lift operation.

The Eastern Theater portion of this exercise may have involved as many as 1,300 vehicles, the equivalent of two heavy combined arms brigades. The deck cargo ships’ calculated surge capacity in two one-way lifts to Gulei is approximately 400 military vehicles. The two RO-RO ferries could have moved as many as 600 military vehicles and 4000 personnel in two one-way lifts from Xiamen to Guang’ao. The two RO-RO ferries deployed from the Northern Theater may have projected as many as 300 military vehicles and 2000 personnel to Xiamen.

In the Northern Theater, the four RO-RO ferries deployed from Bohai Gulf ferry terminals may have projected as many as 600 military vehicles and 4000 personnel to the southern side of the Shandong Peninsula. This may have simulated a distribution of forces, for example, the deployment of northern air defense assets in support of the Eastern Theater exercise. The Northern Theater RO-RO ferries may have also been simulating cross-strait operations using Northern Theater ports and Lianyungang as surrogates that are closer to Bohai ferry routes. This may reduce the impacts on commercial activity associated with long transits to the southern reaches of the Eastern Theater.

Northern Theater ferry deployments from commercial ferry terminals intentionally obscure military activity and create potential indications and warning problems for outside observers. For example, in a 19 July 2023 lift event unrelated to Surge Lift Event Two, the CHANG SHAN DAO conducted a military lift exercise between civilian ferry terminals at Lushun and Dalian Bay.<sup>25</sup> This event was publicized on Chinese state television, CCTV. Had it not been for the report, this event would have been extremely difficult to discern from normal commercial activity (see Figure 15).<sup>26</sup>



Figure 15. CHANG SHAN DAO Unloading Military Vehicles at Dalian Bay Ferry Terminal, 19 July 2023

<sup>24</sup> Dahm, “More Chinese Ferry Tales,” pp. 15, 24. There were frequent lift events between the Southern and Eastern Theaters in the immediate vicinity of the Taiwan Strait.

<sup>25</sup> AIS position data: CHANG SHAN DAO (MMSI 412331000), July 19, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>26</sup> Joseph.W 約瑟 (@JosephWen), “央視發佈軍事報導” [“CCTV released a military report”], X (Twitter), July 22, 2023, 4:44 a.m., <https://twitter.com/JosephWen/status/1682673043519447043>.

*Surge Lift Event Three, 25-29 August 2023*

**Activity:** Surge Lift Event Three took place from 25-29 August 2023 and involved four deck cargo ships conducting a single, one-way lift from Ningde (Fujian) to Jiangyin (Fujian) (see Table 8 and Figure 16). On 25 August, two deck cargo ships, the BO RUN and HUAYI008, probably loaded in Ningde and transited to the Jiangyin Anchorage where they waited for over 20 hours before proceeding into Jiangyin Port probably to offload on 27 August. Similarly, the JINGZHOUHAI and YOU JIAN JI XIANG loaded in Ningde on 26 August, proceeded to Jiangyin Anchorage to wait and then docked in Jiangyin Port on 28 August.

The RO-RO ferries, JI LONG DAO and CHANG SHAN DAO, transited from the Bohai Gulf to offload in Jiangyin on 29 August. JI LONG DAO may have loaded at the ferry terminal in Dalian Bay Port. The CHANG SHAN DAO stopped in Lianyungang on its transit south where it probably loaded troops and equipment.<sup>27</sup>

Table 8. Surge Lift Event Three, 25-29 August 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
CHANG SHAN DAO	长山岛	JI LONG DAO	吉龙岛
<b>Deck Cargo Ships</b>			
BO RUN	博润	YOU JIAN JI XIANG	友建吉祥
JINGZHOUHAI	靖舟海	HUAYI008	铎意 008
<b>Ports</b>			
Dalian Bay Port	大连湾港	Ningde Port	宁德港
Lianyungang Port	连云港港	Jiangyin Port	江阴港

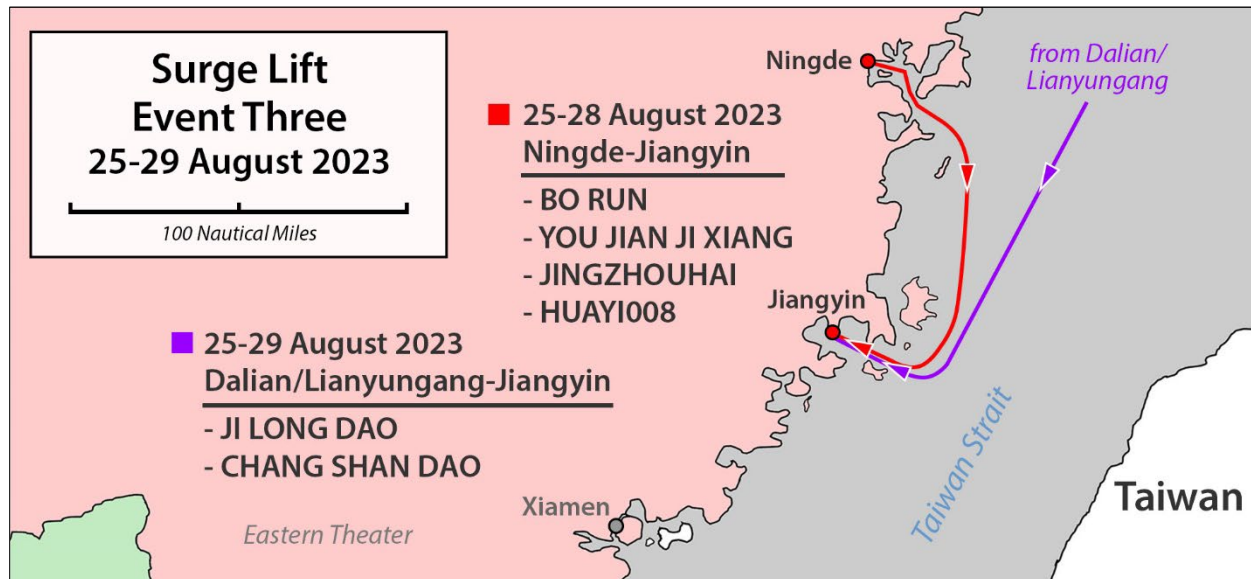


Figure 16. Surge Lift Event Three, 25-29 August 2023

<sup>27</sup> AIS position data: BO RUN (MMSI 413556960), JINGZHOUHAI (MMSI 413492320), YOU JIAN JI XIANG (MMSI 413289660), HUAYI008 (MMSI 413237850), CHANG SHAN DAO (MMSI 412331000), and JI LONG DAO (MMSI 414510000), August 25-29, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

**Assessment:** Surge Lift Event Three was the smallest of the 2023 surge lift events involving only six ships with only two ships docking each day over three days, 27-29 August, at the destination port of Jiangyin. This lift event may have been to demonstrate the synchronization of sequenced deck cargo ship lifts with inter-theater transfers from the larger RO-RO ferries. In the absence of other indicators, specific objectives for this relatively minor surge lift exercise are unknown. In any case, it further demonstrates the 2023 emphasis on short-duration, one-way lift exercises versus the longer-duration port-to-port lift evolutions observed in years past.

### Section 3. Amphibious Landing Training

#### Unit-Level Offshore Landing Training

From 6-15 March 2023, a single RO-RO ferry, the PU TUO DAO, probably participated in unit-level offshore landing training at the Qianhai Bay amphibious training area (Guangdong) in the PLA's Southern Theater. The ship's maneuvers indicate it may have deployed amphibious vehicles or assault boats offshore. The PU TUO DAO departed and returned to Dalian, but made no port calls in the Eastern or Southern Theaters over the course of its 19-day deployment away from Bohai Gulf ferry routes (see Table 9 and Figure 17).<sup>28</sup> Amphibious exercise elements may have embarked in Dalian. Alternatively, units may have pre-deployed to the Qianhai Bay landing area and loaded on and unloaded from the PU TUO DAO offshore over the course of the exercise. Commercial satellite imagery available for this report did not capture the PU TUO DAO conducting offshore landing training. However, Figure 18 does show the PU TUO DAO anchored 3 nautical miles (5 km) offshore while amphibious forces are assembled in the Qianhai Bay training area.

Table 9. Offshore Landing Training, 6-15 March 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ships</b>		<b>Ports and Amphibious Landing Areas</b>	
PU TUO DAO	普陀島	Qianhai Bay (Landing Area)	前海湾



Figure 17. Offshore Landing Training, 6-15 March 2023

<sup>28</sup> AIS position data: PU TUO DAO (MMSI 413127000), March 1-19, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).



Figure 18. Qianhai Bay Amphibious Landing Area, 7 March 2023 (© 2024 Airbus)<sup>29</sup>

**Assessment:** The PU TUO DAO’s deployment from the Northern Theater to conduct nine days of probable amphibious landing operations in the Southern Theater without a port call may reflect an increased confidence by the PLA in the use of RO-RO ferries for sustained offshore amphibious operations. Very similar unit-level training with RO-RO ferries was observed off the Qianhai Bay landing area in both July 2021 and July 2022, but both involved several port calls while on deployment. The 2021 and 2022 exercise events, like the March 2023 event, originated in the Northern Theater and may have involved Northern Theater PLAN Marine Corps units based on previous assessments of this type of activity.

Besides moving this annual evolution to the spring, these unit-level events appear to have gotten smaller or possibly just more efficient. Activity in 2021 involved two RO-RO ferries operating offshore Qianhai for eighteen days. Activity in 2022 involved only one RO-RO ferry operating off Qianhai for six days but added several days of in-port activity and additional operations off the Honghai Bay amphibious training area near Xiaomo.<sup>30</sup> Moving this type of training to the spring may also reflect increased demand for commercial ferry business following China’s COVID lockdowns. The move may also have been necessary for RO-RO ferry availability considering the increase in summer 2023 exercise activity.

<sup>29</sup> Airbus, Pléiades, Image ID: DS\_PHR1B\_202303070253145\_FR1\_PX\_E111N21\_0714\_00248, March 7, 2023, Qianhai (aka Fuhu Harbor 福湖港), China, 21.523N, 111.535E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

<sup>30</sup> Dahm, “More Chinese Ferry Tales,” pp. 34-36, and Dahm, “Chinese Ferry Tales,” pp. 33-40.



*Single-RO-RO Ferry Training with PLAN Amphibious Forces*

**Activity:** A small, but notable amphibious event involving a RO-RO ferry occurred off of Dongyin Island and Dacheng Bay amphibious training area in mid-May 2023. The RO-RO ferry BO HAI BAO ZHU deployed from the Bohai Gulf and arrived in Jinluan Bay off of eastern Dongyin Island on 16 May. According to AIS data, BO HAI BAO ZHU remained offshore and then proceeded to probably deploy amphibious armor or assault boats offshore in Dacheng Bay on 17 May, returning to Jinluan Bay on 28 May (see Table 10 and Figure 19). Commercial satellite imagery of Jinluan Bay from 19 May revealed the presence of at least one Type 071 Yuzhao-class amphibious transport dock ship (LPD) as well as two tank landing ships (LST) (see Figure 20). BO HAI BAO ZHU proceeded to conduct probable port-to-port lift activity between Jiangyin and Ningde from 21-28 May.<sup>31</sup>

Table 10. Single RO-RO Ferry Off-Shore Training, 16-28 May 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ships</b>			
BO HAI BAO ZHU	渤海宝珠		
<b>Ports and Amphibious Landing Areas</b>			
Jinluan Bay (Dongyin Island)	金銮湾	Dacheng Bay (Landing Area)	大埕湾
Jiangyin Port	江阴港	Ningde Port	宁德港

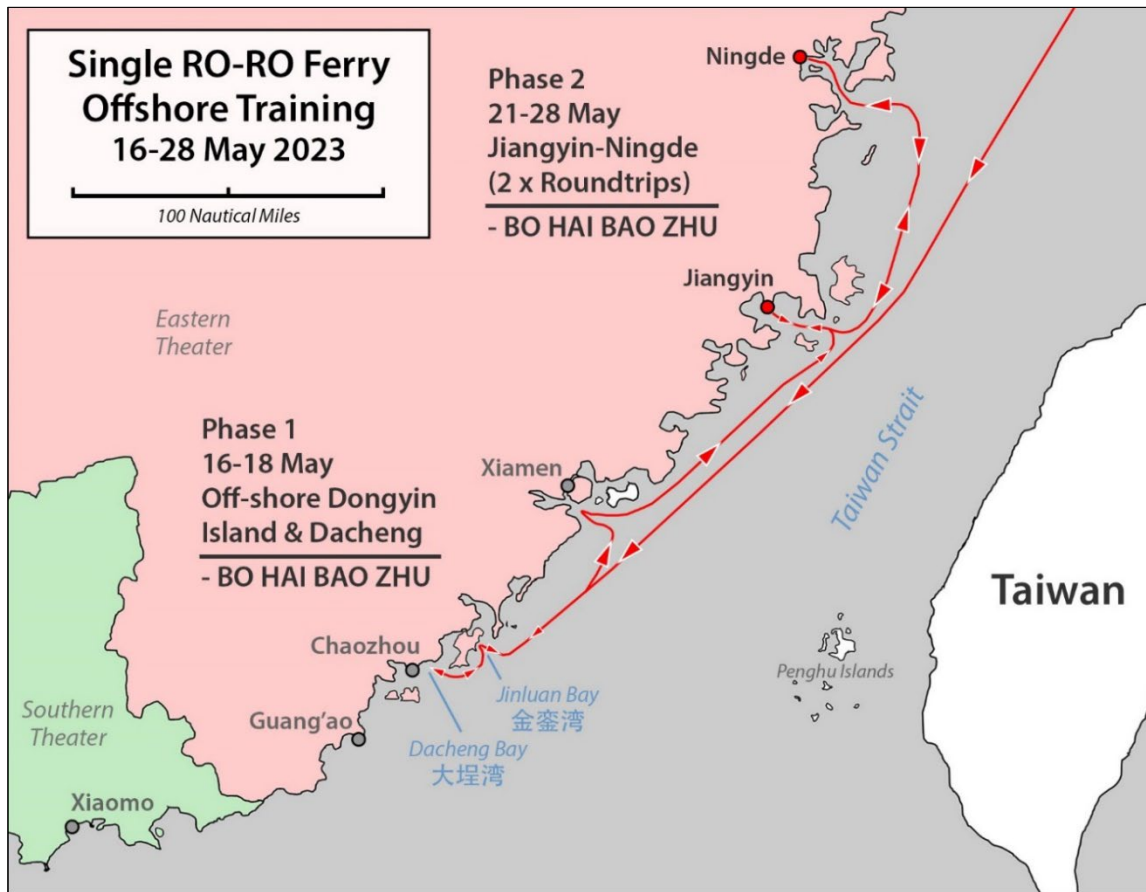


Figure 19. Single RO-RO Ferry Offshore Training, 16-28 May 2023

<sup>31</sup> AIS position data: BO HAI BAO ZHU (MMSI 412330020), May 16-28, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).



Figure 20. Amphibious Ships in Jinluan Bay, Dongyin Island, 19 May 2023 (© 2024 Planet)<sup>32</sup>

**Assessment:** Analysis of other exercises in this area indicates that BO HAI BAO ZHU probably loaded amphibious armor or assault boats offshore in Jinluan Bay before proceeding to offload those forces offshore in Dacheng Bay. The presence of an LPD and LSTs in the vicinity of Dongyin Island immediately following BO HAI BAO ZHU’s operations may indicate that the RO-RO ferry event happened in conjunction with other amphibious landing training or an exercise involving the PLAN ships. This conclusion is supported by observations of the late-September amphibious landing capstone exercise described in Section 4.

#### *Floating Causeway Events & Developments*

Observed training with the PLA’s improved floating causeway system was limited in 2023 compared to activity observed in 2022. The PLA developed the causeway system to discharge non-amphibious wheeled and tracked vehicles from RO-RO ferries and possibly PLAN amphibious ships directly onto a beach. The modular system consists of five powered sections and a terminal section that may extend more than 2,000 feet from a beach landing area, allowing ships with deep drafts to dock and offload without fear of running aground regardless of tidal variations in the landing area. This Chinese system is similar to the U.S. Navy’s Improved Navy Lighterage System (INLS). While this improved causeway system had previously been seen operating only in the Eastern Theater, in June and July 2023 it was observed operating in the Southern Theater off Hainan Island.<sup>33</sup>

The floating causeway system is probably maintained and operated by the PLA’s JLSF. A 2020 JLSF exercise was the first to showcase the use of a modular floating pier system with RO-RO ferries.<sup>34</sup> In 2023, the improved floating causeway appeared in a JLSF recruiting video.<sup>35</sup> Figure 21 shows the causeway docked with the semi-submersible barge SAN HANG GONG 8 and the RO-RO ferry BO

<sup>32</sup> Planet, PlanetScope, Image ID: 20230519\_015600\_94\_24b4, May 19, 2023, Dongyin Island, China, 23.688N, 117.506E, [www.planet.com](http://www.planet.com).

<sup>33</sup> For previous analyses of the PLA’s floating causeway system see, Dahm, “More Chinese Ferry Tales,” pp. 32-34, and Dahm, “Chinese Ferry Tales,” pp. 47-52.

<sup>34</sup> Exercise EASTERN TRANSPORTATION-PROJECTION 2020A, see Dahm, “Chinese Ferry Tales,” pp. 4-7.

<sup>35</sup> PLA JLSF, “第 7 集, 征兵宣传片系列” [“Episode 7, Recruitment Video Series”], video, 0:42, Douyin, July 26, 2023, <https://www.douyin.com/video/7260104332538957093>.

HAI BAO ZHU, as depicted in the video. Based on previous analysis, the image was probably taken during training events in Dacheng Bay in May or June of 2022.<sup>36</sup>



Figure 21. Floating Causeway, SAN HANG GONG 8, and RO-RO Ferry in JLSF Recruiting Video, 26 July 2023<sup>37</sup>

**Activity:** A RO-RO passenger cruise ship, QI ZI WAN, and two smaller Qiongzhou Strait (Hainan Island) RO-RO ferries docked with and probably offloaded vehicles onto the floating causeway in Hainan Bay, Hainan Island in July 2023 (see Table 11). The 22-24 July event may have been a remote part of Surge Lift Event One, described in Section 2, that occurred on the same dates.

Table 11. Floating Causeway Training, Hainan Island, 22-24 July 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ships</b>			
QI ZI WAN	棋子湾	ZI JING JIU HAO	紫荆九号
YIN ZI JING	银紫荆		
<b>Barges</b>			
SAN HANG GONG 8	三航工 8	E SHAN	峨山
<b>Ports and Amphibious Landing Areas</b>			
Nansha Port / Shazai Island	南沙港 / 沙仔岛	Zhanjiang Naval Base	湛江海军基地
Haikou Port	海口港	Hainan Bay (Landing Area)	海南湾

On 22 July 2023, the QI ZI WAN departed Hainan Island for Shazai Island, known commercially as the Guangzhou Port Nansha Car Terminal (Guangdong). This terminal has supported civil maritime-military events since at least 2020.<sup>38</sup> There, QI ZI WAN probably loaded military vehicles and

<sup>36</sup> Dahm, “More Chinese Ferry Tales,” pp. 32-34.

<sup>37</sup> PLA JLSF, “Episode 7, Recruitment Video Series.”

