NSFS in a Contested Environment

Long-range naval surface fire support (NSFS) is a force multiple in any operation giving its users considerable advantages ... but the benefit comes with risk

by LtCol Jon M. O'Gorman

During October 2016, Iranian supported Houthi rebels conducted multiple missile attacks on the U.S.S. *Mason* and other vessels operating in international waters in the Red Sea and the Bab el Mandeb Strait, one of the world's most heavily trafficked waterways.[1] This act is representative of the evolving threat that was only previously inherent to nation states. This is a fact on which we, the U.S., have based our force structure and tactics. It is time to not only recognize non-state threats in the contested environment but also how they couple with operational design and strategy of the force. Long-range naval fires, manifested in developing and legacy weapons systems, provide its users continued access within contested waters at a time when those waters are multiplying.

Throughout 2016, there have been multiple cases of Iranian naval craft intercepting U.S. naval vessels, or in one case, the detaining of Navy Sailors by Iran operating from fast attack craft from small islands in the Persian Gulf. With these threats, the United States is looking at a global freedom of navigation challenge not seen since World Wars I and II. Our naval concepts discuss counters for these actions. The Chief of Naval Operations (CNO) in "A Design for Maintaining Maritime Superiority," orders the Navy to prepare for decisive combat operations:

> U.S. combat at sea must address blue water scenarios far from land and power projection ashore in a highly "informationalized" and contested environment.[2]

USMC Title 10 responsibilities are also quite clear:

> The Marine Corps shall be organized, trained, and equipped … in the seizure or defense of advanced naval bases and for the conduct of such land operations as may be essential to the prosecution of a naval campaign.[3]

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Long-range naval fires provide its users continued access within contested waters. *(Photo by SCPO Matthew Bodenner, USN.)*

While these naval concepts are very relevant in the current world situation, the risk today is from shore defense missiles that can range 80nm and greater, which aids definition of the term *contested environment*. Naval campaigns have experienced contested environments before: the classic example is the Allied attempt to force the Dardanelles Straight in World War I, known to history as the Gallipoli campaign. An Allied naval force of French and British capital ships (18 battleships with associated cruisers and destroyers) attempted to force a passage through mined waters covered by Ottoman coastal artillery. It was believed this effort could knock the Ottoman Empire out of the war. However, the Allied fleet was unable to suppress the shore batteries in order to allow the minesweepers to clear a passage—resulting in the loss or dam-

age of five capital ships to mines and shore fire.[4] This is a prime example of a contested naval environment, and not dissimilar from the modern day threat of cruise missiles (versus coastal artillery) and mines. The increase range of cruise missiles will require creative solutions and naval forces must have counter measures.

This range gap was further exacerbated by the decommissioning of the battleships in 1992, and it caused the Marine Corps to rely on aviation to offset this loss in firepower. However, in a naval campaign or amphibious operation, aviation comes with limitations; as with missiles, aircraft are expensive and lack capacity in any sustained action.

Past naval history and current war gamming recommend overlapping fires capability (and capacity) for these types of operations. This means aviation, land attack missiles, and naval surface guns must all function in concert to support an amphibious operation. Investment decisions in high priced weapons programs, such as the F-35 and missile systems, have delayed investment in range improvements to gun systems and their associated rounds. This gap of surface fires in supporting operations on a contested island/shore requires solutions and resourcing.

Current naval thinking seems to support improvements: "In Surface Force Strategy: A Return to Sea Control," VADM Thomas Rhoden notes:

> The concept of distributed lethality enables the goal of sea control … It is achieved by increasing the offensive and defensive capability of individual warships.[5]

Distributed lethality opens the aperture for creative solutions to include Naval Surface Fires.

