



**DISTRIBUTED MARITIME
OPERATIONS**

Solving what problems
and seizing which opportunities?

By Dmitry Filipoff

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Executive summary

What is DMO?

Distributed Maritime Operations (DMO) is the US Navy's service warfighting concept. However, the concept suffers from a wide variety of interpretations across the service and needs more specificity regarding what warfighting approaches it is concentrating on. While the concept describes mass fires and decision advantage as core themes, DMO lacks sufficient coherence and concrete focus to effectively guide the Navy's development.

DMO is a departure from how the Navy traditionally operates. In past decades, the Navy would pull forces into concentrated formations for high-end threats, or disaggregate formations into independent assets for low-end threats. Distribution in DMO describes spreading warships outward and more broadly, but still having them act with unity of purpose, and primarily with a high-end warfighting focus. DMO is a fleet-level warfighting concept, centered on a higher level of command across a broader geographic expanse compared to the strike group-centric operating norms of recent decades.

Why DMO?

The desire to distribute naval forces is part defensive reaction and part offensive evolution.

Defensively, distribution aims to improve survivability by imposing more friction on the targeting process that precedes strikes. China fields a significant array of sensors and anti-ship firepower, and distribution attempts to prevent that sensing from culminating in decisive strikes. Distribution is an asymmetric approach for circumventing an adversary's sensing and firepower by employing nontraditional schemes of maneuver and force posturing.

Offensively, distribution better postures US forces to harness new anti-ship capabilities that are emerging across the joint force. All services are now procuring long-range anti-ship missiles and introducing newfound anti-ship firepower into a broad swath of untapped force structure, including surface warships, submarines, bombers, and land-based forces. This will level the playing field against China in key respects and provide the joint force with new options for mass fires.

Degrading decision-making through naval deception

Deception is a natural partner to distribution by targeting decision-making. Deception operations and capabilities should form a cornerstone of the DMO approach. These capabilities can include unmanned systems and decoy missiles that help overload adversary sensing. Deception can help compensate for force generation challenges by inflating the number of contacts that appear to be confronting an adversary. These capabilities are much more affordable than the platforms they replicate and they can be broadly distributed across existing force structure.

Reinforcing decision-making with distributed command

Distributed forces may still be commanded by heavily centralized command structures. The Navy should consider distributing its command elements by having more expeditionary and afloat Maritime Operation Centers (MOCs). It can also better distribute command by enabling platforms with considerable command-and-control (C2) capability to take on certain command functions when networks are contested. Aerial platforms such as E-2s, F-35s, and P-8s are especially strong candidates for taking on the key role of backup joint fires integrators.

Operational learning

The Navy's ability to investigate and implement DMO is heavily contingent upon the service's system of operational learning. This system needs reform to better translate the concept into concrete updates to tactical development programs, as well as warfighter training and education. This system also needs to be reformed so the warfighting development of the Navy's siloed communities can be deliberately integrated into fleet-level approaches under the overarching framework of DMO. The Navy's MOCs should be specifically targeted with an intensive wargaming curriculum and additional staffing to markedly increase their warfighting skill in the near term.

Introduction

Distributed Maritime Operations (DMO) is the US Navy's service warfighting concept.¹ It is a form of fleet-level warfare, intended to provide a framework for how the Navy could fight the next high-end war at sea. But DMO requires clearer definition if it is to effectively guide the Navy's future development and operations. As it currently stands, the DMO concept suffers from a wide variety of interpretations across the fleet, demonstrating a lack of coherence and effective socialization of the concept's specifics. Compared to other warfighting concepts—such as the Marine Corps's Force Design, the Navy's 1980s Maritime Strategy, or the Cold War-era AirLand Battle—the DMO concept lacks a critical degree of clear definition and service-wide understanding.²

To properly orient a service, successful warfighting concepts require specificity. Namely, warfighting concepts identify specific operational problems and specific operational approaches to address those problems. Certain operational dynamics are highlighted as having an outsized impact on the outcome of future battles and campaigns, and the

concept centers on delivering focused warfighting advantage to those key levers. A primary function of warfighting concepts is to settle critical debates about the changing character of war and how to adapt to it, thereby charting a distinct course for military reform.³

Public definitions of DMO have consistently included decision-making advantage as a key element of the concept's value—claiming that distribution will impact the adversary's targeting decisions while posturing friendly forces for seizing initiative.⁴ This central aspect of DMO deserves to be further explored and developed with concrete methods and capabilities. Operational methods specifically focused on naval deception and distributed command offer significant promise in a high-end war at sea and can form a hallmark of the DMO approach. By exploring how naval forces can leverage deception and distributed command to earn decision advantage, DMO can carve more valuable specifics into how the distributed fleet will fight.

1 "Chief of Naval Operations Navigation Plan 2022," US Navy Chief of Naval Operations, 2022, 8, https://media.defense.gov/2022/Jul/26/2003042389/-1/-1/1/NAVIGATION%20PLAN%202022_SIGNED.PDF.

2 John B. Hattendorf and Peter M. Swartz, "U.S. Naval Strategy in the 1980s," *Naval War College Newport Papers* 33 (2008), 203, <https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1032&context=newport-papers#page=210>; Douglas Skinner, "Airland Battle Doctrine," Center for Naval Analyses, September 1988, <https://apps.dtic.mil/sti/tr/pdf/ADA202888.pdf>; Robert Work, "Marine Force Design: Changes Overdue Despite Critics' Claims," *Texas National Security Review* 6, 3 (Summer 2023), 81–98, <https://tnsr.org/2023/05/marine-force-design-changes-overdue-despite-critics-claims/>.

3 Andrew F. Krepinevich Jr., *The Origins of Victory: How Disruptive Military Innovation Determines the Fates of Great Powers* (New Haven, CT: Yale University Press, 2023), 401–402, 406–407, 439.

4 "Statement of Admiral Michael M. Gilday, Chief of Naval Operations on the Posture of the United States Navy before the House Armed Services Committee," US Navy Chief of Naval Operations, 2021, 7; "Chief of Naval Operations Navigation Plan 2022," 8, <https://docs.house.gov/meetings/AS/AS00/20210615/112796/HHRG-117-AS00-Wstate-GildayM-20210615.pdf>.

Why DMO?

The US Navy is implementing DMO in the context of several major operational challenges. With respect to the People’s Republic of China in the Western Pacific, the US Navy must be able to pursue large-scale sea control and power projection operations, while evading detection by an extensive array of sensors. China’s sensors are linked to an impressive arsenal of anti-ship firepower that is superior to that of the US Navy in key respects, including range and the scope of equipped force structure.⁵ DMO will need to provide methods that allow a heavily outnumbered and outgunned US Navy to endure within an adversary’s weapons engagement zone and sensor-rich environment.

The term “distribution” means an ideal balance in the spread of capability, where it sits between the extremes of overconcentration and being stretched thin.⁶ While distribution can apply to many aspects of organizing capability, it is widely interpreted in spatial terms. In the case of DMO, distribution refers to spreading naval forces outward and more broadly across the battlespace, which is a distinct departure from the more concentrated naval formations of the past. DMO is not the same as “disaggregated” naval operations, in which naval forces spread out and operate mostly independently in pursuit of separate, mainly low-end, missions.⁷ Instead, DMO involves physical separation, but it maintains unity of purpose and is mainly centered on high-end warfighting.

The US Navy’s desire to distribute naval formations is a reaction to its changing perceptions of the hider-finder competition and the offensive-defensive balance. These constructs describe the

character of war in terms of the current balance of advantage between scouting and evasion, and between offense and defense.⁸ Warfighting concepts often articulate a perception about the current state of advantage in these competitions and balances, reflecting how modern warfare is heavily governed by considerations of how to organize links between sensors and firepower. The desire to distribute forces reflects a perception of how the changing character of naval warfare may have tilted against traditional US naval force employment methods.

A common adage describing the state of affairs in modern warfighting is “to be seen is to be killed.”⁹ But this does not apply as readily to war at sea as it does to ground combat, given how different combat dynamics govern naval operations. When fighting warships with missiles, it is rarely enough to have accurate targeting information. Forces must also be able to muster a large enough volume of fire to break through powerful naval defenses, often through carefully orchestrated overlapping strikes, which can impose a major command and control (C2) challenge for the attacking forces. A naval force can more easily afford a disadvantage in the hider-finder competition if it is confident that it holds a major defensive advantage in the offensive-defensive balance.

