

Naval Mine Warfare Crossover

Create adaptive capabilities internally

by LCDR Virgil Fermin



Explosive ordnance disposal technicians release an unmanned service vehicle known as “Amy” used for seafloor mapping and mine hunting as part of BALIC OPERATIONS (BALTOPS) 50.¹ (Photo by Cpl Robin Lewis.)

As the Avenger-class mine countermeasures (MCM) ships continue to age, the fleet patiently anticipates the transition of the littoral combat ship (LCS) mine countermeasures mission package (MCM MP) to initial operational capability (IOC).² As the expected replacement for the MCM, the LCS MCM MP is critical for a fleet necessitating increased mine warfare (MIW) assets. What remains to be clarified is if or how nascent capabilities will transform MIW. The perfunctory strategy is a simple one-for-one replacement of the MCM ship class with an MCM MP-capable LCS. The issue with the one-for-one replacement strategy is that sustaining technology needs an adequate response compared to the volume of mines proliferating worldwide. In contrast, studies indicate that the

People’s Republic of China’s (PRC) naval mine inventory has over 50,000 mines with over 30 actuation methods.³ Additionally, the PRC is estimated to operate approximately 80,000 fishing and merchant vessels capable of minelaying operations.⁴

Naval mines are a long-admired problem often considered a pedestrian hazard. As weapons, mines are unsophisticated, inexpensive to produce, and capable of catastrophic consequences in the maritime domain. Naval mines are a proverbial black elephant, a challenge that is seen and largely ignored.⁵ As the late CAPT Wayne P. Hughes

stated, “History is a fickle teacher who lets her opinionated and ill-disciplined students draw lessons as they will.”⁶ The Marine Corps has experienced the consequences of naval mines before. During DESERT STORM, the USS *Tripoli* (LPH-10) was unloaded and reconfigured in theater as a mine countermeasure ship.⁷ Personified as a case study, *Tripoli* was an ad hoc response and undesirable tactical adjustment in a moment of extremes. The *Tripoli* struck a contact mine and blew a 20 x 16-foot hole in her bow.⁸ Therefore, the Marine Corps should have an expansive vested interest in the MIW mission set.

Recent trends indicate that naval mines remain foundational to naval warfighting doctrine for pacing threats. In 2015, the Chinese National Defense University conducted a study and envisioned a phased deployment of up to 14,000 naval mines in response to Taiwan’s declaration of independence.⁹ Mines may not be the weapon that delivers the decisive blow, but they are part of an overarching strategy that deserves more attention. The PRC has adapted from historical lessons, innovated sea-based mining concepts, and repurposed platforms for minelaying.¹⁰ Mines have also endured and remained relevant in the European area of operations. In 2022, reports estimated that Russian military forces deployed approximately 400 to 600 mines within Ukraine’s territorial waters.

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Naval tacticians can no longer consider mines as a one-dimensional crisis management problem. Contemporary statistics irrefutably confirm that naval mines persist as a disruptive option and a prospective sea-denial strategy. Tangible change is needed to overcome potential complications in future operating environments. However, there is a viable path for the Navy and Marine Corps to collaborate and revitalize MIW as a naval discipline. Due to their scalable and sustainable framework, there is already common ground between the Navy and Marine Corps to devise solutions inherent to existing structures.¹¹ Expeditionary Strike Group 3 is adequately positioned for change as the commander of Mine Countermeasures Group 3, fourteen littoral combat ships, and two subordinate divisions.¹² The Marine Corps and Expeditionary Strike Group 3 have firmly established critical resources, processes, and organizational values.¹³ The Naval Services can adequately address the threat of maritime mines by optimizing mine warfare capabilities, hybrid MIW operations, and increased human integration. The Navy and Marine Corps must seize the opportunity to disrupt routine patterns and implement a crossover MIW into multiple domains.

