MARINE CORPS
Gazette
Professional Journal of U.S. Marines

MARCH 2023 Vol. 107 No. 3 www.mca-marines.org/gazette

A publication of the Marine Corps Association


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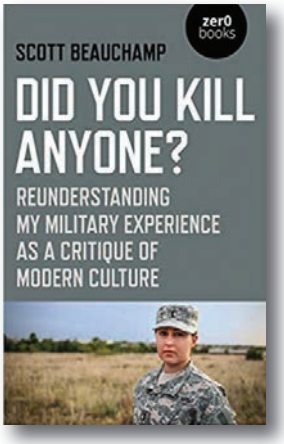
March 2023
Volume 107 Number 3

MARINE CORPS Gazette
Professional Journal of U.S. Marines

Cover
Presence in the Pacific: On 26 January. 2023 MCICOM and MCIPAC marked the activation of Marine Corps Base Camp Blaz, Guam.
(Photo by LCpl Jonathan Beauchamp.)

DEPARTMENTS



IDEAS AND ISSUES

Logistics & Sustainment

Strategy & Policy

Training & Education

O'Leary Contest Winners

Wargaming/Advertiser Content

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Submit entries anytime from 1 January to 30 April.

See p.42 for instructions.

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MARINE CORPS Gazette
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MARCH 2023

Editorial: Focus on Contested Logistics

The *Force Design 2030 Annual Update,* published in May 2022, emphasizes the importance of logistics to the implementation of the Corps' campaign of modernization: "The challenge of providing distribution and sustainment in the context of our emerging concepts makes logistics the pacing function for both modernization and operational planning. Logistics will be contested—in some respects, it is being contested now—by peer and near-peer competitors, along the entire length of the supply chain. ... We need systemic change in logistics."

This month's annual logistics-focus edition takes an in-depth look at efforts across the entire Marine Corps Logistics Enterprise and the Corps' installations to effect this systemic change. Starting with an update letter from LtGen Edward D. Banta, Deputy Commandant for Installations and Logistics on page 6, we present fifteen articles covering a wide range of logistics and installations topics from the Service-level through tactical-level Combat Service Support. Stand-out articles include "*MCDP 4, Logistics* 2.0" by Mr. Mark Schouten on page 7, an overview of the Corps' new capstone doctrine for logistics. On page 10, "Offense Wins Games, Defense Wins Championships" by the Commander of Marine Corps Installations Command, MajGen David W. Maxwell, and Col Joseph C. Novario examines the role installations, to include expeditionary advanced bases, play as platforms for force generation, sustainment, and force protection. The critical roles of casualty care and medical readiness in the future operating environment are the subjects of "Casualty Treatment in Tomorrow's War" by LCDR Trevor Tompane on page 20 and "21st-Century Medical Readiness" by Maj Andrew P. Kettner on page 43. Also noteworthy is "Bridge to Nowhere" by 1stLt Katherine Schumann on page 47, a critical analysis of bridging requirements for Stand-in Forces.

In addition to this month's focus on logistics we feature articles on Training & Education including "Reinvigorating Amphibious Training and Education" by the Staff of Expeditionary Warfare Training Group Atlantic on page 74 and ""Read" or Get Off the Pot" by Capt Karl Watje on page 76. Our collection of Strategy & Policy articles continue with "Should the United States Retain its Forces in South Korea?" by Maj Andrew Krebs on on page 56 and an analysis of the People's Liberation Army's assessment of U.S. Forces in "How Well Does Your Adversary Know You?" by Col Scott E. Stephan and Mr. Conor M. Kennedy on page 61.

Finally, we present the two winners of the Col Thomas M. O'Leary writing contest beginning on page 83. This contest was made possible by the support of the 29th Commandant, Gen Alfred M. Gray, Jr. and the Potomac Institute for Policy Studies. The first-place essay is "Repurpose Naval Innovation" by LT Virgil Fermin, USN, which proposes leveraging the Navy's development of unmanned surface vessels to support Marine Stand-in Forces and expeditionary advanced bases. The second-place essay is "From Their Cold Dead Hands" by Capt Michael Hanson, an examination of how increased training in the employment of foreign ordnance can reduce the sustainment burden on Stand-in Forces.

Christopher Woodbridge

"Trained to Go on Liberty"

Kudos to Peter D'Arpa for his eye-opening look at the 4th Marines in China and the Philippines during World War II ("Trained to Go on Liberty," *MCG*, Nov22)! We—including this historian—have a tendency to overlook leadership failures of Marines in the Greatest Generation. Mr. D'Arpa reminds us to look at and learn from the whole picture.

