

US Navy's Littoral Combat Ship (LCS) can counter asymmetric threats however lacks power projection capabilities for A2/AD environment

The US Navy's \$35+ billion "Littoral Combat Ship" program is intended to create a new generation of affordable surface combatants that could operate in dangerous shallow and near-shore environments, while remaining affordable and capable throughout their lifetimes. The littoral combat ship is a modular, reconfigurable ship, with three mission packages (surface warfare, mine countermeasures, and anti-submarine warfare).

LCS was designed for countering Asymmetric and A2/AD threats. That requires the ability to counter growing "asymmetric" threats like coastal mines, quiet diesel submarines, global piracy, and terrorists on small fast attack boats. It also requires intelligence gathering and scouting, some ground combat support capabilities, and the ability to act as a local command node, sharing tactical information with other Navy aircraft, ships, submarines, and joint units.

At the same time, US Navy needs ships that can act as low-end fillers in other traditional fleet roles, and operate in the presence of missile-armed enemy vessels and/or aerial threats. The littoral combat ships also assumed to provide critical role in dealing with anti-access and the area denial weapons, under US Air-Sea Battle (ASB) concept.

However according to experts expressed doubt about its power

projection capability. "To put things in perspective, the two variants of the U.S. Littoral Combat Ship, Freedom and Independence, are substantially larger at roughly 2,900 tons and 3,100 tons respectively—but they do not possess any cruise missile or similar power projection capability," wrote Garrett I. Campbell Federal Executive Fellow, Brookings Institution. Therefore LCS do not currently possess the power-projection capabilities recently demonstrated by Russia's Caspian Sea fleet.

The Navy is considering at least three over-the-horizon missile weapons for its Littoral Combat Ship – Harpoon, Naval Strike Missile, Long-Range Anti-Ship Missile and an Extended Range Griffin Missile. Specifically, the USN is considering a proposal for an OTH missile offered by a Raytheon-Kongsberg team featuring the Naval Strike Missile (NSM).

Vice Adm. Thomas Rowden, commander, Naval Surface Forces, said this month that that he is relying on an over-the-horizon missiles to "increase offensive firepower on surface warships by continuing to modify existing over-the-horizon surface weapons by expanding procurement of improved anti-ship, anti-air antisubmarine and surface strike missiles." Rowden, speaking at the annual Surface Navy Association symposium," emphasized that increasing attack technology for the surface fleet was vital to the service's future strategy.

Navy surface fleet leaders in early 2015 announced a new organizing concept for the Navy's surface fleet called distributed lethality. Under distributed lethality, offensive weapons such as Anti Ship Cruise Missiles (ASCMs) are to be distributed more widely across all types of Navy surface ships, and new operational concepts for Navy surface ship formations are to be implemented. The aim of distributed lethality is to boost the surface fleet's capability for attacking enemy ships and make it less possible for an enemy to cripple the U.S. fleet by

concentrating its attacks on a few very high-value Navy surface ships (particularly the Navy's aircraft carriers), according to Congressional Research Service Report.

LCS Class

The LCS requirement has been identified as part of a broader surface combatant force transformation strategy, which recognizes that many future threats are spawning in regions with shallow seas, where the ability to operate near-shore and even in rivers will be vital for mission success.

Six LCS of two different designs are now in service, even though formal operational testing is not complete, and they've done real-world deployments to Singapore. The LCS class consists of the Freedom and Independence variants, designed and built by two separate industry teams.

The Independence-class LCS features a unique trimaran hull and a larger flight deck than the Freedom class. Furthermore, the Independence class has more fuel capacity and consequently a wider operational range. Independence-class ships, in comparison to the Freedom variant, are also capable of accommodating two rather than one helicopter.

The Freedom variant team is led by Lockheed Martin (for the odd-numbered hulls, e.g. LCS 1). The Independence variant team is led by Austal USA (for LCS 6 and follow-on even-numbered hulls) and was led by General Dynamics, Bath Iron Works for LCS 2 and LCS 4.