<sup>38</sup> 军地联合 完成重装跨海投送 [“Military-Civil Joint Forces Complete Heavy Equipment Cross-Sea Projection”], 中国军视网 [China Military Television Network], June 7, 2020, [https://www.js7tv.cn/video/202006\\_219448.html](https://www.js7tv.cn/video/202006_219448.html). The video shows RO-RO vehicle carrier CHANG DA LONG (MMSI 413473010) loading armored elements at Shazai Island.

personnel before returning to offload on the floating causeway on 24 July. Similarly, the RO-RO ferries YI ZI JING and ZI JING JIU HAO departed their ferry routes and proceeded to Zhanjiang Naval Base where they likely loaded military vehicles and personnel on 23 July. The two RO-RO ferries arrived in Hainan Bay and offloaded onto the floating causeway immediately after the QI ZI WAN on 24 July (see Figure 22).<sup>39</sup>

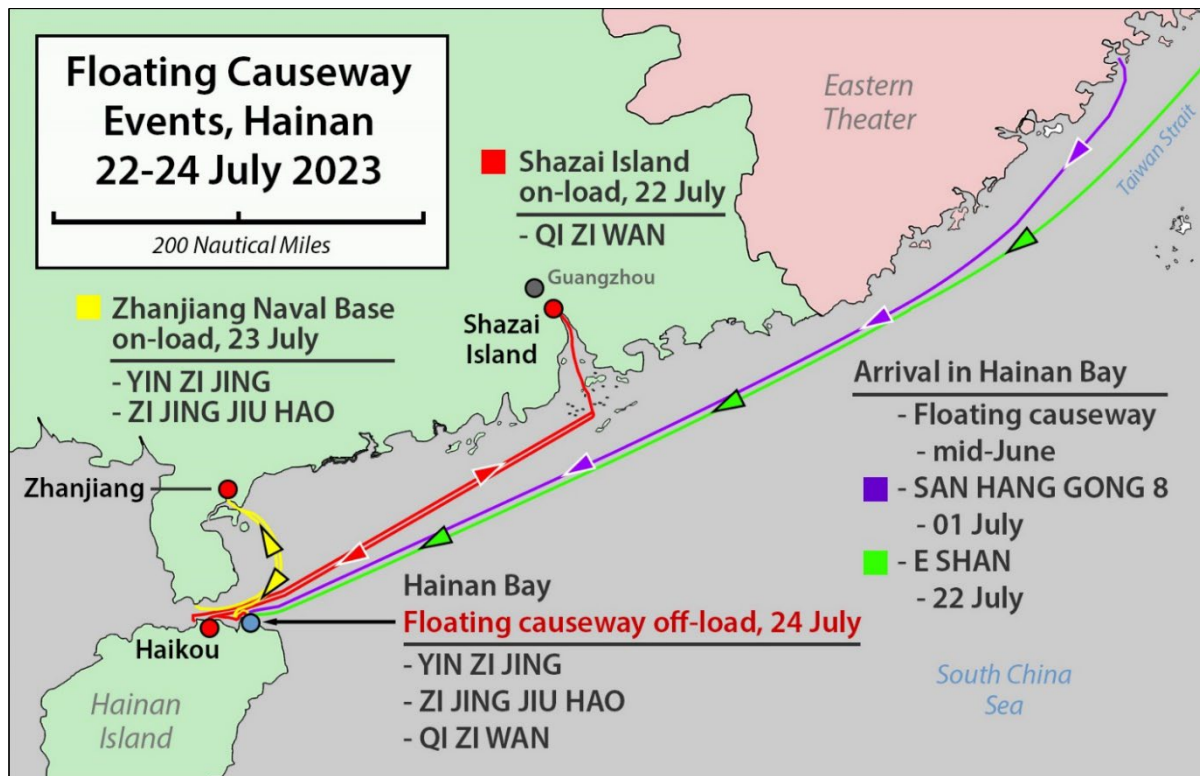


Figure 22. Floating Causeway Events, Hainan Bay, 22-24 July 2023

According to commercial satellite imagery, the floating causeway (which does not transmit AIS data) arrived in Hainan Bay in mid-June 2023.<sup>40</sup> Floating causeway training was observed in satellite imagery for several weeks as the causeway was assembled and disassembled several times (see Figure 23). The semi-submersible barge SAN HAN GONG 8, which is required to stabilize the head of the causeway and provides a docking platform for RO-RO ships, arrived in Hainan Bay on 1 July but did not dock with the floating causeway until 19 July according to AIS data.<sup>41</sup>

The Hainan Island floating causeway activity saw the first use of the E SHAN self-propelled barge, which may have been purpose-built to serve as the stabilizing head of the causeway. E SHAN was built at the Wuhu Shipyard on the Yangtse River. The new-construction barge was apparently launched on 5 July 2023.<sup>42</sup> The E SHAN traveled directly to Hainan Bay, arriving on 22 July. The

<sup>39</sup> AIS position data: QI ZI WAN (MMSI 413396680), YI ZI JING (MMSI 413233380), and ZI JING JIU HAO (MMSI 413234440), July 22-24, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>40</sup> Planet, PlanetScope, Image ID: 20230613\_021828\_60\_24d0, June 13, 2023, Hainan Bay, China, 20.105N, 110.642E, [www.planet.com](http://www.planet.com).

<sup>41</sup> AIS position data: SAN HANG GONG 8 (MMSI 413378280), June 26-July 24, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>42</sup> Wuhu Maritime Safety Administration (MSA), “关于芜湖造船厂有限公司“峨山”轮拖带航行的通告” [“Notice on the Towed Voyage of Wuhu Shipyard Co., Ltd., ‘E SHAN’”], MSA Notice 芜航通 [2023] no. 20, July 5, 2023,

barge docked with the floating causeway once on 23 July but was replaced by the SAN HANG GONG 8 for the RO-RO ferry docking evolutions on 24 July according to AIS data and imagery (see Figure 24). The E SHAN docked with the causeway again on 25 July according to AIS data.<sup>43</sup>

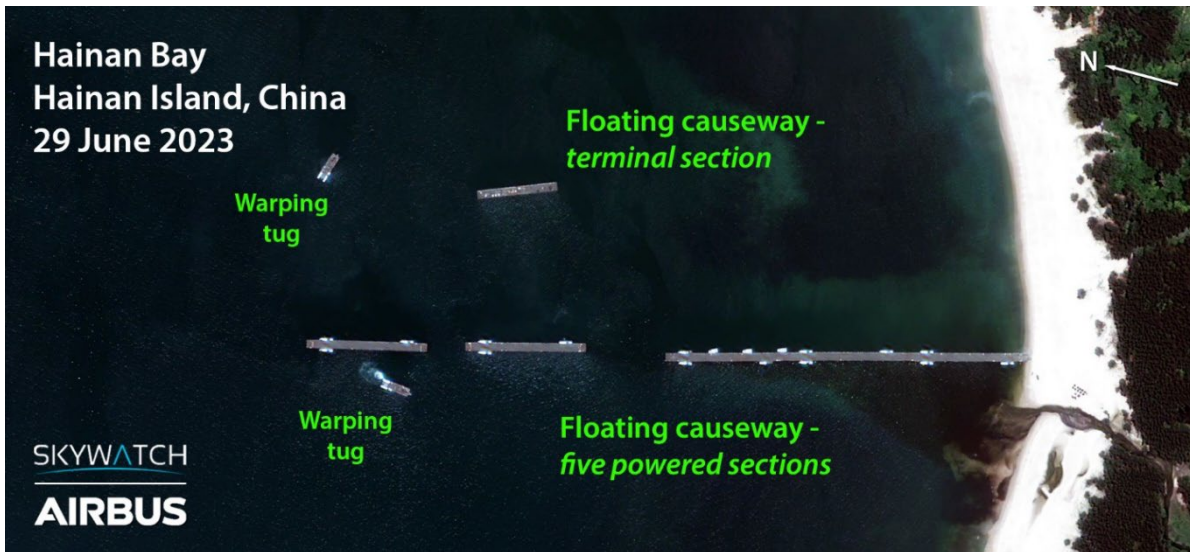


Figure 23. Floating Causeway Assembly Training, Hainan Bay, 29 June 2023 (© 2024 Airbus)<sup>44</sup>

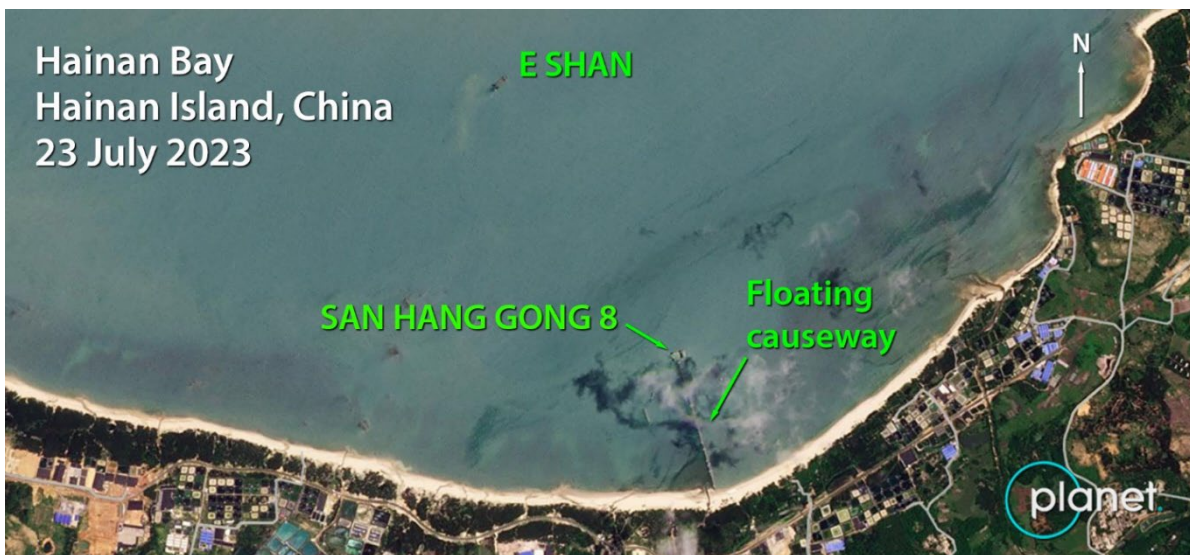


Figure 24. Floating Causeway Docked with SAN HANG GONG 8, Hainan Bay, 23 July 2023 (© 2024 Planet)<sup>45</sup>

**Assessment:** The synchronization of the Hainan Bay floating causeway offload with Surge Lift Event One in the Eastern Theater demonstrates previously unobserved inter-theater coordination. The

<https://www.msa.gov.cn/page/article.do?articleId=BCB603B2-356E-4F6E-8649-70BCD2165CBB&channelId=5EBF724E-5F19-4730-9FC1-F5AB4700D4B2>.

<sup>43</sup> AIS position data: SAN HANG GONG 8 (MMSI 413378280), July 19-24, 2023 and E SHAN (MMSI 413531460), July 5-25, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>44</sup> Airbus, Pléiades, Image ID: DS\_PHR1B\_202306290315265\_FR1\_PX\_E110N20\_0804\_00391, June 29, 2023, Hainan Bay, China, 20.105N, 110.642E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

<sup>45</sup> Planet, PlanetScope, Image ID: 20230723\_025824\_95\_249a, July 23, 2023, Hainan Bay, China, 20.105N, 110.642E, [www.planet.com](http://www.planet.com).

deployment of the floating causeway to the Southern Theater has also allowed additional types of RO-RO ferries gain experience with the causeway system. In previous exercises and training evolutions, the floating causeway had only been observed in Dacheng Bay near the Taiwan Strait. Hainan Bay may represent a second training area for the causeway system that will allow it to work more frequently with the smaller, shorter-range Qiangzhou Strait RO-RO ferries.

The E SHAN barge may be intended as a replacement for the semi-submersible barge SAN HANG GONG 8 that has been used as the head of the improved causeway system and its predecessor system since at least 2020. The E SHAN may have been undergoing evaluation in 2023 since it was not used for RO-RO ferry offloads in the Hainan Bay event. E SHAN proceeded to Dacheng Bay where it docked with the floating causeway prior to the amphibious landing capstone exercise. Again, it was replaced by the SAN HANG GONG 8 for the actual RO-RO landing evolutions.<sup>46</sup> Figure 25 shows the E SHAN in Dacheng Bay. The barge appears to have a steel lattice superstructure.

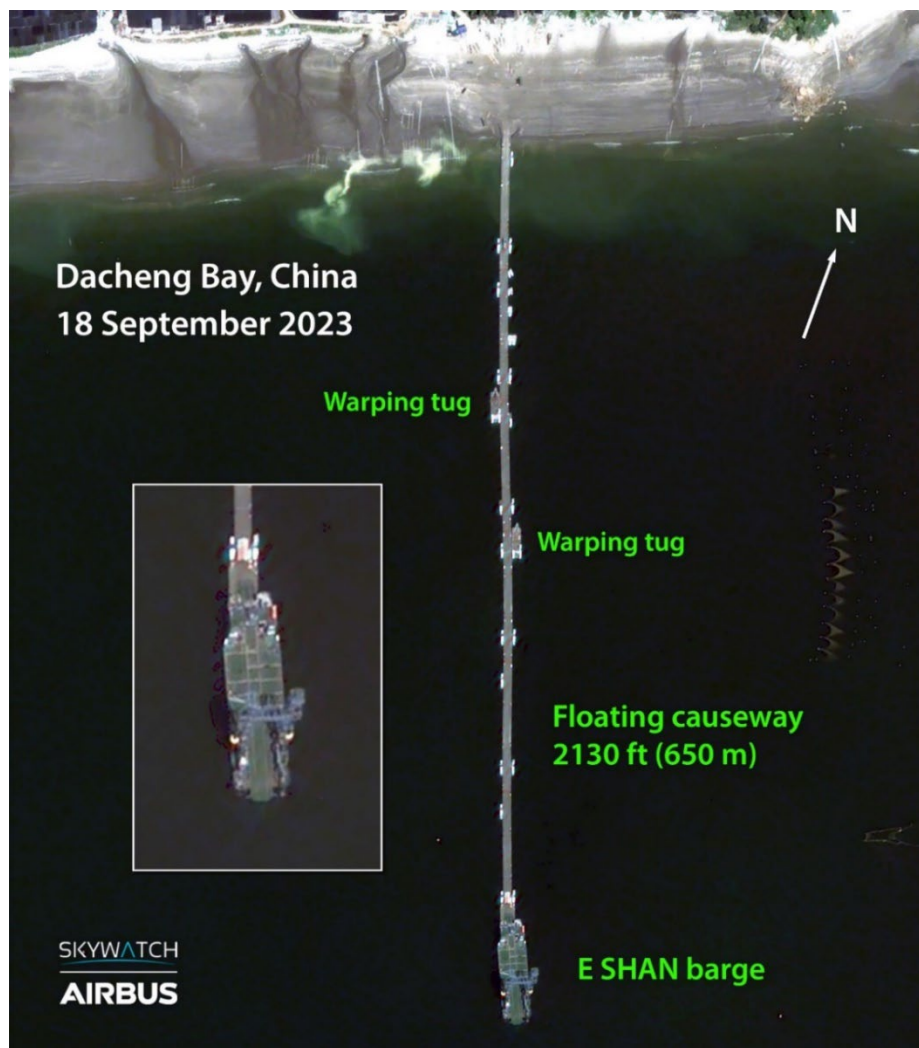


Figure 25. Floating Causeway and E SHAN Barge, Dacheng Bay, 18 September 2023 (© 2024 Airbus)<sup>47</sup>

<sup>46</sup> AIS position data: SAN HANG GONG 8 (MMSI 413378280) and E SHAN (MMSI 413531460), September 12-26, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>47</sup> Airbus, Pléiades, Image ID: DS\_PHR1A\_202309180253348\_FR1\_PX\_E117N23\_0216\_00339, September 18, 2023, Dacheng Bay, China, 23.612N, 117.180E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

#### Section 4. Amphibious Landing Capstone Exercise

Sixteen civilian cargo ships participated in the September 2023 end-of-training cycle amphibious landing capstone exercise. This is a significant increase from the eight civilian ships that participated in the annual exercise in 2021 and ten civilian ships that participated in 2022. The number of large, ocean-going RO-RO ferries used in the 2023 exercise was reduced to six, down from seven in both 2021 and 2022. Among the most significant changes noted in the 2023 exercise was the first use of six deck cargo ships. Also, a “Hainan Group” of three Qiangzhou Strait RO-RO ferries joined the “North Group” and “South Group” in conducting synchronized amphibious landings and in-port offloads on 26 September 2023.

Figure 26 shows the scheme of maneuver for the thirteen civilian ships in the North and South Groups in the main body of the exercise. These groups used the same landing areas and ports used in the 2022 amphibious landing exercise. Preparations for this amphibious exercise probably began in early-September. RO-RO ferries, deck cargo ships, and general cargo ships appeared to move equipment and personnel to and from the exercise ports of Xiamen, Gulei, and Guang’ao between 11-22 September.<sup>48</sup> The civil-maritime component of this large, inter-theater exercise began on 24 September 2023 at approximately 2000 local time. It appeared to conclude late on 26 September.

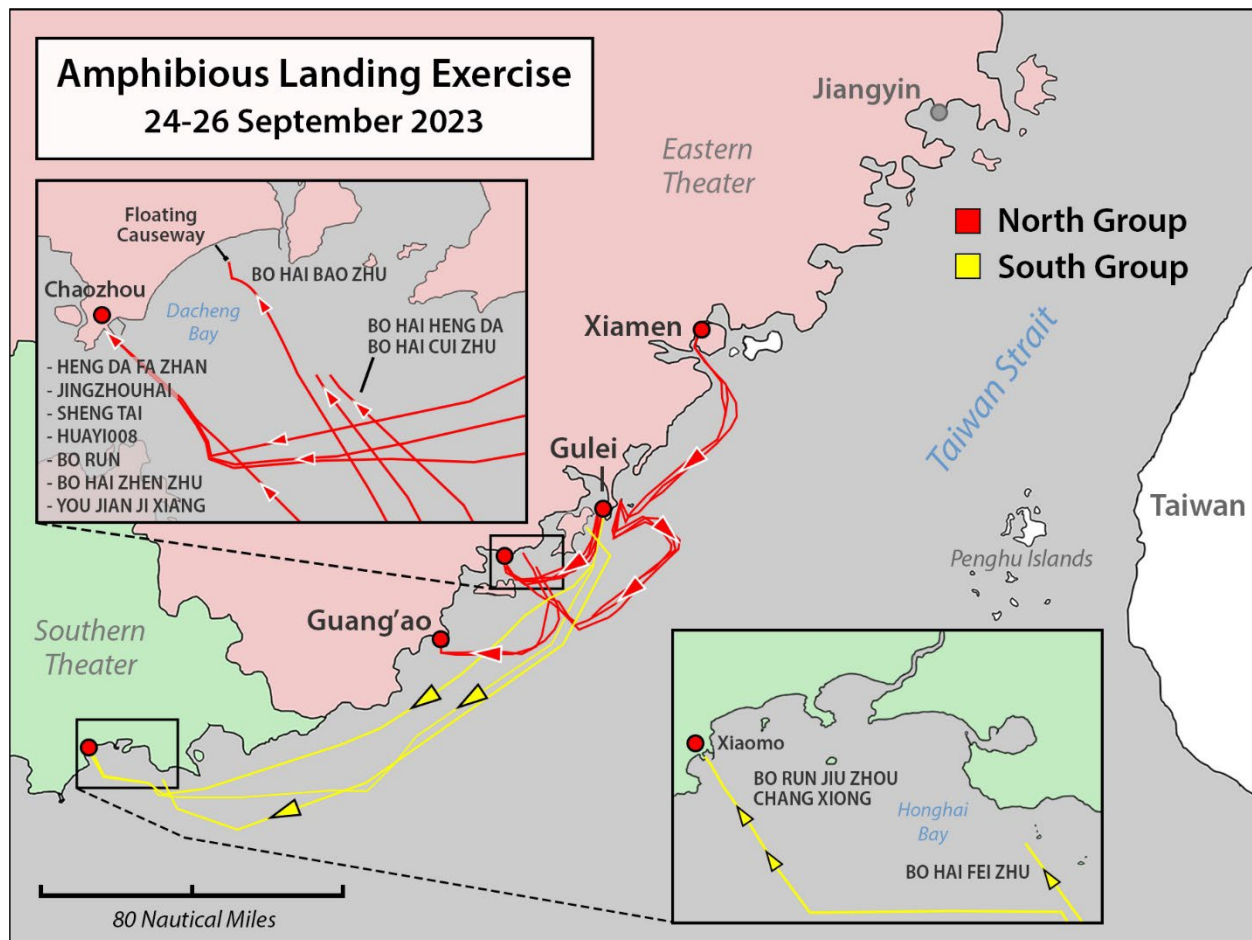


Figure 26. Amphibious Landing Exercise, 24-26 September 2023

<sup>48</sup> AIS position data: BO HAI MA ZHU (MMSI 414211000), BO HAI HENG SHENG (MMSI 413384000), JINGZHOUHAI (MMSI 413492320), HUAYI008 (MMSI 413237850), TIAN ZHU SHAN (MMSI 412076010), and SHENG TAI (MMSI 412081630), September 11-22, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

### *Amphibious Landing Exercise North Group*

**Activity:** The exercise North Group consisted of four RO-RO ferries, five deck cargo ships (one outfitted with a variable height loading ramp), and one general cargo ship (see Table 12). The ports of Xiamen and Gulei served as primary ports of embarkation for the North Group. In addition to in-port loading in Xiamen and Gulei, offshore loading of amphibious vehicles was also observed.