Col Nicholas Reynolds, USMCR(Ret)
author of *Need to Know, World War II* and the *Rise of American Intelligence*

Maneuverist Paper No. 23

As three Marines mentioned in Marinus' Maneuverist Paper No. 23 (*MCG,* Sep22) concerning the evolution and adaptation of maneuver warfare in the Marine Corps, we can attest to the accuracy of his reporting the events as they unfolded and the connections that were made to bring it to fruition.

For those young officers fortunate enough to have attended the Amphibious Warfare School in the early 1980's while Mike Wyly was the head of tactics instruction, they were introduced to maneuver warfare and expected to think their way through tactical problems and not rely on the approved school solution.

Bernard Trainor, then a major general, was Director of Marine Corps Education. The heads of the several schools at Quantico reported to him. Mike Wyly had been a member of Gen Trainor's staff and had enrolled himself in a graduate history program at George Washington University. This was based on "conventional wisdom" at the time that tensions between the United States and the Soviet Union had the potential of developing into full scale war. Wyly was concerned over the lack of attention, Corps-wide, at the time, given to the study of military history. Biographical writings available at the time of U.S. leaders in World War II, especially those of Fleet ADM Chester Nimitz, recounted the enormous value of their pre-war study of military history. Discussions between Mike Wyly and Bernard Trainor led to Trainor's assignment of Wyly to teach tactics at the Amphibious Warfare School at Quantico.

In the meanwhile, a Congressional Aid, William Lind, who had studied military history at Princeton, had been publicly criticizing the leadership of all U.S. Services for their lack of attention to historical study. He had written critical letters to the editors of major newspapers. Having re-introduced historical studies at Quantico, especially at the Amphibious Warfare School, Gen Trainor personally invited Mr. Lind to visit Quantico and witness the introduction of military history—now a major facet. Lind was invigorated by what he found. While observing the training being given at Quantico, he introduced himself to some of the Marine officers who were students and invited them to his house to meet weekly, holding seminars on the relevance of historical studies for young officers in the combat arms.

While Lind admittedly had zero experience in military service, much less, experience in combat, he knew how to teach and appreciated the back-and-forth discussions that occur in a seminar forum such as he had experienced at Princeton and Dartmouth in the 1960s and '70s.

Gen Trainor invited Lind to give a presentation on military history as he had studied it—this in the context of graduate education and its potential value.

After a presentation made by Bill Lind in 1980 at the Amphibious Warfare School, an after-hours study group was formed by Mr. Lind for those students who wished to know more about maneuver warfare. We met weekly at Mr. Lind's house in Arlington.

Three members of that study group would later be assigned to Camp Lejeune and would form up their own study group along with other interested officers already stationed there.

The point needs to be made that at that time we were not familiar with John Boyd and his work. Our mentors were Mike Wyly and Bill Lind, and we endeavored to learn as much as possible from our study of military history.

Arguably, Mr. Lind's greatest contribution to the eventual adoption of maneuver warfare by the Marine Corps was, through his lectures and articles, distilling the principles down to specific actions that could be understood and employed by leaders at all levels.

Also, participating in an informal, roundtable discussion with our contemporaries, outside the structured format of a formal class, and discussing operational theory was completely new to us. We were exploring why we were doing things and not just how things were done. It was no longer just a matter of "two up, one back." We felt we were actually learning about our profession.

To the best of our collective knowledge, unit level discussion groups were unheard of.

Then, the only military history taught to young officers in the Corp's formal education system was Marine Corps history. Any additional knowledge of military history would have to be obtained on one's own. Mike Wyly's tactics classes were novel in that he, being an avid military history buff, used historical examples to illustrate his points.

We wish to thank Marinus for his accurate and insightful telling of the many varied efforts by numerous individuals that led up to the adoption of maneuver warfare and the writing of *FMFM 1, Warfighting*.

Lastly, we could not agree more with Marinus that a disturbing trend seems to be gaining traction and that is the move away from mission tactics, a hallmark of maneuver warfare in favor of more centralized command through advanced technology as illustrated by *Force Design 2030*. *Force Design 2030* is essentially a myopic high-tech tactic, technique and procedure that gives up the Marine Corps maneuver warfare ghost!

Col Michael D. Wyly
Col Gary I. Wilson
LtCol William A. Woods

Letters of professional interest on any topic are welcomed by the *Gazette*. They should not exceed 300 words and should be DOUBLE SPACED. Letters may be e-mailed to gazette@mca-marines.org. Written letters are generally published three months after the article appeared.

