

Analysis: China's expanding amphibious capabilities

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Introduction

China's amphibious capabilities are inexorably on the rise.

Depending on where you are sitting, this is variously attributed to China belatedly building armed forces and capabilities commensurate with its size and economic power; just a resurgence of its interest as a global player looking for power projection tools; a peer competitor flexing its muscles; or an outright threat to neighbours with clashing territorial or mineral claims.

Regardless of the reasons behind the growth, China's amphibious forces are maturing rapidly.

People's Liberation Army Navy (PLAN) vessels have expanded their horizons over the last few years, with ships deploying to the Horn of Africa on counter-piracy patrols since late 2008 and interest growing in exercises within its region and beyond. July this year saw the PLAN

wrap up its biggest-ever series of exercises in foreign waters, then the PLAN was a key visitor to the Australian International Fleet Review in September.

The PLAN has been steadily building its submarine and surface combatant fleet for the last couple of decades, as well as making high-profile steps towards carrier aviation, much to the chagrin of India with its slow-moving carrier projects.

However, it is in amphibious power that China is making the biggest strides, as its smaller island neighbours are quick to point out. In March 2013, a PLAN amphibious task force led by a Type 071 landing platform dock (LPD) caused a stir in the region when it steamed around the disputed Spratly islands, exercised amphibious assaults, and visited James Shoal just off Malaysia.

In July 2013 satellite imagery of the Jiangnan Group's Changxing Island shipyard showed progress on some

large blocks of what was initially thought to be an indigenous Chinese aircraft carrier, but which might actually be an amphibious assault ship.



This cutaway shows the internal well dock arrangement of the Type 071 LPDs, with the dock running roughly two-thirds of the ship's length (image © CCTV, via R Foster)

A few months on, exactly what the vessel is remains unclear, but it could possibly be a manifestation of the landing helicopter dock (LHD) design that China Shipbuilding and Offshore International Co (CSOC) has bid to Turkey. China has yet to build an LHD and CSOC officials working with the Turkish bid asserted that the design they were bidding was purely for export, but China does have aspirations in that direction. In late 2012, Admiral Yin Zhou said China would like large LHDs in future, possibly displacing in the range of 40,000 tonnes.

Until that ship emerges, the PLAN's amphibious flagships centre on the three 18,500-tonne Yuzhao-class Type 071 LPDs, with a fourth reported to be in-build.

Underlining China's no-nonsense approach to naval acquisitions, the first Type 071, Kunlunshan, was laid down in June 2006 and commissioned in November the following year. It underwent substantial sea trials and design shakedown before the second and third hulls – Jinggangshan and Changbaishan – were laid down in 2009 and 2010, respectively. Changbaishan was commissioned in September 2013.



Side view of the PLAN's current amphibious flagship class, the Type 71 LPD Jinggangshan, alongside in Shanghai (image © FYJS)

The ships have an overall length of 210 m, with a SEMT Pielstick 16 PC2.6V 400 CODAD arrangement turning two shafts to get the ships up to a maximum speed of 20 kt.

Surprisingly, little is still known of their exact capacity for amphibious forces, but they require a crew of 120.

They each have hangar space for an aviation detachment of four Z-8 helicopters and two spots on the flight deck. Below the flight deck, the ships have a two-level vehicle hangar that can accommodate up to 16 ZBD-05 amphibious armoured fighting vehicles (AFVs). Those hangars lead aft to the dock, which can fit four Type 726 Yuyi-class hovercraft.



China's first Pomornik Zubr assault hovercraft. (image © Ukroboronprom)

Imagery also shows a pair of vehicle and personnel-type landing craft (LCVPs) on davits amidships, but there are no more details available about the offload rate or capabilities of the vessels.

China is, however, building up a dual-role, ships-taken-up-from-trade (STUFT) capability.

A key stage of this saw the 36,000-tonne ferry Bohai Sea Green Pearl launched at Yantai Port in August 2012. Its primary role is to serve as a passenger ferry, but also to provide guaranteed availability as a strategic lift platform for 2,000 military personnel, 300 vehicles (or “dozens” of main battle tanks [MBTs]), and stores. It can also serve as a temporary barracks alongside and has a helicopter platform aft, although with no hangar it will be limited to lilypad operations.

Three similar vessels are understood to be under construction, while a number of container vessels have also been converted to carry military stores.