Table 12. Amphibious Landing Exercise, North Group, 24-26 September 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
BO HAI BAO ZHU	渤海宝珠	BO HAI HENG DA	渤海恒达
BO HAI CUI ZHU	渤海翠珠	BO HAI ZHEN ZHU	渤海珍珠
<b>Deck Cargo Ships</b>			
BO RUN	博润	JINGZHOUHAI	靖舟海
YOU JIAN JI XIANG	友建吉祥	HUAYI008	桦意 008
HENG DA FA ZHAN	(?)		
<b>General Cargo Ships</b>			
SHENG TAI	盛泰		
<b>Ports and Amphibious Landing Areas</b>			
Gulei Wharf	古雷码头	Xiamen Xiangyu Wharf	厦门象屿码头
Chaozhou Port	潮州港	Dacheng Bay (Landing Area)	大埕湾
Guang'ao Port	广澳港		

On 24 September, the four RO-RO ferries were at an anchorage south of Xiamen while the five deck cargo ships and one general cargo ship were anchored immediately east of Gulei. That evening, the four RO-RO ferries proceeded to Xiamen's Xiangyu Wharf, presumably to begin loading military vehicles and personnel. The deck cargo ships and general cargo ship began loading in-port Gulei on the morning of 25 September.<sup>49</sup>

After probably loading military vehicles and embarking personnel in Xiamen, BO HAI ZHEN ZHU, which later off-loaded in port, took up position at anchorage east of Dongshan Island on 25 September. The RO-RO ferries BO HAI BAO ZHU, BO HAI CUI ZHU, and BO HAI HENG DA, which later deployed amphibious elements offshore, took up positions east of the Gulei Peninsula early on 25 September. This is the same location that was used in the 2022 exercise for offshore loading of amphibious armor.<sup>50</sup> Medium-resolution commercial satellite imagery from 25 September captured the three RO-RO ferries east of the Gulei Peninsula. Figure 27 shows the wakes of what are probably amphibious armor surrounding the ships. The RO-RO ferries were likely loading the swimming elements of an amphibious combined arms battalion from the Gulei Peninsula beach.

<sup>49</sup> AIS position data: BO HAI BAO ZHU (MMSI 412330020), BO HAI CUI ZHU (MMSI 414096000), BO HAI HENG DA (MMSI 413254910), BO HAI ZHEN ZHU (MMSI 413409000) BO RUN (MMSI 413556960), JINGZHOUHAI (MMSI 413492320), YOU JIAN JI XIANG (MMSI 413289660), HUAYI008 (MMSI 413237850), HENG DA FA ZHAN (MMSI 413369160), and SHENG TAI (MMSI 412081630), September 24-25, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>50</sup> Dahm, "More Chinese Ferry Tales," p. 43, also Christopher Biggers, "Analysis: PLA conducts amphibious exercises near Taiwan," *Janes Defence Weekly*, September 21, 2022, [www.janes.com](http://www.janes.com).



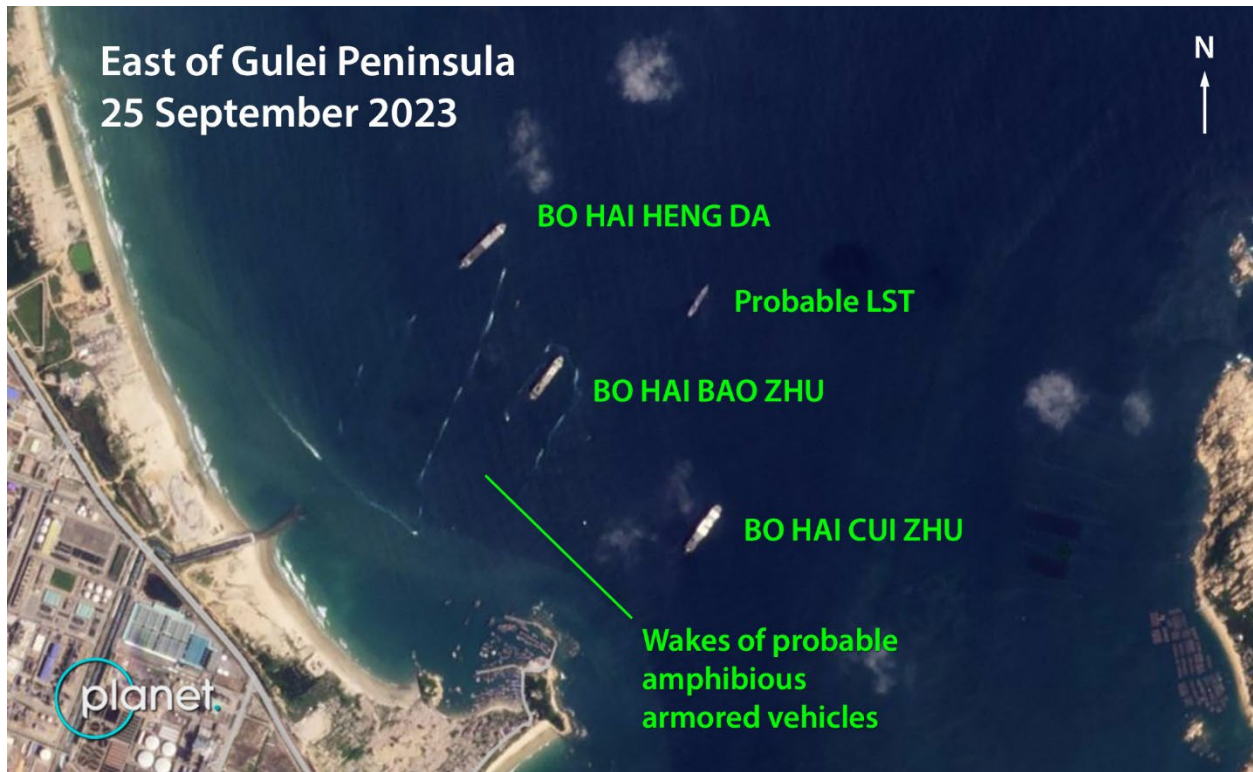


Figure 27. Amphibious Loading East of Gulei Peninsula, 25 September 2023 <sup>51</sup>

After completing the probable loading of amphibious armor elements, the three RO-RO ferries proceeded from Gulei on the evening of 25 September to Dacheng Bay. On the morning of 26 September at approximately 0700 local time, BO HAI CUI ZHU and BO HAI HENG DA were positioned 6.5 nautical miles (12 kilometers) offshore. Here, according to AIS data, the ships remained stationary for almost three hours and probably began offloading amphibious vehicles into the water. At the same time, the BO HAI BAO ZHU proceeded toward the beach and docked with the SAN HANG GONG 8 semi-submersible barge which sat at the head of the floating causeway. The BO HAI BAO ZHU likely offloaded wheeled and tracked vehicles via the causeway.

Meanwhile, having completed loading at Gulei Wharf on 25 September, the five deck cargo ships and the general cargo ship SHENG TAI proceeded to stage outside the port of Chaozhou. As the offshore operations began in Dacheng Bay on the morning of 26 September, these ships and the RO-RO ferry BO HAI ZHEN ZHU probably began offloading military vehicles, personnel, and cargo at Chaozhou's bulk coal terminal. Here, in a repeat of July's Surge Lift Event One, the deck cargo ship outfitted with the variable height loading ramp, the HENG DA FA ZHAN, took up position in the port first. Other ships docked aft of the HENG DA FA ZHAN and probably unloaded vehicles onto the quay using the loading ramp. Each ship was in port for approximately two hours. Figure 28 shows the HUAYI008 with approximately 40 vehicles ready for offload having just docked with the HENG DA FA ZHAN.<sup>52</sup>

<sup>51</sup> Planet, PlanetScope, Image ID: 20230723\_025824\_95\_249a, July 23, 2023, Hainan Bay, China, 20.105N, 110.642E, [www.planet.com](http://www.planet.com).

<sup>52</sup> AIS position data: BO HAI ZHEN ZHU (MMSI 413409000) BO RUN (MMSI 413556960), JINGZHOUHAI (MMSI 413492320), YOU JIAN JI XIANG (MMSI 413289660), HUAYI008 (MMSI 413237850), HENG DA FA ZHAN (MMSI 413369160), and SHENG TAI (MMSI 412081630), September 25-26, 2023; [www.marinetraffic.com](http://www.marinetraffic.com).

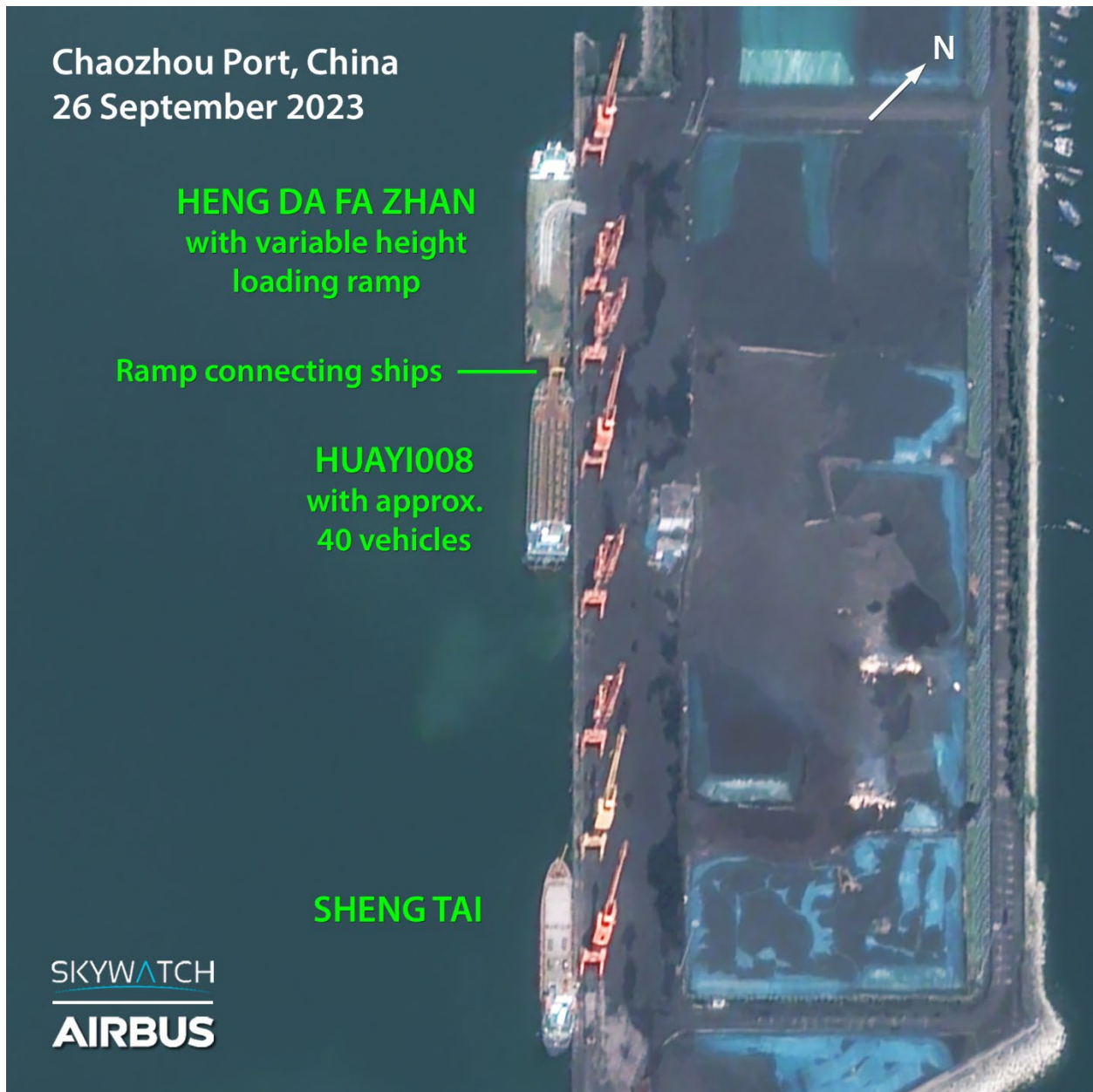


Figure 28. Off-load Activity, Chaozhou Port, China, 26 September 2023 (© 2024 Airbus)<sup>53</sup>

BO HAI HENG DA and BO HAI CUI ZHU, the two ferries that had offloaded offshore in Dacheng Bay, proceeded to Guang’ao following the exercise. They arrived in the early morning hours of 27 September and probably offloaded non-amphibious elements they had embarked in Xiamen.

*Amphibious Landing Exercise South Group*

**Activity:** The smaller South Group consisted of one RO-RO ferry, one deck cargo ship, and one general cargo ship (see Table 13). The port of Gulei served as the port of embarkation for the deck cargo ship and the general cargo ship. The RO-RO ferry, BO HAI FEI ZHU, arrived at the exercise directly from its commercial route on the Bohai Gulf with a brief stop at the Xiamen anchorage. The

<sup>53</sup> Airbus, Pléiades, Image ID: DS\_PHR1B\_202309260242227\_FR1\_PX\_E117N23\_0216\_00522, September 26, 2023, Chaozhou, China, 23.557N, 117.100E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

BO HAI FEI ZHU arrived in Jinluan Bay, east coast of Dongshan Island, on 24 September where it probably loaded amphibious armor offshore like the three RO-RO ferries in the North Group.<sup>54</sup>

Table 13. Amphibious Landing Exercise, South Group, 24-26 September 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferry</b>		<b>Deck Cargo Ship</b>	
BO HAI FEI ZHU	渤海翡翠	BO RUN JIU ZHOU	博润九州
<b>General Cargo Ships</b>			
CHANG XIONG	长(長)富		
<b>Ports and Amphibious Landing Areas</b>			
Gulei Wharf	古雷码头	Jinluan Bay (Dongyin Island)	金銮湾
Xiaomo Port	小港港	Honghai Bay (Landing Area)	

Figure 29 shows the RO-RO ferry BO HAI FEI ZHU in Jinluan Bay on 24 September 2023. The ferry remained there, just offshore, for 24 hours, probably to embark amphibious elements. The medium-resolution satellite image also shows a PLAN Type 075 *Yushen*-class amphibious assault ship (LHA), a Type 071 *Yuzhao*-class LPD, and two LSTs. PLAN ships typically do not transmit publicly available AIS data, so commercial satellite imagery is a readily available means of identifying their presence at civil maritime-military events. This image should leave little doubt that this amphibious landing capstone exercise likely combined civilian ships with PLAN ships as integral components of amphibious operations and over-the-shore logistics.

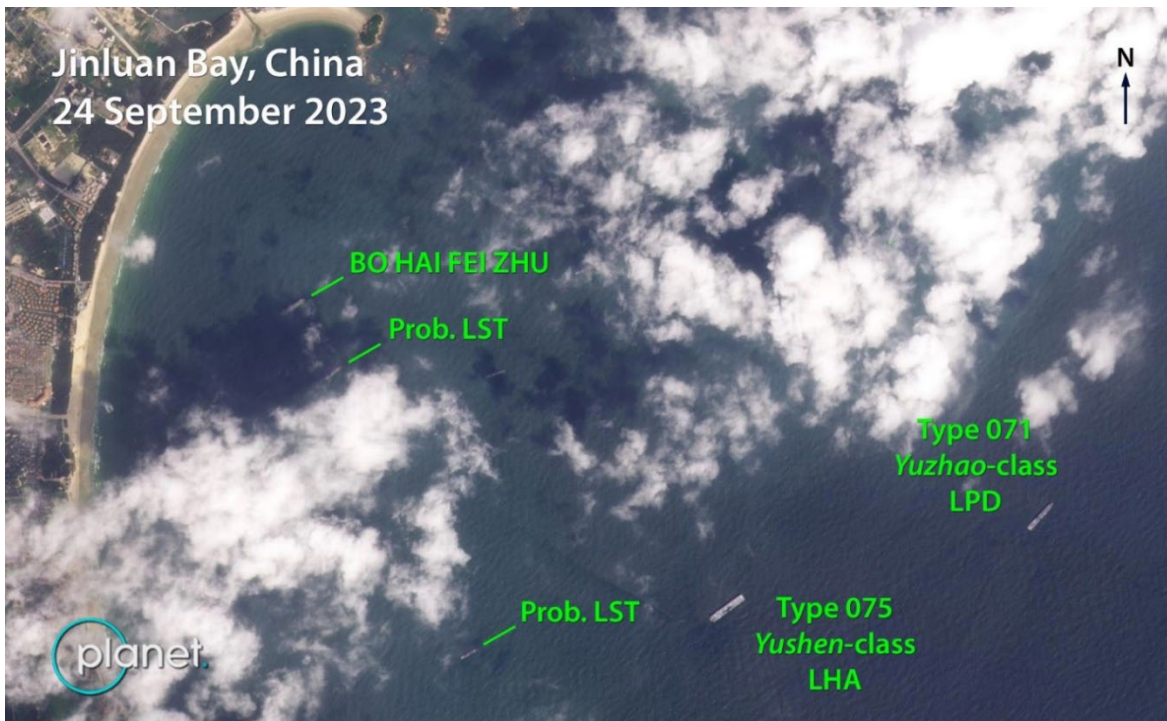


Figure 29. Amphibious Ships in Jinluan Bay, 24 September 2023 (© 2024 Planet)<sup>55</sup>

<sup>54</sup> AIS position data: BO HAI FEI ZHU (MMSI 413324830), September 20-25, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>55</sup> Planet, PlanetScope, Image ID: 20230924\_023650\_32\_2446, September 24, 2023, Dongyin Island, China, 23.688N, 117.506E, [www.planet.com](http://www.planet.com).

