
WHAT THE RED SEA AND UKRAINE SUGGEST ABOUT DISTRIBUTED LETHALITY

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IN Despatch Editor's Note: This article was originally published in the August 2024 USNI Proceedings, Vol. 150/8/1,458. It is published here with the permission of the Editor-in-chief of the Proceedings. The original link to it is <https://www.usni.org/magazines/proceedings/2024/august/what-red-sea-and-ukraine-suggest-about-distributed-lethality>

The world is currently witnessing three large conflicts, two of which have a distinct maritime character: the Russia-Ukraine war and the large-scale disruption of maritime trade unleashed by the Houthis. While the geopolitical aim of each conflict is distinct, there are some similarities in smaller belligerents' application of force against larger ones.

The Ukrainian Navy ceased to exist as a viable fighting force early in the conflict. But Ukraine has since clawed its way back at sea. It claims to have sunk or damaged beyond repair more than 30 percent of the Russian Navy's Black Sea Fleet, and it has become extremely hazardous to the fleet's remnants to support land-based operations. The Ukrainians have largely accomplished these effects with shore-based missiles (e.g., to sink the *Moskva*) and the audacious employment of surface drones in conjunction with robust intelligence and secure communication links.

The damage to the Russian Navy has been so severe that it has shifted the bulk of its assets east to Novorossiysk to keep them out of strike range. Further, after the sinking of the Ropucha-class landing ship *Tsezar Kunikov* on 14 February 2024—the fourth ship in the class to have been struck within seven months—the Black Sea Fleet commander was relieved of his responsibilities.¹

Roughly a thousand miles away, in the Red Sea, the Houthis are engaged in a different form of maritime warfare, in which the aim is disruption of maritime trade on a large scale. To accomplish this, they have adopted unrestricted drone/missile warfare, very much akin to the unrestricted submarine warfare of the 20th Century. The weapons used to

sustain this effort vary from relatively simple loitering munitions to far more complex antiship ballistic missiles (ASBMs). This campaign has been so effective that it is estimated traffic through the Suez Canal has dropped by two-thirds since December 2023.²

The weaker belligerents in both conflicts have used asymmetric tools anchored in a distributed architecture to their advantage. Missiles, drones (aerial and afloat), and loitering munitions are dispersed across numerous concealed locations, making it difficult for the threat to be addressed on shore.

Defense Is Hard

Once such weapons are launched, a fresh set of problems for the defender comes into play. The first is detection. Because most of these weapons are small and sometimes stealthy, this is quite challenging. More often than not, the threat becomes apparent only when it is close to its target. The next issue is interception. For an unescorted merchant ship, there is no recourse other than trying to minimize the spread of fire once the weapon has struck. Warships have more tools at their disposal. However, given the lack of risk tolerance for Western navies, the tendency is to address the threat at the maximum possible range with the most capable weapon available. With the cost of most loitering munitions being in the five-figure dollar range, striking them down with missiles that, more often than not, cost in excess of a million dollars is an unsustainable proposition. The unequalness of this contest is further exacerbated by the limited quantity of air-defense missiles men-of-war carry. As these get exhausted, the ships are forced to leave station to replenish, because reloading vertical launch cells at sea is not a skill most navies possess.

The situation is made worse by the fact that the industrial base's ability to build new missiles has atrophied. As inventories deplete, delays in receiving new munitions could stretch to several months—if not years. This is in sharp contrast to the rate at which drones/loitering munitions can be produced, durations increasingly being measured in days.

Given the inequality of this contest, it is only to be expected that the large-scale employment of low-cost antiship weapons through a highly distributed architecture will increase manifold. Further, as such weapons are largely low-tech and not easily restrained by export/technology control

regimes, their employment will be widespread, not only in war, but also in short-of-combat situations. As the quality and capabilities of such weapons increase, their ability to target ships more accurately, at greater ranges, and in the face of only limited countermeasures will rise.

Another class of weapons has the potential to reshape maritime warfare at sea: ASBMs.³ For kinetic weapons, the complexity of ballistic-missile defense (BMD) is substantial. Getting a ballistic warhead to hit a large moving ship at sea is less complex than getting an interceptor to strike a small and possibly maneuvering warhead. This unequalness also imposes a cost asymmetry in which the expense of successful interception exceeds that of the threat. It is, therefore, not surprising that the cost of a mature shipborne BMD-capable missile is high. RTX's SM-3 Block 1B Standard Missile sets a shooter back by an estimated \$11.8 million per shot. The SM-6 brings costs down to a more affordable \$4.3 million.⁴

This, however, is not a contest between the missile and the interceptor. It is a contest between the missile and the targeted ship! Given the velocities involved and the ASBM's resultant kinetic energy, even if the quantity of explosive carried is limited, the potential for substantial damage in the event of a hit is high. Even if the targeted ship were not sunk, the probability of it remaining combat-capable is low. The odds favor the attacking missile by several orders of magnitude.

The ASBM Threat Is Getting Worse

It may be argued that ASBMs do not come cheap. Launch costs are high, and there is a cost associated with guidance under extremely stressful conditions of atmospheric reentry. Here, too, changes are underway.

If reusable rockets were to be weaponized—that is, if a rocket were to be used as a warhead dispenser, recovered after use, reloaded, and launched again—the cost of missile launch would drop significantly. SpaceX has made use of partially reusable rockets for years. Arguably, any entity that seeks to remain competitive in the space-launch industry will be forced to adopt similar technology. If a single Falcon 9 rocket today can launch 20 Starlink V2 mini satellites, each weighing some 800 kilograms, what is to stop a belligerent from launching an equal number of warheads to target a large formation at sea?⁵ As Starship and other fully reusable rockets become operational, the possibility of repeatedly launching an even larger number

of warheads at far less cost will only grow.