The amphibious workhorses of the fleet, however, remain the Yuting classes of helicopter-capable tank landing ship (LSTs). They were built in two main batches of 10 split into two sub-classes: Type 072 II Yuting I (commissioned between 1992 and 2002) and Type 072 III Yuting II (2003 to 2005).

Both types share virtually identical dimensions and official performance figures, the later versions appearing to have a subtly altered superstructure with design revisions to the ramp and funnel, and easier access between the front and rear decks.

Accordingly, the on-paper performance for both types includes a 3,000 n mile range, 17 kt top speed, and fully

laden displacement of 4,877 tonnes (3,830 tonnes unladen). They have an overall length of 120 m and a 3.2 m draft, though as LSTs they are designed to beach and disgorge their contents, which can comprise 250 troops and 10 light tanks. They can also offload using four LCVs or two medium helicopters.

They are armed only with guns, but fitted with three twin 37 mm/63-calibre guns to put up a weight of fire in the beach assault and subsequent support phases.

As might be expected from their designations, they are derived from the earlier Type 072 Yukun LSTs, but with the addition of the large helicopter deck (there is no hangar) in place of the rear gun and superstructure above the tank deck. The original Type 072s were built between 1980 and 1995, and seven are understood to remain in service in the East Sea Fleet.

Without the flight deck and a reduced payload (4,237 tonnes fully loaded – 200 troops and 10 light tanks), the Type 072s are much less capable vessels, serving more to highlight the amphibious capability enhancements that the PLAN has undertaken.

The PLAN also boasts a substantial force of medium landing ships (LSM). There are a number of elderly vessels, such as the seven Yuliang Type 079s that began construction in 1980 and several singleton survivors of other classes still on the books, but the bulk of the force is made up of a dozen slightly smaller Wuhu-A Yuhai

Type 074 ships and the 10 newer Yudeng III Yunshu-class LSMs.

The 58.4 m-long Wuhu-As were built in the mid-1990s and can carry two light tanks and 250 troops, displacing 812 tonnes fully loaded.

By contrast, the 87 m-long Yudeng III ships displace up to 1,880 tonnes and were built between June 2003 and March 2004. They can cover 1,500 n miles at 14 kt, lifting six light tanks or 12 trucks in a vehicle deck loaded through a stern gate.

In looking to offload the amphibious forces, the PLAN has traditionally relied mainly on fairly generic utility landing craft (LCU) designs, with some dating back to the 1960s and 1970s remaining in service. Some include novel design features, such as the 1,219-tonne displacement, catamaran-hulled Type 074A Yubei-class LCUs, commissioned in 2004 and 2005. Somewhat unusually, those 10 ships feature the wheelhouse and superstructure on the port side amidships, rather than the traditional aft location.

However, the biggest area of motion currently sees the PLAN in the process of recapitalising and bolstering its landing craft air cushion (LCAC) forces.

China has fielded three generations of hovercraft since the 1960s, with varying degrees of success, before the Type 722 II Jinsha II design really hit its stride in the late

1980s. A number of them are still in service, offering high-speed transits and a payload in excess of 65 tons.

More recently, however, production has begun on a new class of far more advanced LCACs, with the Type 726 Yuyi class set for service with the Type 071 LPDs and the culmination of the long-running project to build Russian Zubr assault hovercraft.

To date, not very many hard details have surfaced of the Yuyi class, but from the pictures that have emerged and very basic models that have been displayed, the design is very similar in concept to the US LCAC, with an open vehicle deck/cargo area in the centre of the platform sandwiched between engine fuselage fairings for the QC-70 gas turbines, which offer combined thrust and lift. Those engines are a little larger than the engines used by the US craft, which is likely one of the drivers of the platform's growth.

Like the US LCAC, the Yuyi's wheelhouse/cockpit is also forward, but it is located on the port side, rather than the US' craft's starboard location. The vessels have straight-through, aligned bow and stern ramps, the latter between two large shrouded main propellers.

Despite their passing resemblance, the Chinese vessels are actually marginally larger, measuring 33 m long and 16.8 m across the beam (the US LCAC is 26.4 x 14.3 m), although it appears to have a marginally lower displacement with 170 tonnes (the US can carry 185 tonnes) and a similar military lift of around 60 tons. This

means that they are usually associated with lifting the army's Type 96 MBTs into action. According to IHS Jane's Fighting Ships statistics, both vessels also have very even performance, able to cover 200 n miles at 40 kt.

The first Yuyi was built at Qiuxin Shipyard and launched in 2009, but there have been no further reports of additional vessels yet and trials appear to be ongoing.