Currently, the Navy-Marine Corps Team is researching temporary solutions to the NSFS range gap while increasing distributed lethality. One option is the backfit of the MK41 Vertical Launch System (VLS) and Tactical Tomahawk Weapons Control System (TTWCS) on LPD-17 (amphibious) San Antonio class ships. This will increase the strike range of the amphibious forces to greater than 1,000nm—thus achieving more standoff range from the cruise missile threat. The basic infrastructure for a sixteen-cell launcher was built into the early ships of the class, but the requirement was eventually removed and replaced with more affordable point defense systems (RAM). A 1,000nm range could neutralize those threat missile sites, thus setting conditions for joint forced entry operations. However, back fits to ships require time and extensive maintenance periods; they are also not cheap. The Navy is studying costs associated with this question and affordability, given the current budget constraints.

Another short-term, low-cost option that could bring distributed lethality to an LHD/LPD/LSD will be firing the M142 HIMARS from the flight deck. While this option brings its own tradeoffs (deck heat shielding, weapons stowage, reloading, and loss of a flight deck spot for aviation operations), it requires less engineering, modification, and procurement compared to VLS. The HIMARS system firing the Guided Multiple Launch Rocket System (GMLRS) can achieve a range of 48nm. One HIMARS launcher carries a pod of six GMLRS rockets. The HIMARS system can also carry a pod with one Army Tactical Missile System. which can achieve a range of 160nm. These ranges with organic Marine Corps systems firing from Navy amphibious vessels is a low-cost fix to add firepower (and distributed lethality) to our naval forces, however, this only partially closes the gap in range for naval fires; while a good advancement in capability, there will still be a capacity issue.

If high-end weapons and platforms are costly when used for lower-end conflicts, an operation against a near-peer competitor greatly exacerbates cost and capacity problems. In a major amphibious operation on a contested coastline, expensive precision weapons will quickly be in need of resupply and the need for volume fires will fall to naval guns. The current range of our Mk-45, 5-inch caliber gun is 13nm.

The Marine Corps has codified the need for a naval gun range of 97nm, in a letter "Naval Surface Fire Support Requirements for Expeditionary Maneuver Warfare," signed by LtGen Edward Hanlon in 2002. The rational for range is derived from ships' guns supporting a heliborne assault force inland (helo range plus the range of enemy rockets from the landing zone).[6]

The Office of Naval Research (ONR) has been researching this problem and has a few initiatives underway that might meet the naval need for sustained long-range and volume fires. The hyper-velocity projectile (HVP) is a next-generation, guided projectile designed for the five-inch guns on all our fleet of cruisers (CGs) and destroyers (DDGs). The five-inch guns have inherent value as the only all-weather, sustained (with magazine depth) fire support asset in the initial stages of an amphibious operation. HVP is currently under testing and could achieve ranges of 41nm.[7] Therefore, multiple ships with HVP munitions fired from five-inch guns supporting a landing force will be a major capacity upgrade in the depth of targets they could range and volume effect they could produce.

Another future weapon showing promise under development by ONR is the electromagnetic railgun. The railgun is a long-range weapon that fires projectiles using electricity instead of chemical propellants. This leap-ahead technology uses magnetic fields created by high electrical currents to accelerate a sliding metal conductor, or armature, between two rails to launch projectiles up to 4,500mph. It is expected to be powerful enough to do more damage than a Tomahawk missile at a fraction of the projectile cost. On 31 January 2008, the Navy tested a magnetic railgun; it fired a shell at 2,520 m/s using 10.64 megajoules of energy. ONR projects 100+ nautical mile initial capability while shooting at 10 shots per minute.[8] The railgun is the only gun technology that meets the Marine Corps' stated need for a 97nm precision range and volume capability. This is a future capability and will need to be placed on a ship that could generate the power required for the gun, but if put in service with the fleet, it could be a true game changing technology, both in range and sustained rate of fire.