The U.S. Navy commissioned its latest warship, the Independence-class Littoral Combat Ship (LCS) USS Gabrielle Giffords, in Galveston, Texas on June 10. The U.S. Navy plans to commission another Independence-class LCS this year, the USS Omaha, along with two Freedom-class LCS: the USS Sioux City and USS Little Rock.

US Navy's littoral combat ship USS Coronado (LCS 4)

USS Coronado is part of the US Navy's comprehensive plan of action to upgrade and integrate the Littoral Combat Ship (LCS) into the Fleet. Commissioned in April, this high-speed, shallow-draft multi-mission vessel is capable of operating independently or with an allied strike group.

These modular, highly agile, networked surface and reconfigurable vessels are mainly used to prevent threats in coastal waters. Due to its modular design, the ship is easy to reconfigure for different roles, including anti-submarine warfare, mine countermeasures, anti-surface warfare, intelligence, surveillance and reconnaissance.

Most of the functions of the mission modules will be performed by carried vehicles such as helicopters like MH-60R / S Seahawks or unmanned vehicles like MQ-8B Fire Scout, a Vertical Takeoff and Landing, Tactical Unmanned Aerial Vehicle System.

The swappable mission modules are inspired by Denmark's Standard Flex 300 corvettes based on ISO containers, that "flex ships" can radically change the ships' capabilities, by swapping in a full breadth of equipment focused on a particular need. In contrast to the traditional approach, which is to cram a wide-ranging set of bolted-in compromise equipment into fixed installations.

The multimission 57mm Mk 110 naval gun system is a medium-calibre shipboard weapon designed to deliver high rates of accurate fire against threats, such as those which are surface, airborne and sea-based.

Capable of quickly switching between different optimized

ammunition, the fully automatic gun system can fire up to 220 rounds a minute at a distance of up to 10.5 miles. The other armament is evolved SeaRAM 11 cell missile launcher that combines the radar and electro-optical system of the Phalanx 1B CIWS with an 11-cell RAM launcher. It is designed to effectively engage in future high-performance supersonic threats in the littoral environments.

USS Coronado's (LCS 4) Initial Operational Test and Evaluation (IOT&E)

The Navy has completed Initial Operational Test and Evaluation (IOT&E) phase one and the second increment of the surface warfare mission package (SUW MP). The Navy is scheduled to complete IOT&E phase two on USS Coronado with the SUW MP in the spring of 2016. Phase two will validate cyber security and software updates planned for installation prior to deployment.

The events completed during IOT&E gauged the ship's ability during the following: tracking and live fire tests against threat representative high speed maneuverable surface targets using the 30 mm and 57 mm guns; tracking air threats with the ship's air search radar and the SeaRAM anti-ship missile defense system; and conducting Visit, Board, Search, and Seizure operations utilizing the SUW MP's maritime security module and MH-60R Helicopter.

USS Coronado's successfully tested against a "Swarm raid"

US Navy's littoral combat ship (LCS4) successfully tracked and neutralized both single and multiple fast inshore attack craft during live-fire testing off the coast of California.

The ship's crew and embarked surface warfare (SUW) mission

package (MP) detachment conducted test events using the ship's core weapons system – the Mk 110 57mm gun-and the embarked SUW MP Mk 46 30mm gun weapon systems (GWS) against a “swarm raid” of representative fast inshore attack craft. In a swarm raid, multiple enemy ships attempt to attack a ship using large numbers of smaller craft.

Raytheon SeaRAM Missile Fired from USS Coronado (LCS 4)

The U.S. Navy successfully fired a Rolling Airframe Missile (RAM) from a SeaRAM launcher aboard the Independence-class littoral combat ship USS Coronado (LCS 4) 14, according to a Raytheon Company news release. Coronado fired the RAM from its SeaRAM anti-ship missile defense system. The SeaRAM detected, tracked, and engaged an inbound threat target, and successfully intercepted it with a RAM Block 1A missile.