Adversaries may be forced to hold off on firing at readily targetable warships for lack of sufficient firepower. A concentrated naval formation such as a traditional carrier strike group fields a tremendous amount of overlapping defensive firepower, including hundreds of anti-air missiles, making

5 Dmitry Filipoff, “Fighting DMO Pt. 2: Anti-ship Firepower and the Major Limits of the American Naval Arsenal,” Center for International Maritime Security, February 27, 2023, <https://cimsec.org/fighting-dmo-pt-2-anti-ship-firepower-and-the-major-limits-of-the-american-naval-arsenal/>; Dmitry Filipoff, “Fighting DMO, Pt. 8: China’s Anti-ship Firepower and Mass Firing Schemes,” Center for International Maritime Security, May 1, 2023, <https://cimsec.org/fighting-dmo-pt-8-chinas-anti-ship-firepower-and-mass-firing-schemes/>.

6 This is the author’s own working definition.

7 “Naval Operations Concept 2010: Implementing the Maritime Strategy,” US Navy and US Marine Corps, 2010, 17, 83, <https://www.marines.mil/Portals/1/Publications/Naval%20Operations%20Concept%202010.pdf>.

8 Krepinevich Jr., *The Origins of Victory*, 22–42.

9 Major Brian Kerg, “To Be Detected Is to Be Killed,” US Naval Institute, December 2020, <https://www.usni.org/magazines/proceedings/2020/december/be-detected-be-killed>; William Williamson III, “From Battleship to Chess,” US Naval Institute, July 2020, <https://www.usni.org/magazines/proceedings/2020/july/battleship-chess>.



Ships from the US Navy, Japan Maritime Self-Defense Force, Royal Australian Navy, and Royal Canadian Navy break formation in the Philippine Sea during Annual Exercise (ANNUALEX) 19. Credit: Japan Maritime Self-Defense Force, November 11, 2019, <https://www.dvidshub.net/image/5903836/us-japanese-australian-and-canadian-navies-participate-annualex-19>.

these formations extremely difficult to breach for most adversaries.¹⁰ But China's anti-ship firepower appears powerful enough to threaten even concentrated naval formations, which could suffer severe weapons depletion even if they emerge unscathed from Chinese attacks.

Offensive and defensive drivers of naval distribution

Distribution is partly a defensive a reaction to China's theorized ability to use numerous sensors to enable large-scale strikes against naval formations.¹¹ Rather than count on the defensive firepower of a concentrated formation, distribution attempts to frustrate and undermine the sensing and decision-making that precede strikes.¹² The primary source of survivability for distribution is counter-targeting rather than raw defensive firepower. Concentrated naval formations appear as a distinct center of

gravity to an adversary, which simplifies its decision-making in major respects, even if the cost of breaching the formation will involve considerable weapons depletion.

A more distributed naval formation can pose a more amorphous threat that makes target prioritization more difficult, even if the cost of overwhelming individual forces is more affordable. When individual distributed units are identified, it may be unclear how pressing a threat they pose and how they might combine their capabilities with other distributed forces. Numerous sensors may be tied down by a need to maintain continuous coverage over distributed forces as an adversary attempts to gain sufficient clarity for targeting decisions. Distribution increases the inherent tension between the desire to gain more information and the pressure to strike sooner.

10 The calculation of hundreds of missiles stems from how a carrier strike group usually has three or four warship escorts, each with nearly one hundred launch cells, many of which field anti-air missiles, including quad-packed missiles. This figure can also include the carrier's own missile defenses, and potentially its air-wing-launched defenses as well.

11 This driver is a very consistent theme cited among subject matter expert consultations.

12 "Surface Force Strategy: Return to Sea Control," Commander, Naval Surface Force, 2020, 10, 19; "Statement of Admiral Michael M. Gilday," 7.

In this sense, distribution is an asymmetric approach for circumventing an adversary's sensing and firepower advantage by employing nontraditional schemes of maneuver and force posturing. Distribution seeks to heavily influence the hide-finder competition so that it cannot culminate in decisive strikes that capitalize on an offensive-defensive imbalance.

Distribution is more than a defensive reaction attempting to solve a survivability problem. It is also a proactive endeavor looking to seize an offensive opportunity. The US military is on the cusp of a historic transformation in its anti-ship firepower, during which a large swath of force structure previously untapped for this mission will soon be fielding a considerable array of long-range anti-ship missiles, including surface warships, bombers, submarines, and land-based forces.¹³ The long-range anti-ship strike mission that was once entirely concentrated in the aircraft carrier will soon be available to many more parts of the US Navy, and the joint force as a whole. Fielding these new anti-ship weapons will unlock the great potential of many platforms and necessitate new combined arms relationships, especially with the carrier.

Distribution will better posture the joint force to harness its newfound anti-ship capability and allow it to generate unprecedented mass fires against hostile navies. This will level the playing field in critical respects, given how China's military already has considerable anti-ship firepower broadly fielded across its force structure.¹⁴

DMO can serve as an organizing framework for how the Navy and the broader joint force will better deliver and withstand massed anti-ship fires. Through distribution, naval forces will influence the decision-making process that is attempting to attack them, while also posturing forces for launching attacks of their own. Distribution will affect offensive and defensive considerations simultaneously. But the act of massing fires from across distributed forces could require a sizeable amount of sensing and communication to align a wide variety of kill chains against time-sensitive targets. The extensive decision-making that infuses this process may be ripe for exploitation and reinforcement.

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- 13 Stew Magnuson, "Army Looks to New Missile to Attack Enemy Ships from Shores," *National Defense*, December 19, 2023, <https://www.nationaldefensemagazine.org/articles/2023/12/19/army-looks-to-new-missile-to-attack-enemy-ships-from-shores>; Aaron-Matthew Lariosa, "Army Activates Latest Land-Based SM-6, Tomahawk Battery Based on Navy Tech," *USNI News*, January 18, 2024, <https://news.usni.org/2024/01/18/army-activates-latest-land-based-sm-6-tomahawk-battery-based-on-navy-tech>; Ashley Calingo, "Corps Views New Ship-Killing System as Key to Force Design Modernization," *US Marine Corps*, September 14, 2021, <https://www.marines.mil/News/News-Display/Article/2773565/corps-views-new-ship-killing-system-as-key-to-force-design-modernization/>; John A. Tirpak, "Navy Shoots Four LRASMs in 'Graduation Exercise,' as Air Force Ramps Up Multiyear Buy," *Air & Space Forces Magazine*, April 3, 2024, <https://www.airandspaceforces.com/navy-shoots-four-lrasm-air-force-multiyear-buy/>. US surface warships and submarines have very little anti-ship missile firepower. They only field a small number of short-range Harpoon missiles, which are inadequate for long-range, massed fires against warships. Their increase in firepower will come with the fielding of the Maritime Strike Tomahawk, which is compatible with their launch cells.
- 14 Sam Goldsmith, "Vampire Vampire Vampire: The PLA's Anti-Ship Cruise Missile Threat To Australian And Allied Naval Operations," *Australian Strategic Policy Institute*, April 2022, 61–62, https://ad-aspi.s3.ap-southeast-2.amazonaws.com/2022-04/Vampire%20Vampire%20Vampire_0.pdf?VersionId=tHAbNzJSXJHskd9VppGNRcTFC4hW7UqD.

Degrading decision-making: Deception as a force multiplier to distribution

Deception is a natural partner to distribution. Both target decision-making and complicate the adversary's ability to make sense of the battlespace. As an adversary peers into the vast and bustling maritime domain to locate an evasive force, deception can actively intensify the fog of war and create opportunities for one's own forces. The sensor-rich environment of the modern battlespace strongly encourages navies to leverage sophisticated deception tactics and capabilities in their operating concepts.

Deception can impose a variety of useful force-multiplying effects. As deception complicates the search problem for the adversary, it can clarify the search problem for one's own forces. As adversaries attempt to identify decoys or launch fires against false targets, it can allow the deceiver to witness how the adversary's tactics and kill chains come together.¹⁵ Deception can compel lurking hostile forces to activate sensors and launch attacks that resolve the search challenge for one's own forces and set the stage for engagements. Deception can play a critical role in stimulating adversaries to show their hand and create opportunities to gather useful intelligence on their warfighting methods. Deception can also compensate for shortfalls in force structure and force generation, as false contacts can multiply the number of forces that appear to be confronting an adversary.

Information overload can multiply the effects of distribution on an adversary's decision-making better than strict silence can. Rather than leaning on tight emissions control that will likely crumble once the shooting starts, forces can aim to inflict deafening overload via deception. Flooding the battlespace with a multitude of false contacts and emissions could overwhelm the adversary's decision-making and suffocate its information

processing. By operating under the cover of sensory overload, friendly naval forces may be able to fight within a more permissive environment that allows them to take actions that would otherwise be highly risky in a quieter battlespace.