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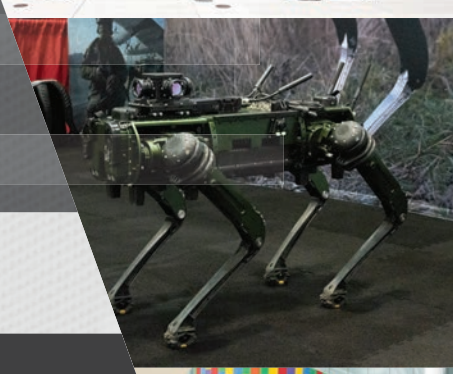

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MARINE CORPS ASSOCIATION

March 2023

A MESSAGE FROM THE DEPUTY COMMANDANT FOR INSTALLATIONS AND LOGISTICS

This is truly an exciting time for our Marine Corps Installations and Logistics Enterprise. Today, we are balancing the demands of a ready force in day-to-day competition with the imperative to support the development of the future force. We recognize that success in a contested environment hinges on the ability of our Marine Corps elements to persist in early phase maneuver across vast, dispersed littoral maneuver space.

Our Commandant continues to identify logistics as the pacing function for the Marine Corps. I will continue to ask all Marines and our civilian teammates, regardless of occupational field, to think critically and offer solutions for how we can reduce demand and mitigate challenges associated with sustaining our force in campaigning and conflict. Logistics is not just a critical requirement; it is a critical vulnerability. With this in mind, we must work quickly to transition thoughts into action and concepts into capabilities to ensure future success.

As we look to the future, we are shifting our mindset from a streamlined supply chain that is vulnerable to threats to a resilient sustainment web that assures mission success. Our homestation installations and advanced bases are integral as force generation, deployment, and sustainment platforms. We are leveraging opportunities to globally position equipment and supplies at or near the point-of-use, accurately forecast and plan sustainment using real-time data, and coordinate logistics support across the tactical, operational, and strategic levels. We are exploring ways to reduce demand on a distribution system across long and vulnerable lines of communication. We are also maturing habitual relationships with partner, allied, joint, and interagency support capabilities and agreements.

Over the past three years, we have focused on expanding global logistics awareness, diversifying distribution, improving sustainment, and making our installations ready for a contested environment. We have cultivated emergent technologies to advance our tactical logistics capabilities, wargamed and exercised with variations of force organizations, and experimented across the FMF and Supporting Establishment. The output of this logistics experimentation has been critical for us to refine our organizations, capabilities, and concepts. For all who have contributed to these efforts—thank you. This is a team effort, and your voices matter!

The articles in this *Marine Corps Gazette* are representative of the innovation occurring across the Marine Corps Installations and Logistics Enterprise and illustrate the complexity of sustaining our forces in a globally-contested environment. This is no easy feat, but our Marines have proven time and again that they are up to the job as long as we set the conditions for their continued success. We appreciate the opportunity to share these articles with our *Gazette* readers and invite your thoughts on the challenges ahead. Semper Fidelis!

Edward D. Banta
Lieutenant General, U.S. Marine Corps
Deputy Commandant for Installations and Logistics

MCDP 4, Logistics 2.0

Resilient logistics for the force today and tomorrow

by Mr. Mark D. Schouten

"The thoughts contained here are not merely guidance for action in combat but a way of thinking. This publication provides the authoritative basis for how we fight and how we prepare to fight. This book contains no specific techniques or procedures for conduct. Rather, it provides broad guidance in the form of concepts and values. It requires judgment in application." [1]

—Gen Charles Krulak,
31st Commandant of the Marine Corps

The Marine Corps is adapting to an evolving strategic environment and emergent threats. Great power competition, globally contested environments, and expanding warfighting domains are changing the context and character of Marine Corps and Joint Force operations. The *Force Design 2030* initiative is intended to modernize the force for a multi-domain crisis and conflict. Logistics is an essential part of this modernization.

Anti-access/area-denial capabilities, new and emerging threats, and time-distance challenges complicate how we sustain our forces, particularly Stand-in Forces. Modernization efforts that account for these challenges will result in relevant capabilities that will be positioned or sustained in contested environments. Therefore, Gen Berger considers logistics "the pacing function for both modernization and operational planning."[2] Service-level efforts to systemically change the Marine Corps Installations and Logistics Enterprise through analysis and experimentation are ongoing. To help guide, inform, and complement these efforts, *MCDP 4* has been updated with immediate relevance for the force today and to continue to shape how we fight tomorrow.

>Mr. Schouten's biography was unavailable at the time of printing.

