

The Second Battle

Operations in the South China Sea

by Maj Robert Spodarek & Benjamin Jensen, PhD

The following is the third in a series of fictional accounts of a hypothetical engagement between the Chinese and U.S. militaries in the South China Sea.¹ The road to war was first published in the Marine Corps Gazette in February 2020 and explained the diplomatic crisis that escalated through initial hostilities between China and a U.S.-treaty ally in the region. The second account, in the Defense of Duffer's Drift style, detailed how the first battle might occur as the U.S. deployed a joint task force (JTF) to the area to link up with elements of a littoral combat group (LCG) and Marine littoral regiment.² Similarly, this account revisits the same battle scenario. However, it envisions a scenario where the JTF, LCG, and MLR reap the benefits from investments in disruptive technology, electromagnetic spectrum operation (EMSO) capabilities, and partner nation infrastructure projects including subterranean facilities. This story is based on observations from eight iterations of fighting a joint scenario with participants in the TECOM Warfighting Society and School of Advanced Warfighting as part of their capstone planning exercise series Agile Competition and Agile Response.

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LtGen Wiggin stirred in his sleep, dreaming about how a battle between a U.S.-led coalition and China could unfold in the South China Sea. Unlike his previous dream,³ he began to imagine fighting the battle using the Mosaic Warfare concept the United States had been experimenting with since he was a junior officer.

Mosaic Warfare envisioned fighting networked swarms of unmanned systems like a Mongolian horde constantly conducting feints, spoiling attacks, and reconnaissance pull to dislocate the en-

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emy.⁴ The concept called for integrating command and control (C2) automation, artificial intelligence (AI), and fleets of low-cost, partially autonomous unmanned autonomous systems capable to hold the enemy at risk in multiple domains.⁵ Mosaic formations possessed swarming capabilities with hundreds of small unmanned aerial systems armed with multi-mission payloads constantly probing to identify surfaces and gaps.⁶ The central idea was to create a web of smaller, more lethal, survivable, and adaptable forces that outpaced the adversary's decision-making cycle and created the conditions for a defeat in detail.⁷ The mosaic force constantly pulsed the environment, forcing the adversary to respond, creating simultaneous bait and ambush opportunities. In this manner, the swarming fleet of interoperable sensor and shooter platforms increased joint battlespace awareness and enabled the force to operate in more distributed formations that increased survivability without sacrificing lethality. The enemy could defeat any single swarm but found it difficult to track and respond to them all at once. Additive manufacturing capabilities printed new swarms on demand to generate combat power forward and compound the dilemma.

While he was a student at the School of Advanced Warfighting, Wiggin

partnered with DARPA to develop a concept of Mosaic based on studying Gen Krulak and the Hunter Warrior experiments in the 1990s.⁸ Despite years of fielding autonomous and human-on-the-loop platforms, many of his colleagues still acted as if they were Napoleon or Frederick the Great, great commanders whose intuition allowed them, individually, to identify patterns and positions of advantage. He found this nostalgic thinking not only antiquated but dangerous. Machines were better at pattern recognition—the heart of coup d'oeil—but humans were more creative. Wiggin knew that taking advantage of Mosaic capabilities required changing how commanders thought about battle networks.⁹ They needed to know when to trust the machine and when to challenge the underlying logic in AI models driving rapid target identification and optimized course of action recommendations. The modern commander developed a theory of victory and concept of operation with their staff mindful of shifting strategic conditions and limitations and let the machine optimize force flow, phasing and sequencing, and targeting based on intent.

Modern battle networks had to be resilient and capable of self-forming. Traditional linear kill chains proved brittle. Sever the sensor link and the weapon

was lost. Every major competitor, from China to Russia, had concepts for paralyzing the United States by degrading and denying C2. Consistent with network theory, interoperable sensors that could re-establish larger connectivity or form localized kill chains would provide flexibility and response options. Along with the C2 sensor interoperability offered by Joint All-Domain Command and Control (JADC2), Mosaic's Context-Centric Command, Control, and Communications (C3) created more resilient C2 and communication pathways.¹⁰ JADC2 overhauled legacy platforms to enable interoperability amongst C2 and sensor systems, while Mosaic's Context-Centric C3 leverages manned-unmanned teaming to harness C2 automation, AI decision-making aids, and multiple communication pathways, including decentralized wireless networks and future wireless ad hoc networks (WANET).¹¹ Hardware though required new software and the most important algorithm in war remained the thinking warrior.