Optimize Capabilities

As the LCS MCM MP reaches full IOC, the utility of the developmental platform requires an acceptable operational residence. ADM Thomas Hayward, the 21st Chief of Naval Operations, once stated, “Every body of water requires a different set of tactics.”¹⁴ However, tactical development depends on aligning operators, technology, and resource agents.¹⁵ The Marine Corps is seeking a return to their role as operators in the maritime littorals.¹⁶ The Marine Corps return to its maritime roots and commitment is apparent in the publication of the *Littoral Operations in a Contested Environment* (LOCE) concept.¹⁷ Although theoretical, LOCE is a foundational document in exploring possible solutions. The Marine Corps’ interest in an expanded role in the littorals is adequately justified. During the Gulf War build-up, the Marine Corps

unmistakably experienced the consequential introduction of Iran’s mines in the Persian Gulf and shallow waters near Kuwait’s coast.¹⁸ Naval planners estimated it would take up to 28 days to set the operational environment for amphibious operations.¹⁹ The Gulf War dilemma rendered ship-to-shore maneuvers via landing craft impractical. The presence of Iran’s mines had an undeniable influence on the United States Central Command’s operational plans and realtime analysis. Moreover, a 28-day delay in current environments is indefensible and intolerable.

Since the Gulf War, the Naval Services have generated extraordinary momentum and technological developments to counter adversary mines. Marine Corps explosive ordnance disposal (EOD) sections have been at the forefront of the cutting edge for underwater robotics and expeditionary mine countermeasures (ExMCM).²⁰ As leading technologists, the EOD formations have various personnel and rapidly deployable portable ExMCM assets. The EOD formations provide inherent flexibility with their stand-alone mobile systems and portable configurations. Another essential element of EOD is their ability to conduct realtime target identification and mine-neutralization. Rapid mine target identification and mine neutralization are areas where the fleet currently requires support from external assets. Equally, Marines need diverse vessels of opportunity for distributed operations.

Therefore, the MCM MP-capable LCS must be a prospective vessel of opportunity and a surrogate platform. Successful evidence of the LCS MCM MP is the minimum baseline concept of operations. As with any emerging technology, there are risks and vulnerabilities associated with responsiveness outside of a controlled environment. Preliminary evidence confirms that the LCS MCM MP is constrained to the limitations resident within the mission systems, support equipment, and crew detachment.²¹ Although controversial, LSCs are the ideal resource agent for expeditionary forces due to their modularity. Without exquisite MIW capabilities, the LCS MCM MP must be

augmented with ExMCM equipment and personnel to diversify variable MCM ocean operating depths. When combined, resource paring for optimization will increase mine hunting, minesweeping, and mine-neutralization options. Furthermore, the union brings credence to MAGTF fleet integration and rectifies capacity challenges defined in LOCE.²²

Hybrid Mine Warfare

There is a propensity to interpret MIW as a reactive situation, with MCM serving as a solution waiting on a problem.²³ Since 1950, naval mines have caused 77 percent of casualties against U.S. ships, influencing the defensive inclination towards MIW.²⁴ Nevertheless, MIW deserves expanded consideration beyond MCM crisis management tactics. Pairing a Marine EOD element with an MCM MP-capable LCS alters the application of MIW. The optimization of MIW assets is a hybrid offensive and defensive operations conduit. A hybrid MIW platform will transform the integration of offensive mining and realtime weaponering.

Combat loading offensive mines onboard LCS MCM MP platforms and storing them in shipboard magazines is an alternative to expensive fire control systems installations. Furthermore, the Navy could facilitate the Marine Corps with supplementary options for airborne maritime mining. Asymmetric offensive naval mining is worthy of an expanded role in the Marine fleet due to its cost-effectiveness and potential for rapid integration. Collectively, aggregated MIW capabilities produce various means to achieve tactical initiative and surprise.²⁵

In the MIW spectrum, data is the product of the proactive offensive or defensive MCM. The environment can have a substantial influence on the outcome of operations. During World War II, the Naval Services suffered the painful consequences of poorly synergized coordination and tidal impacts on landing crafts.²⁶ The Navy and Marine Corps must vaporize reactive MIW data consumption in favor of a multi-mission data creation approach. There is a tendency to narrowly consider MIW

technology as a producer of only mine countermeasure-relevant data. However, the reality is that mine-hunting systems can provide a wide range of mission-relevant environmental data. Modification is contingent on careful consideration of the functions germane to MIW. Correspondingly, the operations adjacent to MIW directly support naval expeditionary forces.