Naval deception and blending into maritime traffic

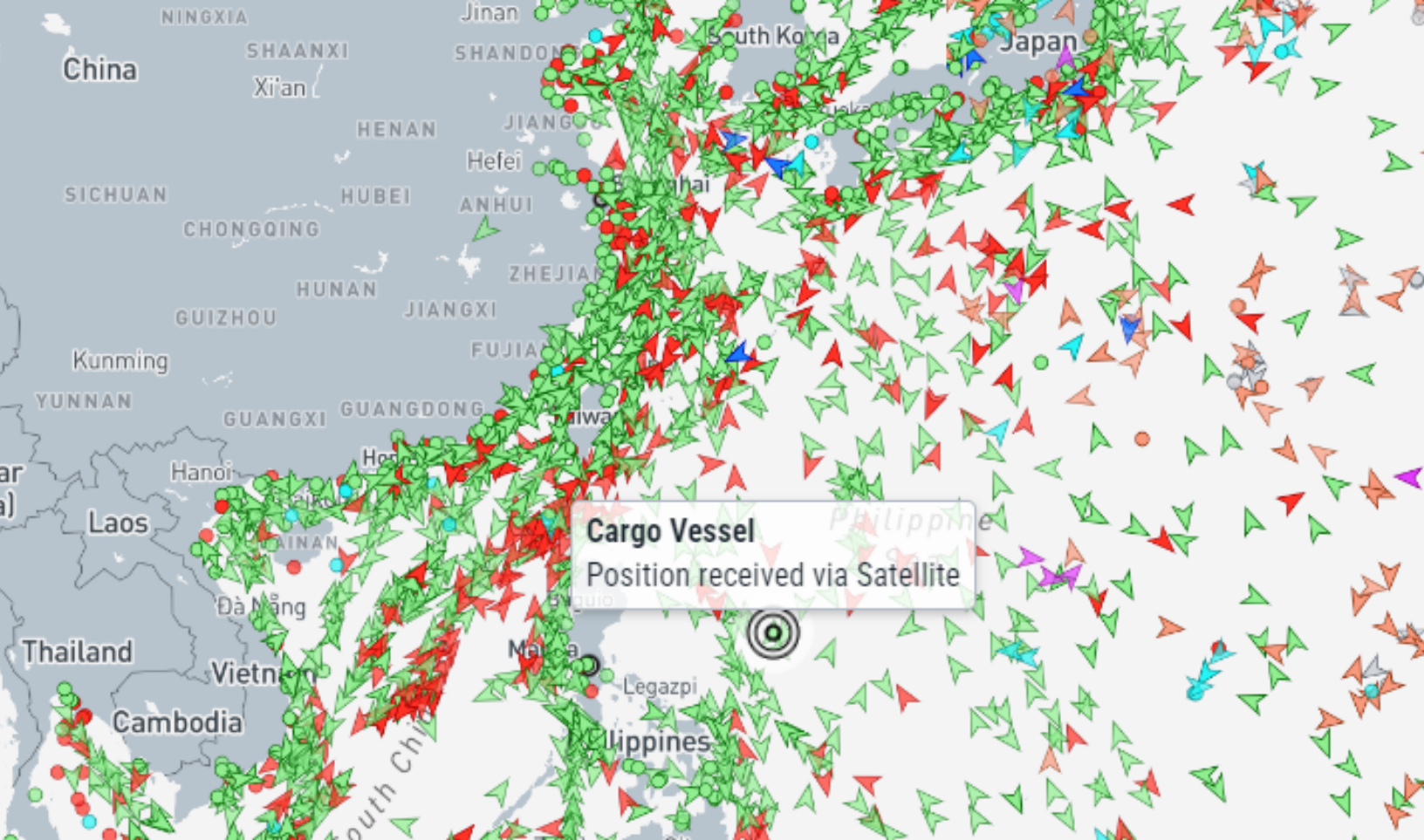
The act of distributing warships creates a force posture that is more conducive to deception. Distribution in this sense can involve spreading warships outward and more broadly into looser formations. These elastic formations can make it more difficult for an adversary to perceive naval targets in an ocean bustling with commercial traffic. Large, oceangoing commercial vessels typically travel alone and along distinct courses for long periods. By comparison, a structured formation of multiple warships maneuvering together and making frequent course changes will appear much more distinct on sensors and help clarify the adversary's search challenge. This encourages looser and more expansive naval formations that maintain some measure of cohesion, while allowing warships to blend into dense maritime traffic.

But the maritime environment is unlikely to remain a useful cover for long. Navies should not count on commercial traffic to continue as usual in the midst of major naval combat operations. Shipping might take alternative routes to avoid contested seas, resulting in an emptying of the ocean that diminishes the amount of sea traffic into which naval forces can blend. These effects have been apparent in the Red and Black Seas.¹⁶

China may have a distinct advantage, in that it could command the numerous commercial vessels of its massive, state-owned shipping firms to obfuscate the battlespace in close coordination with military

¹⁵ Jonathan F. Solomon, "Defending the Fleet from China's Anti-Ship Ballistic Missile: Naval Deception's Roles in Sea-Based Missile Defense," Georgetown University, 2015, 61–62.

¹⁶ Parisa Kamali, et al., "Red Sea Attacks Disrupt Global Trade," International Monetary Fund, March 7, 2024, <https://www.imf.org/en/Blogs/Articles/2024/03/07/Red-Sea-Attacks-Disrupt-Global-Trade>; Michelle Nichols, "Zelenskiy Says Black Sea Grain Corridor in Doubt without US Aid," Reuters, February 27, 2023, <https://www.reuters.com/world/europe/zelenskiy-says-black-sea-grain-corridor-doubt-without-us-aid-2024-02-27/>.



A snapshot of maritime traffic in the Western Pacific, via vessels transponding AIS signals. Credit: Author graphic captured in MarineTraffic.com, Global Ship Tracking Intelligence, May 8, 2024, <https://www.marinetraffic.com>.

authorities.¹⁷ These commercial vessels, including China’s Maritime Militia, could also double as widely distributed scouting assets that pervade the maritime battlespace and complicate US deception measures. The United States, with its dearth of US-flagged vessels, would hardly be able to match such a capability.

As the ships of many other states start circumventing an active battlespace, US-flagged ships may prove to be some of the few that are willing to sortie into contested zones to inflate distribution alongside US forces. Yet many US-flagged vessels may be heavily mobilized in support of national defense and economic security requirements in the midst of a major war.¹⁸ This would strongly conflict with a potential desire to keep US-flagged ships in the forward battlespace to populate deserted seas in support of DMO. The

imperatives that would drive US-flagged ships into delivering vital logistics would greatly diminish their operational flexibility and overall ability to contribute to fleet distribution.

The United States needs to develop mutual understanding with commercial firms, flag registries, and allies so they understand why and how US naval forces may need to operate among their maritime traffic within a contested region. Such understandings might need to extend to the global automatic identification system (AIS) to allow US warships to convincingly spoof the identities of commercial vessels. Otherwise, an adversary’s ocean surveillance network could isolate ships that are not broadcasting AIS and mark them as priority contacts for targeted scouting.¹⁹

17 Michael J. Dahm, “China Maritime Report No. 25: More Chinese Ferry Tales: China’s Use of Civilian Shipping in Military Activities, 2021–2022,” China Maritime Studies Institute, January 2023, <https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?article=1024&context=cmsi-maritime-reports>.

18 Bryan Clark, Timothy A. Walton, and Adam Lemon, “Strengthening the U.S. Defense Maritime Industrial Base: A Plan to Improve Maritime Industry’s Contribution to National Security,” Center for Strategic and Budgetary Assessments, February 12, 2020, 11–13, 35–36, https://csbaonline.org/uploads/documents/CSBA8199_Maritime_Industrial_FINAL.pdf.

19 Solomon, “Defending the Fleet from China’s Anti-Ship Ballistic Missile,” 99.

The act of using commercial sea lanes to obfuscate warship movements and identities can expose a navy to criticism on humanitarian grounds and invite accusations of using civilians as human shields. This could result in political stipulations that revise the rules of engagement and constrain operational behaviors. If distribution successfully prompts an adversary to fire on a misidentified target, are US naval forces willing to reveal themselves by shooting down missiles heading for civilian ships, or will operational imperatives to maintain silence and preserve weapons inventory encourage calculated inaction? Sneaking within maritime traffic could turn an offensive naval operation into a defense of sea lines of communication if that traffic comes under fire, potentially compromising much of the stealth and maneuver space naval forces hoped to gain.

Even though operating within maritime traffic is a natural implication of distributed operations at sea, it should not be considered an enduring source of advantage. These considerations should drive forces to develop deception methods that do not depend on the presence of third-party civilians.

False contacts as force multipliers: Unmanned systems and decoy missiles

While DMO warrants more expansive naval formations and schemes of maneuver, these methods will offer advantage for only so long. The distinct emissions of military-grade radars can travel for hundreds of miles and sharply reduce uncertainty as to which ships are military rather than commercial. Even if warships operate in total emissions silence, the act of launching missiles still creates distinct signatures that can be traced back to launch platforms. Missile salvos are themselves a clarifying signature, and one that can betray a launching unit's identity and location. The act of massing fires can be a critical turning point in which a distributed force shows its hand and opens itself up to retaliation. These factors highlight a need for deception that complicates the interpretation of critical actions that would otherwise be sharply clarifying events to an adversary's sensing.