Updating logistics doctrine is a supporting effort for *Force Design 2030*. The original *MCDP 4, Logistics,* was signed in 1997 and provided all Marines with a conceptual framework for the understanding and practice of effective logistics. This document described how logistics relates to the Marine Corps philosophy described in *MCDP 1, Warfighting*. While much of *MCDP 4* is enduring and timeless, Marines operate in a strategic context and environment much different than the one that existed when the foundational doctrine for Marine Corps logistics was originally published. Therefore, *MCDP 4* has been revised to reframe Marine Corps logistics in this emergent, high-threat environment. The primary changes address logistics in great power competition, in a globally contested operating environment, and with an increasingly important Joint Logistic Enterprise (JLEnt). The revised *MCDP 4* is intended to encourage innovative thinking, experimentation, and collaboration throughout the Naval Services and Joint Force to sustain forward-positioned forces over time.

Logistics in Great Power Competition

MCDP 4 explains how logistics fit into great power competition. *MCDP 1-4, Competing,* provides an updated framework for understanding the relations between international actors. This framework expands upon the old war/peace construct by presenting international relations as an ongoing competition. Marines compete daily through logistics activities that sustain expeditionary forces while also assuring allies and deterring adversaries. Forward posturing of logistics capabilities enables the force to rapidly respond to crises and stand ready to defeat enemies in conflict. The revised *MCDP 4* aligns with *MCDP 1-4* and provides considerations and examples of how logistics relates to each of these competitive acts.[3]

Globally Contested Environment

Another change from the late 20th century is the realization that military operations can be contested globally. Adversaries have invested in ways to match U.S. capabilities or achieve asym-

metric military advantages such as mature precision strike, space platforms, and cyber networks. U.S. adversaries can attack or disrupt military operations in lethal and non-lethal ways using a variety of multi-domain options. The result is that U.S. military forces can be targeted from the most forward forces all the way back to the homeland, which includes academia and industry that form the Nation's defense industrial base.

MCDP 4 captures the challenges of this contested environment, explores the operational implications of this environment, and provides potential ways to address these threats. For example, it is unlikely that U.S. forces will always be able to project forces into a foreign country using large-scale commercial shipping (such as maritime prepositioning ships) in permissive littorals as they did in Operations DESERT SHIELD and DESERT STORM. Marines must develop capabilities, experiment with techniques, and train to move over distance and at scale while being attacked and disrupted by opposing forces.

MCDP 4 also explores how to create a resilient logistics system. While traditional security means such as hardening, recovery, and active defense remain valid, elements of avoidance, dispersed capabilities, and swarming provide additional ways to achieve the survivability necessary to sustain forces over time. This discussion includes a shift in the paradigm from efficiency to effectiveness exemplified by using supply webs versus supply chains.

The Joint Logistics Enterprise (JLEnt)

The revised *MCDP 4* dedicates a chapter to explain how Marine corps forces interface with the larger Joint Force to sustain forces. The 1997 version emphasized the self-sufficiency of naval expeditionary forces. However, decades of combat experience demonstrated that sustaining forward forces over time requires significant Joint Force cooperation. Marine Corps logistics is never conducted in a vacuum and the ability to harness capabilities from international, interagency, and inter-Service sources are important to supporting any operation. Understanding the activities, capabilities, and limitations of the JLEnt enables Marines to leverage opportunities and material resources from the entire Nation.

The demands of great power competition and globally-contested environments increase the need for Marine logistics efforts to be integrated within the larger JLent. In the future, Marines may be called to missions they have not performed in the past, particularly logistics operations that enable the Joint Force to get to the fight, sustain the fight over vast distances, and win. For example, Stand-in Forces may be the only node in a logistics system that can rearm or repair naval vessels or refuel joint and coalition aircraft.

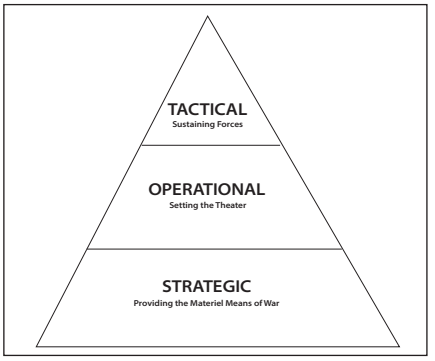

Figure 2. Levels of war and logistics focus. *(Figure provided by author.)*

Logistics at Each Level of War

Logistics activities vary significantly at each level of war. The original version of *MCDP 4* explicitly focused on tactical logistics, while the revised version describes what activities need to be accomplished at each level of war, and who is responsible for conducting them.

