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# MISSION COMMAND IN A FUTURE NAVAL COMBAT ENVIRONMENT

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*Robert C. Rubel*

**M**ission command is a command-and-control (C2) concept that increasingly is being integrated into the doctrine of the U.S. armed forces. Joint Publication 3-0 defines it as follows: “If a commander loses reliable communications, *mission command*—a key component of the C2 [joint] function—enables military operations through decentralized execution based on mission-type orders” (emphasis original).<sup>1</sup> Throughout its history, the Navy has practiced decentralized C2

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owing to the huge distances involved and the difficulty of communications. However, the modern networked and more intensely joint/multidomain environment imposes a new context within which C2 in a war-at-sea environment will be practiced. To adapt its tradition of decentralized C2 to a new environment that features the potential for high-end war at sea, naval officers must understand how the dynamics of naval combat affect the transition from a communications-rich environment to one that is either constrained or distorted—specifically, the considerations required to exert effective mission command as operations devolve into forms characterized by lesser degrees of structure and control.

The Navy is currently in the process of re-discovering its war-at-sea roots, owing to the emergence of potential opposition to its policy of

maintaining a free and open global commons, with such opposition supported by the naval building programs of both China and Russia. One of the key concepts on which that rediscovery is riding is distributed lethality, the installation of offensive missiles on a wide variety of the Navy's ships. The idea is to increase the number of potential shooters with which an enemy navy has to deal, instead of allowing it to focus narrowly on our aircraft carriers. The concept also implies greater geographic dispersion of forces, including surface action groups (SAGs) and independently operating ships that are not attached to the carrier battle group. Such distribution and dispersal pose C2 challenges for the Navy; the intended solution is a wide-area battle-force network. However, opponents will challenge that network, and dispersed units may find themselves with either partial or no connectivity. A current answer to this problem is the concept of mission command.

Recognition that a return to war fighting at sea is necessary has been slow to come and incremental, with the discussion over the past few years focused on countering littoral antiaccess/area-denial systems. The development of air-sea battle, now transformed into the joint concept for access and maneuver in the global commons (known as JAM-GC), is a step forward in addressing the problem, but does not cover all the bases with regard to a fleet-versus-fleet engagement. While the author acknowledges that a future sea battle will be multidimensional and multidomain, there are certain dynamics of fleet-versus-fleet combat, which will be discussed in this article, that commanders at all levels must understand.

War at sea always has been difficult to control, even with the advent of radio, radar, and computing. The historical trend is that advances in communications have been matched by increases in weapons ranges and distance between friendly units. The constant has been the difficulty an admiral has in maintaining control of the flow of a fight. This is one reason that Navy culture is characterized by decentralization and the philosophy of command by negation. Naval officers at all levels are inculcated with the ethos of thinking for themselves. This culture has served the Navy well throughout its history and may yet do so again, but an understanding of its place in the arena of modern naval combat is necessary for its intelligent application. To develop such understanding, it is useful to revisit the dynamics of combat at sea.

### NAVAL COMBAT DYNAMICS: THREE TRADITIONAL MODES

Tactical combat at sea generally has occurred in three basic modes: structured battle, melee, and sniping.<sup>2</sup> These modes emerge from the relationship between a commander and his or her forces, and thus are manifested whether we are talking about oared galleys, nuclear submarines, or unmanned vehicles. It is also a comprehensively exhaustive list; any manner of fighting at sea (as opposed to

projecting power ashore) will be a variation of one of these modes. Understanding this is an important first step in gaining a useful grasp of naval war fighting, and thus the necessary approach to mission command in the new context. Defining the intellectual boundaries of a problem serves as a clarifying lens and a counterweight to vague and sometimes oracular new concepts and the immoderate claims made for new technologies.

We will define *structured battle* as a broad term that indicates coordinated action among the units of a force, whether individual ships, task groups, or even a fleet. In past eras, the battle line was the principal tool admirals used to achieve coherence and coordination among their individual ships. This worked when guns were the main armament. Once aviation developed to the point of being able to sink ships, the aircraft carrier–centric circular formation and aggregations of it became the basis for coordination and control. However, a specific formation is not a prerequisite for engaging in a structured battle. Tight doctrine, detailed plans, and ship captains who are well schooled in the commander's intent are also ways to achieve structure and coordination. Among the objectives of a structured-battle approach are making the force as a whole maneuverable, massing fires, and obtaining mutual support. The distinguishing characteristic is coordination, regardless of how it is attained, whether by doctrine; operation order; a more distributed command authority; or swift, compact, and almost invisible tactical commands, using a modern signal book.