The large deck cargo ship BO RUN JIU ZHOU and general cargo ship CHANG XIONG departed Gulei in the afternoon on 24 September and arrived in the port of Xiaomo on the morning of 25 September, probably to offload military vehicles, personnel, and cargo. BO RUN JIU ZHOU was in port for six hours, while CHANG XIONG was in port for seven hours. Commercial satellite imagery of in-port activity was not available for this report. Whether the large deck cargo ship offloaded vehicles using a ramp or the ship used the cranes at the terminal to offload vehicles and cargo could not be determined based on AIS data alone. CHANG XIONG likely offloaded vehicles and cargo from its holds using either its onboard cranes or cranes available at the terminal.<sup>56</sup>

The RO-RO ferry BO HAI FEI ZHU departed its offshore loading location in Jinluan Bay on 25 September and proceeded to Honghai Bay. The ship stopped approximately 4 nautical miles (7.5 kilometers) offshore at approximately 0800 local time on 26 September and began amphibious offload operations. Figure 30 shows BO HAI FEI ZHU at this location deploying what are likely amphibious armored vehicles. After four hours, the ferry moved to within 3 nautical miles (5 kilometers) of the beach and remained stationary for another hour, possibly offloading more armor or infantry assault boats.<sup>57</sup>

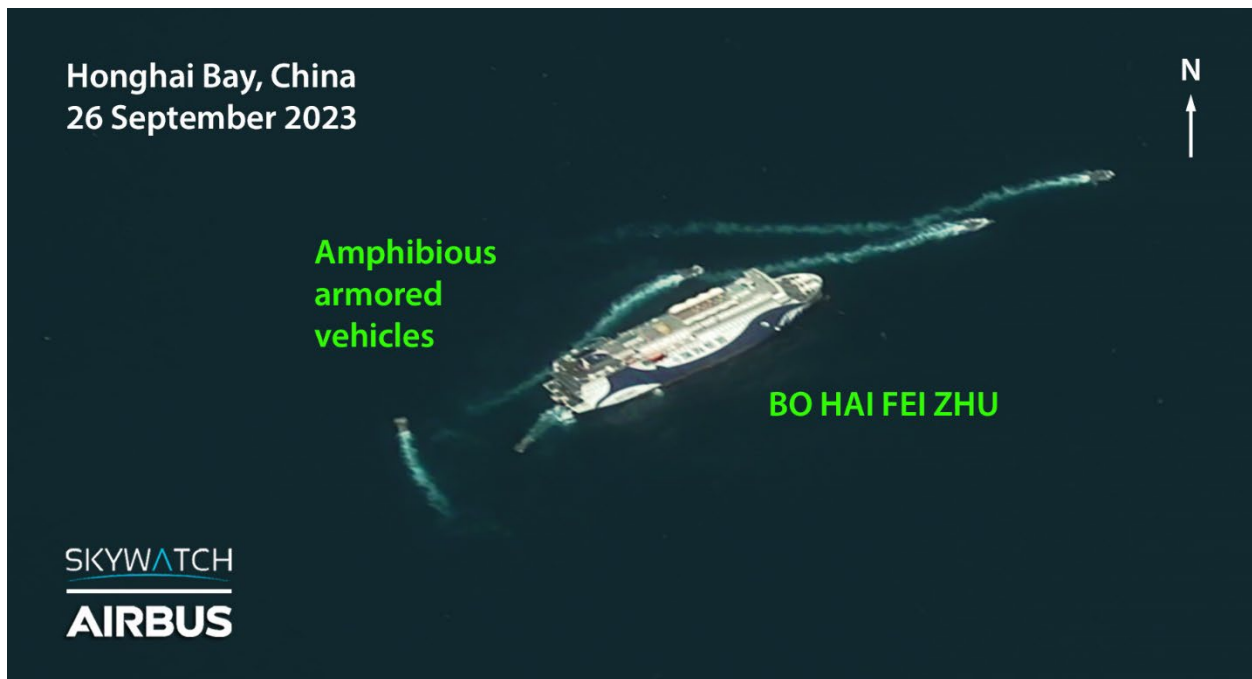


Figure 30. Amphibious Off-load from BO HAI FEI ZHU, 26 September 2023 (© 2024 Airbus)<sup>58</sup>

#### *Amphibious Landing Exercise Hainan Group*

**Activity:** A Hainan Group element is a new addition to the amphibious landing capstone exercise for 2023. Three Qiongzhou Strait RO-RO ferries probably moved military vehicles and personnel between Zhanjiang Naval Base and Hainan Island in two lifts on 24 and 26 September (see Table 14 and Figure 31).

<sup>56</sup> AIS position data: BO RUN JIU ZHOU (MMSI 413536970), CHANG XIONG (MMSI 413380840), September 24-25, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>57</sup> AIS position data: BO HAI FEI ZHU (MMSI 413324830), September 20-25, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>58</sup> Airbus, Pléiades, Image ID: DS\_PHR1B\_202309260242349\_FR1\_PX\_E115N22\_0518\_00256, September 26, 2023, Chaozhou, China, 23.557N, 117.100E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

Table 14. Amphibious Landing Exercise, Hainan Group, 24-26 September 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
SHUANG TAI 26	双泰 26	ZI JING SHI YI HAO	紫荆十一号
SHUANG TAI 36	双泰 36		
<b>Ports</b>			
Haikou Port	海口港	Haikou New Seaport	海口市新海港
Zhanjiang Ferry Port	湛江渡口港	Zhanjiang Naval Base	湛江海军基地



Figure 31. Amphibious Landing Exercise, Hainan Group, 24-26 September 2023

The RO-RO ferries SHUANG TAI 26 and SHUANG TAI 36 left their normal Qiongzhou Strait ferry routes early on 24 September and proceeded to Zhanjiang. According to AIS data, SHUANG TAI 26 called at a Zhanjiang Naval Base pier while SHUANG TAI 36 docked at the civilian ferry ramp across the river. Both ships then proceeded to the old Haikou Port ferry terminal, which is not the normal ferry terminal for these two ferries. The two ferries appeared to return to normal commercial activity on 25 September.<sup>59</sup>

On 26 September, SHUANG TAI 26 and SHUANG TAI 36 returned to the old Haikou Port ferry terminal. They were joined there by the RO-RO ferry ZI JING SHI YI HAO and proceeded on a return trip to Zhanjiang. All three ships docked at the civilian ferry ramp on the west side of the river in Zhanjiang, opposite the naval base. The three ships then returned to Haikou.<sup>60</sup>

<sup>59</sup> AIS position data: SHUANG TAI 26 (MMSI 413233590) and SHUANG TAI 36 (MMSI 413233630), September 24-25, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>60</sup> AIS position data: SHUANG TAI 26 (MMSI 413233590), SHUANG TAI 36 (MMSI 413233630), and ZI JING SHI YI HAO (MMSI 413233370), September 26-27, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

**Assessment:** The 2023 amphibious landing capstone exercise was very similar to the 2022 exercise, using most of the same ports, landing areas, and scheme of maneuver. Notably, the number of ships involved in the 2023 exercise increased to sixteen, up from eight in 2021 and ten in 2022. Granted, three of the RO-RO ferries added in 2023 conducted a relatively simple lift to and from Hainan Island, remote from the main exercise area. Still, this annual exercise continues to expand in scope and complexity and stands as a benchmark for civil maritime support to PLA amphibious landings and over-the-shore logistics. What cannot be determined by the data available for this report is how civilian ships may be integrated with PLAN amphibious operations and whether the PLA considers that integration successful.

The addition of coordinated lift activity in the Southern Theater between Zhanjiang Naval Base and Hainan Island probably represents the expansion of the exercise design for 2023. In 2021, the exercise was limited to what was 2023's North Group Activity. In 2022, the South Group was added, making two groups. Future exercises may continue to add groups, individual group operations may increase in size and complexity, or both.

Among the most striking features of the 2023 exercise is that only two of the sixteen civilian ships involved also participated in the 2022 exercise. Only the RO-RO ferry BO HAI CUI ZHU and general cargo ship SHENG TAI, which have participated in this annual exercise since 2021, participated in the 2022 exercise. All other ships, and presumably their crews, were new to this large-scale exercise. This likely demonstrates that the PLA is attempting to expand military experience across its civil maritime support fleet.

The offshore loading of RO-RO ferries at the beginning of the exercise is a significant capability that the PLA continues to develop for its civil maritime fleet. This capability would be useful if embarkation ports were damaged or unavailable in a military conflict or even a natural disaster if the PLA were given a relief mission. Beyond compensating for possible damage to mainland China embarkation ports, offshore loading and unloading from civilian ships would also be useful in moving forces up the Taiwan coast from one beachhead to another in an invasion scenario.

Among the most significant developments observed in the 2023 exercise is the use of six deck cargo ships even as the number of large, ocean-going RO-RO ferries in the annual exercise was reduced from seven to six. While an inventory is difficult to quantify, there are certainly many more deck cargo ships available in China's merchant fleet than there are large RO-RO ferries. The RO-RO ferries will likely continue to be important as auxiliary amphibious assault ships and an integral part of the PLA's over-the-shore logistics plans. However, readily available deck cargo ships could potentially provide the PLA with the necessary volume to conduct a large-scale cross strait operation. How satisfied the PLA was with the deck cargo ships' performance in 2023 events may be reflected in future exercises.

As in past years, the tracks of most of the participating ships appear to indicate that threats or opposition forces were probably not considered in the exercise. Most ships appeared to move independently of one another, some proceeding to anchorages near offload ports several hours prior to landing while others arrived in their exercise areas immediately prior to commencing landing operations. Maintaining a tight convoy formation may be useful, especially if the ships are escorted by a navy combatant. A PLAN ship could provide air defense coverage or protection against submarine or surface threats, provided the merchant ships stayed close to their escort and were not as spread out as they appeared to be during these exercise transits.

The possible exceptions that did display some modicum of threat awareness were the two RO-RO ferries that conducted offshore landings in Dacheng Bay, the BO HAI CUI ZHU and BO HAI HENG DA. These two ships proceeded in tandem, remaining within a mile or two of each other during their transit, arriving simultaneously in their offload positions. Similarly, while transiting alone, the BO HAI FEI ZHU arrived at its offshore location and promptly began amphibious offload operations. These activities may have been coordinated and synchronized with other PLAN amphibious ship operations, but such coordination was not apparent from available AIS data and satellite imagery.

### Section 5. Other Notable 2023 Civil Maritime-Military Activity

Several civil maritime-military developments in 2023 are noteworthy: 1.) In October and November 2023, two RO-RO ferries and two general cargo ships participated in what appeared to be a significantly scaled-down version of the major 2022 loading exercise at the Tianjin International Cruise Ship Terminal. 2.) The RO-RO passenger cruise ship QI ZI WAN emerged as a logistics workhorse for the PLA and JLSF, transferring vehicles, equipment, and personnel throughout the Southern Theater. 3.) Throughout 2023, two general cargo ships, CHANG ZAN and CHANG XIONG, continued providing logistical support to the PLA’s South China Sea artificial island-reef bases as they had in 2022. 4.) The BO RUN JIU ZHOU, a large deck cargo ship that participated in 2023’s Surge Lift Event One as well as the amphibious landing capstone exercise, was used as an offshore space launch platform in December 2023.

#### 2023 Tianjin Loading Exercise

**Activity:** Beginning on 28 October 2023, the RO-RO ferry PU TUO DAO probably practiced loading and unloading military vehicles at the Tianjin International Cruise Ship Terminal. Commercial satellite imagery was not available to confirm the presence of military vehicles at the terminal, but they were very likely present based on past activity. After two days in port, PU TUO DAO proceeded to the Tianjin Anchorage for a day before returning to the terminal, presumably to unload what it had taken to sea. PU TUO DAO was joined by the RO-RO ferry BANG CHUI DAO on 31 October, which followed the same in-and-out pattern. During this time, two general cargo ships, CHANG XIONG and TIAN ZHU SHAN, also presumably loaded cargo or vehicles, sailed out to the Tianjin Anchorage, and returned to port. This activity continued through 3 November.<sup>61</sup>

Following the Tianjin loading evolution, the cargo ships, CHANG XIONG and TIAN ZHU SHAN, proceeded to call in Huludao (Liaoning) in the far north of the Bohai Gulf and then Dongying (Shandong) on the south side of the Gulf between 2 and 9 November.

Table 15. Tianjin Loading Exercise, 28 October-9 November 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ferries</b>			
PU TUO DAO	普陀岛	BANG CHUI DAO	棒槌岛
<b>General Cargo Ships</b>			
CHANG XIONG	长(長)富	TIAN ZHU SHAN	天柱山
<b>Ports</b>			
Tianjin Int’l Cruise Ship Terminal	天津国际邮轮母港	Tianjin Port	天津港
Huludao Port	葫芦岛港	Dongying Port Terminal	东营港码头

<sup>61</sup> AIS position data: PU TUO DAO (MMSI 413127000), BANG CHUI DAO (MMSI 412450000), TIAN ZHU SHAN (MMSI 412076010), and CHANG XIONG (MMSI 413380840), October 28-November 9, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

**Assessment:** The 2023 Tianjin loading exercise is probably a return to normal and more closely resembles an October 2021 Tianjin loading exercise that involved three RO-RO ferries. The 2022 version of this exercise was likely the exception. Probably capitalizing on the forces and ships that were available due to COVID lockdown restrictions, the 2022 Tianjin loading exercise involved a complete PLA Army heavy combined arms brigade consisting of 640 vehicles.<sup>62</sup> Facilities at Tianjin are close to Bohai Gulf ferry routes and provide a ready location for the PLA to practice loading and unloading RO-RO ferries or other civilian ships. This six-day annual exercise underscores how civilian ships might be used to move non-amphibious, second echelon forces in a large-scale amphibious lift operation.

*Southern Theater/Woody Island Logistics Support*

**Activity:** The RO-RO cruise ship QI ZI WAN appeared to engage in non-commercial military-related activity throughout 2023 (see Table 16). QI ZI WAN began supporting civil maritime-military activity in 2022, probably following COVID lockdown restrictions on cruise ships.<sup>63</sup> QI ZI WAN is owned and operated by China Ocean Shipping Company (COSCO) subsidiary Hainan Strait Shipping Co., Ltd.<sup>64</sup> QI ZI WAN had provided “eco-tourism” cruises to places like the Paracel Islands. The ships’ RO-RO ramps offer opportunities to launch small boats or access reefs directly. In 2023, no such cruise activity by QI ZI WAN was noted.

Table 16. QI ZI WAN Logistics Support in the Southern Theater, 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ships</b>			
QI ZI WAN	棋子湾		
<b>Ports</b>			
Haikou Port	海口港	Haikou New Seaport	海口市新海港
Fangcheng Port	防城港	Guang'ao Port	广澳港
Maoming Port	茂名港	Nansha Port / Shazai Island	南沙港 / 沙仔岛
Woody Island (Yongxing Dao)	永兴岛	Yulin Naval Base	榆林海军基地
Zhanjiang Ferry Port	湛江渡口港	Zhanjiang Naval Base	湛江海军基地

On at least twelve occasions in 2023, QI ZI WAN probably provided military logistics support in the Southern Theater. Notable destination ports included Woody Island, a PLA outpost in the Paracel archipelago; Yulin Naval Base (Hainan); and Zhanjiang Naval Base (Guangdong).<sup>65</sup> The left-hand image in Figure 32 shows QI ZI WAN in-port Yulin Naval Base just prior to the ship’s departure for Shazai Island, a commercial car terminal with a history of military support activity. The image on the right shows 44 military vehicles arrayed on the quay approximately one hour before QI ZI WAN arrived on 26 December 2023. The RO-RO ship departed for Shazai Island the same day, probably transporting the military vehicles.<sup>66</sup>

<sup>62</sup> Dahm, “More Chinese Ferry Tales,” pp. 28-32.

<sup>63</sup> Ibid., pp. 45-46.

<sup>64</sup> 2022 年半年度报告 [2022 Semi-Annual Report], 海南海峡航运股份有限公司 [Hainan Strait Shipping Co., Ltd.], August 25, 2022, p. 145, <http://static.cninfo.com.cn/finalpage/2022-08-25/1214390203.PDF>.

<sup>65</sup> AIS position data: QI ZI WAN (MMSI 413396680), January-December 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>66</sup> AIS position data: QI ZI WAN (MMSI 413396680), March 30-April 1, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).





Figure 32. Yulin Naval Base - QI ZI WAN In Port (left) and Just Prior to QI ZI WAN's Arrival (right) (© 2024 Airbus)<sup>67</sup>

**Assessment:** The QI ZI WAN, similar to the general cargo ships CHANG ZAN and CHANG XIONG described below, may be in the fulltime employ of the PLA JLSF, based on observed activity. The QI ZI WAN also made an appearance in a JLSF promotional video loading military vehicles at the Shazai Island/Guangzhou Port Nansha Car Terminal (See Figure 33).



Figure 33. QI ZI WAN Loading Military Vehicles at Shazai Island<sup>68</sup>

<sup>67</sup> Airbus, Pléiades, Image ID: DS\_PHR1A\_202303300316185\_FR1\_PX\_E109N18\_0707\_00282, March 30, 2023 and DS\_PHR1B\_202312260331134\_FR1\_PX\_E109N18\_0706\_00323, December 26, 2023, Yulin Naval Base, China, 18.221N, 109.537E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

<sup>68</sup> PLA JLSF, 《捍卫》——联勤保障部队成立七周年主题宣传片 (“Defend” A Promotional Video on the 7<sup>th</sup> Anniversary of the Establishment of the Joint Logistics Support Force”) video, 2:50, Douyin, September 12, 2023, <https://www.douyin.com/video/7278147472323530045>.

*Spratly Island Logistics Support*

**Activity:** According to AIS data and commercial satellite imagery, the general cargo ships CHANG ZAN and CHANG XIONG provided dedicated logistics support to the PLA’s South China Sea artificial island bases throughout 2023 (see Table 17). South China Sea logistics support from these two ships began in 2021.<sup>69</sup> Every three to four weeks, either the CHANG XIONG or the CHANG ZAN called at the Nansha Container Terminal, south of Guangzhou, and proceeded to each of the PLA’s major artificial islands—Subi Reef, Fiery Cross Reef, and Mischief Reef. When either of the ships were not involved in South China Sea logistics support, they were usually supporting other civil maritime military activity as outlined in previous sections of this report.<sup>70</sup> Figure 34 shows CHANG ZAN transloading cargo and containers at Subi Reefs in December 2023.

Table 17. Spratly Logistics Support, 2021-2022

Name	Name (Chinese)	Name	Name (Chinese)
<b>General Cargo Ships</b>			
CHANG XIONG	长(長)富	CHANG ZAN	长赞
<b>Ports</b>			
Fiery Cross Reef (Yongshu Jiao)	永暑礁	Subi Reef (Zhubi Jiao)	渚碧礁
Mischief Reef (Meiji Jiao)	美济礁	Woody Island (Yongxing Dao)	永兴岛
Nansha Container Terminal	南沙集装箱码头		



Figure 34. CHANG ZAN at Subi Reef, 09 December 2023 (© 2024 Planet)<sup>71</sup>

<sup>69</sup> Dahm, “More Chinese Ferry Tales,” pp. 46-47.