Naval deception capability can be greatly enhanced by combining unmanned systems, electronic warfare, and decoy missiles into deception-focused platforms. These platforms can multiply the effects of distribution by posing as credible contacts and artificially inflating the scope of forces and emissions an adversary perceives in the battlespace. Their combination of capabilities allows them to maintain credibility for longer against an adversary's overlapping array of sensor types and reduces the extent of operational behaviors that can sharply clarify the search challenge for the adversary.

An especially potent capability could involve combining unmanned platforms with decoy missiles, such as the ADM-160 Miniature Air-Launched Decoy (MALD). Unmanned platforms with decoy missiles could be vital for preserving the stealth of the fleet during a mass firing sequence—a critical operational event that can expose forces and resolve much of the adversary's search challenge. By firing decoy missiles from fake warships and aircraft during a mass firing sequence, the streams of salvos leaving the real platforms will become less of a sharply clarifying signature that betrays their identity. Decoy missiles can be used to inflate the volume of fire that appears to be bearing down on an adversary, potentially compelling them to waste numerous defensive weapons on phantom salvos. Decoy missiles can be useful for inflicting weapons depletion against an adversary, paving the way for real missiles to finish off targets at lower levels of weapons expenditure, all while preserving the identity of launch platforms.

An unmanned vessel fielding decoy missiles could possibly imitate carrier operations by having the decoys replicate a multitude of aircraft signatures and flying behaviors.²⁰ There is also Cold War precedent for equipping surface warships with electronic equipment that can make them appear to be carriers. The Cold War US Navy had the ability to install a trailer containing the Integrated Cover and Deception System (ICADS) onto the flight deck of a warship. ICADS enabled the warship to emit telltale carrier signatures, use false-target generators to deceive radars, and acoustically deceive submarines by simulating carrier machinery noise.²¹

20 "Miniature Air Launched Decoy (MALD) and Miniature Air Launched Decoy—Jammer (MALD-J)," Director, Operational Test and Evaluation, 2019.

21 Solomon, "Defending the Fleet From China's Anti-Ship Ballistic Missile," 50, 61; Jonathan F. Solomon, "Maritime Deception and Concealment: Concepts for Defeating Wide-Area Oceanic Surveillance-Reconnaissance-Strike Networks," *Naval War College Review* 66, 4 (2013), <https://digital-commons.usnwc.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1413&context=nwc-review>.



Two Miniature Air Launch Decoys (MALD) sit side-by-side in the munitions storage area on Barksdale Air Force Base, Louisiana. Credit: Technical Sergeant Micaiah Anthony, March 21, 2012, <https://www.dvidshub.net/image/549385/b-52-beefs-up-capabilities>. MALDs, when uploaded to the B-52H Stratofortress, are capable of reprogramming while the aircraft is in flight. MALDs are programmed to run several different routes to give aircrews more options when flying in enemy territory.

Installing similar systems across the fleet today could significantly increase the Navy's capacity for distributed deception. Inflating the number of capital ships that seem to be in the battlespace can pull the adversary's attention away from the real vessels, and possibly induce it to waste large amounts of weapons against false contacts. Deception can be instrumental for depleting both offensive and defensive weaponry and forcing platforms out of the fight due to depleted magazines.

Undersea deception: Capitalizing on asymmetric advantage

Distributed deception may be especially potent in the undersea realm. The United States maintains a qualitative advantage in submarines, which are

among the few platforms that can confidently penetrate deep into China's anti-access, area-denial (A2/AD) zone.²² China's naval leadership has declared the undersea domain a priority area for capability development, likely in recognition of long-standing US naval superiority in this area.²³ The stealthy nature of submarines magnifies the effects of their presence, given that the latent threat of submarine attack can weigh heavily on an adversary's decision-making. In the 1982 Falklands War, the British Royal Navy fired a remarkable two hundred torpedoes in five weeks against false submarine contacts, which turned out to be acoustic anomalies.²⁴ Purpose-built decoys could inflict similar effects.

22 Richard R. Burgess, "Submarines Among Last U.S. Asymmetric Advantages, Admiral Tells Symposium," *Seapower Magazine*, November 6, 2019, <https://seapowermagazine.org/submarines-among-last-u-s-asymmetric-advantages-admiral-says/>.

23 Ryan D. Martinson, "Winning High-End War at Sea: Insights into the PLA Navy's New Strategic Concept," Center for International Maritime Security, May 18, 2023, <https://cimsec.org/winning-high-end-war-at-sea-insights-into-the-pla-navys-new-strategic-concept/>.

24 Lieutenant Commander Jeff Vandenengel, "Fighting Along a Knife Edge in the Falklands," US Naval Institute, *Proceedings* 145, 12 (December 2019), <https://www.usni.org/magazines/proceedings/2019/december/fighting-along-knife-edge-falklands>.

Distributed deception can capitalize on adversary fears of US undersea dominance by fielding unmanned underwater vehicles (UUVs) that imitate the acoustic signatures of US submarines. Such UUVs could spark hurried responses from naval forces that are expecting imminent submarine attack or attempting to seize a fleeting opportunity to strike a high-value target. Deceptive UUVs could be harder for torpedoes to hit and discriminate due to their small signatures, potentially compelling an adversary to waste many munitions in the pursuit of false targets. Artificially multiplying the presence of feared US submarines can induce adversaries into many self-defeating actions and be highly disruptive to their operations.

These deception capabilities could likely be accommodated onto medium-class UUVs, which are relatively small, lightweight, and affordable, yet can feature more than two hundred miles of range.²⁵ These UUVs could be designed to deploy from submarines, stealth aircraft, Marine stand-in forces, cruise missiles, and other assets that can earn enough proximity to adversary fleets. While real submarines are hotly demanded assets that can be hard to come by, a wide variety of forces could still reap some benefits of submarine-like presence by leveraging decoys.

Evolving force design and weapon loadouts for deception

Fielding widespread deception capabilities can involve significant revisions to Navy equipment and force design. Many unmanned naval platforms are still in their early stages of development and will require extensive experimentation and trialing before they are deemed fit for serial production. However, decoy missiles stand out as a possible deception capability that can be broadly fielded across existing platforms with relative speed and affordability.

DMO's predecessor concept of Distributed Lethality introduced a mantra of "if it floats it fights" to emphasize the broader distribution of firepower across the surface fleet.²⁶ A similar philosophy can be applied in the vein of distributed deception—if it floats, it deceives. By broadly fielding small decoy missiles across forces that do not typically carry long-range firepower—such as the amphibious fleet, littoral combat ships, sealift ships, helicopters, and maritime patrol aircraft—the Navy can magnify its distributed posture in the battlespace and potentially overload the adversary's sensing.

The ability to field decoy missiles across such a broad variety of platforms can be facilitated by their especially small size. At less than three hundred pounds and ten feet of length, MALD is notably small for a payload featuring more than five hundred miles of range.²⁷ Adapting it onto ships could involve developing quad-packed canisters for vertical-launch cells similar to those used for the Evolved SeaSparrow Missile, and developing compact box launchers of several missiles each. Box launchers could be mounted topside on warships and towed onto the flight decks of amphibious platforms and littoral combat ships (LCSs). Decoy missiles are a small enough payload that they could be reloaded at sea and even be rearmed within shipboard hangars, potentially offering warships and ship-based aircraft a sustainable ability to launch deceptive fires. Having small, yet long-range decoy missiles distributed across a force could allow a wide variety of platforms to contribute to deception from standoff ranges. A similar logic could be applied to fielding submarine-imitating UUVs across a variety of force structure.

Almost all decoy missiles produced so far have been for the US Air Force, which aimed for an inventory of about three thousand of the payloads.²⁸ For most of the Air Force production run, the unit cost was less than \$500,000 per decoy, with production runs yielding more than two hundred units annually, making for a relatively

25 "Remus 620: Unmanned Underwater Vehicle, Unsurpassed Multi-Mission Capabilities," HII, November 4, 2022, https://hii.com/wp-content/uploads/2022/11/REMUS-620_11-4-2022_1700-1.pdf.

26 Vice Admiral T. S. Rowden, "Surface Force Strategy: Return to Seapower," Commander, US Naval Surface Forces, Department of the Navy, 2017, <https://media.defense.gov/2020/May/18/2002302052/-1/-1/1/SURFACEFORCESTRATEGY-RETURNTOSEACONTROL.PDF>; Sydney J. Freedberg, Jr. "If It Floats, It Fights: Navy Seeks 'Distributed Lethality,'" *Breaking Defense*, January 14, 2015, <https://breakingdefense.com/2015/01/if-it-floats-it-fights-navy-seeks-distributed-lethality/>.