Understanding how operational and strategic logistics activities influence the force and provide opportunities is increasingly important. Demands affected by the threat and environment are so great on the Joint Force that Marines may increasingly be asked to contribute to operational-level logistics efforts. The time horizons and funding considerations of strategic logistics require different skills and approach than those required for tactical logistics. The revised *MCDP 4* includes an updated framework with examples of how activities vary at each level (Figure 3). This framework is intended to expose Marines to the wide array of activities required to sustain the force and provoke creative ways of executing them in more relevant or effective ways.

Operations, Logistics, and Warfighting Functions

The revised *MCDP 4* modifies how the relationship between operations and logistics is presented. Operations are the result of interplay across all warfighting functions. Each warfighting function is integral in both enabling and limiting every operation. Additionally, each warfighting function influences the others (Figure 4). For example,

	Supply	Maintenance	Transportation	General Engineering	Health Services	Services
Tactical	• Storage • Procurement • Disposition	• Preventive Maintenance • Corrective Maintenance	• Ground Vehicles • Assault Support • Material Handling Equipment	• Expeditionary construction • Hygiene • Power distribution	• Preventive Medicine • Surgery • Casualty Evacuation	• Mortuary Affairs • Postal • Food Service • Dispersing
Operational	• Regional Contracts • Forward positioned stores	• Equipment rebuild • Part manufacturing	• Intra-theater lift • Distribution process enablers • Ports of debarkation	• Forward bases • Base recovery • Port repair	•Medical evacuation •Theater treatment facilities	• Contingency base services • Operational Contract Support
Strategic	• Acquisitions • Enterprise Inventory Management • War Reserves	• Corrosion Programs • Warranties	•Strategic Sealift •Strategic Airlift •CONUS based transportation •Ports of Embarkation	• Installations • Land Management • Environmental	• Vaccination policy • Preventive health care • Long term medical care	• Mortuary management • Community Services • Welfare programs

Figure 3. Logistics function activities at each level of war. *(Figure provided by author.)*

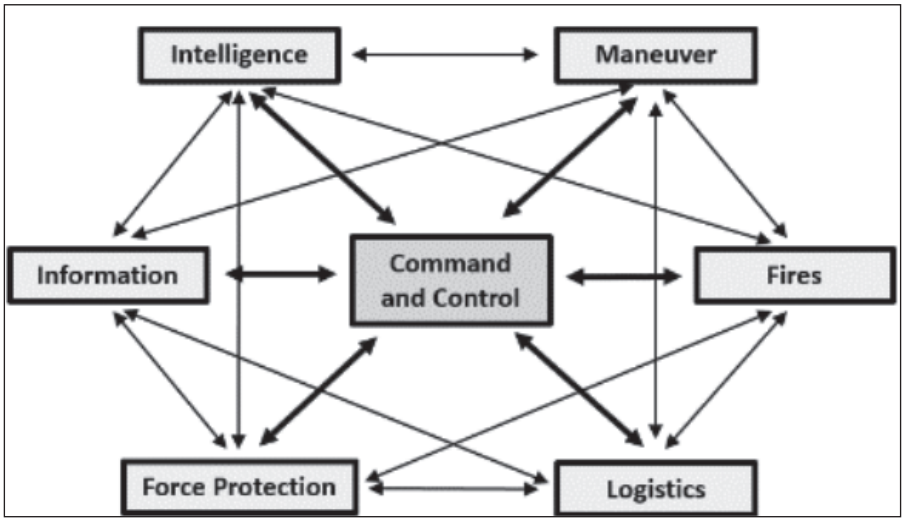

Figure 4. Warfighting functions. *(Figure provided by author.)*

providing critical supplies to suffering people impacts the information aspects of humanitarian operations, to include even strategic messaging. Operational success is the result of the harmonious interactions of each warfighting function aligned to specific objectives.

MCDP 4 is written for every Marine, not just those with certain occupational specialties within the logistics community. Commanders, planners, and staff at each level must consider how logistics influences achieving goals and objectives. Plans that do not incorporate supply, maintenance, transportation, general engineering, and health factors risk being unfeasible, unacceptable, and un-executable. Logistics demands cooperation. Everyone plays a role in maintaining the combat power of the force.

The original* MCDP 4 *provided time-tested, combat-proven principles, yet it needed to be updated within the current warfighting context.

Conclusion

The original *MCDP 4* provided time-tested, combat-proven principles, yet it needed to be updated within the current warfighting context. The updated *MCDP 4* includes significant and actionable concepts and ideas such as resilient supply webs versus supply chains, hybrid logistics and optionality, talent management, wargaming, and risk. This updated version also highlights the importance of installations as operational platforms for force generation, force deployment, and force sustainment. Several historical and fictional futuristic vignettes are used to broaden the reader's perspective of logistics. This refreshed *MCDP 4* brings to life the challenges of sustaining the force in a globally contested environment, within multiple domains, and across the competition spectrum.