Still dreaming, Wiggin's mind wander through a collage of memories—the tired faces of his staff across multiple, brutally honest after-action reports. He had conducted hundreds of hours of wargames and exercises, even mandated individual battle studies and wargaming known as the Fight Club,¹² to practice mission command in an environment characterized by JADC2 and Mosaic. He helped his teamwork through how not to get lost in the flood of data, to separate the signal from the noise working with—not against—the machines, and when to press the attack with dispersed, automated formations that survived the initial salvo.

Wiggin's dream shifted. His mind turned to strategic infrastructure required for 21st century power projection and staging Mosaic capabilities forward. His dreamscape recounted how the U.S. diplomatic and military infrastructure investments in Indo-Pacific partner nations over the last decade enhanced Mosaic options for advanced basing and deception operations. As a young officer, he loved these rotations. He would land with a company on short notice and simulate

using autonomous air and sea platforms to move tons of supplies forward during the initial stages of a missile exchange while his teams pushed out decoys. Forward-positioned airheads and underground facilities that stored key parts for Mosaic swarms and critical munitions generated scalable response options. These infrastructure investments offered deception options to increase ambiguity, as the combined force could increase activities at multiple locations to disrupt China's ability to discern signals from noise. The facilities also helped on the diplomatic front by reassuring partner nations similar to his grandfather's stories about caves in Norway during the Cold War. U.S. investments with willing Indo-Pacific partners provided senior U.S. decision makers with multiple options to dis-

tribute the force and quickly aggregate combat power from disparate locations.

Wiggin's dream pulled him from his youth to his possible future. He saw himself in the operations center receiving his morning commander's update brief on the eve of confronting the Chinese in the South China Sea. His staff assessed that China would likely rely on its long-range sensor networks and precision-guided munitions to defend their occupation of a partner nation airfield. According to LtGen Wiggin's staff and Mosaic AI-decision-making aids, the Chinese Southern Theater Command's most likely course of action was multi-domain sea denial. The Chinese would establish a guard force of frigates and missile boat hiding in the littorals. To scout potential JTF intentions, China would employ high-alti-



Swarms of sUAS armed with multi-mission payloads formed an innovative reconnaissance and security force. (Photo by Petty Officer 1st Class Charles White.)

tude, long-endurance unmanned aerial vehicles (UAVs) paired with cyber and space-based assets to provide indications and warnings of U.S. force activities. Type 93 Shang Class nuclear attack subs would be forward searching for high value unit vessels and critical supply ships. The Southern Theater Command's surface action groups (SAGs) and carrier strike groups would remain in vicinity of Taiwan to provide a robust counterattack option while reinforcing ambiguity on China's true intentions. China would then deploy continuous combat air patrols from airfields on the mainland and in the South China Sea to pull U.S. forces into their Integrated Air and Missile Defense weapons engagement zones (WEZ). By pulling the United States into the weapons engagement zones, China could leverage their home field advantage near the mainland—which provided greater magazine depth, greater advanced missile capabilities (extended ranges and hypersonic speeds), and robust sustainment—to launch converging attacks at key choke-points. LtGen Wiggin's staff assessed that China's military objective was likely to hold territory in and around the U.S.-treaty ally and use this territory as a bargaining chip for future negotiations while keeping the confrontation non-nuclear. China envisioned a short, conventional victory over the United States to dictate diplomatic terms and advance their nine-dashed line claims while signaling the risks of getting involved to other Asia-Pacific nations. At the conclusion of the commander's update brief, LtGen Wiggin thanked the staff for their hard work and told his team to "keep pressing."

In his dream, LtGen Wiggin saw himself leave the meeting and go outside to get some fresh air aboard the Expeditionary Strike Group (ESG) flag ship. As he peered out at the Pacific from the catwalk underneath the flight deck of the flag ship, LtGen Wiggin reflected upon his tall task of upholding treaty commitments to retake the key airfield in a U.S.-treaty ally's territory while containing the conflict and preserving crisis off-ramp options with China. He believed the JTF did not possess adequate forces within the ESG, LCG,

and MLRs to accomplish this task, so he requested additional forces from USINDOPACOM—to include support from a carrier strike group and Air Force Expeditionary Forces. As LtGen Wiggin returned to the combat operations center, he was flooded with scouting analysis on the disposition and potential intentions of Chinese activities, based on manned-unmanned teaming and analysis from the JTF's staff and *Mosaic interpreters and analysts*—a collection of Marine data scientists similar to operations researchers trained on narrow AI applications.¹³