A *melee* is a form of battle in which each unit fights on its own without coordination with others. A common mode of fighting in the days of galleys up through nineteenth-century battles in the age of sail, a melee was characterized by loss of control by the admiral after initial contact and usually involved confusion, if not chaos. Nonetheless, under certain conditions, the melee at sea could be advantageous, if not downright desirable. In the days of sail, if an enemy's line broke and he started to flee, a general chase resulting in a melee was considered "permissible, indeed obligatory."<sup>3</sup> The idea was to take advantage of an enemy's disarray and demoralization by engaging as many of his ships as possible so as to neutralize his fleet. In World War II, a notorious incident occurred during the battle of Leyte Gulf. Japanese vice admiral Takeo Kurita failed to give general chase to fleeing American forces when he had the opportunity to inflict great damage.<sup>4</sup>

In one sense, then, a naval melee can be the functional equivalent of kicking the enemy when he is down—a desirable operational situation that calls for aggressiveness, even at the cost of control. The downside to a melee is that units tend to lose mutual support, so risk increases; but the potential payoff is inflicting greater loss on the enemy than could be achieved if structure and control were maintained. The distinguishing characteristic of a melee—at least in the sense in which the term is used in this discussion—is the absence of coordination among

units. While the breakdown in coordination among the elements of a force could occur in a defensive struggle—especially if the force is surprised, as was the Allied force in the first battle of Savo Island (August 1942)—more often it has occurred when an overall aggressive thrust of the force is called for.<sup>5</sup>

A key characteristic of melee warfare is that, unless planned beforehand, it springs on a commander unexpectedly. Therefore, the commander's mind must be ready to make a difficult decision in a heartbeat. It is a risk-versus-payoff decision that involves an understanding of the current relationship between strategy and operations. Admiral Kurita stood to lose ships if he pressed his attack, but the payoff could have been major disruption of the Allied campaign. It does not appear that Admiral Kurita was prepared to make that decision in any kind of considered way. Personal inclinations may be a powerful influence—one might imagine how differently Admiral William F. "Bull" Halsey would have acted had he been in Kurita's shoes. A prepared mind is one that understands the characteristics of a melee both as an unexpected danger and as an opportunity to exploit, and its potential place within the overall campaign structure. Such a mind would be ready to make the best decision for his or her force.<sup>6</sup> A commander who seeks to issue enlightened mission orders ought to understand the potential situations that subordinate commanders might encounter and prepare them to mitigate, accept, or exploit a melee if the opportunity presents itself.

*Sniping* is ambush warfare. At sea it most often has taken the form of commerce raiding, but in World War II in the Pacific there were a number of cases in which submarines on both sides were able to pick off major combatants.<sup>7</sup> Like the melee, sniping involves units acting independently; but, unlike the melee, it is highly dispersed and episodic. Given its dispersed nature, the risk to individual units is a function of their stealth—submarines being the most effective—because sniping is undertaken in areas in which the enemy is sufficiently strong to make structured battle a losing proposition. In sniping, wide latitude is granted to the individual ship captain to select targets and the time and place to attack them.

#### ADAPTATION TO THE MODERN ENVIRONMENT

Although structured battle has been the default mode of sea fights at least since the development of the line-ahead battle formation, the other two modes have been used in various conditions. The question for today's naval tacticians and campaign planners is what the equivalent conditions are in the modern operational environment, and how each mode plays out in the age of missiles, unmanned systems, and battle networks. Especially interesting is how modern weapons affect the decision on whether to allow some kind of melee to occur or to try to maintain a structured fight even if it means, as it did with Admiral Kurita, passing up opportunities to inflict great destruction on the enemy.