27 "ADM-160 MALD," *Air and Space Forces Magazine*, last visited June 4, 2024, <https://www.airandspaceforces.com/weapons-platforms/adm-160-mald/>.

28 "Department of Defense Fiscal Year 2017 President's Budget Submission," Department of the Air Force, 2016, 4, <https://www.saffm.hq.af.mil/Portals/84/documents/FY17/AFD-160208-044.pdf?ver=2016-08-24-102038-590#page=331>.

affordable payload with an inventory that can quickly grow.²⁹ Decoys are generally much more affordable than the platforms they mimic, making them far more distributable assets.

Most of the Air Force's decoy missile inventory is of the MALD-J variant, which offers a stand-in jamming capability in addition to the deception capability.³⁰ The Navy took an interest in these decoy missiles in recent years through a more expensive and navalized variant, which appears to be ramping up production going into 2025. However, the Navy has only procured around one hundred of these decoy missiles to date, and these would likely need further modifications to be fielded by more platform types beyond fixed-wing aircraft.³¹

Current platform-based deception capabilities are mainly focused on short-range self-defense and are insufficient for distributed deception.³² Many of the deception capabilities aboard surface warships in particular are primarily concerned with deceiving anti-ship missiles that are only a short distance away from striking the ship. As with distribution, deception should ideally focus on influencing the decision-making that precedes the launching of fires, rather than focusing on deceiving those fires at the very end of their kill chains. Deception capability can be rebalanced to be more of an area-defense capability that influences targeting decisions, instead of a point-defense solution that narrowly avoids hits.

Aspects of persuasive and enduring deception capability

Even if deception capability is widely fielded across the force, deception can be convincing for only so long against a thoughtful adversary. Deception can require multiple signature types to survive the process of elimination that finds forces that do not want to be found. A decoy that emits the signature of a destroyer's radar but floats at an unrealistically slow speed may not be convincing. A decoy missile that returns the radar signature of a

large aircraft, but only has the infrared signature of a small missile, may be ignored. Countermeasures that emit multiple signatures but look nothing like the platform they are imitating may be discarded by optical sensors and visual-identification algorithms.

However, it may be unnecessary for deception to fully replicate the signatures of platforms and weapons. Deception needs to be useful only to a point, where it can create sufficient openings and improve margins of success at critical times. Rather than attempting to make high-fidelity decoys that can mimic the full breadth of telltale signatures, real forces can adjust their behaviors to better align with the signatures of moderately sophisticated decoys. In this approach, deception can be effective not only by making an adversary classify decoys as real targets, but by making the adversary classify real forces as decoys.

Some deception capabilities may have a short half-life as adversaries adapt, but by often being a function of signatures and electronic methods, deception capability can maintain its relevance through rapid adaptation of its own. New signatures and behaviors can be programmed into decoys to keep the adversary off balance, given how a decoy's relevance can be prolonged at the speed of a software update.³³ A high-end war might not last long enough for hardware-centric changes to leave their mark, but deception capability may offer some capacity for quicker adaptation.

Targeting the center of gravity: Eroding warfighter trust and confidence

The effects of deception can linger even if countermeasures are developed. By sowing distrust, deception can target the moral and psychological forces that undergird the resolve of the warfighter. Units that have been deceived time and time again, who have wasted numerous weapons without effect, and are losing trust in what their sensors and networks are telling them, are

29 Ibid., 331.

30 Ibid., 327.

31 "Department of Defense Fiscal Year 2023 Budget Estimates," Department of the Navy, 2022, 253, https://www.secnav.navy.mil/fmc/fmb/Documents/23pres/WPN_Book.pdf#page=253.

32 Capabilities that fall into this category include Nulka decoys, chaff and flare launchers, noisemakers, and electronic warfare.

33 Tyler Rogoway, "This Is What the Navy's New Shipboard Electronic Warfare System Can Actually Do," Warzone, August 4, 2021, <https://www.twz.com/41829/this-is-what-the-navys-new-shipboard-electronic-warfare-system-can-actually-do>.

units that may eventually commit grave unforced errors. Deception can be a powerful force multiplier by magnifying the destructive effects of doubt and confusion in the mind of the warfighter.

The structure of naval warfare often compels commanders to make pivotal tactical decisions that are irretrievable or cannot reach culmination without unbending resolve. Whether it be setting course for a distant station while under fire, depleting a large share of magazine depth in firing a single missile salvo, or activating a radar that will broadcast revealing emissions for hundreds of miles, naval commanders must be able to firmly commit to fateful actions with long lead times and long-lasting

consequences. Deception may be especially potent in this form of warfare, in which individual tactics demand such steadfast commitment from warfighters.

Deception capability is relatively affordable, adaptable, and capable of outsized operational effect. It can become a cornerstone of the DMO approach and serve as a key source of asymmetric advantage. If outnumbered and outgunned US forces attempt to penetrate into sensor-rich A2/AD zones, deception may offer the critical edge that enables success.

Enhancing decision-making: Distributed command and control

While distribution can pose a challenge to an adversary's decision-making, it also imposes a considerable C2 challenge on one's own forces. Spreading forces out through distribution makes communication and coordination more challenging, especially when those forces are encouraged to limit their electromagnetic emissions. The value of DMO is heavily predicated on a belief that distribution will impose a greater decision-making challenge against the adversary than on one's own forces. DMO must consider how to make naval C2 more resilient and distributed so it can withstand the challenges imposed by a force's own distribution and the adversary's deliberate efforts to degrade C2.

Liabilities of distributed forces operating under centralized control

A distributed fleet of many spread-out units will still likely be commanded by a highly centralized system of control. In the case of naval forces, a distributed fleet can fall under the overall control of a Maritime Operations Center (MOC), such as the US Pacific Fleet MOC. A carrier strike group can be commanded from the carrier's Tactical Flag Communications Center (TFCC), and other formations can be commanded by a specialized command ship, such as the USS *Blue Ridge* (LCC 19). Although these entities wield considerable C2, they still represent heavy concentrations of capability and authority. Much like how aircraft carriers offer adversaries a readily distinguishable center of gravity when it comes to force structure, the Navy's MOCs and flagships offer adversaries a clear center of gravity when it comes to targeting critical command structures.

Despite these liabilities, the major tactical challenges of modern naval warfare can naturally drive navies toward more centralized systems of command. Modern warships have multiple layers of capability that significantly drive up how many missiles are required to break through their dense defenses and score hits. The challenges of overwhelming naval formations with missiles can be better met if more platforms can coordinate and combine their firepower against targets through

mass fires. These mass fires can encourage highly centralized command structures, in which a broader level of situational awareness and a higher level of authority can be useful for combining firepower from across many distributed units.

A key challenge is figuring out which command entities can serve as an appropriate synchronizing authority for mass fires, and how a navy can preserve the ability to synchronize fires if key command entities and networks are being degraded or destroyed. If a distributed fleet's mass firing capability hinges on a handful of MOCs or flagships staying in the fight, then that could make for a brittle force.

A critical consideration of distributed warfighting is how well spread-out forces can continue the fight if the distributed fleet loses cohesion and fractures into individual units. If communication links are contested, or if the decision-making of higher echelons is overwhelmed, distributed C2 can provide lower-level commanders with some ability to continue the fight. This can take the form of a unit-level commander using their organic C2 capability to coordinate fires and forces. Nearby units can connect and form ad hoc force packages to combine fires and maintain favorable exchanges at their local level.

This doctrine and capability are critical because the more overall network connectivity is degraded, the more the offensive-defensive balance favors the defense. Warships maintain their organic defensive firepower even if broader networks degrade, especially given how many of the information demands of their defensive kill chains can be readily met by the warship's organic sensors. But getting targeting information for over-the-horizon attacks, and coordinating enough missile firepower to breach naval defenses, becomes increasingly difficult when units are struggling to network with one another. Distributed units may have dependencies that span hundreds of miles, where one unit may be forced to wait until another unit's local tactical situation is favorable enough to synchronize offensive fires. If isolated units cannot



A US Navy sailor assigned to the *Arleigh Burke*-class guided-missile destroyer USS *Mustin* (DDG 89), stands watch in the ship's combat information center during Exercise Valiant Shield 2014 in the Pacific Ocean/. Credit: Specialist 2nd Class Declan Barnes, September 18, 2014, <https://www.flickr.com/photos/usnavy/15324034822/in/photostream/>.

be sure their fires will combine with those from other forces, then they become more likely to abort attacks or suffer severe weapons depletion in a bid to muster the required volume of fire alone. Mission command and delegated authority should not be viewed as a blank check for unit-level commanders to ignore the many imperatives that strongly encourage the coordination of fires. Therefore, having robust C2 at the unit level helps naval forces maintain some ability to self-organize combined fires despite degraded C2 at higher echelons.