LtGen Wiggin reviewed the latest version of the JTF's course of action based on his commander's guidance and directed changes. The JTF's staff, operational planners, and *Mosaic interpreters and analysts* recommended simultaneous anti-scouting operations to create firepower opportunities to isolate and exploit radars associated with the PLA's early warning networks and Integrated Air and Missile Defense systems.¹⁴ Specifically, destroying the PLA's high-altitude, long-duration UAV—the Soar Dragon—would significantly degrade the PLA's near realtime ability to scout and disrupt the PLA's decision-making and targeting kill chain. Next, multiple Mosaic formations would employ deception decoys and jamming via selective EMSO in multiple domains to increase ambiguity and enhance the effects of the anti-scouting operations. Additionally, willing partner nations and *Inside Forces* would increase activities at key airheads and logistical sites to create additional power projection and deception options.¹⁵ These counterforce decoys and deception operations would entice PLA formations to illuminate radars and firing positions, and create opportunities for U.S. lethal strikes and swarms to neutralize low-density ballistic missile and anti-ship cruise missiles firing assets across the battlefield.¹⁶ In essence, the JTF would take advantage of its converging geometry to confuse the PLA with respect to its avenues of approach and basing options, as well as which elements would strike the PLA first.

After isolating and blinding radar networks, the anti-scouting operations

would then create opportunities to roll-back portions of the PLA's weapons engagement zones to achieve local sea control and air superiority by surging U.S. air sorties to destroy the PLA's vulnerable radars and Integrated Air and Missile Defense systems with long-range anti-ship and joint anti-surface standoff missile. Effective anti-scouting operations would disrupt PLA kill chains and degrade their ability to sense and observe U.S. maneuvers.

With these conditions set, the JTF would begin sequencing Mosaic amphibious formations forward, activating forward positioned airheads and expeditionary advanced bases (EABs) as needed, and deploying swarms of UAVs to isolate and overwhelm radars associated with the remaining PLA's Integrated Air and Missile Defense Systems. The concentrated fires delivered from the distributed force would create a penetration opportunity for ESG elements to link up with the littoral combat group and conduct an amphibious assault to seize a friendly airfield held by PLA forces. EABs already set up by the LCG would provide additional forward air refueling points for aircraft and strike sites to support ground forces assaulting the airfield and establish blocking positions to prevent Chinese amphibious forces from reaching the base.¹⁷ LtGen Wiggin remembered first seeing the potential of this maneuver from observing how insurgents linked together cheap drones, cruise missiles, and ballistic missiles to attack Saudi Aramco facilities in 2019.¹⁸

As he reviewed the plan, the flag ship suddenly stirred with commotion as general quarters buzzers erupted and Sailors and Marines sprinted to prepare battle positions. JTF sensor networks informed the combat operations center and combat information center of multiple vampires inbound toward the LCG, potential ballistic missile launches, while the AEGIS, global hawks, and F-35s reported a sharp increase in PLA activity toward the ESG—J-15s and J-31 fighters likely providing escort to protect H-6s loaded with anti-ship cruise missiles and land-attack cruise missiles. The Mosaic sensor networks had already created adaptive cross-

domain kill webs (ACKs) and had autonomously deployed munitions and unmanned systems to intercept these anti-ship cruise missiles and land-attack cruise missiles like the Navy's Close-In Weapons System (CIWS) in self-defense of the ship.¹⁹ The PLA was simultaneously attacking two different target sets, which appeared to be U.S. navy warships and key land bases. Even with the Mosaic technology and Marine Air Defense Integrated Future Weapon System, some missiles from the PLA's missile salvos hit a series of EABs, focusing on fuel sites and cratering runways.²⁰

Although the PLA experienced some initial success, Mosaic's ACKs had been calculating the most lethal and cost effective ways to reduce PLA threats from the JTF's fleet of legacy and autonomous systems. In firing the first salvos, the PLA illuminated many of their firing systems and radars, which uncovered their locations and enabled Mosaic's ACKs to generate multiple targeting solutions to destroy these PLA platforms. In response to the PLA's preemptive strikes, LtGen Wiggin ordered the JTF to execute the plan immediately and authorized commanders to prosecute ACK webs according to the theater rules of engagement. LtGen Wiggin's mind raced as he reflected on the multiple wargames that helped shape the rules of engagement and whether the plan managed escalation well enough to provide crisis off-ramps that kept the situation from becoming World War III.