MCDP 4, Logistics, challenges every Marine to read, think, and write about logistics. To this end, the Deputy Commandant for Installations and Logistics is spearheading efforts to modernize installation and critical infrastructure, invest in the people who sustain the force, diversify distribution capabilities, and develop concepts for moving and sustaining forces in contested environments. Efforts include a deliberate experimentation campaign plan to exercise, learn, and refine how we operate at the tactical, operational, and strategic levels of war. Armed with an understanding of the challenges of the future war, Marines will overcome these challenges with their can-do attitude and relentless spirit, as they always have in the past.

"Like war itself, our approach to warfighting must evolve. If we cease to refine, expand, and improve our profession, we risk becoming outdated, stagnant, and defeated." [4]

—Gen Al Gray, 29th Commandant of the Marine Corps

Notes

1. Headquarters Marine Corps, *MCDP 1, Warfighting*, (Washington, DC: 1997).

2. Gen David H. Berger, *Force Design 2030 Annual Update*, (Washington, DC: May 2022).

3. Gen David H. Berger, *MCDP 1-4, Competing*, (Washington, DC: December 2020).

4. *MCDP 1, Warfighting.*

Offense Wins Games, Defense Wins Championships

Installations in a contested environment

by MajGen David W. Maxwell & Col Joseph C. Novario

"Recognizing growing kinetic and non-kinetic threats to the United States' homeland from our strategic competitors, the Department will take necessary actions to increase resilience–our ability to withstand, fight through, and recover quickly from disruption."

—National Defense Strategy 2022

Soccer is often referred to as "the beautiful game." As the most recent World Cup Champions, Argentina demonstrated in Qatar, the only way to win the championship trophy was by fielding a combination of a lethal offense and a resilient and impenetrable defense that blends seamlessly together. The path to being able to raise the cup is by scoring more goals on your opponents than they score on you over a series of matches. It is unique in that for 90 minutes of the game, the play is generally fluid and continuous—there is no play calling from the sidelines or television commercial breaks. For 45 minutes in each half, it is two teams locked in competition with each other, one side leveraging the strength of their team to generate and attack while the other team is posturing to defend their goal and, more importantly, seize the ball from the adversary to generate their own attack and strike a goal. It is a constant battle for position to create a window of temporary advantage to allow an attack to develop or to seize a strategic opening to strike quickly and unexpectedly. This is the nature of championship tournaments—it is also the nature of great power competition. Today in this era of great power competition, the Marine Corps is part of a similar contest, fighting for positional advantage that will lead to decision advantage and result in "net" effects.

In many respects, the mutually supporting and reinforcing nature required in the relationship between the installations and the operating forces we support is much like the relationship between the eleven players who take to the pitch. For the Marine Corps, holding the defensive line are the Marines and civilians operating and protecting installations around the globe while simultaneously providing the foundation from which the FMF can generate an attacking offense. It is this mutually supporting relationship that allows the Marine Corps to gain the advantage and deliver the necessary effects.

If the Marine Corps Installations team is the defensive line, the foremost priority is to defend the goal—to ensure installations are secure and there is a resilient defense, capable of shifting to counter diverse points of attack, whether securing our installation perimeters, protecting the installations communications network, or ensuring the resiliency of the installation from climate and energy effects. Without a strong defense, a team will be under constant pressure, and midfielders and forwards will be forced back just to help defend the goal. For the last twenty years, we have been able to accept risk in the defense. Our adversary was not able to generate an attacking threat that could get out of their back half and cross the midfield line. This is no longer the case today.

>MajGen Maxwell is the CG of Marine Corps Installations Command.

>>Col Novario is a Logistics Officer and currently serves as the Assistant Chief of Staff for Engagement, Mission Sustainment, and Innovation at Marine Corps Installations Command.

The global nature of warfare has changed. Modern technology allows command and control from anywhere to anywhere. Drones can be piloted from around the world. The cyber domain is actively contested today—with attacks coming through virtual private networks that complicate tracing and attribution. Numerous recent examples have illustrated the ways our enemies can attack our installations. The ongoing conflict between Russia and Ukraine has dramatically changed the traditional calculus. Meanwhile at home, 11 September is perhaps the most striking example, but there are also smaller examples: Oldsmar Florida water treatment plant hack in 2021 and the Colonial Pipeline attack against our fuel infrastructure. Regular cyberattacks on airlines and healthcare systems all expose potential vulnerabilities and risks to the installations, which provide many similar services. Add to this disruptions caused by climate events like hurricanes and droughts or economic impacts of COVID-19, and it is apparent the contested environment is a today problem. Worse yet are the opportunities for our adversaries to put us in a dilemma by pressing their attack when we may be distracted by these events. Much like one player might make a deep run past a defender while another looks to exploit the space it creates, our enemies will look to be aggressive when we are dealing with another problem.