<sup>70</sup> AIS position data: CHANG XIONG (MMSI 413380840) and CHANG ZAN (MMSI 413307520), January-December, 2023; [www.marinetraffic.com](http://www.marinetraffic.com). Days providing logistics support in the South China Sea for CHANG XIONG (76 days) and CHANG ZAN (294 days) are not counted in civil maritime-military support “total ship days” in this report.

<sup>71</sup> Planet, SkySat, Image ID: 20231209\_022128\_ssc1\_u0001, December 9, 2023, Subi Reef, South China Sea, 10.937N, 114.092E, SkyWatch EarthCache, [www.skywatch.com](http://www.skywatch.com).

**Assessment:** CHANG ZAN and CHANG XIONG may have been employed full-time to support the PLA and JLSF throughout most of 2023. Based on observed activity, both ships solely engaged in civil maritime-military activity until at least December 2023. CHANG XIONG’s full-time support status may have changed. In December 2023, CHANG XIONG was noted on its first international voyage, calling in Hyundai Vinashin, Vietnam, and Kunak, Malaysia.<sup>72</sup>

*Large Deck Cargo “Spaceships”*

**Activity:** Following September’s amphibious landing exercise, the large deck cargo ship BO RUN JIU ZHOU proceeded to the Shandong Peninsula and the port of Fengcheng, which is adjacent to the Haiyang Oriental Aerospace Port. Since 2019, the Haiyang space port has employed modified deck cargo ships for offshore space launches.<sup>73</sup> Between mid-October and late-November 2023, BO RUN JIU ZHOU was apparently outfitted with launch equipment and loaded with a launch vehicle before setting sail for an area south of Yangjiang (Guangdong) in the South China Sea (See Table 18).

While positioned 19 nautical miles (35 kilometers) offshore, the BO RUN JIU ZHOU launched a Smart Dragon-3 (Jielong-3) solid-fuel rocket on 6 December 2023.<sup>74</sup> The rocket successfully carried an internet technology test satellite into orbit.<sup>75</sup> The BO RUN JIU ZHOU returned to Fengcheng, was refitted with another launch vehicle, and returned to the same spot south of Yangjiang.<sup>76</sup> There it launched another solid-fuel rocket, a Long March 11, that carried three experimental satellites into orbit.<sup>77</sup> Figure 35 shows the rocket launches from the BO RUN JIU ZHOU.

Table 18. BO RUN JIU ZHOU Space Launch Activity, December 2023

Name	Name (Chinese)	Name	Name (Chinese)
<b>RO-RO Ships</b>			
BO RUN JIU ZHOU	博润九州		
<b>Ports</b>			
Fengcheng Port	凤城港	Yangjiang Port	阳江港

**Assessment:** The space launch activity is not military activity and is not counted in this report as a military event. As such, BO RUN JIU ZHOU’s December 2023 activity also does not contribute to the “total ship days” count of civil maritime-military activity that appears at the beginning of this report. It is nevertheless interesting that a ship and a shipping company that supported PLA military exercises in 2023 is also involved in at-sea space launches.

The December South China Sea launch events demonstrate the dynamic capabilities of large deck cargo ships. In a military conflict involving on-orbit losses, ships like the BO RUN JIU ZHOU might be used for a mobile, rapid launch capability to reconstitute Chinese military space capabilities.

<sup>72</sup> AIS position data: CHANG XIONG (MMSI 413380840), December 8-31, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>73</sup> Yuan Quan, “Coastal City Boosts Development Path with Space Launches,” Xinhua, November 8, 2023, <https://english.news.cn/20231108/f5dc799f12264d36bd81d051416bab51/c.html>.

<sup>74</sup> AIS position data: BO RUN JIU ZHOU (MMSI 413536970), November 29-December 6, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>75</sup> Andrew Jones, “China Launches Internet Technology Test Satellite from Sea Barge,” *Space News*, December 6, 2023, <https://spacenews.com/china-launches-internet-technology-test-satellite-from-sea-berge/>.

<sup>76</sup> AIS position data: BO RUN JIU ZHOU (MMSI 413536970), December 7-26, 2023, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>77</sup> Zhao Lei, “Second Rocket Launch from South China Sea Sends Three Satellites into Orbit,” *China Daily*, December 26, 2023, <https://www.chinadaily.com.cn/a/202312/26/WS658a401ca31040ac301a9933.html>.

Similarly, space launches demonstrate that there are no physical limits precluding these ships from being used as launch platforms for weapons such as ballistic missiles.

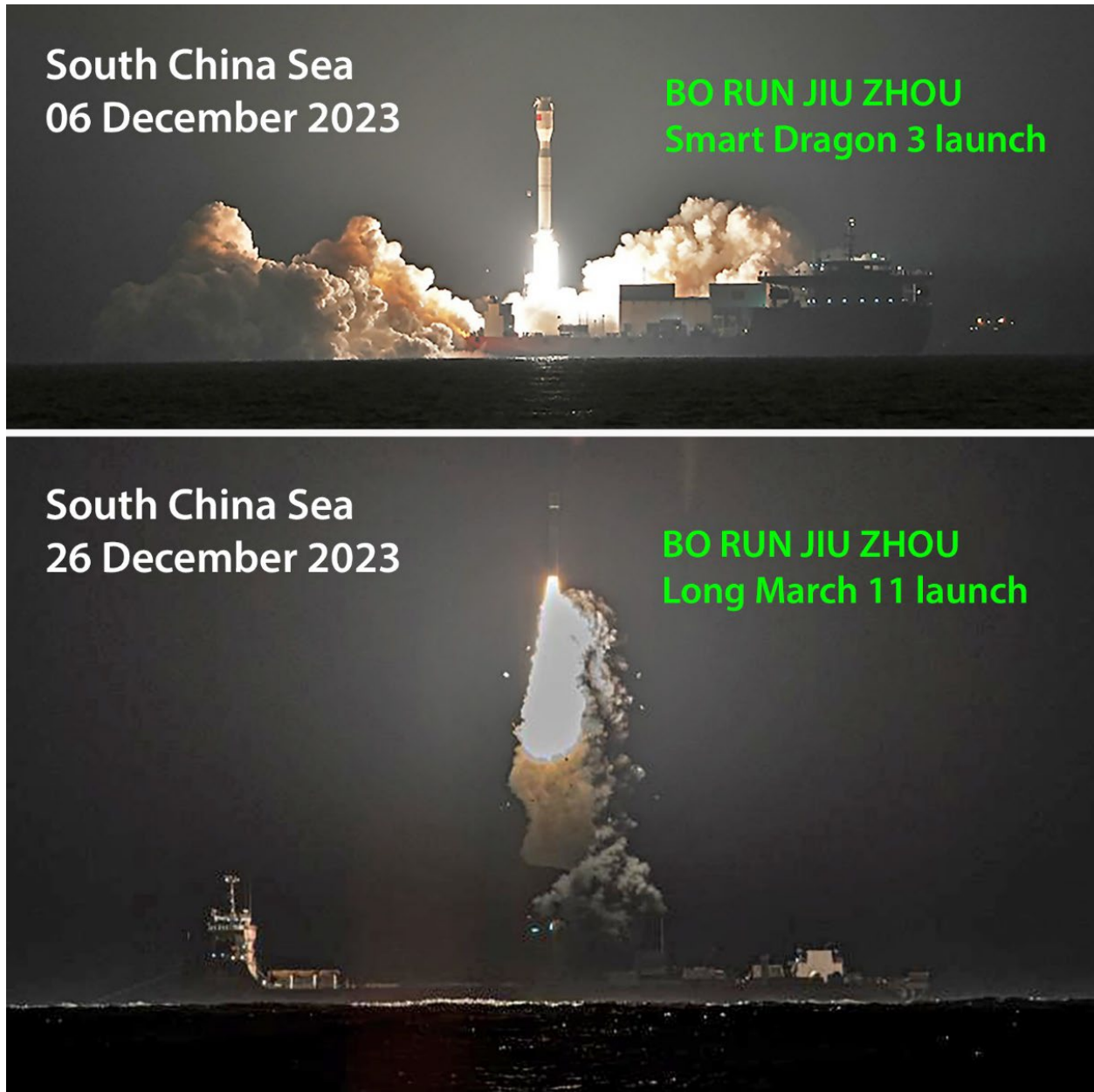


Figure 35. BO RUN JIU ZHOU Space Launches, 06 and 26 December 2023<sup>78</sup>

<sup>78</sup> (Top image) Zhao Lei, “South China Sea Hosts First Space Launch Mission,” *China Daily*, December 6, 2023, [https://www.chinadaily.com.cn/a/202312/06/WS6566fbfb3a31090682a5f19e8\\_3.html](https://www.chinadaily.com.cn/a/202312/06/WS6566fbfb3a31090682a5f19e8_3.html), (bottom image) Zhao, “Second Rocket Launch from South China Sea Sends Three Satellites into Orbit.”

## Conclusion

This report represents a second attempt at using open and commercial sources to comprehensively examine Chinese civil maritime-military activity throughout an entire training year. A total of thirty-three civil maritime-military events were observed in 2023, with ten categorized as “significant events,” involving multiple ships in coordinated activities. Six “major events” or exercises also occurred during the year, including four surge lift events and a large-scale amphibious landing exercise.

Thirty-nine Chinese civilian ships spent a combined total of 812 ship-days in support of PLA activities in 2023. This represents an 11 percent increase in the overall level of support compared to 2022 (733 ship-days). However, more RO-RO ferries and cruise ships were probably available in 2021 and 2022 due to COVID pandemic restrictions and a corresponding decrease in commercial activity. The marginal increase in civil maritime-military activity in the context of the end of China’s COVID lockdowns and a return to normal economic activity is significant. Moreover, the PLA’s use of civilian shipping between July and September 2023 was more concentrated and seemingly intense. Civilian ships supported military activity for 611 ship-days between July and September 2023 compared to 462 ship-days for the same period in 2022, a 32 percent increase. Rapidly increasing military support activity over a few weeks or months is probably more representative of what would be required of China’s civilian fleet to support a large-scale military operation.

What are described in this report as “surge lift events” were observed for the first time in 2023. These events involved relatively large numbers of civilian vessels—as many as fifteen—in operations that took place over just a few days. Surge lift events may indicate how the PLA envisions a first wave of follow-on forces and initial logistics support in a cross-strait operation. That is, if PLA amphibious forces were able to secure a substantial beachhead on Taiwan and capture several ports intact, civil maritime ships might then surge into Taiwan ports and harbors with second echelon forces and logistics. Alternatively, surge lift events may represent how the PLA could rapidly deploy offensive or defensive forces up and down China’s coast, especially if roads, rail, or other infrastructure were damaged in a conflict or natural disaster. Surge lift events held in 2023 contrast with the weeks-long, high-volume port-to-port lift exercises observed in 2022. Longer term, high-volume lift would certainly be necessary to ensure robust logistics sustainment in any protracted military operation.

The inter-theater coordination and synchronized activity associated with Surge Lift Events One and Two as well as September’s amphibious lift capstone exercise represents an apparent evolution in PLA logistics training. This inter-theater activity raises questions about whether events were simply time synchronized across theaters or whether the PLA distributed training across different areas to mitigate disruptions to commercial maritime activity. If events were, in fact, distributions of a singular exercise, the geographically disparate activity simulates civil maritime events that would be concentrated in the ports and harbors along the Taiwan Strait in a real-world scenario.

The integration of deck cargo ships into PLA exercises is likely the most significant innovation noted in 2023 civil maritime-military activity. The increased use of deck cargo ships represents an important capability for the PLA, potentially allowing it to overcome its noted shortcomings in amphibious lift capacity necessary for a large-scale Taiwan invasion. While this report uses AIS data and limited commercial satellite imagery to indicate that deck cargo ships were, in fact, used to support military activity in 2023, this report cannot substantiate how well the deck cargo ships performed or whether the PLA was satisfied with their performance. Over the past several years, the PLA and JLSF have highlighted the use of RO-RO ferries to support military operations. Numerous newspaper articles and videos have heralded these ships supporting the PLA as part of China’s civil-

military fusion initiative. It will be interesting to see if large deck cargo ships are promoted in the same manner.

The continued or expanded use of deck cargo ships in future exercises will likely be the best indication about whether these types of ships meet the PLA's amphibious lift requirements. While deck cargo ships with their open decks may not be suited for long-distance voyages with military vehicles embarked, they may be an adequate and plentiful choice for the PLA to lift military forces short distances, such as across the Taiwan Strait. Larger deck cargo ships could also support helicopter operations, acting as "lily pads" potentially offering a platform where helicopters operating across the 100 nautical miles of the Taiwan Strait could refuel and rearm.

The 2023 amphibious landing capstone exercise was very similar to the 2022 exercise, using most of the same ports, landing areas, and scheme of maneuver. Notably, the number of ships involved in the 2023 exercise increased to sixteen, up from eight in 2021 and ten in 2022. This annual exercise continues to expand in scope and complexity and stands as a benchmark for civil maritime support to PLA amphibious landings and over-the-shore logistics. Among the most striking features of the event is that only two of the sixteen civilian ships involved in the 2023 exercise participated in the 2022 exercise. This likely demonstrates that the PLA is attempting to expand military experience across its civil maritime support fleet.

The offshore loading of RO-RO ferries noted at the beginning of the annual amphibious landing exercise and other amphibious landing training events is a significant capability that the PLA continues to develop for its civil fleet. This capability would be useful if embarkation ports were damaged or unavailable in a military conflict. Beyond compensating for possible damage to mainland China embarkation ports, offshore loading and unloading from civilian ships would be useful in moving forces up the Taiwan coast from one beachhead to another in an Taiwan invasion scenario where Taiwan ports may be similarly damaged or unavailable.

Like those observed in 2022, exercises held in 2023 did not appear to simulate enemy threats, the damage and sabotage of ports, or other challenges that would likely manifest in real-world, opposed operations. Similarly, enemy threats did not appear to be represented in amphibious landing exercises that featured the use of civilian RO-RO ferries to offload amphibious forces at sea. While more complex and fast-paced than years past, PLA amphibious exercises still appear to take place in ideal weather conditions with ferries anchored offshore for several hours at a time as proverbial "sitting ducks," discharging amphibious vehicles into relatively calm waters.

Observations from 2023 have resolved questions raised in China Maritime Report No. 25 about the deck cargo ship loading ramp present at the September 2022 Tianjin loading exercise. This variable height loading ramp is apparently used to allow ships to dock parallel to a quay and then use bow or stern ramps to offload vehicles onto the deck cargo ship hosting the ramp. Vehicles then proceed up and over the ramp and onto the quay. The variable height of the ramp allows for tidal variations as the ship rises and falls. Assuming near-maximum loads on deck cargo ships and RO-RO ferries in observed 2023 activity, the variable height loading ramp appears to offer reasonably fast throughput of military vehicles, between 40 and 160 vehicles in times ranging from 90 minutes to three hours depending on the capacity and configuration of the offloading ship.

The PLA's floating causeway system is probably considered operational but appears to be used only in limited operations. In 2023, the system was noted for the first time operating on the north coast of Hainan Island. The causeway system operators appeared to prepare and train for several weeks for what ended up being a single, three-ship offload event. Similarly, the system was again assembled

and disassembled over several weeks leading up to September's amphibious landing capstone exercise, which appeared to consummate in a single offload by one large RO-RO ferry. Whether the causeway was used by PLAN amphibious ships for offloading military vehicles could not be determined based on AIS data and commercial satellite imagery. The apparent limited use of this novel causeway system raises questions about its capabilities to support real-world operations.

A new-construction barge, the E SHAN, was identified as a potential replacement for the semi-submersible barge SAN HANG GONG 8 that has been used as the head of the causeway system and its predecessor system since at least 2020. E SHAN was noted docking with the causeway only a few times in 2023, again raising questions about the technical challenges of the barge and causeway combination. An over-the-shore capability like the floating causeway will be a critical capability in a Taiwan invasion, giving the PLA the capability to bypass damaged or sabotaged ports and harbors with an independent, relocatable off-shore loading and unloading capability.

As of this writing, a full-scale invasion of Taiwan prior to 2030 would probably be an extraordinarily high-risk endeavor for the PLA, one that would likely result in very high losses, especially among its supporting merchant fleet. Still, the PLA continued to make progress in 2023 to reduce its potential risk and losses. However, this report assesses that at least through 2030, the PLA's reserve civilian merchant fleet is probably unable to provide significant amphibious landing capabilities or the maritime logistics in austere or challenging environments necessary to support a large-scale, cross-strait invasion of Taiwan. That said, if current trends in training and exercises continue, the PLA may be able to effectively leverage civil maritime shipping on a large enough scale to support a major amphibious operation by the mid-2030's.

The PLA is clearly developing required procedures and increasing proficiency using civilian ships for logistics and landing operations. In the short term, the PLA may be able to leverage civilian shipping in a variety of smaller scale logistics and landing operations in a Taiwan contingency (e.g., the seizure of Taiwan's offshore islands). These civil maritime-military capabilities could also be leveraged against other foreign military objectives or in domestic or foreign disaster relief operations. Beyond 2030 and probably into the mid-2030's the PLA will likely continue to pursue development of its civil maritime-military capabilities in both complexity and scale concurrent with other necessary military capabilities that might support a full-scale invasion of Taiwan.

## Appendix A. Chinese Merchant Ships Supporting Civil-Military Activity

Tables 19-24 list ships owned, operated, or managed by companies that have been observed through open-sources and commercial sources providing logistics support to the PLA or participating in Chinese military exercises since at least 2020. Ship data provided includes:

- **MMSI** – Maritime Mobile Service Identity number / Automatic Identification System (AIS) number.
- **IMO** – International Maritime Organization number.
- **Gross Tonnage** – A calculated measurement of a ship’s internal volume where a vessel “ton” is 100 cubic feet.
- **Deadweight Tonnage (DWT)** – Number of metric tons (1000 kg/2204 lbs.) of cargo, stores, and fuel a vessel can transport.
- **Vehicles** – “Vehicle” numbers provided by RO-RO ferry companies or ship manufacturers probably refer to a mix of cars and trucks. For vehicle carrier ships, this is assumed to refer to a car equivalent unit (CEU), 4 meters by 1.5 meters. A ship’s military vehicle capacity, including heavy armor and oversized vehicles, is likely less than advertised vehicle numbers.
- **Lanes in Meters (LIM)** – A measurement of a RO-RO ship’s vehicle lanes, conventionally with a 2-meter-wide lane. (1 LIM = 2 square meters, 2000 LIM = 4000 square meters of vehicle deck space).

The civil maritime industry is organized around an often-complex array of owners, managers, joint ventures, and front companies. Civilian ships observed supporting military activities during 2023 fall into three ownership categories: 1) RO-RO ferries owned by the publicly traded Bohai Ferry Group corporation, 2) privately-owned deck cargo ships, and 3) ships that are ultimately owned by large Chinese state-owned enterprises (SOEs) such as the China Ocean Shipping Company (COSCO) or China Merchants Group. This appendix delineates subsidiary companies and managers that appear to be directly responsible for day-to-day operations of ships noted supporting civil maritime-military activity in 2023.

Ships supporting civil maritime-military activity are probably paid for their participation through charter contracts. Most of these ships also likely enjoy some legal protection as members of the Maritime Militia. Bohai Ferry Group ships are organized into the Militia’s “Eighth Transport Dadui” (海运八大队).<sup>79</sup> The China Merchants vehicle carriers reportedly constitute the “Fifth Transport Dadui” (海运五大队). RO-RO ferries servicing Hainan Island may constitute the “Ninth Transport Dadui” (海运九大队).<sup>80</sup>

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<sup>79</sup> 全国国防动员工作先进个人颁奖仪式在烟台举行 [“National Defense Mobilization Advanced Individual Award Ceremony Held in Yantai”], 渤海轮渡集团股份有限公司 [Bohai Ferry Group], July 4, 2020, <http://www.bhferry.com/e/action/ShowInfo.php?classid=11&id=81>.