The PLA attempted to mass a second wave of anti-ship cruise missiles from missile boats, frigates, and subs targeting the LCG. Many of these strikes, however, were far less accurate and missed their intended targets. The degraded accuracy was likely the result of effective JTF anti-scouting operations that destroyed Soar Dragon ISR platforms and multiple radar and sensor networks. Multiple attempts to deny JTF communications networks were also largely unsuccessful given the resilient Context-Centric C3 capabilities. The JTF's guided missile destroyer defenses destroyed most of the incoming rounds to protect the ESG and LCG, but one Amphibious Transport Dock and a Landing Dock Ship took multiple direct hits.

The fighting lasted over two hours and both sides sustained losses, with the PLA sustaining more damage based on tonnage of shipping sunk, damage to radar and sensor networks, ballistic missile units, and aircraft. The PLA expended much of their magazine arsenal—many on U.S. decoys and false basing sites—and also lost credibility within the international community for striking first. On the U.S. side, the Amphibious Transport was lost, but the remaining Mosaic naval formations were able to establish local maritime superiority thanks to JTF CAP and airstrikes. JTF aircraft from Japan and Guam arrived and shot down 25 Chinese fighters around the Island,

losing only 5 aircraft to a combination of air-to-air combat and HQ-9s SAMs launched from the SAG and the islands. Legacy B-1s also successfully attacked a PLAN SAG and installations in the South China Sea, sinking four ships and destroying multiple surface-to-air missiles sites and associated radars and isolating the PLA forces occupying the airfield.

LtGen Wiggin's dream turned to a flood of news feeds and commentary as the world digested the results of the skirmish. Following the intense fighting between his JTF and PLA, decision makers from the U.S.-treaty ally, United States, and China reviewed damage to infrastructure and the losses sustained by all parties. Although the PLA sustained more damage than the United States, the costs and risks were unacceptable to all countries and drove negotiations by the U.S. partner nation for a cease-fire with the Chinese. Tensions remained high with sporadic cyber and air-to-air engagements in the South China Sea. ASEAN states held an emergency summit and demanded an end to all hostilities. UN representatives were involved behind the scenes but weary of a veto by either China or the United States. The economic costs were devastating. Both the Chinese and U.S. currencies lost value and stock markets continued to crash around the world. In Washington, cabinet officials had to debate pressing the fight without significant allied support or bailing out U.S. businesses that were failing. Unlike the early 2000s, the United States could no longer "print money" by buying government debt. Interest rates were higher and rising fast because of the risk premium placed on U.S. debt by the risk of World War III. Despite winning a local battle, the U.S. military had to pullback while diplomats negotiated a ceasefire and brokered larger talks to reduce the arms race and deployments that had increased tensions in the region.

In the after action, Mosaic technology and long-term investments in partner nation infrastructure, EABs, and underground facilities proved beneficial. Specifically, anti-scouting and counterforce operations from EMSO, decoys, and deception operations created



The JTF's guided missile destroyer's defenses helped protect the ESG and LCG but not without cop. (Photo by Seaman Trevor Welsh.)

multiple opportunities for the JTF to exploit vulnerable PLA systems. Mosaic technology provided the joint force the credible decoys and unmanned systems to create a more survivable force while also buying down the risk of losing U.S. lives and expensive, legacy platforms.

Investments in Mosaic technology and infrastructure also provided ample firepower options. Regarding the targeting process, Mosaic's ACKs accelerated decision making and provided options to commander's that may not have been possible without operating at machine speeds offered by C2 automation and AI. Manned-unmanned teaming enabled Mosaic systems to compose the most optimal formations and firing solutions in each aspect of the mission increasing lethality while once again buying down risk. The swarming capabilities delivered by the unmanned systems car also was a boon to U.S. firepower and counterforce capabilities. They were also cheap, which would become increasingly important given the economic shock of the crisis.

Although the United States and China avoided World War III, the conflict revealed the dangers associated with future war in the precision-strike age and how a limited conflict would affect senior decision makers and the will of the people—with high casualties and wartime destruction as an unacceptable outcome for most Indo-Pacific nations, the international community, and the U.S. population. China's *fait accompli* proved somewhat successful, as the United States and its ally cut short the U.S. mission to expel PLA forces in order to avert a potential World War. Autonomous systems, AI, and infrastructure provided the JTF a competitive military advantage but at the cost of revealing new technology and secretive basing options. Further, effective employment of autonomous systems and AI had prompted a technology arms race, creating a security dilemma amongst world powers. The new systems were a blessing and a curse.