The counter-argument to these concepts is that advancements in anti-ship

cruise missile technology makes close-in supporting fires too costly. Consider the example of the Falklands in 1982, when the Argentines seized British held territory and garrisoned it with forces equipped with surface and air anti-ship missiles. British forces had no long-range fires available to support the amphibious landing; thus, the Royal Naval cruisers and destroyers had to move dangerously close toward the shore, putting themselves in range of Argentine missiles. In the initial stages of the operation, the British warship HMS *Sheffield*, a Type 42 destroyer, was struck by a single air-launched Exocet missile, she later sank as a result of the damage that she sustained. On 13 June 1982, as British forces fought to recapture Falklands capital of Port Stanley, they were supported by naval gun fire from the destroyer HMS *Glamorgan*, when the ship was struck by an MM38 missile from an improvised trailer-based launcher from land, resulting in 13 killed and extensive damage. All told, the British naval forces suffered seven sunk or damaged ships in support of the operation.[9] These results have led some to consider amphibious operations ancient history, an archaic way of fighting negated by the current proliferation of anti-ship cruise missile systems around the globe. Yet, in several engagements, naval guns hastened the surrender of the Argentines, helping to psychologically break their will to resist.[10]

If we were to cede this form of maneuver and warfare to the enemy, not only do we lose the ability to project power, but it changes the threat calculus in the enemy's favor (less threats they must defend against). Consider the concept of a "fleet in being." In naval warfare, a fleet in being is a naval force that extends influence (credible threat) without ever leaving port, but because it exists, the enemy is forced to continually deploy forces to guard against it.[11] Investments spent on amphibious warfare, mean adversaries must spend even more to defend their coastline against it. For enemies with large coastlines, this presents a problem; the more those forces spread out, the more likely it will be to create a gap in that defense to exploit.

As naval fires are the enabling function to amphibious operations, the naval Services must continue to develop naval gun, munitions, and platform systems for possible procurement. As the Commandant of the Marine Corps has noted in the *Marine Corps Operating Concept*:

> We must develop capabilities and training that reflect the mutually reinforcing relationship between sea control and power projection.[12]

The combination of these systems, if procured, may finally fix the volume/range capability gaps that were created when the battleships were decommissioned. Adding HIMARS and VLS to our amphibious fleet is in line with CNO/CMC and distributed lethality guidance/concepts and will partially help. But the true range capacity and capability will only arise from investment in HVP and railgun. These game-changing technologies will prepare us for decisive combat at and from the sea and will be the means to allow us to maintain true maritime superiority.

Notes

1. *The New York Times*, (Online: 13 October 2016), available at https://www.nytimes.com. Matthew Rosenberg and Mark Mazzetti, V.S. Ship off Yemen Fires Missiles at Houthi Rebel sites.

2. Office of Chief of Naval Operations, *A Design For Maintaining Maritime Superiority*, Version 1.0, (Washington, DC: January 2016).

3. Information available at 10 U.S. Code § 5063, see https://www.law.cornell.edu.

4. Philip Haythornthwaite, *Gallipoli 1915: Frontal Assault on Turkey*, (Oxford: Osprey Publishing, 1991).

5. Thomas Rowden, "In Surface Force Strategy: Return to Sea Control," Commander Naval Surface Forces, available at http://navylive.dodlive.mil.

6. Edward Hanlon, "Naval Surface Fire Support Requirements for Expeditionary Maneuver Warfare," (Quantico, VA: Deputy Commandant for Warfighting Requirements letter, 19 March 2002).

7. Office of Naval Research, "Hypervelocity Projectile," available at https://www.onr.navy.mil.

8. Office of Naval Research, "Electromagnetic Railgun," available at https://www.onr.navy.mil.

9. J.B.A Bailey, *Field Artillery and Firepower,* (Annapolis, MD: Naval Institute Press, 2004).

10. Robert Scales, *Firepower in Limited War*, (Novato, CA: Presidio Press, 1995).

11. J.B. Hatterdorf, "The Idea of a 'Fleet in Being' in Historical Perspective," (Newport, RI: *Naval War College Review*, Winter 2014).

12. Headquarters Marine Corps, *Marine Corps Operating Concept: How An Expeditionary Force Fights in the 21st Century*, (Washington, DC: September 2016).