Meanwhile, China's project to build up a force of four Zubr assault hovercraft is gaining traction, the first vessel having been delivered in November 2012.

China has been negotiating for the heavily armed craft since 2005. Their delivery should lend the PLAN a potent assault capacity to deliver three MBTs or 10 armoured personnel carriers and 230 troops, albeit over a relatively short unrefueled range of 300 n miles at 50 kt (slightly less at the full speed of 63 kt).

Hit the beach

Away from the ships, the PLA's manoeuvrist doctrine and the terrain across the region have combined to ensure that many of the service's AFVs have some ability to swim, looking to cross lakes and slow-flowing rivers if not actually conduct beach assaults.

In addition, both the PLA and PLAN field their own amphibious forces. The army has the largest capability with at least one amphibious armoured brigade and two amphibious mechanised divisions, but the 'Marine'

element of the PLAN still boasts a substantial capability with two amphibious brigades, the 1st and 164th, which are deployed with the South China Sea Fleet and near their headquarters at Zhanjiang. Both services deploy similar equipment, although the navy section is a lighter force and does not currently operate MBTs.

The PLA's interest in amphibious AFVs is long-standing, but the new generation of amphibious tracked AFVs marks a step change in capability, especially regarding their firepower and ability to operate in a wider range of sea conditions than that of older vehicles. This enables them to be launched from an LPD at a greater distance offshore, offering greater tactical flexibility and enhancing the survivability of the launch ship.



Chinese WZ501 IFV modified for amphibious operations with new, larger trim vane on front of hull and large outboard motor at rear (image © NORINCO)

Initial steps to improve the amphibious capability of legacy WZ501/Type 86 infantry fighting vehicles (IFVs) – a copy of the Russian BMP-1 – saw the vehicles fitted with a large trim vane at the front of the hull and a powerful outboard motor at the rear. The latter is claimed to have

increased its maximum water speed by 50% to 12 km/h, but the vehicle is still limited in heavy seas.

As a result, Chinese industry has developed a range of more specialised vehicles with greater natural buoyancy and higher in-water speeds, enabling them to launch assaults more effectively, cross the surf line, and move inland.

As the United States learned to its cost with the now-cancelled expeditionary fighting vehicle (EFV), this is a complex and expensive operation, but China has developed a similar – if ultimately lower-performance – capability in the shape of the ZBD-05.

The latest ZBD-05 amphibious assault vehicle (AAV) configuration was first seen in public in significant numbers in 2009, having made literal and figurative waves when pictures emerged of it travelling at apparently high speeds only a few years before. It is estimated that more than 1,000 of these vehicles and their more specialised support versions have now been manufactured and are deployed by army and navy amphibious forces.

The exact performance of the vehicle in the water is unconfirmed, with the contractor claiming simply that it is “high”, but sources variously report it can swim at up to 30 or 45 km/h (16-24 kt). If it is anything like that, it is substantially faster than its predecessors and international equivalents.

A range of variants have also been developed, enabling a mixed force to swim ashore together and arrive with organic direct-fire support, engineering, and command-and-control capabilities.

Unlike most traditional amphibious vehicles, which were typically converted from existing designs, ZBD-05 was purpose-built to be launched offshore and operate comfortably afloat, providing its crew and dismounts with basic protection from small arms fire and shell splinters. The need for streamlined hulls means that vehicles of this type cannot sensibly be fitted with bar/slat armour for amphibious operations, but in theory this could be fitted once ashore and moving inland.

Although it is unlikely to be capable of accurately engaging targets while surging toward the shore, it is able to lay down suppressive fire from a stabilised 30 mm dual-feed cannon and a 7.62 mm co-axial machine gun (MG) mounted in a two-person, power-operated turret. Launchers for Red Arrow 73 missiles – available with a range of warhead types to engage different target sets out to 3,000 m – are mounted on either side of the turret.

Each vehicle is operated by a commander and gunner (seated in the turret), and a driver, with space for nine dismounts in the back. The main entrance is through a powered ramp in the rear of the hull.

Despite its bespoke swimming design, it still requires a little preparation before entering the water, but it is relatively simple for the crew, who just need to activate

bilge pumps and electronically erect a trim vane. Once in the water, the driver reduces drag by retracting the suspension mounts, pulling up the tracks, and then activating a pair of waterjets at the rear of the hull, driving the vehicle with standard controls.