Distributing C2 and creating more joint fires integrators

A key question is which units can effectively step into this critical role of joint fires integrator and serve as backup synchronizing authorities. In the case of the Navy, several of its unit-level platforms—such as destroyers, the combat aircraft F-35, early-warning-and-control (AEW&C) aircraft E-2D, and maritime patrol aircraft P-8—feature a useful amount of capability for integrating sensor and communication information. Airborne platforms may be especially advantageous for facilitating over-the-

horizon communications and targeting, while using their speed and maneuver to better manage the risks of emitting. By virtue of their superior ability to gain situational awareness and proximity, aerial platforms may be well-suited to act as joint fires integrators for disconnected forces at the forward edge of the battlespace. If higher-echelon C2 is degraded, these joint fires integrators can help the distributed fleet fracture more gracefully into self-organizing forces and preserve a useful measure of coordinated firing capability.

There will be challenges with creating more joint fires integrators from existing Navy forces. These challenges can include giving unit-level platforms and crews the ability to process information at higher levels of classification, the ability to embark or directly support a higher-echelon command staff, and the ability to have onboard decision-aid capabilities that can help speed command decisions, such as designing mass-firing sequences on short notice. There will also be considerable training and tactical development involved, which will require careful tradeoffs involving a multitude

of other mission areas that are already taxing the warfighters' ability to develop a broad spectrum of expertise. Training to be an on-demand joint fires integrator will push warfighters to command a more complex scope of capability that goes well beyond that of their individual platform or force package, which is typically where most of their expertise lies. They may need to be prepared to act as orchestrators of a combined-arms team of forces fighting at the operational level of war. A midgrade naval flight officer or a tactical action officer might need to quickly wield a range of capability that would typically be commanded by more senior officers at higher echelons, such as a carrier strike group commander.

Even if these backup C2 capabilities exist, the authorities to wield them might not. Higher-echelon commands may need to be acclimated to relinquishing control over crucial capabilities and delegating key firing authorities down the chain of command. Similarly, lower-level joint fires integrators need to be trained to know when conditions are appropriate for seizing these authorities and taking the initiative in organizing fires. If a contested network is not allowing command echelons to get through to one another, then integrators need to be prepared to relinquish and seize key firing authorities as needed to continue the fight. This passing of authorities needs to be rigorously trained and must feature well-refined doctrine that provides clarity. Otherwise, having widely distributed and redundant C2 capability could result in chaotic operational behavior as units seize initiative without regard for broader intent.

Expanding C2 flexibility with expeditionary and afloat MOCs

The Navy can further distribute its C2 through two relatively novel concepts—adaptive force packages and expeditionary MOCs. An adaptive force package is a set of systems that can be installed onto a warship to replicate a MOC's C2 capability to an extent. The Navy conducted a demonstration by installing an adaptive force package aboard a landing platform dock (LPD) amphibious ship, suggesting that more ships could take on flagship and operational command roles if needed.³⁴ By creating a capability for afloat MOCs, adaptive force packages can contribute to a more resilient C2 architecture and bring MOC functionality closer to units in the forward battlespace. Afloat MOCs can also bypass the political limits on operations that can come with employing MOCs from foreign territories.

Expeditionary MOCs are similar to the adaptive force package concept in that they broaden the structure of the MOC from beyond that of a singular fixed location. Expeditionary MOC capabilities have been tested by 2nd and 3rd Fleets, where MOCs were assembled beyond the usual fleet headquarters within days and then actively participated in large-scale fleet exercises.³⁵ 2nd Fleet established seven expeditionary MOCs within three years of the fleet's reactivation, including at locations as far forward as Iceland.³⁶ The expeditionary MOC capability offers further C2 resilience for Navy forces by broadening the options of ashore placement of MOC facilities and functions.

Sometimes units practice resilient C2 by forcing warfighters to assume greater combat responsibility after making their commanders a simulated casualty.³⁷ A similar philosophy can be applied on a higher level to DMO and fleet-level warfare, in which the prospect of degraded networks and destroyed flagships should compel midgrade officers to prepare for greater command responsibility to continue the fight.

34 Rita Boland, "First Use of Shipboard Option for Maritime Operations Centers Makes Navy More Expeditionary," *CHIPS Magazine*, US Department of the Navy, July 15, 2019, <https://www.doncio.navy.mil/CHIPS/ArticleDetails.aspx?ID=12609>.

35 "U.S. 3rd Fleet Deploys Forward in Support of LSE 2021," Defense Visual Information Distribution Service, Department of Defense, August 9, 2021, <https://www.dvidshub.net/news/402699/us-3rd-fleet-deploys-forward-support-lse-2021>.

36 Mass Communication Specialist Jahlena Royer, "U.S. 2nd Fleet is 'Ready to Fight' as it Leads 7th Expeditionary Maritime Operations Center During Large Scale Exercise 2021," US Fleet Forces Command, August 14, 2021, <https://www.usff.navy.mil/Press-Room/News-Stories/Article/2733238/us-2nd-fleet-is-ready-to-fight-as-it-leads-7th-expeditionary-maritime-operation/>.

37 Lieutenant General Milford Beagle, Brigadier General Jason Slider, and Lieutenant Colonel Matthew Arrol, "The Graveyard of Command Posts: What Chornobaivka Should Teach Us About Command and Control in Large-Scale Combat Operations," *Military Review*, Army University Press, May 2023, <https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/May-June-2023/Graveyard-of-Command-Posts/>.

Operational learning for DMO

Warfighting concepts require implementation plans to translate the concept into meaningful reform. The concept must be broken down into specific initiatives that are then operationalized by a wide variety of commands, which are aligned by the concept's overarching framework. This is critical for driving fleet-wide, deckplate-level socialization of the concept's warfighting implications and cultivating the future leaders who will sustain the reform effort. The depth of implementation is also a crucial measure of the progress and seriousness of the concept. The US Navy will face a substantial learning curve when adapting to fleet warfare and DMO, and senior leaders must take active ownership of the concept's implementation.

According to Chief of Naval Operations (CNO) Admiral Lisa Franchetti, the Navy's fiscal year 2025 budget request "favors readiness for the near-term fight...over the modernization we will need for the future."³⁸ This tradeoff toward a near-term focus may be driven by the myriad crises erupting around the world, and also the much-discussed possibility of China attempting to seize Taiwan by force around 2027.³⁹ The Navy's options for implementing DMO narrow significantly as a result of this near-term focus. The Navy can hardly make major changes to its force structure and weapons inventory within the next few years, which encourages it to look elsewhere for building advantage quickly.

Admiral Franchetti stated that the Navy is in a "1930s moment," and cited the interwar Navy's historically effective system of operational learning.⁴⁰ The interwar US Navy featured a mutually supporting system of wargaming, fleet-scale exercising, and campaign planning that combined to deliver a war-winning Navy.⁴¹ These major functions focused primarily on fleet-level warfare and firmly oriented the service on high-end warfighting. Ninety-nine percent of the US Navy's admirals at the start of World War II were graduates of the Naval War College's intensive wargaming program, which provided the Navy's flag officers with a critical shared understanding of fleet-level warfighting concepts and campaign planning.⁴² When world war came, the US Navy did not just outproduce its adversaries at the shipyard, it also outfought them in the battlespace. Its system of operational learning effectively prepared a generation of naval officers for wartime command, and it continued to deliver increasingly superior warfighting skill as the conflict continued.

The modern US Navy's system of operational learning is a far cry from that of its interwar ancestor. There is far less unity of effort between major learning functions, fleet exercises and combat training chronically suffer from heavy scripting and lack of realism, and only a tiny percentage of Navy admirals have graduated from wargaming programs.⁴³ The fleet's high-end warfighting skill suffered decades of atrophy after the Cold War

38 "Statement of Admiral Lisa Marie Franchetti, 33rd Chief of Naval Operations, on Department of the Navy Fiscal Year 2025 Budget Request Before the House Armed Services Committee," Chief of Naval Operations, May 2024, 3, <https://www.congress.gov/118/meeting/house/117263/witnesses/HHRG-118-AS00-Wstate-FranchettiL-20240501.pdf>.

39 Noah Robertson, "How DC Became Obsessed with a Potential 2027 Chinese Invasion of Taiwan," Defense News, May 7, 2024, <https://www.defensenews.com/pentagon/2024/05/07/how-dc-became-obsessed-with-a-potential-2027-chinese-invasion-of-taiwan/>.

40 Admiral Lisa Marie Franchetti, "CNO Delivers Remarks at the Surface Navy Association National Symposium," Chief of Naval Operations, January 2024, <https://www.navy.mil/Press-Office/Speeches/display-speeches/Article/3641326/cno-delivers-remarks-at-the-surface-navy-association-national-symposium/>.

41 Trent Hone, *Learning War: The Evolution of Fighting Doctrine in the U.S. Navy, 1898–1945* (Annapolis, MD: Naval Institute Press, 2018), 129–140.