Obviously, the nature of the weapons being used exerts considerable influence. Alfred Thayer Mahan, writing in an era in which the ram as the principal naval weapon was starting to be challenged by the long-range naval rifle, speculated on the relationship between melee and structured battle (the prevailing view then being that ram-induced melees were the proper form of battle). “Until that time [trial by battle] there is room for the opposite view—that a melee between numerically equal fleets, in which skill is reduced to a minimum, is not the best that can be done with the elaborate and mighty weapons of this age.”<sup>8</sup>

It should be noted that structured battle is the underlying assumption behind much of, if not all, the literature on network-centric warfare (NCW). A key tenet of NCW is self-synchronization, a condition in which individual units would be able to achieve coordination of their efforts without the need for rigid plans or intervention from centralized authority.<sup>9</sup> While NCW assumes sufficient network connectivity to enable self-synchronization, a similar effect can be achieved by units adhering rigidly to prebattle doctrine, plans, or both. Similarly, “control-free” operations, as the NCW literature visualizes them, do not imply a melee.<sup>10</sup> Current initiatives, such as network-optional warfare, are also ways of achieving coordination among forces without having network connectivity available continuously.<sup>11</sup> The relative elasticity or intermittency of C2 measures does not have a bearing on whether a force is engaging in structured battle or melee, or sniping for that matter.

### *Nested Variation*

The range of naval weapons, such as aircraft and missiles, and the dispersed nature of battles permit nesting of the fighting modes. A major operation involving subordinate task forces and groups is likely to be planned as a structured battle, but sniping operations could be built into it. Moreover, depending on the exigencies of battle, individual groups or units may end up operating in melee conditions.

At the October 1944 battle of Leyte Gulf, all three modes were on display. The day prior to the battle, American submarines *Darter* and *Dace* ambushed Admiral Kurita’s task force, sinking his flagship. Structured battle took place in the Surigao Strait when the battle line of Rear Admiral Jesse B. Oldendorf, USN, blasted two Japanese forces attempting a southern pincer maneuver. As mentioned earlier, a brief melee broke out between Admiral Kurita’s force, which issued through the San Bernardino Strait, and Rear Admiral Clifton A. Sprague’s escort carrier force, which it caught by surprise. Kurita at first ordered a general chase (an order that normally produces a melee), but then—possibly uncomfortable with the way his force was losing cohesion—he ordered his units to regroup, which let the American force gain some separation. Kurita subsequently ordered

a withdrawal. From the perspective of Admiral Chester W. Nimitz, commander of the Pacific Ocean Areas, the overall operation to support General Douglas MacArthur's landing on Leyte might have appeared to degenerate into a melee, once he learned that Halsey had taken his entire force north chasing after Vice Admiral Jisaburō Ozawa, leaving the San Bernardino Strait uncovered. Any time a naval force is dispersed into individual units or independent groups, such as is called for in today's emerging concept of distributed lethality, the nesting of modes could occur—planned, desired, or not.

### *The Effects of Reach: Weapons, Sensors, and Communications*

In 1944, C2 of dispersed forces could be exerted only by precursor plans and orders or through radiotelegraphy. This necessarily left wide latitude for task-force commanders and ship captains to operate as they saw fit. At the same time, weapons were targeted mostly visually, whether by aircrew, periscope, or ship's lookouts. In today's missile age, the situation has changed, with a number of different nonvisual sources of target location and identification available. These are integrated into a common operational picture (COP) that is shared among units and headquarters, and whose radius may extend a thousand miles or more. Riding on data links and secure, long-haul communications, the COP creates a whole new environment in which the three modes of sea fighting will occur.

Most readers of this article will be familiar with the campaign-phasing template embedded in joint doctrine.<sup>12</sup> Its phases range from Phase 0 (Shape) to Phase V (Enable Civil Authority). The following discussion will focus on Phases II (Seize the Initiative) and III (Dominate)—in other words, once the fighting breaks out. However, later on it will examine the role of the three modes during Phase I (Deter), moving to crisis and the brink of war.