<sup>80</sup> Conor M. Kennedy, “Getting There: Chinese Military and Civilian Sealift in a Cross-Strait Invasion,” in *Crossing the Strait: China’s Military Prepares for War with Taiwan*, Joel Wuthnow, Derek Grossman, Phillip C. Saunders, Andrew Scobell, and Andrew N.D. Yang, eds. (Washington, DC, National Defense University, 2022), p. 234. <https://ndupress.ndu.edu/Portals/68/Documents/Books/crossing-the-strait/crossing-the-strait.pdf>.



### *RO-RO Ships – Bohai Gulf Ferry Routes*

Over two dozen roll-on/roll-off passenger (ROPAX) ferries provide regular service across the mouth of China’s Bohai Gulf. All of these large ocean-going vessels have at least two vehicle decks. They also have external doors that close and seal to create a high-water line, increasing their ability to operate safely in heavy seas. Different classes of RO-RO ferries are shown in Figure 36.

**Bohai Ferry Group** – Bohai Ferry Group Co. Ltd. (渤海轮渡集团股份有限公司) and its subsidiaries own and operate fourteen RO-RO ferries across the Bohai Gulf. ROPAX ferries fall directly under the Bohai Ferry Group. BO HAI YIN ZHU was inactive throughout 2023 and remains pier-side in Yantai. BO HAI JIN ZHU, provides cargo service under the subsidiary Tianjin Bohai Ferry Shipping Co., Ltd. (天津渤海轮渡航运有限公司). BO HAI MING ZHU was sold to a Turkish company and renamed LIDER EXPRESS. Purpose-built RO-RO cargo ferries BO HAI HENG TONG and BO HAI HENG DA are owned by Bohai Hengtong Ferry Co., Ltd. (渤海恒通轮渡有限公司), a joint venture company between Bohai Ferry Group, Hengtong Logistics Corporation, and Longkou Port Group. ZHONG HUA FU QIANG suffered a serious fire in its vehicle bay in April 2021. ZHONG HUA FU QIANG was repaired and returned to service in 2023 as the BO HAI HENG SHENG, probably as part of the the Bohai Hengtong Ferry Co. In 2020, Bohai Ferry Group acquired Weihai Haida Passenger Transport Co., Ltd. (威海市海大客运有限公司) and its RO-RO ferries.<sup>81</sup> Weihai Haida’s SHENG SHENG 1 has been retired. Bohai Ferry Group ships are listed in Table 19.

**COSCO Shipping** – The China Ocean Shipping Co., Ltd. is a large Chinese SOE. The COSCO subsidiary COSCO Shipping Ferry Co., Ltd. (中远海运客运有限公司) owns and operates twelve ocean-going ferries that provide service across the Bohai Gulf.<sup>82</sup> The HAI YANG DAO has been renamed MIN TAI ZHI XING and is apparently now providing ferry services from Xiaman up and down the Chinese coast. In 2022, COSCO Ferry Shipping took delivery of the SHUN LONG HAI, a purpose-built RO-RO cargo ferry similar to Bohai Hengtong Ferry cargo ferries. A second RO-RO cargo ferry, CHANG LONG HAI, entered service in 2023.<sup>83</sup> COSCO Shipping (Qingdao) Co., Ltd. (中远海运(青岛)有限公司) operates a Chinese-flagged ROPAX ship that sailed between Yantai, China and Incheon, South Korea throughout 2022.<sup>84</sup> COSCO Ferry ships are listed in Table 20.

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<sup>81</sup> Bohai Ferry Group Co., Ltd., 2021 年年度报告 [2021 Annual Report], March 29, 2022, pp. 10-11. <http://static.cninfo.com.cn/finalpage/2022-03-30/1212725160.PDF>

<sup>82</sup> 船舶风采 [“Ship Style”], COSCO Shipping Ferry Co., Ltd., accessed 10 October 2022, <https://ferry.coscoshipping.com/col/col6772/index.html>.

<sup>83</sup> 公司隆重举行“顺龙海”轮首航仪式 [“The Company Grandly Held the Maiden Voyage Ceremony of ‘Shunlonghai’”], COSCO Shipping Ferry, Co., Ltd., September 23, 2022, [https://ferry.coscoshipping.com/art/2022/9/23/art\\_6760\\_283155.html](https://ferry.coscoshipping.com/art/2022/9/23/art_6760_283155.html).

<sup>84</sup> “新香雪兰”轮成功命名交付! [“‘Xinxiang Xuelan’ Successfully Delivered and Named!”], COSCO Shipping (Qingdao) Co., Ltd., December 11, 2020, [https://qd.coscoshipping.com/art/2020/12/11/art\\_17685\\_183954.html](https://qd.coscoshipping.com/art/2020/12/11/art_17685_183954.html).



1. BO HAI BAO ZHU



2. BO HAI ZUAN ZHU



3. ZHONG HUA FU XING



4. BO HAI HENG DA



5. SHENG SHENG 2



6. BANG CHUI DAO



7. CHANG SHAN DAO



8. JI LONG DAO



9. SHUN LONG HAI

Figure 36. RO-RO Ships on Bohai Gulf Ferry Routes<sup>85</sup>

<sup>85</sup> Images: 1-4 – Bohai Ferry Group ([www.bhferry.com](http://www.bhferry.com)); 5 – Wikimedia Commons ([https://commons.wikimedia.org/wiki/File:生生2号\\_威海海大客运有限公司.jpg](https://commons.wikimedia.org/wiki/File:生生2号_威海海大客运有限公司.jpg)); 6-9 – COSCO Shipping Ferry Co. (<https://ferry.coscoshipping.com>).

Table 19. Bohai Ferry Group RO-RO Ships (Bohai Gulf Routes)<sup>86</sup>

2020	2021	2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)	Passengers	Vehicles	LIM (m)
<b>Bohai Ferry Group Co., Ltd. (渤海轮渡集团股份有限公司)</b>																
				BO HAI YIN ZHU **	渤海银珠	412328370	9486221	2007	19847	6984	528/161	79/24	20/6	-	300	1800
				BO HAI YU ZHU	渤海玉珠	413408000	9508330	2009	24024	7535	538/164	82/25	20/6	1571	300	1993
				BO HAI ZHEN ZHU	渤海珍珠	413409000	9508328	2009	24024	7535	538/164	82/25	20/6	1571	300	1993
				BO HAI BAO ZHU	渤海宝珠	412330020	9508342	2010	24024	7618	538/164	82/25	20/6	1571	300	1993
				BO HAI FEI ZHU	渤海翡珠	413324830	9508366	2010	24024	7592	538/164	82/25	20/6	1571	300	1993
				BO HAI CUI ZHU	渤海翠珠	414096000	9584803	2012	34222	7587	587/179	92/28	20/6	2038	300	2500
				BO HAI JING ZHU	渤海晶珠	414095000	9584815	2012	34222	7598	587/179	92/28	20/6	2038	300	2500
				BO HAI MA ZHU	渤海玛珠	414211000	9723461	2015	33458	7503	587/179	92/28	20/6	2038	300	2500
				BO HAI ZUAN ZHU	渤海钻珠	414210000	9713533	2015	33458	7481	587/179	92/28	20/6	2038	300	2500
				ZHONG HUA FU XING	中华复兴	412283000	9849875	2019	44403	9356	696/212	95/29	20/6	1689	350	3000
<b>Tianjin Bohai Ferry Shipping Co., Ltd. (天津渤海轮渡航运有限公司)</b>																
				BO HAI MING ZHU **	渤海明珠	412303720	8818312	1992	18685	6934	518/158	79/24	20/6	-	-	-
				BO HAI JIN ZHU	渤海金珠	413305960	9486219	2006	19847	6984	528/161	79/24	20/6	-	300	1800
<b>Bohai Hengtong Ferry Co., Ltd. (渤海恒通轮渡有限公司)</b>																
				BO HAI HENG DA	渤海恒达	413254910	9870692	2020	24777	11344	623/190	85/26	20/6	-	300	2700
				BO HAI HENG TONG	渤海恒通	413244930	9870680	2021	24777	11288	623/190	85/26	20/6	-	300	2700
				BO HAI HENG SHENG*	渤海恒生	413384000	9899404	2020	37883	8933	610/186	95/29	20/6	2262	300	2600
<b>Weihai Haida Passenger Transport Co., Ltd. (威海市海大客运有限公司)</b>																
				SHENG SHENG 1 **	生生1	412328670	8741545	2006	10347	2541	394/120	66/20	16/5	1026	123	615
				SHENG SHENG 2	生生2	413328380	8673293	2013	20472	5493	541/165	79/24	16/5	2160	300	2200

\* ZHONG HUA FU QIANG, salvaged and repaired following a catastrophic 2021 fire, renamed BO HAI HENG SHENG, reentered service in 2023.

\*\* BO HAI YIN ZHU and SHENG SHENG 1 retired, BO HAI MING ZHU sold to a Turkish company and operating in the Black Sea

**NOTE:** Green boxes indicate years individual ships were observed participating in civil maritime-military events.

<sup>86</sup> 2023 activity as outlined in this report. 2020-22 activity from Dahm, “Chinese Ferry Tales” and “Beyond Chinese Ferry Tales.” Ship data aggregated from databases including MarineTraffic.com and VesselFinder.com as well as other shipping industry sources including company websites, financial statements, and media reports.

Table 20. COSCO RO-RO Ships (Bohai Gulf Routes)<sup>87</sup>

2020	2021	2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)	Passengers	Vehicles	LIM (m)
<b>COSCO Shipping Ferry Co., Ltd. (中远海运客运有限公司)</b>																
				BANG CHUI DAO	棒槌岛	412450000	9110781	1995	15560	3547	443/135	75/23	18/5.5	1200	226	835
				HU LU DAO	葫芦岛	413134000	9305166	2005	16234	3873	450/137	75/23	20/6	1428	235	835
				PU TUO DAO	普陀岛	413127000	9305154	2005	16234	3996	450/137	75/23	20/6	1428	240	835
				WAN RONG HAI	万荣海	412206430	8741569	2008	11585	3252	427/130	66/20	16/5	1108	143	700
				WAN TONG HAI	万通海	412208030	9622497	2010	24205	7646	538/164	82/25	20/6	1618	192	2000
				CHANG SHAN DAO	长山岛	412331000	9520297	2012	24572	7670	551/168	82/25	20/6	1400	350	2000
				LONG XING DAO	龙兴岛	412900000	9517317	2010	24572	7743	551/168	82/25	20/6	1400	350	2000
				YONG XING DAO	永兴岛	412091000	9517329	2011	24572	7662	551/168	82/25	20/6	1400	350	2000
				XIANG LONG DAO	祥龙岛	414556000	9904015	2021	43195	8497	682/208	95/29	23/7	1370	500	2800
				JI LONG DAO	吉龙岛	414510000	9904003	2021	43195	8497	682/208	95/29	23/7	1370	500	2800
				SHUN LONG HAI	顺龙海	414611000	9936020	2022	23249	10839	633/193	85/26	20/6	-	350	3000
				CHANG LONG HAI	畅龙海	413388490	9936032	2022	23249	10840	633/193	85/26	20/6	-	350	3000
				MIN TAI ZHI XING *	闽台之星	412468000	9110793	1995	15560	3547	443/135	75/23	18/5.5	1200	225	835
<b>COSCO Shipping (Qingdao) Co., Ltd. (中远海运(青岛)有限公司)</b>																
				XIN XIANG XUE LAN	新香雪兰	414472000	9885714	2020	32729	5972	623/190	102/31	21/6.5	700	300	1900

\* HAI YANG DAO renamed MIN TAI ZHI XING

**NOTE:** Green boxes indicate years individual ships were observed participating in civil maritime-military events.

<sup>87</sup> Ibid.

### *RO-RO Ships—Qiongzhou Strait Ferry Routes and South China Sea Cruise Routes*

Forty-eight ROPAX ferries provide regular service across the Qiongzhou Strait between mainland China and Hainan Island. These relatively small ROPAX ships carry up to sixty vehicles on a single vehicle deck. Due to Hainan's tropical heat, the ferries have large openings in the sides of the hull and in the vehicle bay overheads for ventilation, a design that makes them dangerous to operate in heavy seas. Prior to COVID epidemic shutdowns, three ROPAX cruise ships offered South China Sea "eco-tourism" cruises from Sanya to the Paracel (Xisha) Islands. These three ocean-going cruise ships are similar in design to the Bohai Gulf RO-RO ferries (see Figure 37).

**COSCO Shipping / Qiongzhou Strait Ferry Transportation** – In 2021, 47 RO-RO ferries that operate across the Qiongzhou Strait were consolidated under the ownership of the COSCO-controlled Qiongzhou Strait (Hainan) Ferry Transportation Co., Ltd. (琼州海峡(海南)轮渡运输有限公司).<sup>88</sup> Qiongzhou Strait Ferry Transportation is a joint venture between provincial government-owned Guangdong Xuwen Strait Shipping Co., Ltd. (广东徐闻海峡航运有限公司), which contributed 29 ferries to the joint company, and COSCO subsidiary Hainan Strait Shipping Co., Ltd. (海南海峡航运股份有限公司), which contributed 18 ferries. COSCO's Hainan Strait Shipping apparently has effective control of the joint venture with 51 percent of the voting rights.<sup>89</sup> Following the 2021 consolidation, in March 2022, the joint company formed its own subsidiary, Qiongzhou Strait (Guangdong) Ferry Transportation Co., Ltd. (琼州海峡(广东)轮渡运输有限公司), which now owns all 29 ships originally contributed by Xuwen Strait Shipping.<sup>90</sup> Qiongzhou Strait ferries appear in Table 21.

**COSCO Shipping** – COSCO subsidiaries operate three ROPAX cruise ships likely chartered to support military activity in 2021 and 2022 after being rendered inactive by COVID-19 restrictions. Hainan Strait Shipping Co., Ltd. (海南海峡航运股份有限公司) owns and operates the CHANG LE GONG ZHU and QI ZI WAN. COSCO subsidiary Sansha Nanhai Dream Cruises Co., Ltd. (三沙南海梦之旅邮轮有限公司) owns and operates the NAN HAI ZHI MENG (Nanhai Dream).<sup>91</sup> Cruise ships appear in Table 22.

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<sup>88</sup> There is apparently a single privately owned RO-RO ferry that now operates across the Qiongzhou Strait, the YONGZHENG/YONG JI (永正号) (MMSI 413522080). The consolidated Qiongzhou Strait Ferry company is reportedly trying to run the owners of the YONG JI out of business. See, Wu Yingjiao, 琼州海峡现“不平等条约” [“The Qiongzhou Strait Now an ‘Unfair Pact’”], 华夏资讯通 [China Infocom], July 12, 2022, <https://xueqiu.com/1140252644/226137818>.

<sup>89</sup> CITIC Securities, Co., Ltd., 海南海峡航运股份有限公司, 出资组建合资公司重大资产重组报告书 [Hainan Strait Shipping Co., Ltd., Report on the Investment and Major Asset Restructuring of a Joint Venture Company], November 2021, pp. 11-12, [https://pdf.dfcfw.com/pdf/H2\\_AN202111091528062976\\_1.pdf](https://pdf.dfcfw.com/pdf/H2_AN202111091528062976_1.pdf).

<sup>90</sup> 海南海峡航运股份有限公司 [Hainan Strait Shipping Co., Ltd.], 关于向琼州海峡(广东)轮渡运输有限公司增资的公告 [“Announcement of a Capital Increase in Qiongzhou Strait (Guangdong) Ferry Transportation Co., Ltd.”], May 28, 2022, <http://static.cninfo.com.cn/finalpage/2022-05-28/1213530208.PDF>.

<sup>91</sup> 2022 Semi-Annual Report, p. 145.



Figure 37. RO-RO Ships on Qiongzhou Strait Ferry Routes and South China Sea Cruise Routes<sup>92</sup>

<sup>92</sup> Images: 1, 4, 5, 8 – Taizhou Kouan Shipbuilding (<http://www.cnkasc.com/sitecn/pro.aspx?cid=1657>); 2-3 – “客滚船” [RO-RO Passenger Ships] posted to <https://www.sgss8.com/tpdq/21658323> (blog); 6 – “Qiongzhou Strait Ferry MS HaiTangWan” ([https://www.youtube.com/watch?v=2rEgrlPJV\\_0](https://www.youtube.com/watch?v=2rEgrlPJV_0)); 7 – 凤凰网海南 [Phoenix Net Hainan] ([http://hainan.ifeng.com/a/20191226/8008603\\_0.shtml](http://hainan.ifeng.com/a/20191226/8008603_0.shtml)); 9 – Nanhai Cruises (<https://www.nanhaicruises.com/>).

Table 21. Qiongzhou Strait Ferry Transportation RO-RO Ships (Qiongzhou Strait Ferry Routes)<sup>93</sup>

2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)	Passengers	Vehicles	LIM (m)
<b>Qiongzhou Strait (Hainan) Ferry Transportation Co., Ltd. (琼州海峡 (海南) 轮渡运输有限公司)</b>														
		XIN HAI 12 HAO	信海 12 号	412522670		2004	6516		322/98	66/20	21/6.5	790	40	
		XIN HAI 16 HAO	信海 16 号	413520260		2007	6555		348/106	66/20	20/6	963	41	
		XIN HAI 19 HAO	信海 19 号	413522110		2011	8275		394/120	66/20	21/6.5	972	41	
		BAO DAO 12 HAO	宝岛 12 号	413521120		2010	6815		348/106	66/20	20/6	986	41	
		BAO DAO 16 HAO	宝岛 16 号	413522220		2012	8275		390/119	66/20	21/6.5	972	41	
		WU ZHI SHAN	五指山	413523180	9734458	2013	10940	2073	407/124	66/20	21/6.5	999	46	
		HAI TANG WAN	海棠湾	413523980		2014	10124	2773	420/128	69/21	21/6.5	999	46	
		BAI SHI LING	白石岭	413523210	8671087	2013	10940	2529	407/124	69/21	21/6.5	999	46	
		JIAN FENG LING	尖峰岭	413523230		2014	10940	2403	404/123	66/20	21/6.5	999	46	
		YING GE LING	鹦哥岭	413523240	9734460	2014	10940	2148	420/128	66/20	21/6.5	999	46	
		LI MU LING	黎母岭	413523190	9734472	2014	10940	2123	407/124	66/20	21/6.5	999	46	
		TONG GU LING	铜鼓岭	413523220		2014	10940	2393	407/124	66/20	21/6.5	999	46	
		FENG HUANG LING	凤凰岭	413523990		2014	10982	2641	417/127	69/21	21/6.5	999	46	
		LIU LIAN LING	六连岭	413524010		2014	10982	2555	417/127	69/21	21/6.5	999	46	
		HAI XIA YI HAO	海峡一号	413522050		2012	5960		308/94	59/18	20/6	596	30	
		HAI KOU LIU HAO	海口六号	413522480		2012	7959		387/118	66/20	21/6.5	966	50	
		HAI KOU JIU HAO	海口九号	413523430	8531677	2015	9208	3203	423/129	69/21	21/6.5	986	50	
		HAI KOU 16 HAO	海口 16 号	413525630		2016	10387	3314	417/127	69/21	21/6.5	986	60	
<b>Qiongzhou Strait (Guangdong) Ferry Transportation Co., Ltd. (琼州海峡 (广东) 轮渡运输有限公司)</b>														
		SHUANG TAI 11	双泰 11	413233360		2009	5297		308/94	62/19	18/5.4	650	36	
		SHUANG TAI 12	双泰 12	413233560		2009	5297		308/94	62/19	18/5.4	650	36	
		SHUANG TAI 16	双泰 16	413231030		2012	8410	2000	367/112	69/21	20/6	680	40	
		SHUANG TAI 18	双泰 18	413233570		2011	8965	1900	361/110	66/20	20/6	960	42	

<sup>93</sup> 2023 activity as outlined in this report. 2020-22 activity from Dahm, “Chinese Ferry Tales” and “Beyond Chinese Ferry Tales.” Ship data aggregated from databases including MarineTraffic.com and VesselFinder.com as well as other shipping industry sources including company websites, financial statements, and media reports.