RAM's superior accuracy, extended range and high maneuverability extend the reach of the system while enhancing its accuracy and effectiveness against 21st century targets, including fixed-wing and rotary-wing aircraft, anti-ship missiles, and other threats.

“This test success marks a major milestone toward full operation and employment of the SeaRAM system on U.S. Navy ships,” said Rick Nelson, vice president of Naval Area and Mission Defense product line at Raytheon Missile Systems. “SeaRAM demonstrated that it is a vital weapon for defending navies against anti-ship cruise missiles, and provides warfighters with a capability found nowhere else.”

SeaRAM leverages the proven Phalanx Close-In Weapons System (CIWS) that is fitted to many U.S. Navy allied and partner nation ships worldwide. The SeaRAM system employs the Phalanx Block 1B's high-resolution search-and-track sensor and

computer systems and reliable quick-response capability, but replaces the Phalanx's 20mm Gatling gun with an 11-cell RAM launcher.

Last year, the USS Coronado (LCS 4), successfully test-fired the Naval Strike Missile (NSM) from its deck by hitting a mobile ship target. The Naval Strike Missile (NSM) is an anti-ship and land-attack missile developed by the Norwegian company Kongsberg Defence & Aerospace (KDA).

Navy Scraps RMMV Mine Drone developing alternatives

One of the Littoral Combat Ship's most important and most difficult missions is clearing minefields. In previous plans, the Lockheed Martin Remote Multimission Vehicle (RMMV) was to tow the AN/AQS-20A sonar for volume search; the Textron Common Unmanned Surface Vehicle (CUSV) would tow a minesweeper, and the General Dynamics Knifefish unmanned underwater vehicle would hunt for buried mines.

With the Navy finding that RMMV as it stands today is too unreliable for its mission, it decided to scrap RMMV drone, replacing it with a different type of robot boat, said Navy Secretary Ray Mabus. Mabus acknowledged. "We've got ten of these, we're going to upgrade them to make 'em more reliable, but it's not a long-term answer." Instead, "we're going to move to something different," Mabus said. "We're going to move first to probably an unmanned surface vehicle, instead of this semi-submersible, and then we're going to move longer-term to an unmanned underwater vehicle."

The Navy is hoping to fully resurrect Mine-Hunting technology for the Littoral Combat Ship such that it can find an

eliminate threatening undersea mines with drones, helicopters and underwater sonar, service officials said. The service plans to engineer a new “truck” or delivery mechanism for its sonar and undersea mine-detection technology as a way to ensure the system is integrated and functional by 2018. The Navy plan is to preserve and build upon the promising testing performance airborne mine-neutralization technology and underwater sonar by providing a new RMMV-like delivery technology, Capt. Casey Moton, LCS Mission Packages Program Manager, told Scout Warrior in an interview.

CUSV procurement will be accelerated, Rear Adm. Brian Antonio said, and “comparing it to an RMMV – easier to maintain, harder to maintain; easier to recover, harder to recover; easier to launch, harder to launch; up time, down time, finding mines. We’ll evaluate all that in concert with the fleet.”

Antonio called Knifefish a “very promising system” that had a built-in volume mine search capability in addition to its unique buried mine search sensors. Knifefish fielding is furthest out, but user feedback from the three systems would ultimately get the Navy to a decision in late 2018 or early 2019 regarding which system – or combination of systems – should be used to perform the volume mine search mission on LCSs.

Remote Minehunting System (RMMV or RMS)

The Remote Minehunting System, or RMS was developed for the Navy’s LCS to detect and locate mines and communicate that information to the ship in real time so the explosives can be avoided or destroyed. But the Defense Department’s Office of Operational Test & Evaluation says the drone hunting technology was unable to consistently identify and destroy underwater explosives during tests dating back to September

2014. "The Navy has determined that the RMS' total number of failures and periodicity of failures fall short of the design requirement for the system," said Capt. Thurraya Kent, a spokeswoman for the Navy.