Thus the role of installations must also change. There was a time when we relied on our installations primarily for force generation and to a lesser degree force projection. It was a place to rest and refit before returning forward. Now, a defender must be able to repel an attack while providing the opportunity for a counter—potentially fighting through a contest without assistance from the midfielders or strikers. Perhaps those attacks are small UAS intrusions or swarm attacks or long-range missile attacks. Perhaps they are attacks against the communications network or the utilities infrastructure. Installations must be able to sense and make sense of those attacks and defeat the threat using both kinetic and non-kinetic responses without unduly reducing the capacity of our offense. Consistent with the themes in *Talent Management 2030*, we must build a team that strikes an appropriate balance of the offense and defense as well as develop players, both Marines and civilians, who can take to the field, fight, and win.

A strong defense will not only secure and protect the goal but will create opportunities to generate and sustain the attack. It is out of the defense that the ball is projected forward and the beginnings of the attack are generated. If our opponent is pressing us, it may take time—we will have to distribute the ball quickly, moving it around, often back and forth between the defense and the midfielders, looking for the opening

Soldiers with the 3rd Air Defense Artillery Regiment move the Terminal High Altitude Area Defense anti-ballistic missile defense system in into a Hangar on Marine Corps Base Camp Blaz, Guam. *(Photo by Cpl Andrew King.)*

to be able to move forward and press into the opponent's final third. Our FMFs are the offense. They move forward, operating out of expeditionary advanced bases, constantly exercising, training, deploying, redeploying—always sensing, probing, and conducting reconnaissance to understand where the opponent's weaknesses and vulnerabilities are. At the point of the attack, forces like the Marine Littoral Regiment are ready, waiting for the moment, and sensing the opportunity to find the opening to strike or to lay the ball off and create an opening to attack elsewhere. They are supported and sustained by MEF units transitioning between the installations and advanced naval bases forward into the opponent's side to initiate, reinforce, or sustain attacks while at the same time always being prepared to support and reinforce the defense if under attack.

But increasingly, our operating forces can attack from anywhere and we can support from anywhere. Joint, all-domain command and control, robotics, and autonomous vehicles will only increase this global connection of our installations with our strikers. In a sense, we have big legs that can put shots on goal from around the globe. As we demonstrate the ability to fight from our installations, we must be prepared to defend them.

Just like the eleven players on the field, the installations and FMF players connect. We cooperate. We are inseparable and mutually dependent. We can project power and hold our enemies at bay. If we are resilient and prevent our opponents from penetrating our defense, our strikers can stay on offense. If the defense is brittle or weak, we may be unable to generate the offense against an effective opposing force firing on our goal. We should recognize the accumulated debt of under-investment in our installations is akin to the yellow card that can haunt a player for multiple matches, restraining play to avoid a second yellow card and ejection, or a red card that forces a club to play a man down the rest of the game.

Defeating the threats presented by today's adversaries ensures installations can continue to support the attack but also preserve our offensive forces' capacity if we can defend the installations with limited FMF augmentation. Resilience through disruptions will also provide continued installation support to our offensive forces. The dilemmas described above can be overcome if installations are resilient. The ability to mitigate or recover from the effects of hurricanes or power outages allows the continuation of power projection. When our enemies know we not only can survive but can adapt and respond in a contested environment, they will know our resilience is a source of strength and give them pause.

Though our homeland is no longer a sanctuary, and our goal can be shot upon at any time, the same is true for our opponents. The offense and defense are mutually integral to our strength. One must complement the other to achieve a synergistic effect. If our strikers keep the pressure on the opponent, the ability of our adversary to truly put pressure on our defenders will be limited. If our defenders can prevent or quickly repel penetrations, this allows the continuation of the attack. We must maintain pressure on the opponent's goal. Keeping their players collapsed on their goal prevents sustained and effective pressure on our goal. On the field of competition today, this is very challenging. The game of soccer depends on two teams accepting the rules of the game. As we respect the international rules of order, the principles of national sovereignty, and the freedom and democratic values that form the foundation of this Nation, we will be constrained in what offensive strategies we can employ. Meanwhile, our adversaries do not appear to be constrained by these same values. We must assume they will have the opportunity and ability to generate an offense that can strike at our goal.