Table 21. Qiongzhou Strait Ferry Transportation RO-RO Ships (Qiongzhou Strait Ferry Routes) (continued)

2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)	Passengers	Vehicles	LIM (m)
<i>Qiongzhou Strait (Guangdong) Ferry Transportation Co., Ltd. (琼州海峡 (广东) 轮渡运输有限公司) (continued)</i>														
		SHUANG TAI 19	双泰 19	413233580		2011	8965	1900	361/110	66/20	20/6	960	42	
		SHUANG TAI 26	双泰 26	413233590		2015	10360	2623	417/127	69/21	21/6.5	960	50	
		SHUANG TAI 27	双泰 27	413233620		2015	10360	2651	417/127	69/21	21/6.5	960	50	
		SHUANG TAI 28	双泰 28	413233240	9798208	2016	11772	3165	420/128	69/21	21/6.5	999	50	
		SHUANG TAI 29	双泰 29	413233650		2016	11772	3160	420/128	69/21	21/6.5	999	50	
		SHUANG TAI 36	双泰 36	413233630		2019	12787		417/127	69/21	21/6.5	999	50	
		SHUANG TAI 37	双泰 37	413233640		2019	12787		417/127	69/21	21/6.5	999	50	
		YANG FAN HAI AN	扬帆海安	413234640		2015	9045	2863	404/123	66/20	21/6.5	988	48	
		HAI ZHUANG 2 HAO	海装 2 号	413234430		2010	5371		312/95	62/19	18/5.4	680	40	
		HAI ZHUANG 6 HAO	海装 6 号	413234420		2011	7899		358/109	66/20	20/6	780	46	
		HAI ZHUANG 8 HAO	海装 8 号	413234410		2012	7899		358/109	66/20	20/6	780	46	
		TENG SHENG BAO CHANG	腾胜宝昌	413234660		2012	7353		348/106	66/20	20/6	963	46	
		HAI ZHUANG 18 HAO	海装 18 号	413234390		2017	11840	2479	420/128	69/21	21/6.5	998	50	
		NAN FANG 6 HAO	南方 6 号	413234720		2012	7899		358/109	66/20	20/6	780	46	
		SHUANGTAI BAOCHANG	双泰宝昌	413234380		2008	6553		348/106	66/20	20/6	939	46	
		JIN ZI JING	金紫荆	413232890	9320788	2004	5680	4182	305/93	62/19	20/6	650	35	
		YIN ZI JING	银紫荆	413233380		2010	7143		348/106	66/20	20/6	900	45	
		ZI JING JIU HAO	紫荆九号	413234440		2012	7152		348/106	66/20	20/6	680	40	
		HAI XIA ER HAO	海峡二号	413232860		2012	5960		308/94	59/18	20/6	600	35	
		ZI JING SHI YI HAO	紫荆十一号	413233370		2012	8869	2122	397/121	69/21	21/6.5	959	45	
		ZI JING SHI ER HAO	紫荆十二号	413232490		2013	9224	~3000	397/121	69/21	21/6.5	960	45	
		ZI JING SHI LIU HAO	紫荆十六号	413233350		2016	10669	3150	420/128	69/21	21/6.5	874	45	
		ZI JING SHI WU HAO	紫荆十五号	413232480		2016	11388	3245	417/127	69/21	21/6.5	968	45	
		ZI JING ERSHI ER HAO	紫荆二十二号	413232470		2018	12005	3162	420/128	69/21	21/6.5	999	60	
		ZIJING ERSHISAN HAO	紫荆二十三号	413231340		2018	12005	3147	420/128	69/21	21/6.5	999	60	

NOTE: Green boxes indicate years individual ships were observed participating in civil maritime-military events.



Table 22. COSCO South China Sea RO-RO Passenger Cruise Ships<sup>94</sup>

2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)	Passengers	Vehicles	LIM (m)
<b>Hainan Strait Shipping Co., Ltd. (海南海峡航运股份有限公司)</b>														
		CHANG LE GONG ZHU	长乐公主	413526230	8530192	2017	12336	2191	427/130	69/21	16/5			
		QI ZI WAN	棋子湾	413396680		2009	11585	3199	427/130	69/21	16/5			
<b>Sansha Nanhai Dream Cruises Co., Ltd. (三沙南海梦之旅邮轮有限公司)</b>														
		NAN HAI ZHI MENG	南海之梦	412237000	9520285	2011	24629	5995	558/170	82/25	20/6	721	350	

**NOTE:** Green boxes indicate years individual ships were observed participating in civil maritime-military events.

<sup>94</sup> Ibid.

### *Vehicle Carriers*

Vehicle carriers, sometimes called pure car carriers (PCC) or pure car/truck carriers (PCTC), are large, ocean-going cargo ships with multiple decks of interior space maximized for transporting fleets of vehicles (see Figure 38). While seemingly optimal for moving large formations of military vehicles, they likely do not have facilities to accommodate large numbers of personnel (seating, kitchens, restrooms, etc.) for long at-sea periods. Some vehicle carriers have drafts greater than 30 feet (9 meters), limiting the ports that may be used for embarkation and debarkation. In 2022, large vehicle carriers were also in high demand for vehicle imports/exports and moving fleets of new vehicles to market within China, probably limiting their availability for military exercises.

**Jiangsu Dafeng Port Holding Group** – Jiangsu Dafeng Port Holding Group (江苏大丰海港控股集团) and Jiangsu Yueda Logistics Co., Ltd. (江苏悦达物流有限公司) own two large, ocean-going RO-RO vehicle carriers as part of a joint venture. One of these ships—DA FENG GANG LI MING HAO—has been noted supporting Chinese military activities since 2021.<sup>95</sup> In 2023, DA FENG GANG LI MING HAO operated primarily between mainland China, South Korea, and Mexico and did not support military activity. Jiangsu Dafeng Port Holdings is a Chinese SOE primarily focused on port management and logistics. Yueda is a logistics company that provides auto shipping logistics for Dongfeng Yueda Kia automobile manufacturing company. The two Dafeng/Yueda vehicle carriers are managed by Weihai Sheng An Shipping Co., Ltd. (威海市升安海运有限责任公司).<sup>96</sup> Weihai Sheng An manages four other large vehicle carriers (SHI HAI, SHI JIANG, SHI YANG, and SHI YUAN) for Kingfour Marine Co., Ltd. (中甫(上海)航运有限公司), a subsidiary of CDC International Logistics.<sup>97</sup> There are no indications that the Kingfour vehicle carriers have supported Chinese military exercises and are not listed in Table 23.

**China Merchants Group** – China Merchants Guangzhou RO-RO Shipping Co., Ltd. (广州招商滚装运输有限公司) (CMRORO) is a joint venture created in 2019 by China Merchants Energy Shipping (70 percent share) and Guangzhou Automobile Group Business Co., Ltd. (30 percent).<sup>98</sup> CMRORO operates 10 ocean-going vehicle carriers and several river vehicle carriers. Only one of these vehicle carriers, CHANG DA LONG, has been noted supporting the PLA since at least 2018.

**COSCO Shipping** – COSCO Shipping Specialized Carriers Co., Ltd. (中远海运特种运输股份有限公司) operates five large, ocean-going vehicles carriers.<sup>99</sup> None of these ships have been noted supporting Chinese military activity. They are, however, included in Table 23 because of COSCO's established relationship with the PLA. COSCO SHENGSHI and COSCO SHENGSHI are Panama-flagged vessels typically employed on long-haul international routes.

**SAIC AnJi Logistics** – SAIC Motors, China's largest automaker, operates fourteen ocean-going vehicle carriers through SAIC AnJi Logistics Co., Ltd. (上汽安吉物流股份有限公司) and its

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<sup>95</sup> 大丰港“杀”入沿海滚装船运输 (“Dafeng Port ‘Reduced’ to Coastal RO-RO Transport”), 航运交易公报 (*Shipping Transaction Bulletin*), February 16, 2017, <https://www.cnss.com.cn/html/gkdt/20170216/258226.html>.

<sup>96</sup> 威海市升安海运有限责任公司简介 [Introduction of Weihai Sheng'an Shipping Co., Ltd.], Weihai Sheng'an Shipping Co., Ltd., accessed October 10, 2022, <http://www.sdseafarer.com/col.jsp?id=108>.

<sup>97</sup> 滚装航运业务 [“RO-RO Shipping Business”], CDC International Logistics Co., Ltd, accessed October 10, 2022, <http://www.cdcgroup.com.cn/group/showimg.php?lang=cn&id=41>.

<sup>98</sup> “RO-RO Shipping,” China Merchants Energy Shipping Co. Ltd., accessed October 10, 2022, <https://www.cmenergyshipping.com/page.php?p=spec>.

<sup>99</sup> “Fleet,” COSCO Shipping Specialized Carriers Co., Ltd., accessed October 10, 2022, <http://spe.coscoshipping.com/main/fleet>.

shipping subsidiaries.<sup>100</sup> None of these Chinese-flagged RO-RO vehicle carriers have been noted supporting Chinese military activity. Therefore, they are not included in Table 23.



Figure 38. Vehicle Carriers<sup>101</sup>

<sup>100</sup> 航运物流 [“Shipping Logistics”], SAIC AnJi Logistics, accessed October 10, 2022, [https://anji-logistics.e-cie.com/cn/2018/shipping\\_1025/5.html](https://anji-logistics.e-cie.com/cn/2018/shipping_1025/5.html).

<sup>101</sup> Images: 1 – Weihai Sheng An Shipping ([http://www.sdseafarer.com/pd.jsp?id=16#\\_pp=2\\_338](http://www.sdseafarer.com/pd.jsp?id=16#_pp=2_338)); 2 – China Military Television Network ([https://www.js7tv.cn/video/202006\\_219448.html](https://www.js7tv.cn/video/202006_219448.html)); 3 – China Merchants Energy Shipping (<https://www.cmenergyshipping.com/page.php?p=spec>); 4 – China Merchants Industry (<https://www.xindemarineneews.com/topic/chuanbojianzhao/2022/0418/37834.html>); 5-6 – COSCO Shipping Specialized Carriers (<http://spe.coscoshipping.com/main/fleet?name=滚装船&index=5>).

Table 23. Chinese Military-Affiliated RO-RO Vehicle Carriers<sup>102</sup>

2020	2021	2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)	Passengers	Vehicles	LIM (m) <sup>103</sup>
<b>Weihai Sheng An Shipping Co., Ltd. (威海市升安海运有限责任公司)</b>																
				DA FENG GANG LI MING HAO	大丰港黎明号	413239310	9188790	1999	33863	10834	538/164	92/28	30/9	-	3578	~10000
				DA FENG GANG HE SHUN HAO	大丰港和顺号	414284000	9188805	1999	33831	10818	538/164	92/28	30/9	-	3578	~10000
<b>Guangzhou China Merchants RO-RO Transportation Co., Ltd. (广州招商滚装运输有限公司)</b>																
				CHANG XIANG LONG	长祥隆	413233230	9442598	2009	19370	5594	463/141	79/24	20/6	-	2200	~6600
				CHANG XING LONG	长兴隆	413240580	9556777	2009	19370	5508	463/141	79/24	20/6	-	2200	~6600
				CHANG FA LONG	长发隆	413468970	9442627	2011	19222	6561	463/141	79/24	20/6	-	2200	~6600
				CHANG DA LONG	长达隆	413473010	9471197	2012	19684	5836	463/141	79/24	20/6	-	2200	~6600
				CHANG JI LONG	长吉隆	413463060	9442586	2009	19370	5568	463/141	79/24	20/6	-	2200	~6600
				CHANG WANG LONG	长旺隆	413301850	9556789	2010	19207	5512	463/141	79/24	20/6	-	2200	~6600
				CHANG SHENG HONG	长盛鸿	414317000	9177040	2000	37237	12743	551/168	102/31	30/9	-	4632	~14000
				CHANG TAI HONG	长泰鸿	414249000	9382102	2009	40619	12282	554/169	102/31	26/8	-	4870	~14000
				MAO HONG	茂鸿	414526000	9903217	2021	35425	11773	554/169	92/28	26/8	-	4500	~13500
				TANG HONG	塘鸿	414496000	9903205	2021	35425	11783	554/169	92/28	26/8	-	4500	~13500
<b>COSCO Shipping Specialized Carriers Co., Ltd. (中远海运特种运输股份有限公司)</b>																
				CHANG AN KOU	常安口	414260000	9177026	1999	37237	12780	581/177	102/31	30/9	-	4632	~14000
				CHANG RONG KOU	常荣口	414276000	9177038	2000	37237	12780	581/177	102/31	30/9	-	4632	~14000
				YU HENG XIANG FENG	玉衡先锋	412163000	9166895	1998	53240	13418	591/180	105/32	30/9	-	4305	~14000
				COSCO SHENGSHI	中远盛世	372727000	9454711	2011	51671	14500	571/174	105/32	30/9	-	5276	~16000
				COSCO TENG FEI	中远腾飞	355518000	9454723	2011	51699	14500	571/174	105/32	30/9	-	5276	~16000

**NOTE:** Green boxes indicate years individual ships were observed participating in civil maritime-military events.

<sup>102</sup> 2023 activity as outlined in this report. 2020-22 activity from Dahm, “Chinese Ferry Tales” and “Beyond Chinese Ferry Tales.” Ship data aggregated from databases including MarineTraffic.com and VesselFinder.com as well as other shipping industry sources including company websites, financial statements, and media reports.

<sup>103</sup> LIM (Lanes in Meters) estimated based on reported vehicle capacity. 1 CEU (car equivalent unit) is typically 4 m x 1.5 m. Estimate assumes a 2 m wide lane.

### *General Cargo Ships, Deck Cargo Ships, and Barges*

Several general cargo ships and barges supported Chinese military activity in 2023. Tugs and other utility craft employed during military exercises were probably hired from harbors near exercise areas. Examples of tugs used to assist with floating causeway operations in Dacheng Bay include GU GANG TUO 3 and GU GANG TUO 4 from the nearby port of Gulei. Cargo ships and barges that provided significant civil-military support are shown in Figure 39 and listed in Table 24.

**China Merchants Group** – In 2017, Sinotrans Limited and the Changjiang Shipping Corporation (CSC) (Sinotrans CSC Group) were acquired by China Merchants Group.<sup>104</sup> CSC subsidiary Shanghai Changjiang Shipping Corporation (SCSC) (上海长江轮船有限公司) owns and operates two 8000 DWT-class general cargo ships, CHANG XIONG and CHANG ZAN, that provided year-round support to the PLA in 2022 and 2023. Each feature two 50-ton deck cranes.<sup>105</sup> SCSC’s 5000 DWT-class general cargo ship TIAN ZHU SHAN supported PLA exercises in 2020 and 2021 and again in 2023. Another Sinotrans CSC Group subsidiary, China Yangtze River Shipping Co., Ltd. (中国扬子江轮船股份有限公司), owns the 5000 DWT-class general cargo ship SHENG TAI, which has supported PLA activity since at least 2020. SHENG TAI is currently managed by SCSC.<sup>106</sup>

**Privately-Owned Deck Cargo Ships** – Several private shipping companies that own and operate deck cargo ships supported military activity in 2023. Few details are readily available on these shipping companies and what other ships they may own. Companies that own and operate deck cargo ships involved in 2023 civil maritime-military activity include the Anhui Borun Shipping Co., Ltd (安徽博润航运有限公司) that owns and operates at least four deck cargo ships, Guangdong Yaqing Shipping Co., Ltd. (广东亚庆海运有限公司), Taizhou Youjian Shipping Co., Ltd. (台州市友建船务有限公司), and Shanghai Zhenxin Shipping Co., Ltd. (上海振新船务有限公司).

**China Communications Construction Corporation** – China Communications Construction Corporation (CCCC) (中国交通建设股份有限公司) is a large Chinese SOE. The CCCC Third Engineering Co., Ltd. (中交三航局第三工程有限公司) operates the SAN HANG GONG 8, a semi-submersible barge that is normally used in port construction projects.<sup>107</sup> SAN HANG GONG 8 is used as the docking/transfer platform for the PLA’s floating causeway system.

**Unknown Owners** – Ownership and management could not be determined for the deck cargo ships HENG DA FA ZHAN, XINHAISHENG 8, HUAYI003, HUAYI008, or HUAYI009. The owner of the new-construction self-propelled barge E SHAN has also not been identified.

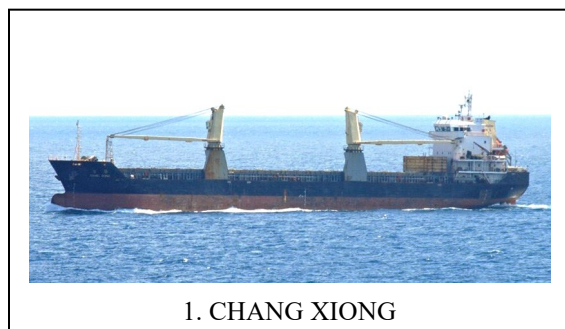
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<sup>104</sup> Lee Hong Liang, “China Merchants, Sinotrans & CSC Complete Strategic Reorganisation,” *Seatrade Maritime News*, April 11, 2017, <https://www.seatrade-maritime.com/asia/china-merchants-sinotrans-csc-complete-strategic-reorganisation>.

<sup>105</sup> 宜昌达门建造 8000 吨多用途船首制船下水 [“Yichang Damen (Shipping Co.) Builds and Launches its First 8000-ton Multi-Purpose Ship”], *International Ship Network*, October 1, 2021, [http://www.eworldship.com/html/2021/NewShipUnderConstruction\\_1001/175339.html](http://www.eworldship.com/html/2021/NewShipUnderConstruction_1001/175339.html).

<sup>106</sup> SHENG TAI ownership and management information from VesselFinder.com, accessed October 13, 2022, <https://www.vesselfinder.com/pro/map#vessel-details?imo=9169304&mmsi=412081630>.

<sup>107</sup> 古雷北 1#、2#泊位工程完成全部沉箱安装 [“Gulei North #1 and #2 Berths Completed All Caisson Installations”], 人民網-福建頻道 [People’s Daily Online – Fujian Channel], March 19, 2020, <http://fj.people.com.cn/BIG5/n2/2020/0319/c181466-33889385.html>.