In a very real sense, the differentiation among the three fighting modes in a modern operational environment will be a function of network conditions. The battle-force network, and perhaps fragments thereof, is a prerequisite for effective missile combat, in that it facilitates over-the-horizon targeting (OTH-T) and the efficient use of missiles at the group and higher levels. Relayed positive target identification is necessary to comply with the law of armed conflict, and efficiency is required because a force necessarily possesses fewer missiles than it does bullets for guns or bombs for aircraft.<sup>13</sup> If missiles are expended inefficiently, a force may run out before the enemy is defeated, necessitating risky replenishment operations sooner or more often than otherwise necessary, or even retirement in the face of the enemy. Ways will be found to replenish missiles at sea; nonetheless, missiles are far less tolerant of inefficient use than other types of weapons. Efficiency may be defined from different frames of reference: ship, group, force, or theater. In all cases, a functioning network is key to their efficient use. This

suggests that structured battle is the best mode to employ, with tight firing coordination among as many units as possible.

However, it is likely that a capable enemy will attempt to disrupt our battle-force network in some way, through either intrusion or denial, or we may cut communications voluntarily by imposing emissions-control conditions to deny targeting information to the enemy. We can define four dimensions of network status: full or constrained (available bandwidth); constant or intermittent connectivity; one- or two-way communications; and confidence level, in terms of the validity of the data coming through. Of course, the network also might be completely dark. While these conditions may characterize the network as a whole, they more likely will exist either at the unit level or across some fraction of the force. Owing to the wide dispersal of autonomous or semiautonomous intelligence, surveillance, and reconnaissance (ISR) assets, it could be the case that a distant maritime operations center (MOC) has better situational awareness about local conditions than a unit or group commander, assuming the opposing forces are over the horizon from each other. Of course, the opposite also could be the case.

In either situation, when communications are disrupted it must be left to the local commander to decide what to do. It is in this situation that an understanding of the three modes of sea fighting will be needed to concoct robust commander's intent before the battle and to inform constructive decision making by unit and group commanders.

### *Planning and Doctrine*

Assuming the force under discussion initially engaged under the construct of structured battle—regardless of how dispersed it may have become since then—the logical course is to try to maintain some semblance of that structure even as the network suffers degradations. However, planning and doctrine should consider the prospects for doing so. If the initial plan requires little in the way of contingent C2 loops once in execution, then the plan, while inflexible, is relatively impervious to network outages, and a form of structured battle is likely to ensue and continue.

However, inflexible plans usually are not desirable, so the next best thing is to have a plan, or perhaps a doctrine, that can accommodate initiative by unit commanders as they see local conditions develop. The classic paradigm for this is the battle of Trafalgar, at which Admiral Horatio Nelson's captains had such a clear understanding of his ideas about tactics under a wide range of conditions that once the battle was joined he had no need to issue any further instructions. "Once Nelson set the *Victory* on its final course for the allied line, his physical

presence was superfluous. His spirit walked with every admiral and captain who paced a British quarterdeck that first ‘Trafalgar Day.’”<sup>14</sup>

This is the stuff that stirs the spirit of naval officers, but it must be remembered that in 1805, and indeed up to the advent of carrier aviation, naval forces fought within sight of each other. The development of weaponry that can be launched at targets over the horizon is bound to have an effect on this sentiment. It was one thing during World War II carrier battles for airborne strike leaders to exercise judgment, such as Lieutenant Commander Wade McClusky displayed at the battle of Midway; it is quite another when missiles—which are relatively scarce and cannot be recalled—are launched at targets over the horizon, especially in a battle space that could contain significant numbers of merchant and neutral ships.<sup>15</sup>

Individual units may have their own OTH-T resources—probably some kind of unmanned aerial vehicle (UAV)—to provide not only the location but an identification of the target, allowing the unit to fire without violating the law of armed conflict. However, several problems arise. First, if a coordinated salvo is required to penetrate the defenses of the enemy ship or force, unless the unit has many offensive missiles aboard or the unit is in company with others and line-of-sight communications are available to coordinate firing, a single unit’s missiles could be countered by enemy defenses, and thus wasted. Second, a unit’s organic OTH-T may not be able to match the full kinetic range of its missiles. A SAG composed of three or four ships may be able to conduct OTH-T on its own if network connectivity is lost; but, from the perspective of the joint force maritime component commander, if it cannot take advantage of the full range of its missiles, it may be wasting them against lower-priority targets.