Unmanned underwater vehicles (UUVs) have altered the possibility with hydrographic data and sonar payloads.²⁷ ExMCM robotics systems can provide navigational hazard data, currents, water temperature, and high-definition video while searching for mines.²⁸ As data consumers and producers, Marines are interested in the time-sensitive exploitation of UUV sensor scans for maneuver and maritime platform risk reduction. The Navy would equally benefit from UUV employment on ships without hull mounter sonar suites. Modern MCM systems are producers of data that spans a multi-mission spectrum. These resources should be more valued and utilized. The Marine Corps benefits significantly from a proactive hybrid approach to a longstanding maritime warfare discipline.

Increase Human Integration

In searching for military advantages, people are equally important as technology. MIW requires professionals acquainted with deliberate mission planning and methodical mission execution timeliness. Assembling MIW specialists for the MIW mission remains challenging, with Navy shortfalls of 5,000 to 6,000 personnel billets at sea.²⁹ However, the Navy's personnel gaps would benefit significantly from an unconventional response. The advantage of including LCS in an expanded MIW role is the adjacent access to their corresponding staff. In recent years, the Navy has experimented with utilizing LCS Surface Warfare Division staff as embarked warfare commanders on LCSs.³⁰ Correspondingly, the Navy can and should direct the LCS Mine Warfare Division (MIW DIV) staff to expand their role at sea. The Marine Corps also necessitates expanded mission sets in the maritime domain.

With the Marine Corps shifting back towards a maritime-centric focus, combined MIW staff would form a fully integrated Navy and Marine Corps MIW team. In a watershed moment, the recent establishment of integrated littoral code staff directorates for the naval services in the Indo-Pacific region should be the prototype for the new MIW staff at sea.³¹ In eighteen months of experimentation, Task Force 76/3 has turned once inconceivable integration into a functional reality.³²

Contrarians may be inclined to categorize physical space as a limiting factor to an MIW DIV staff, but that is refutable. There are viable alternatives for advanced MIW to the physical constraints of the LCS platform. Amphibious ships provide a new resolution to MIW staff planning space, systems consoles, and equipment constraints. In particular, the San Antonio-class LPD's 684-foot length and aggregated sensors, processing systems, and communications suite are amendable for staff embarkation.³³ With the appropriate personnel at sea, MIW staff can accelerate realtime data processing and follow-on operational planning. Thus, establishing a seabased MIW tactical fusion center for post-mission analysis data, intelligence gathering, ocean floor mapping, and mine target acquisition.³⁴

The benefits of expanding an MIW DIV staff also increased flexibility beyond MIW. The MIW DIV staff could also supplement or serve as composite warfare commanders, primarily the surface warfare commander. This proposal would complement former Commandant Berger's 2019 guidance for further Marine integration into composite warfare.³⁵ An expanded Marine Corps role in MIW is a mutually beneficial endeavor. Embarked staff would unburden shipboard personnel from additional planning and administrative requirements. Additionally, an expanded role for MIW staff within composite warfare alleviates shipboard personnel from fatigue caused by supplementary duties. Staff augmentation is an unspoken and welcome reality for a fleet with gapped critical billets at sea. Ultimately, integrated staffs solve capacity shortfalls beyond equipment and software.

Conclusion

As the LCS MCM MP reaches IOC, MIW skeptics may be unlikely to view the platform as a game changer because they consider it a one-for-one replacement. However, myopic concepts for the LCS MCM MP and MIW should not impede the benefits of transformation. Task Force 76/3 has proven that the Navy and Marine Corps can command tactical units and collaborate effectively outside tradition-bound constructs. Tangible changes for MIW are attainable through reorganization. It is no longer inconceivable to imagine a near future where a Marine Corps ExMCM detachment embarks on an LCS MCM MP conducting aggregated operations with an LPD. A prospective reality in which a blended MIW DIV staff plans missions in the combat information center of an LPD and Marines launch a REMUS 6000 autonomous underwater vehicle from a well-deck days before ship-to-shore craft movements.³⁶ A functional ecosystem where a blended MIW DIV staff patiently awaits the results of acoustic intelligence generated by autonomous underwater vehicles. These ideas do not belong in a notional ecosphere. The Marine Corps and Navy have the authority and ingenuity to reorganize to overcome the challenges of modern naval mine warfare. The MIW crossover is possible now through optimized reorganization, hybrid operations, and increased human integration. The alternative to an MIW crossover is a dangerous waiting game for another fickle history lesson. Time will tell if MIW will see progress or platitude.

Notes

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