In any case, a reasonable proportion of the energy expended during launch is recouped in the form of destructive power conferred by the kinetic energy of the warhead. Further, given the speed of the weapon, the problems associated with the time elapsed between target position at time of launch and at the time of calculated impact diminish substantially. And ASBM range can be enhanced with relative ease once suborbital altitudes are reached.

Tackling multitudes of antiship warheads with BMD-capable interceptors would be inordinately expensive. Further, given limits on the number and types of missiles available in any formation, a saturation attack offers a reasonable probability of leakage. Therefore, it may soon be true that a defending formation loses either way. Even preventing damage through successful interception of all incoming warheads and decoys will come with an economic cost and an operational disadvantage. A hit, on the other hand, will be a major loss in terms of lives, capability, and national prestige, the recouping of which could take years.

Use of ASBMs in conjunction with swarms of low-cost drones/loitering munitions could further enhance the probability of success. Even though the range of the latter is limited, they do not require elaborate launchers and can be deployed with relative ease from craft of opportunity. This means that the coordinated employment of both weapon classes need not be restricted to proximity to a coast.

The largest effort devoted to carrying out such saturation attacks is likely to occur where the adversary assesses cost asymmetry to be greatest. This particularly enhances the vulnerability of large and expensive hulls, as they will be a focal point for attacks of this nature, which will affect these platforms' operational freedom.

Therefore, the problem for gray hulls in combat or even short of conflict is set to grow significantly. A silver bullet, one-size-fits-all solution will be difficult to come by.

What Is to Be Done?

Several near- and long-term measures can be taken. The first and most obvious is to prioritize the development and fielding of effective and inexpensive countermeasures against low-cost weapons, possibly in the

form of directed-energy weapons. Also of use would be systems to jam/spoof satellite position, navigation, and timing signals. Tools to interrupt communication links—particularly those belonging to systems with first-person view guidance—need to be developed and fielded rapidly. Regarding ASBMs, efforts to reduce the cost of hard-kill interceptors should continue. Measures to disrupt different elements of the kill chain—decoys; detection, identification, and generation of targeting data; provision of midcourse guidance/updates; and even degradation of the seeker through the use of high-energy weapons—should be accelerated.

In the long term, navies need to fundamentally reassess their force structures. If the primary role of a warship is to deliver ordnance against an adversary's vessels or targets ashore and long-range weapons make it more economical and reduce risk to the shooter, then the implications of those premises need greater consideration.

A similar seminal moment occurred at the outbreak of World War II. Evolutionary improvements to the battleship, however robust, proved to be of limited use against the superior reach revolutionary airplane-carrying ships brought to the battlefield. Early losses of the *Bismark* and HMS *Prince of Wales* proved this beyond doubt, thereby precipitating an introspection that resulted in increased emphasis on and resources for the fielding of aircraft carriers.

Are we now at a similar juncture? With an entirely new generation of low-cost weapons coupled with the growing effectiveness of ASBMs, has the point arrived at which revolutionary—not evolutionary—changes in force structure are required? The broad contours of such changes are unclear. The solution might lie in robust underwater capabilities augmented by large numbers of dispersed, low-cost, and potent unmanned surface assets. But that leaves unclear the place for large, manned surface combatants. How important will a large visible presence continue to be for shaping influence? Is there a growing divergence between platforms needed by navies during peace and combat?

These questions beg for answers. A convenient response to difficult problems is to pretend they do not exist. The conflicts in the Black and Red Seas have taught us that we are well past that point. Naval warfare is at the threshold of major change, and the earlier we recognize this and prepare for it, the better equipped we will be for the coming challenges.



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1 “How Ukraine Sank the *Caesar Kunikov*—and Is Beating Russia at Sea,” *The Economist*, February 14, 2024, <https://www.economist.com/the-economist-explains/2024/02/14/how-ukraine-sank-the-caesar-kunikov-and-is-beating-russia-at-sea> and Isabel van Brugen, “Russian Navy Commander ‘Sacked’ After Third of Black Sea Fleet Lost,” *Newsweek*, February 15, 2024, <https://www.newsweek.com/russia-black-sea-fleet-commander-viktor-sokolov-sacked-1870254>.

2 James Sillars, “Attacks on Red Sea Shipping Forces 66% Decline in Suez Canal Traffic-ONS,” *Sky News*, April 24, 2024, <https://news.sky.com/story/attacks-on-red-sea-shipping-forces-66-decline-in-suez-canal-traffic-ons-13122044>.

3 Some directed-energy weapons—laser, microwave, etc.—are already combating drones, but their capability for BMD remains a distant proposition.

4 Tyler Rogoway and Joseph Trevithick, “Here Is What Each of the Navy’s Ship-Launched Missiles Actually Costs,” *The War Zone*, December 11, 2020, <https://www.twz.com/38102/here-is-what-each-of-the-navys-ship-launched-missiles-actually-costs>.

5 Jon Brodtkin, “SpaceX Unveils ‘V2 Mini’ Starlink Satellites with Quadruple the Capacity,” *ARS Technica*, February 28, 2023, <https://arstechnica.com/information-technology/2023/02/spacexs-2nd-generation-starlink-satellites-start-launching-as-soon-as-today/>.