All this is to say that in modern, dispersed-missile combat, the Nelsonian paradigm may not serve. If the loss of network connectivity compromises the ability to coordinate missile salvos across the entire battle space, the alternatives—mission command / mission orders or not—will be forms of melee or sniping, unless doctrine requires a withdrawal. Mission orders cannot produce a structured battle in this case (i.e., across a widely dispersed force), but they might be able to provide for a coherent transition to whatever mode follows.

It is important in the development of doctrine and plans to understand the characteristics of the melee and sniping modes. In both, units are operating on their own recognizance; but in a melee, the force as a whole is pursuing an advantage aggressively, and the prospects for inflicting decisive damage on the enemy may be sufficiently compelling to warrant the risks incurred, which include loss of mutual support, increased potential for blue-on-blue casualties, and inefficient use of scarce missile resources. A reversion to sniping, on the other hand, reflects a desire to reduce risks by adopting opportunistic tactics. Branches and sequels

in plans and the structure and content of mission orders must be based on these characteristics.

To visualize better the relationships among the modes in a missile-centric, network-centric war-at-sea environment, imagine that the battle-force network is operating optimally and is generating targeting-quality information on the enemy, as well as comprehensive information on blue-force units. If the network incorporates processing that allows dispersed units to fire in coordination, the network is the basis for structured battle. If, regardless of communications status, each firing unit selects and engages its own target set without regard to what others are doing, then the result is either a form of melee or sniping, depending on the tempo and situation of the battle. The risk in either is that the fleet will use its collective missile inventory inefficiently. The same situation could occur if the network was disrupted.

Enter mission orders. If the network is not able to provide targeting-quality information, each unit has to generate its own. If out of contact with other units, the commander has to rely on whatever guidance he or she received in terms of what to shoot at and when. The guidance might specify an aggressive approach, or it might direct the unit to manage risk in one way or another. Applied across the force, such guidance would produce either a melee or sniping. If communications are intermittent in one way or another, it is still possible for the force as a whole, or parts of it, to adopt either the melee or sniping approach. The fleet commander must understand this when crafting mission orders.

### *Effects of Unmanned Vehicles and Artificial Intelligence*

A future naval battle more than likely will feature the presence of unmanned vehicles and systems that will be characterized by their possession of artificial intelligence (i.e., AI). Most of these systems will have nonkinetic missions and capabilities, such as ISR and perhaps deception. However, some will be fitted with weapons and may have the capability to complete all phases of a kill chain, regardless of whether policy and rules of engagement (ROEs) permit them to do so. The three modes of naval battle apply equally to these systems.

Of course, a species of unmanned sniping has been used for over a century: the deployment of naval mines. While the old contact mine may be too elemental to fit into the sniping category, influence mines with discriminating sensors and ship counters and those consisting of a tethered torpedo designed to detect and attack submarines are sufficiently sophisticated to be regarded as sniping systems.

Unmanned systems are not immune to the logic of naval combat. "Swarming," however achieved, is clearly a form of structured battle at the tactical level, the same being true if the systems involved execute some detailed, preprogrammed plan without communicating with each other. If systems are set loose to find and

attack targets independently, a form of melee is the result, depending on how rigid their programming is. Conversely, modification of such programming might produce a sniping operation. These dynamics hold true regardless of the degree of human control exerted in their operation. Understanding the characteristics of each mode of battle, along with the conditions in which each is appropriate, will inform programming and planning for their use.

### *Early-Phase Operations*

So far, this discussion has assumed that hostilities are under way. However, the modes of naval battle also must be considered during Phase I deterrent operations. If, during a crisis, a U.S. fleet is arrayed in multiple independent groups or as single ships, the possibility of a melee occurring must be considered. Under the ROEs, USN ships are authorized to act in self-defense. Such action might include not only use of defensive systems to parry offensive missiles but reciprocal offensive actions to neutralize any further hostile actions by vessels that continue to present a threat.<sup>16</sup> Depending on specific guidance at the time, a particular incident might or might not precipitate a general engagement. If the network coverage is complete, centralized decision making likely would govern whether fighting spreads to the whole force. But if, as is conceivable, the aggressor first attacks the network, individual group and unit commanders will have to decide what to do. The overall commander should decide before the fact whether to allow a melee to develop or instead to promulgate guidance that restrains engagement until networked control is reestablished. This mirrors the dilemma that Admiral Kurita faced—which illustrates that for future commanders an understanding of the three modes of naval combat is neither academic nor outdated.