1. CHANG XIONG



2. TIAN ZHU SHAN



3. SHENG TAI



4. BO RUN JIU ZHOU



5. BO MAO



6. YOU JIAN JI XIANG



7. ZHEN XIN 69



8. HUAYI009



9. SAN HANG GONG 8

Figure 39. Cargo Ships, Deck Cargo Ships, and Barges<sup>108</sup>

<sup>108</sup> Images: 1-3 – Toanthang Shipping (<https://www.toanthangship.com/en/mv-chang-xiong.html>, <https://www.toanthangship.com/en/mv-tian-zhu-shan-1649061283.html>, <https://www.toanthangship.com/en/mv-sheng-tai.html>); 4 – Douyin (<https://www.douyin.com/video/7234497358300482873>); 5 & 8 – MarineTraffic (<https://www.marinetraffic.com>); 6 – Ship & Marine Equipment Network (<https://www.shipoe.com/news/show-45298.html>); 7 – Dazhong Daily ([https://dzrb.dzng.com/articleContent/705\\_1057345.html](https://dzrb.dzng.com/articleContent/705_1057345.html)); 9 – People's Daily Fujian (<http://fj.people.com.cn/BIG5/n2/2020/0319/c181466-33889385-2.html>).

Table 24. Military-Affiliated Cargo Ships, Deck Cargo Ships, and Barges<sup>109</sup>

2020	2021	2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)
<b>General Cargo Ships</b>													
<b>Sinotrans CSC Group</b>													
<b>Shanghai Changjiang Shipping Co., Ltd. (上海长江轮船有限公司) (SCSC)</b>													
				CHANG ZAN	长赞	413307520	9916111	2022	7732	9085	400/122	66/20	23/7
				CHANG XIONG	长(長)富	413380840	9553361	2010	6550	8394	387/118	59/18	23/7
				TIAN ZHU SHAN	天柱山	412076010	8888927	1995	4061	4944	420/128	66/20	23/7
<b>China Yangtze River Shipping Co., Ltd. (中国扬子江轮船股份有限公司) (Managed by SCSC)</b>													
				SHENG TAI	盛泰	412081630	9169304	1997	4048	5210	325/99	56/17	20/6
<b>Qingdao Old Captain Shipping Co., Ltd. (青岛老船长航运有限公司)</b>													
				FU YUN 828	福运 828	412330280				~5000	325/99	56/17	~20/6
<b>Deck Cargo Ships</b>													
<b>Anhui Borun Shipping Co., Ltd (安徽博润航运有限公司)</b>													
				BO RUN JIU ZHOU	博润九州	413536970		2023	16432		505/154	138/42	16/5
				BO MAO	博茂	413244720		2023			436/133	105/32	13/4
				BO RUN	博润	413556960					374/114	88/27	10/3
				BO RUN XIAN FENG	博润先锋	413375860	9578139	2009	5201	8776	354/108	85/26	16/5
<b>Guangdong Yaqing Shipping Co., Ltd. (广东亚庆海运有限公司)</b>													
				JINGZHOUHAI	靖舟海	413492320					374/114	88/27	10/3

<sup>109</sup> 2023 activity as outlined in this report. 2020-22 activity from Dahm, “Chinese Ferry Tales” and “Beyond Chinese Ferry Tales.” Ship data aggregated from databases including MarineTraffic.com and VesselFinder.com as well as other shipping industry sources including company websites, financial statements, and media reports.

Table 24. Military-Affiliated Cargo Ships, Deck Cargo Ships, and Barges (continued)

2020	2021	2022	2023	Name	Name (Chinese)	MMSI	IMO	Year Built	Gross Tonnage	DWT	Length (ft/m)	Beam (ft/m)	Draft (ft/m)
<i>Large-Deck Cargo Ships (continued)</i>													
<b>Taizhou Youjian Shipping Co., Ltd. (台州市友建船务有限公司)</b>													
				YOU JIAN JI XIANG	友建吉祥	413289660		2021			358/109	72/22	10/3
<b>Shanghai Zhenxin Shipping Co., Ltd. (上海振新船务有限公司)</b>													
				ZHEN XIN 69	振新 69	413233460				~5000	348/106	75/23	10/3
<b>Unknown Owners</b>													
				HENG DA FA ZHAN	(?)	413369160				~6000	354/108	75/23	10/3
				XINHAISHENG 8	新海升 8	413288610				~5000	348/106	72/22	10/3
				HUAYI003	桦意 003	413233790					311/95	72/22	10/3
				HUAYI008	桦意 008	413237850					311/95	72/22	10/3
				HUAYI009	桦意 009	413237840					305/93	72/22	7/2
<b>Barges</b>													
<b>CCCC Third Engineering Co., Ltd. (中交三航局第三工程有限公司)</b>													
				SAN HANG GONG 8	三航工 8	413378280				-	213/65	118/36	18/5.5
<b>Unknown Owners</b>													
				E SHAN	峨山	413531460		2023			262/80	79/24	10/3

**NOTE:** Green boxes indicate years individual ships were observed participating in civil maritime-military events.



## Appendix B. Chinese Ports Supporting Civil-Military Activity

Observed activity in 2023 included activity at thirty-two ports and terminals used by civilian RO-RO and cargo ships to support military activity. These comprise twenty-six civilian facilities as well as six PLAN bases. Table 25 lists ports and terminals used by the PLA in civil maritime-military events in 2022 and 2023. Those ports and terminals, less the three main South China Sea Spratly Island bases (Fiery Cross, Subi, and Mischief Reefs), are shown in Figure 41. Analysis of civil maritime-military activity from 2020-2021 revealed no additional ports or terminals used beyond those listed in Table 25.<sup>110</sup> Table 26 lists the seventeen ferry terminals that facilitate services across the Bohai Gulf and between the Chinese mainland and Hainan Island. These civilian terminals have also been used for military activity. The relatively new RO-RO ferry SHUN LONG HAI established regular service between the Bohai ports of Bayuquan and Weifang. Therefore, since the 2022 report, “More Chinese Ferry Tales,” Weifang has been moved from the “civil-military activity” list to the “ferry terminal” list. However, Weifang was used to support military activity at least four times in 2023.

Many of the ports and terminals listed in Tables 25 and 26 have one or more “RO-RO ramps.” These are either mechanical ramps that connect to a quay wall or pier, or a concrete ramp that extends into the water. These ramps help RO-RO ship onboard vehicle ramps compensate for rising or falling tides. In ports without RO-RO ramps with significant tidal variations, RO-RO ship docking may need to be timed with high tides.

Many of the ports and terminals listed in Tables 25 and 26 are also identified as having a rail transfer point (“Rail X-fer Point”). These are railroad spurs located in the port or terminal area that may allow the PLA to move military vehicles, especially heavy armor, in and out of ports via rail. Several civilian ferry terminals also accommodate train ferries, onto which rail cars carrying vehicles and cargo can be loaded directly onto a ferry. Rail transfer capabilities allow for moving tanks and other heavy equipment that would otherwise require an excessive amount of fuel to move long distances under their own power. In lieu of rail, tanks must normally be moved by heavy equipment transport (HET). Figure 40 shows tanks and other armored vehicles loading onto flat-bed rail cars after unloading from the RO-RO ferry ZHONG HUA FU XING in Qinhuangdao in October 2021.<sup>111</sup>



Figure 40. Rail Transfer, Qinhuangdao Port, October 2021 (CCTV)

<sup>110</sup> Dahm, “Chinese Ferry Tales.”

<sup>111</sup> “PLA Uses Zhong Hua Fu Xing Cruise-Type RO-RO Passenger Ship for Military Transportation,” 央视军事 [CCTV Military], October 16, 2022, <https://www.youtube.com/watch?v=gxJj9G55dQA>.

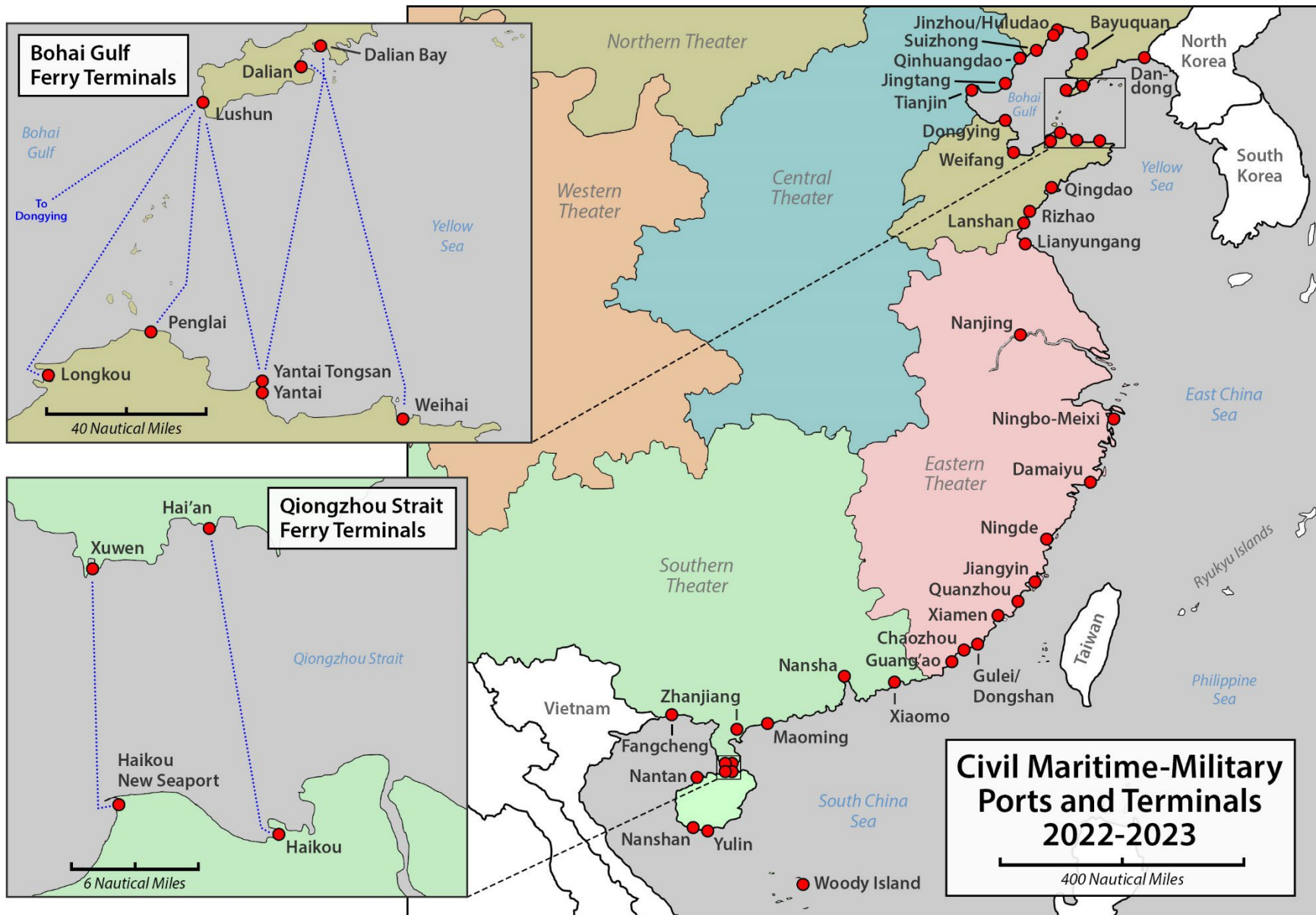


Figure 41. Civil-Military Ports and Terminals, 2022-2023

Table 25. Ports and Terminals Used in Civil Maritime-Military Events, 2022-2023

2022	2023	Name	Name (Chinese)	Alternate Name or <i>Co-located Facilities (in italics)</i>	Coordinates (decimal degrees)	RO-RO Ramp	Rail X-fer Point
<b>Northern Theater</b>							
		Jinzhou Port	锦州港		40.806, 121.066		
		Huludao Port	葫芦岛港	Huludao North Port Pier (葫芦岛港北港码头)	40.746, 120.974		
		Suizhong Port	绥中港		40.0799, 120.120		
		Dandong Port	丹东港		39.801, 124.139		
		Qingdao Port	青岛港		36.100, 120.326		
		Rizhao Port	日照港		35.376, 119.535		
		Lanshan Port	岚山港		35.098, 119.371		
<b>Central Theater</b>							
		Qinhuangdao Port	秦皇岛港		39.911, 119.583		
		Jingtang Port	京唐港		39.198, 118.981		
		Tianjin Port	天津港		38.987, 117.735		
		Tianjin Int'l Cruise Ship Terminal	天津国际邮轮母港		38.975, 117.820		
<b>Eastern Theater</b>							
		Lianyungang Port	连云港港	<i>Lianyungang Int'l Passenger Terminal (连云港港国际客运站)</i>	34.751, 119.374		
		Nanjing Port	南京港	Nanjing Jiangsheng Automobile Terminal (南京港江盛汽车码头)	32.220, 119.069		
		Ningbo-Meixi RO-RO Terminal	宁波梅西滚装码头	<i>Ningbo Meishan Island International Container Terminal (宁波梅山岛国际集装箱码头)</i>	29.765, 121.990		
		Damaiyu Port	大麦屿港	<i>Damaiyu Port Area Direct Shipping Zone to Taiwan, Taizhou Port (大麦屿港区对台直航区台州港口岸)</i>	28.085, 121.140		
		Ningde Port	宁德港	<i>Ningde Port Group (宁德港务集团)</i>	26.746, 119.634		
		Jiangyin Port	江阴港	Fujian Jiangyin Int'l Container Terminal (福建江阴国际集装箱码头)	25.417, 119.286		
		Quanzhou Port	泉州港	Shishi Shihu Port Area (石狮石湖港区)	24.818, 118.721		
		Xiamen Haixiang Wharf	海翔码头	<i>CCCC Third Engineering Bureau (Xiamen) (中交三航局厦门分公司)</i>	24.532, 118.229		

Table 25. Ports and Terminals Used in Civil Maritime-Military Events, 2022-2023 (continued)

2022	2023	Name	Name (Chinese)	Alternate Name or <i>Co-located Facilities (in italics)</i>	Coordinates (decimal degrees)	RO-RO Ramp	Rail X-fer Point
<i>Eastern Theater (continued)</i>							
		Xiamen Cruise Terminal	厦门邮轮码头		24.495, 118.071		
		Xiamen Xiangyu Wharf	厦门象屿码头	Xiamen Xiangyu Free Trade Area (厦门象屿保税区)	24.516, 118.080		
		Gulei Wharf	古雷码头		23.767, 117.582		
		Dongshan Port	东山港		23.760, 117.498		
		Chaozhou Port	潮州港		23.557, 117.100		
		Guang'ao Port	广澳港	Shantou China Merchants Port (汕头市招商局港)	23.226, 116.778		
<b>Southern Theater</b>							
		Xiaomo Port	小港港	Xiaomo International Logistics Port (小漠国际物流港)	22.746, 115.034		
		Nansha Port / Shazai Island	南沙港 / 沙仔岛	Guangzhou Port Nansha Car Terminal (广州港南沙汽车码头)	22.866, 113.545		
		Nansha Container Terminal	南沙集装箱码头	Guangzhou Port Nansha Container Terminal Phase 1 (广州港南沙集装箱一期码头)	22.659, 113.677		
		Maoming Port	茂名港	Maoming Guanggang Terminal (茂名广港码头)	21.422, 111.288		
		Zhanjiang Naval Base	湛江海军基地	Maxie Naval Base (麻斜海军基地)	21.230, 110.441		
		Zhanjiang Ferry Port	湛江渡口港		21.240, 110.420		
		Fangcheng Port	防城港	Ma'anling Tourist Terminal (马鞍山旅游码头)	21.612, 108.315		
		Nantan Port	南滩港	Yangpu Port (洋浦港)	19.836, 109.192		
		Nanshan Port	南山港		18.319, 109.146		
		Yulin Naval Base	榆林海军基地		18.221, 109.537		
		Woody Island (Yongxing Dao)	永兴岛		16.828, 112.336		
		Subi Reef (Zhubi Jiao)	渚碧礁		10.938, 114.085		
		Mischief Reef (Meiji Jiao)	美济礁		9.926, 115.529		
		Fiery Cross Reef (Yongshu Jiao)	永暑礁		9.553, 112.894		

Table 26. China RO-RO Ferry Terminals

Name	Name (Chinese)	Alternate Name or <i>Co-located Facilities</i> (in italics)	Coordinates (decimal degrees)	RO-RO Ramp	Rail X-fer Point
<b>Bohai Gulf Ferry Terminals</b>					
Bayuquan Port	鲅鱼圈港		40.247, 122.085		
Dalian Bay Port	大连湾港		39.026, 121.738		
Dalian Port	大连港		38.934, 121.658		
Lushun New Port	旅顺新港	Dalian Yanda Railway Ferry Port (大连烟大铁路轮渡港)	38.809, 121.133		
Dongying Port Terminal	东营港码头		38.075, 118.948		
Weifang Port	潍坊港	Shandong Weifang Port Passenger Transportation Center (山东港口潍坊港客运中心)	37.231, 119.163		
Penglai New Port	蓬莱新港	Penglai Port Passenger Terminal (蓬莱港客运站)	37.814, 120.831		
Longkou Port	龙口港	Longkou Port Passenger Terminal (龙口港客运站)	37.651, 120.319		
Yantai Port	烟台港	Yantai Port Passenger Terminal (烟台港客运站)	37.552, 121.385		
Yantai Salvage Bureau Passenger Terminal	烟台打捞局客运码头		37.598, 121.388		
Yantai Tongsan Port	烟台同三港	Yantai N. Railway Station (Ferry Station) (烟台北站(轮渡站))	37.588, 121.378		
Weihai Port	威海港	Weihai Ro-Ro Ship Terminal (威海滚装船码头)	37.432, 122.183		
<b>Qiongzhou Strait Ferry Terminals</b>					
Xuwen Port	徐闻港	Guangdong-Haizhou Railway N. Port Pier (粤海铁路北港码头)	20.234, 110.137		
Hai'an Port	海安港		20.269, 110.230		
Hai'an New Port	海安新港		20.267, 110.213		
Haikou Port	海口港		20.025, 110.282		
Haikou New Seaport	海口市新海港	Haikou Railway South Port Pier (海口铁路南港码头)	20.058, 110.152		

## About the Author

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This report reflects the analysis and opinions of the author alone. The author is responsible for any errors or omissions in this report.

## Sources and Methods

This report fuses a variety of publicly and commercially available sources to gain detailed insights into often complex military activity and capabilities. Analysis is supported with AIS data from MarineTraffic—Global Ship Tracking Intelligence.<sup>112</sup> The report features commercial satellite imagery from Planet Labs Inc. Medium-resolution satellite imagery from Planet's PlanetScope constellation (ground sample distance (GSD) ~3.7 meters) was obtained through Planet's *Education and Research Program*, which allows the publication of PlanetScope imagery for non-commercial research purposes.<sup>113</sup> High-resolution satellite imagery from Planet's SkySat constellation (GSD ~0.5 meters) was purchased by the author through SkyWatch Space Applications Inc. The report also features commercial satellite imagery from Airbus Intelligence. Images from Airbus' Pleiades constellation (GSD ~0.5 meters) were also purchased by the author through SkyWatch Space Applications Inc.<sup>114</sup> The SkyWatch team's advice and assistance in accessing archived imagery was greatly appreciated. The author is responsible for all annotations of satellite images contained in this report. Planet and Airbus retain copyrights to the underlying PlanetScope, SkySat, and Pleiades images respectively. Satellite images published in this report should not be reproduced without the expressed permission of Planet or Airbus.

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<sup>112</sup> Marine Traffic, [www.marinetraffic.com](http://www.marinetraffic.com).

<sup>113</sup> "Education and Research Program," Planet Labs, <https://www.planet.com/markets/education-and-research/>.

<sup>114</sup> SkyWatch, <https://www.skywatch.com/>.