42 John M. Lillard, *Playing War: Wargaming and U.S. Navy Preparations for World War II* (Sterling, VA: Potomac Books, 2016), 8.

43 Dmitry Filipoff, "A Fleet Adrift: The Mounting Risks of the U.S. Navy's Force Development," Center for International Maritime Security, February 13, 2023, <https://cimsec.org/a-fleet-adrift-the-mounting-risks-of-the-u-s-navys-force-development/>; Admiral Scott Swift, "Fleet Problems Offer Opportunities," US Naval Institute, *Proceedings* 144, 3 (March 2018), <https://www.usni.org/magazines/proceedings/2018/march/fleet-problems-offer-opportunities>; Captain Dale C. Rielage, "An Open Letter to the U.S. Navy from Red," US Naval Institute, *Proceedings*, 143, 6 (June 2017), <https://www.usni.org/magazines/proceedings/2017/june/open-letter-us-navy-red>; Lieutenant Jonathan Gosselin, "Make Composite Training Less Scripted," US Naval Institute, *Proceedings* 147, 6 (June 2021), <https://www.usni.org/magazines/proceedings/2021/june/make-composite-training-less-scripted>; Lieutenant Erik A. H. Sand, "Performance Over Process," US Naval Institute, *Proceedings* 140, 10, (October 2014), <https://www.usni.org/magazines/proceedings/2014/october/performance-over-process>. Lastly, the wargaming career incentives point is the author's own review of Navy flag-officer bios and conversations with subject matter experts.

ended, and years of deployments focused on the Middle East have reinforced operating tendencies that could prove fatal in a high-end threat environment.⁴⁴

Unlike in World War II, the modern US Navy will not be able to count on overwhelming materiel superiority to compensate for other shortfalls. Now increasingly outnumbered, US fleets will need to depend ever more heavily on their ability to outfight their adversaries. The intensity of fleet warfare can quickly result in decades' worth of shipbuilding being destroyed in a few minutes of combat, minimizing the time navies have to process lessons and adapt in war. The catastrophic nature of naval warfare places a strong premium on robust operational learning in peacetime.

New operational learning structures for DMO and fleet-level warfare

The Navy can leverage DMO to reform its system of operational learning and enhance the skill of warfighters in the fleet today. This system consists of the many functions that deliver warfighting education to the warfighter, and that investigate and implement warfighting concepts. By focusing on warfighting development functions such as combat training, education, experimentation, wargaming, and tactical development, the Navy can sharply increase its slope of improvement within the next few years without making major capital investments. Reformed operational learning can focus on regenerating the high-end sea control skills that atrophied after the Cold War, and can facilitate a historic transition into a new era of great-power competition.

Navy leadership's ability to reform many of these functions primarily runs through authorities that do not involve the annual budgeting and Program Objective Memorandum (POM) processes, which should afford Navy leadership more decision space and quicker results. While reforming the system of operational learning will certainly have some financial implications, near-term change can primarily be a matter of updating design, curricula, standards, and process. After these areas are reformed, tens of thousands of deckplate-level warfighters will be able to rotate through updated combat training and education programs in time for 2027.

DMO encourages the Navy to take a more holistic view of the system of operational learning and reinforce linkages that are currently weak. Even if DMO's specific concepts of operation could use more detail, it is clear that DMO is fundamentally a fleet-level, combined-arms warfighting concept. But the Navy's operational learning is heavily siloed within its various communities, which manage their own combat training, education, and tactical development programs with great independence from one another. These key community functions need to be thoughtfully integrated so that deliberate feedback loops and tradeoffs can be made in service of combined-arms warfighting concepts.

The Navy needs a higher-echelon staff and flag officer to serve as a cross-community integrator at a level above the type commands that run the major naval communities, and to be the chief administrator of the Navy's system of operational learning. OPNAV N7 nominally has responsibility over the Navy's warfighting development, and has critical authorities over the Navy's wargaming, education, and analytic enterprise. But N7 lacks fundamental authorities over tactical development and combat training, which are essential for integrating the warfighting development of a service's communities. A new warfighting development command could be in the vein of the Army's four-star Training and Doctrine Command (TRADOC) or the Marine Corps's three-star Combat Development Command (MCCDC). Such a command should report to the CNO and service leadership, rather than reside within the operational chain of command. Otherwise, longer-term force development imperatives will likely be eclipsed by near-term operational demands. Such a command can help ensure that DMO, or any other service warfighting concept, develops as a cohesive fleet-level approach, rather than a fragmented blend of skillsets that are independently grown by siloed communities.

Siloed combat development in tension with fleet-level warfighting

The siloed nature of the Navy's operational learning is clearly reflected in its workup cycle, which prepares naval forces for deployment. The vast majority of the workup cycle is dominated by community-specific, unit-level training and education. For most of the workup cycle, Navy

44 Admiral Scott Swift, "A Fleet Must Be Able to Fight," US Naval Institute, *Proceedings*, (May 2018), <https://www.usni.org/magazines/proceedings/2018/may/fleet-must-be-able-to-fight>.

warfighters are mainly concerned with building warfighting skills with the platforms of their specific community. It is only toward the very end of the workup cycle, when units are near their deployment date, that they come together as an integrated team for COMPTUEX, a weeks-long series of combat exercises. Following deployment, units may engage in a Fleet Battle Problem exercise, which offers another week or two of combined-arms warfighting.⁴⁵

Altogether, deploying warfighters will have had many months of individual, community-specific training, but only a handful of weeks of genuine combined-arms training, before being sent into regions where they may fight the opening battles of the next major war at sea.

The severity of the problem becomes more apparent when combined-arms experience is situated on the career path of the average Navy officer. Officers can spend as much as the first fifteen to twenty years of their career focused solely on specializing in their community's functions before they need to seriously consider how to wield a combined-arms warfighting team in combat. Often, this experience first arrives in the leadup to COMPTUEX, only mere weeks away from deployment. By the time naval officers reach flag rank, they may have participated in only a handful of COMPTUEXs and Fleet Battle Problems throughout the entirety of their careers, and with plenty of time for skills to atrophy between events. These two events are arguably the most complex combat exercises the Navy executes annually, yet they are primarily focused on strike group-level staffs and operations, which are a level below the fleet-level operations DMO envisions. The Navy's system of operational learning suffers from a dearth of live-combat exercising for fleet-level warfighting, which complicates its ability to manifest DMO and high-end warfighting concepts more generally.

The Navy's slope of improvement is heavily contingent upon the frequency and quality of these few combat exercises that work combined-arms skills. While a concerted effort at reform may improve exercise quality and design, the Navy has little ability to increase the frequency or duration of these events. Whether it be before deployment or during deployment, most of the Navy's schedule

has already been suffocated of margin due to tight force-generation limits and the incessant pressure of forward demand signals. There is virtually no room to introduce frequent fleet-level warfare exercises into a Navy schedule that has already been tightly stretched for decades. Squeezing a new fleet-level warfighting certification into the end of an extremely packed COMPTUEX or Fleet Battle Problem schedule will hardly be enough. These factors highlight critical constraints on the Navy's decision space when it comes to reforming its operational learning and its ability to exercise fleet-level warfare and DMO.

Expanding the MOC combat curriculum

The Navy can reap meaningful gains in operational learning and sidestep many constraints by making a targeted effort toward a critical set of warfighters—fleet commanders and their MOC staffs. These specific warfighters will be charged with orchestrating fleet-level warfare, perhaps making them the central practitioners of the DMO concept. This weighty responsibility implies that MOCs should be subjected to intensive exercising and wargaming to prepare them for their wartime roles and to master distributed fleet combat. MOCs should not be relegated to simple watch floors, but should be forged into combat-ready battle staffs that can apply DMO and command distributed fleets in war.

Wargaming and Live, Virtual, Constructive (LVC) capability can be the primary tools of an intensified MOC warfighting curriculum. They are among the handful of methods that can make warfighters combine a broad array of multi-domain skills and capabilities into a combat context. DMO and fleet-level warfare imply larger force packages and broader areas of operation, which LVC and wargaming can help provide. Wargaming stands out as a particularly useful tool that can frequently train warfighters without the constraints of using live forces of limited availability, or the tight limits of the workup cycle. MOCs can be subjected to a steady schedule of intensive wargaming that sharpens them into the battle staffs they are intended to be. Events of particular interest include MOC certification events and the growing MAKO exercise

45 Sam Lagrone, "Eisenhower Carrier Strike Group Ready to Deploy After COMPTUEX," USNI News, July 25, 2023, <https://news.usni.org/2023/07/25/eisenhower-carrier-strike-group-ready-to-deploy-after-comptuex>; Bryan Clark and Jesse Sloman, "Deploying Beyond Their Means: America's Navy and Marine Corps at a Tipping Point," Center for Strategic and Budgetary Assessments, November 18, 2015, 9, [https://csbaonline.org/uploads/documents/CSBA6174_\(Deploying_Beyond_Their_Means\)Final2-web.pdf](https://csbaonline.org/uploads/documents/CSBA6174_(Deploying_Beyond_Their_Means)Final2-web.pdf).