Specifically, testing revealed that the vehicle "cannot be reliably controlled by the ship or communicate when it is operating out of the line-of-sight of the ship, and the towed sonar cannot detect mines consistently," according to the DOT&E. The memo, cited in a September Senate Armed Service Committee report, also said the drone could only reliably operate for up to 25 hours before it failed during testing, falling far short of its required 75 hours.

"The issue was reliability. We couldn't afford to have a machine that would go out into a minefield that was unmanned, thereby taking the sailor out of the minefield, having it break down in the minefield, and oops, now we're sending a sailor into the minefield to go retrieve the unmanned system. We can't have that. But let's face it, we invested a lot of money and a lot of time along the way to have this capability that actually does work when it works – it actually performs when it works."

The RMMV is a high-endurance, semi-autonomous, low-observable, unmanned, diesel-powered vehicle, operated and maintained from the LCS. It is designed to lower out of the back of an LCS down into the water, bringing a mine-searching AN/AQS-20A sonar with it. The AN/AQS-20A incorporates five separate sonar/sensors in a compact, lightweight, and hydro-dynamically stable towed body. The AN/AQS-20A localizes mine-like objects and provides the operator with a visual image and a contact data list. All mission data are recorded by the LCS for post-mission analysis.

"Joint U.S. Navy and Lockheed Martin assessment teams largely attributed the RMMV reliability issues experienced during testing to mission package integration issues, vehicle

configuration and maintenance shortcomings.

Sensors and Decoys

Among its sensors is Sea Giraffe 3D Surface/Air RADAR, capable of simultaneously detecting small, fast-moving targets at all altitudes and in severe clutter. It provides the most comprehensive Electronic Counter-Countermeasure (ECCM) capabilities, including ultra-low antenna side-lobes.

The decoy systems include Super Rapid Blooming Offboard Chaff (SRBOC) decoy launching system (DLS), deck-mounted, mortar-type countermeasure system may be used to launch an array of chaff cartridges against a variety of threats.

The countermeasures suite will include ES 3601 electronic support measures (ESM) from EDO Corp, a state-of-the-art precision system that enhances ship survivability by detecting, identifying, and locating hostile ship and missile radar signals early and efficiently.

LCS lacks power projection capabilities

In October 2015, Russian warships belonging to the Russian Navy's Caspian Sea Strike Group launched 26 cruise missiles against Islamic State targets located in Syria. The missiles flew nearly 1,500 kilometres (930 mi) over Iran and Iraq and struck targets in Raqqa and Aleppo provinces (controlled by the the Islamic State) as well as Idlib province (controlled by the al-Qaeda-linked Nusra Front). The missiles were launched from Dagestan, which was the flagship of the strike group, is more than 328-feet long, has a displacement of about 2,000 tons, according to the Ministry of Defence.

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respectively—but they do not possess any cruise missile or similar power projection capability,” wrote Garrett I. Campbell Federal Executive Fellow, Brookings Institution. Therefore LCS do not currently possess the power-projection capabilities recently demonstrated by Russia’s Caspian Sea fleet.

“Present LCS designs don’t even carry torpedo tubes, or vertical-launch systems (VLS) that could accommodate present and future attack and/or defensive missiles,” according to Defence Industry Daily.

Naval analyst Raymond Pritchett has pithily described the current compromise as: “...3000 ton speedboat chasers with the endurance of a Swedish corvette, the weapon payload of a German logistics ship, and the cargo hold of a small North Korean arms smuggler.”

The real test of USS Coronado shall be when she is deployed in the South China Sea, and has to deal with the risk of Chinese DF-21D (CSS-5 Mod 4) anti-ship ballistic missiles.

The article source also includes:

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<http://edition.cnn.com/2015/12/11/politics/remote-mine-hunting-drone-fails-tests/>

<http://www.scout.com/military/warrior/story/1683866-navy-rebuilds-lcs-mine-hunting-technology>