The ZBD-05 has yet to be offered for export by China North Industries Corporation (NORINCO), but as with other vehicles developed to meet the requirements of the PLA this could well change in the future.

In the meantime, a number of variants have been developed, including a direct-fire version known as the ZTD-05, which has a similar hull but is fitted with a different turret mounting a stabilised 105 mm gun connected to a digital fire-control system to accurately engage moving targets. The gun can also be fired during amphibious operations, lending relatively heavy organic fire support to assault elements.

As well as conventional 105 mm ammunition such as armour-piercing, fin-stabilised discarding sabot (APFSDS), it can also fire high-explosive, anti-tank (HEAT), and 'bunker-busting' projectiles, the latter of which is claimed to penetrate 1 m of reinforced concrete at a range of 1,500 m.

Another recent development is a programmable anti-personnel/anti-materiel round, and the gun is believed to be able to fire the GP2 laser-guided projectile. The latter can provide precision fire with a tandem HEAT warhead –

able to penetrate 650 mm of steel armour protected by explosive reactive armour – out to 5,000 m.



The ZTD-05 amphibious direct-fire vehicle armed with a 105 mm gun coming ashore during amphibious operations. (image © INA)

Other specialised versions of the ZBD-05 include a command post vehicle with a higher roof line and an auxiliary power unit to supply all of the extra communications equipment required without recourse to the main engine, but armed only with a 12.7 mm MG on the roof.

A combat engineer version has been developed on the ZBD-series hull fitted with a front-mounted dozer blade and a hydraulically operated, telescopic arm fitted with a bucket.

Chinese forces also deploy the Type 63 light amphibious tank, which is similar in many respects to the Russian PT-

76 light amphibious tank, but originally fitted with a different turret armed with an 85 mm gun, 7.62 mm co-axial MG and a roof-mounted 12.7 mm MG.

Many of these vehicles have now been upgraded to the enhanced Type 63A standard, which embodies a host of improvements including increased buoyancy and a new turret armed with a 105 mm main gun and the same supporting weapons.



The upgraded Type 63A light amphibious tank features a new turret and greater buoyancy, shown here with trim vane extended at the front of the hull for amphibious operations (image © China Xinshidia Company)

Venezuela has recently taken delivery of a batch of Type 63A tanks and WZ501/Type 86 IFVs, which indicates the Type 63A is now being phased out and replaced by the ZTD-05.

China has also developed and deployed a 122 mm tracked self-propelled artillery system – likely designated the Type 07B – to support its amphibious assault vehicles, replacing elderly 12-round 107 mm Type 63 multiple rocket launchers for indirect fire support.

Although this is a substantial vehicle, it features a trim vane mounted at the front of the hull so it is assumed that this has at least a deep fording capability and is probably amphibious, though not to the same extent as the ZBD assault vehicles.

The howitzer is armed with a 122 mm turret-mounted ordnance, which is also used in many other Chinese artillery systems, tracked, wheeled, and towed. Its maximum range obviously depends on the projectile/charge combination, but it can reach 15.3 km firing standard, high-explosive (HE) projectiles, 22 km with a base-bleed HE shell or 27 km using a base-bleed, rocket-assisted HE projectile.

Beyond all of these new vehicles, Chinese industry has also developed beach assault support systems such as the Type GLM120A mechanised roadway-laying system that is now in service. This is typically used to prepare exit points on beaches and river-crossing points that can be rapidly made unserviceable by heavy vehicles, delaying the assault.

The system comprises a roll of deployable track 'roadway' mounted longitudinally on the back of a locally built 6x6 Mercedes-Benz truck.

In operation, it is traversed through 90° and the truck reverses on to the roadway as it is laid, taking five minutes to lay the 40 m-long, 4 m-wide roadway. This can then support continued use from tracked vehicles with a combat weight of up to 60 tonnes and wheeled vehicles with an axle weight of 20 tonnes. When the mission has been completed it takes only 10 minutes to be recovered from either end.

There is also the Type GLM123 light trackway system that can be laid from a vehicle manually or by hand and this can be used on gradients of up to 20%, which makes it of special use during amphibious operations.

China also deploys a number of more specialised combat engineer systems that could be deployed during an amphibious assault. These include various types of mine-clearing systems that could be used to breach minefields on beaches after the initial assault.

[This analysis is abridged. The full report is available within IHS Jane's Defence Equipment & Technology Intelligence Centre and IHS Jane's Military & Security Assessments Intelligence Centre.](#)

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