Navy Reserve sailors from Navy Reserve Commander US Pacific Fleet, US Fleet Forces, US 3rd Fleet, and US 7th Fleet work in a Maritime Operations Center in support of Exercise MAKO Sentry in San Diego. Credit: Specialist 2nd Class Elton C. Wheeler, November 18, 2022, <https://www.dvidshub.net/image/7525353/navy-reserve-sailors-participate-exercise-mako-sentry>.

series, both of which can provide critical venues for intensifying the MOC warfighting curriculum.⁴⁶

MOC exercises and wargames should be frequently conducted from adaptive force packages and expeditionary MOC locations. Doing so will help ensure that MOCs retain their warfighting capability when fighting from nontraditional headquarters and that they can flexibly pivot to new command locations to complicate an adversary's C2 targeting. The traditional location of a fleet's central MOC makes for an obvious and concentrated target for an adversary, suggesting MOC staffs could spend most of a war commanding from unconventional setups.

The Navy's Large Scale Exercises (LSEs) heavily work the MOCs and feature a considerable array of virtual forces.⁴⁷ But these biennial exercises may

be too infrequent to seriously improve the Navy in the near term. A key challenge of organizing combat simulation is how to balance frequency with complexity so that exercises and wargames can make the Navy's slope of improvement markedly sharper in the near term. Key metrics of progress should also be centered on measuring learning as a function of people's experience, rather than their platforms. While every deploying strike group completes a COMPTUEX and a Fleet Battle Problem, this is still only a few weeks of combined arms exercising for warfighters who might not have a similar learning experience for years.

Frequent personnel rotation dilutes the collective warfighting skill of Navy staffs and inhibits their ability to build toward higher levels of proficiency and cohesion. Staffs will have more difficulty

46 "From Innovation, A Stronger Fleet: N7 C5F (MOC) Certification," Navy Warfare Development Center Quarterly Newsletter, January–March 2023, 2, https://www.nwdc.usff.navy.mil/Portals/39/NWDC%20Newsletter%20Jan_Feb_Mar%202023.pdf; Jacquelyn Childs and Casey Moore, "Meeting the Challenge: MAKO Challenge Increases Warfighting Readiness for Navy Reserve," US Navy Press Office, January 25, 2023, <https://www.navy.mil/Press-Office/News-Stories/Article/3276847/meeting-the-challenge-mako-challenge-increases-warfighting-readiness-for-navy-r/>.

47 Dmitry Filipoff, "Simulating Global Naval Warfare: CAPT Chris Narducci on Large Scale Exercise 2023," Center for International Maritime Security, October 31, 2023, <https://cimsec.org/simulating-global-naval-warfare-capt-chris-narducci-on-large-scale-exercise-2023/>.

attaining fleet-level warfighting skill if the manning practices struggle to give people enough time and stability to develop together into more skilled warfighting teams. This is also challenged by how the Navy is heavily dependent on reservists to augment certain MOCs and ensure they have enough personnel for high-tempo operations and exercises. One Navy reserve flag officer cited how up to half the staff at Navy fleet commands can be reservists and that their key advantage is the longer timeframes of their tours, compared to the shorter 1–2-year tours that are typical of active-duty officers. The reserve flag officer stated, “This means we have the ability to become the MOC experts for the Navy...We are the capacity that allows the Fleet to go to war.”⁴⁸

If the critical mass of the Navy’s most proficient MOC warfighters resides within the reserves, then the Navy may need to revisit manning practices and career continuums to ensure a better balance with the active-duty component. Having more MOC personnel will enable a higher tempo of wargaming and exercising. With larger staffs, MOCs will be able to cover responsibility for real-world operations while also rotating personnel through combat simulations. Larger staffs will also allow fleet commands to employ multiple MOCs, including afloat and expeditionary MOCs, creating a more resilient C2 posture.

The fleet commands fall under the joint authority of the combatant commands, highlighting that MOC warfighting is joint warfighting. The MOC warfighting curriculum should include a large component of learning other services’ warfighting capabilities and methods, allowing the MOC to serve as a critical link that harmonizes Navy warfighting doctrine with joint approaches. The anti-ship capabilities that are emerging across the joint force can put the MOC in the prime position of organizing new mass firing methods. Aside from

DMO, MOC warfighters will also need to be fluent in the Joint Warfighting Concept (JWC) and how naval forces complement it. MOC warfighters should also develop functional know-how in the capabilities of allies and partners, so that MOCs can command allied forces and coalition task forces as needed.

The need to wield highly classified capabilities at the operational level of war is a key driver of centralizing command at the MOC and away from afloat forces.⁴⁹ Even aircraft carriers are at a disadvantage compared to fleet headquarters’ MOCs when it comes to the critical infrastructure for wielding highly classified capabilities, including staffs, communication pipelines, and spaces. These classification considerations should heavily govern the training and staffing of MOCs. Expeditionary and afloat MOC locations should be able to replicate the access and secure connectivity of a traditional MOC. MOC warfighters should also have the high-level clearances that allow them to learn of highly classified capabilities and train extensively in their use, rather than have these capabilities come as much as a surprise to the enemy as to the warfighters who will supposedly be charged with wielding them.

The MOC is much more to the Navy than a C2 node or a watch floor. It represents a philosophy that naval battles will be won by ashore staffs commanding fleets at the operational level of war. This approach is a steep departure from the disaggregated power projection operations that have characterized many of the Navy’s deployments in the twenty-first century. Much of the Navy’s ability to fight fleet-level warfare will depend upon the warfighting skill and training of the MOCs. The MOCs must seize their role as the chief orchestrators of Navy warfighting concepts and be fully prepared to take command of distributed fleets in war.

48 Childs and Moore, “Meeting the Challenge.”

49 This was a consistent theme among the subject matter experts who were consulted.

Conclusion

DMO must provide the Navy with a concrete vision of how to win future fleet battles and naval campaigns. It must prioritize specific concepts of operation and tactical dynamics that stand to have outsized influence and offer distinct advantage. Naval deception and distributed command stand out as potential focus areas for carving more detail into the warfighting doctrine of DMO. Even if the Navy moves on to a new warfighting concept, the core themes of targeting decision-making and massing fires from distributed forces will likely remain enduring features of modern naval warfare.

DMO is not just an opportunity to change how the Navy will fight, but an opportunity to change how the Navy functions as a learning organization. As the Navy pursues DMO, it must reform its system of operational learning so it can better investigate fleet-level concepts and orchestrate more cohesive warfighting development across its communities. If the Navy's system of operational learning continues to suffer its various disconnects and shortfalls, then it may very well struggle to manifest new warfighting concepts in general.

With the growth of China's power and ambition in the Western Pacific, major geopolitical outcomes may one day hinge on superior naval warfighting. The warfighting concept of the US Navy is much more than one service's guide to action—it is a critical matter of international security. DMO can drive a stronger sense of urgency into the US Navy and prepare it for the fights it hopes will never come.

Recommendations

Effectively define distribution and DMO. The Navy needs to more precisely define DMO in terms of the specific concepts of operation and tactical dynamics it emphasizes, as well as the specific threats it means to address. The Navy's interpretation of the term "distribution" also needs to be more clearly described. The Navy needs to differentiate DMO from the disaggregated operations of the past, in

order to address common misperceptions that the Navy has already been doing DMO for years. It is important that the Navy defines what is *not* DMO and how it differs from past operations. The Navy should publish an unclassified capstone document outlining the concept so it can be better socialized within the service and with other key defense constituencies.

Explore naval deception. The Navy should seriously consider naval deception as a cornerstone of the DMO approach. Focused tactical development and experimentation should explore deception operations and capabilities with an eye toward making deception methods widely understood across the fleet. Deception capabilities, such as unmanned systems and decoy missiles, are relatively affordable compared to the platforms they emulate and can be widely distributed across existing force structure.

Distribute command structures. The Navy should extend the principle of distribution to its command structures. Distributed command capabilities include expeditionary and afloat MOCs, as well as joint fires integrators at the platform level. The ability to pass key authorities between MOC locations and C2 platforms will require extensive doctrinal development and training for effectiveness.

Reform the system of operational learning. Many of the Navy's critical warfighting development and education functions are suffering disconnects and shortfalls. These functions need to be more thoughtfully integrated into feedback loops that better investigate and implement the specifics of the warfighting concept. The Navy should consider establishing a higher-echelon command that can serve as the chief administrator of the service's system of operational learning and harmonize the warfighting development of the Navy's siloed communities into integrated, fleet-level approaches. This command should sit at a level above the type commands and should report to service leadership.

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