What holds true for the kinetic dimension of naval warfare also can apply to nonkinetic operations. A fleet commander who deploys forces for deterrence purposes during a crisis (Phase I), especially in littoral waters or other constrained seas, needs to accomplish two things: preventing the development of tactical conditions that would entice the opponent to initiate a “battle of the first salvo”; and not allowing an isolated incident, perhaps the result of a mistake or a rogue captain, to escalate into full-scale battle. In Phase 0, tight and centralized command is likely to be needed to avoid these situations, but in Phase I and the early stages of Phase II, the opponent may initiate an information fight that could isolate at least some elements of a dispersed force. While such a move might be interpreted as a hostile act in and of itself, it is more likely that the U.S. force would not respond kinetically, creating at least a temporary condition in which mission-type orders would govern.

Such orders must be informed by an understanding of the different dynamics of structured battle versus a melee. The structure of mission-type orders might

orient around actions individual units can take to become or remain untargeted. If centralized control is present, the overall pattern of such actions might be regulated, to support signaling. Without such control, again depending on the structure of doctrine and mission-type orders, individual group or unit actions could be interpreted by the opponent as a signal that higher leadership does not want to send—an instance of a nonkinetic version of the melee generating confusion and risk.<sup>17</sup>

This suggests that an understanding of the three modes of naval war fighting should be considered when developing plans and mission-type orders, including commander's intent, for forces that could be engaged in crisis maneuvering. The key is to achieve coherent transition among the modes.

### *Gaming and Exercises to Explore Tactical Viability*

Using iterative war gaming, the Navy can gain a better understanding of the dynamics of a future sea fight in the context of the three modes. For instance, is it possible to have degrees of structure in a fight, with structure degrading incrementally rather than the force moving abruptly from one mode to the next? Such understanding would inform not only MOC doctrine and procedures but also fleet design and architecture. To retain at least local structure, should the maximum dispersion be three-ship SAGs rather than independently operating units?<sup>18</sup> Should all combatants be equipped with both OTH-T and communications-relay UAVs? If a general reversion to sniping is anticipated, should the design of surface combatants focus on stealth? Provisions such as these are not cheap, so they should be decided with an understanding of how the three modes of sea fighting will be employed.

Certain classes of ships are better suited to certain modes of fighting than others. Submarines, of course, always have been sniping platforms, owing to their stealth and tactical vulnerability if discovered. However, during the early part of World War II, aircraft carriers, because of the range of their aircraft, were used successfully in this mode, conducting raids on Japanese bases. They could do so because the limited ISR of the era allowed them to hide in the open ocean. Battleships and cruisers, however, made poor sniping platforms, as the fates of *Bismarck* and *Graf Spee* illustrate. Destroyers and cruisers became decent melee platforms, especially for night battles. This brings us to ships such as the modern USN littoral combat ship, which, although designed for missions in scenarios in which the ship would be less threatened, now must be adapted for higher-end missile fights, perhaps requiring conversion into a frigate. Although such a ship no doubt would be armed with point-defense systems, its self-defense capacity still would be limited, meaning it would have to operate in conjunction with a destroyer or under air cover. It therefore would need to operate in the context of

a structured battle—assigning a ship of that type to independent sniping duty would incur too much risk. As a rough analogue, back in World War II patrol torpedo (i.e., PT) boats were used in that way—and there is a reason a movie about them was titled *They Were Expendable*.

In the end, it is all about command at sea. The Navy has basked in the luxury of access unimpeded by significant opposition for so long that, as an institution, it has allowed its war-at-sea posture, and indeed the instincts of its officers, to atrophy. It now recognizes the emerging threat and is responding.

Among the features of that response should be reconsideration of the three modes of naval combat and how they affect the application of mission command in a networked, multidomain environment. The challenge is not simply to extract principles and apply them; the Navy first must learn how to talk about naval warfare constructively. This will allow useful professional dialogue to occur, aid in the development of doctrine and plans, enhance education, and ultimately prepare the minds of future commanders so they will be able to achieve mission command at sea.