Wiggin woke up. It was just before dawn. The calm was deceiving. He knew the day ahead was only filled with hard choices.

Notes

1. Benjamin Jensen, "The Crisis: Operations in the South China Sea," *Marine Corps Gazette*, (February 2020), available at <https://mca-marines.org>.

2. Benjamin Jensen and Robert Spodarek, "The First Battle," *Marine Corps Gazette*, (Quantico, VA: March 2021).

3. Ibid.

4. Benjamin Jensen and John Paschkewitz, "Mosaic Warfare: Small and Scalable are Beautiful," *War on the Rocks*, (December 2019), available at <https://warontherocks.com>.

5. Dr. Timothy P. Grayson, "Mosaic Warfare," (presentation, Quantico, VA, July 2018), <https://www.darpa.mil>.

6. Bryan Clark, Daniel Patt, and Harrison Schramm, *Mosaic Warfare: Exploiting Artificial Intelligence and Autonomous Systems to Implement Decision-Centric Operations*, (Washington, DC: Center for Strategic and Budgetary Assessments, February 2020); and *Mosaic Warfare*.

7. Benjamin Jensen and John Paschkewitz, "Mosaic Warfare: Small and Scalable are Beautiful," *War on the Rocks*, (December 2019), available at <https://warontherocks.com>; and *Mosaic Warfare*.

8. Terry Terriff, "Of Romans and Dragons: Preparing the U.S. Marine Corps for Future Warfare," *Contemporary Security Policy*, (Milton Park: Taylor & Francis, 2007).

9. Barry Watts, *Six Decades of Guided Munitions and Battle Networks: Progress and Prospects*, (Washington, DC: Center for Strategic and Budgetary Assessments, 2007).

10. For JADC2, see Nishawn S. Smagh, "Defense Capabilities: Joint All Domain Command and Control," (Washington, DC: Congressional Research Service, April 2020), available at <https://crsreports.congress.gov>.

11. For Context-Centric C3, see *Mosaic Warfare*. Context-Centric C3 envisions using decentralized wireless networks and future wireless ad hoc networks WANET to transmit messages, which will likely require only one element of a Mosaic formation to communicate with another element from an adjacent Mosaic formation to synchronize efforts and carry-out missions.

12. Benjamin Jensen, "Welcome to Fight Club: Wargaming the Future," *War on the Rocks*, (Jan-

uary 2019), available at <https://warontherocks.com>.

13. Wayne P. Hughes and Robert Girrier, *Fleet Tactics and Naval Operations*, 3rd edition, (Annapolis, MD: Naval Institute Press, 2018). Hughes defines scouting as the gathering of "tactical information about the enemy's position, movements, vulnerabilities, strengths, and, in best of worlds, intentions."

14. Ibid. Hughes describes the goal of anti-scouting missions as attempts to "destroy, disrupt, or slow enemy scouts." Hughes and Girrier define firepower as "the capacity to destroy the enemy's ability to apply force," and counterforce as "the capacity to reduce the effect of delivered firepower" by the adversary.

15. Art Corbett, "*Expeditionary Advanced Base Operations (EABO) Handbook: Considerations for Force Development and Employment*," (Quantico, VA: Marine Corps Warfighting Lab, June 2018).

16. *Fleet Tactics and Naval Operations*. Hughes defines counterforce as "the capacity to reduce the effect of delivered firepower" by the adversary.

17. On EABOs, see *Expeditionary Advanced Base Operations (EABO) Handbook*.

18. Seth Frantzman, "Are Air Defense Systems Ready to Confront Drone Swarms?" *Defense News*, (September 2019), available at <https://www.defensenews.com>.

19. For more on ACKs, see LtGen David Deptula (ret) and Heather Penney, *Restoring America's Competitiveness: Mosaic Warfare*, (Arlington, VA: Mitchell Institute for Aerospace Studies, 2019); and *Mosaic Warfare*.

20. On MADIS/FWP, see Staff, "Program Executive Officer Land Systems: It's All About the Warfighter," Marine Corps Systems Command, (n.d.), available at <https://www.marcoarsys.com.marines.mil>.

>Editor's Note: The authors wish to dedicate this series of articles to the memory of Col Arthur J. Corbett, USMC(Ret) who passed away suddenly on 3 February 2021. Col Corbett was the intellectual driving force and principal author behind many Marine Corps Concepts including Expeditionary Advance Base Operations. Semper Fidelis.