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#### NOTES

1. U.S. Defense Dept., *Joint Operations*, JP 3-0 (Washington, DC: January 17, 2017), p. xi.
2. The categorizations are theirs, although Alfred Thayer Mahan and others in the nineteenth and early twentieth centuries used the term *melee* frequently.
3. Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660–1783* (Boston: Little, Brown, 1890; repr. New York: Dover, 1987), p. 184.
4. There are any number of good accounts of the battle, but two favorites are H. P. Willmott, *The Battle of Leyte Gulf: The Last Fleet Action* (Bloomington: Indiana Univ. Press, 2005), and James D. Hornfischer, *The Last Stand of the Tin Can Sailors: The Extraordinary World War II Story of the U.S. Navy's Finest Hour* (New York: Bantam, 2004).
5. James D. Hornfischer, *Neptune's Inferno: The U.S. Navy at Guadalcanal* (New York: Bantam, 2011). Hornfischer takes the reader through a compelling account of all the sea battles associated with the Solomons campaign.
6. For a brief discussion about the relationship between risk and campaign dynamics, see Robert C. Rubel, "Conflict Management: Getting a Grip on Tailored Deterrence," *Orbis* 56, no. 4 (Autumn 2012), pp. 676–91.
7. American submarines sank seven Japanese aircraft carriers, a battleship, and nine cruisers. Joint Army-Navy Assessment Committee, "Japanese Naval and Merchant Vessels Sunk during World War II by United States Submarines," appendix to *Japanese Naval and Merchant Shipping Losses during World War II by All Causes*, NAVEXOS P-468 (Washington, DC: Government Printing Office, 1947), available at [www.ibiblio.org/](http://www.ibiblio.org/). Japanese submarines accounted for three USN aircraft carriers and two cruisers. *Wikipedia*, s.v. "List of US Navy Ships Sunk or Damaged in Action during World War II," [en.wikipedia.org/](http://en.wikipedia.org/).
8. Mahan, *The Influence of Sea Power upon History*, pp. 3–4.
9. David S. Alberts, John J. Garstka, and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information*

- Superiority*, 2nd ed. (Washington, DC: DoD C4ISR Cooperative Research Program, 1999), pp. 166–70.
10. David S. Alberts and Richard E. Hayes, *Power to the Edge: Command and Control in the Information Age* (Washington, DC: DoD Command and Control Research Program, 2003), pp. 25–26.
  11. See the Naval Postgraduate School Wiki website, [wiki.nps.edu/](http://wiki.nps.edu/), for more information.
  12. U.S. Defense Dept., *Joint Operation Planning*, JP 5-0 (Washington, DC: August 11, 2011), p. III-39.
  13. U.S. Navy Dept., *Commander's Handbook on the Law of Naval Operations*, NWP 1-14M (Washington, DC: July 2007), p. 9-5.
  14. Michael A. Palmer, *Command at Sea: Naval Command and Control since the Sixteenth Century* (Cambridge, MA: Harvard Univ. Press, 2005), p. 207.
  15. Many books have chronicled Lieutenant Commander McClusky's savvy airmanship in the battle of Midway, but my favorite is Jonathan Parshall and Anthony Tully, *Shattered Sword: The Untold Story of the Battle of Midway* (Dulles, VA: Potomac Books, 2005), pp. 216–17.
  16. Alan Cole [Cdr., RN] et al., *Sanremo Handbook on Rules of Engagement* (San Remo, It.: International Institute of Humanitarian Law, 2009), p. 4.
  17. For more detail on crisis maneuvering at sea, see Robert C. Rubel [Capt., USN (Ret.)], "In-Fighting: A Needed Warfighting Skill," U.S. Naval Institute *Proceedings* 141/11/1,353 (November 2015).
  18. Navy Project Team, *Alternative Future Fleet Platform Architecture Study* (Washington, DC: October 27, 2016), p. 14. The study calls for both multiship SAGs and a single-ship "SAG" consisting of a modified *Burke*-class destroyer with additional aviation capability.