Marine Corps installations must be ready today while we make ready to meet the emerging challenges and support the future force design requirements as we provide the core of our Corps' defense. If we want to continue to raise the champion's trophy, we must have both an offense that can strike and score and an installations team with the capability and capacity to generate the attack and defend our critical goals.

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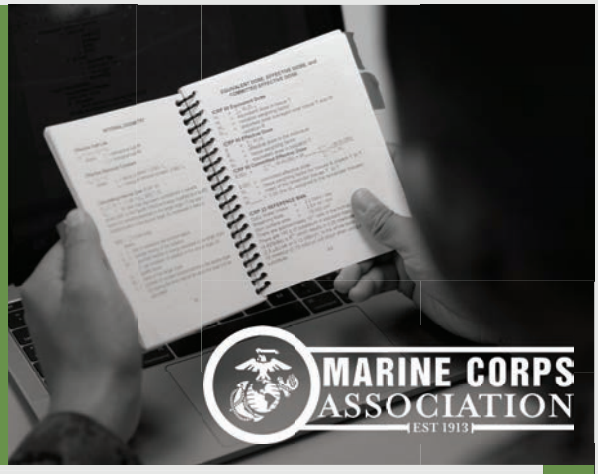

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INTELLECTUAL FUEL FOR THE MILITARY

Dedicated MLR Surface Capability

Our Navy's Army needs its own Navy

by Mr. Thomas Russell

When one hears the term "logistics trains," it often conjures up images of a convoy of large trucks rolling on improved surface roads. This reflects a legacy mindset. It is a mindset characterized by the employment of status quo capability in a sustained land conflict. The future operating environment will require a much different capability. The characteristics of this environment will include wide expanses of contested maritime space dotted with remote islands that are sparsely populated or even uninhabited. Our ability to maneuver and sustain FMF operations will require us to embrace capability that is not anchored to the land but one that can leverage other domains. Of particular importance to this environment will be our ability to embrace the surface domain.

The retail-level work of the Marine Littoral Regiment (MLR) will involve frequent movement of multiple independent maneuver units operating under contested conditions. The nature of the future operating environment will require much of this movement to be accomplished across the surface domain. This will necessitate distribution capabilities designed to persist, or stand-in, and survive within the weapons engagement zone. From a watercraft perspective, this translates to vessels that mirror the size of normal commercial clutter, are of low cost, have high speed, and possess a shallow draft.

OPNAV N95 established a Light Amphibious Warship program in early 2020 to produce a Medium Landing Ship (LSM) designed to be the direct-support platform that will enable the major movements of MLR capability. This vessel has been designed as a stand-in platform from its inception. The LSM will be beachable and will have a length between 350–400 feet. It will have a shallow draft of 11 feet, the ability to operate in excess of 22 knots, and a range in excess of 6,500 nautical miles. It will have approximately 12,000 square feet of storage space and will be able to accommodate 75 embarked personnel.[1] The LSM's target cost will be dramatically less than traditional amphibious shipping. These vessels will be categorized as warships, and they will be crewed by sailors. This will be the MLR's Force employment platform and will be instrumental in subsequent maneuver and sustainment of MLR operations. Nine of these vessels are to be allocated to each MLR.[2] During sustained operations, five of the nine vessels are likely to be active while four are likely to be either en route to or returning from replenishment.

To augment the maneuver and sustainment mission of the MLR, the combat logistics battalions will need to distribute small capabilities and provide resupply support throughout the operating environment to enable the effectiveness and resiliency of the MLR maneuver units. An Ancillary Surface Connector (ASC) will do the work of a heavy truck across the surface domain. The ASC will be a lightweight, 79-foot landing craft capable of reaching speeds in excess of 32 knots, maneuvering a cargo capacity of up to 35 short tons, possessing an extremely shallow draft, and capable of operating ranges greater than 650 nautical miles.[3] These small vessels will assist the LSM with the many distribution micro mission that do not warrant the exclusive tasking of an entire warship. They will expand our operational access to a host of key maritime coastal beaches that may not be accessible to an LSM. ASCs will not operate independently and will need to be associated with on-station LSMs for replenishment and refueling. This watercraft needs to be an organic asset to the combat logistics battalions, operated by a coxswain and maintained by a mechanic wearing MARPAT digital utilities. Although no concept of employment has been developed for this capability, perhaps each active on-station LSM vessel will need up to four of these craft to support all the movement and sustainment needs of the multiple independent maneuver units operating from a host of expeditionary advanced base sites.

The workhorse surface vessel of the MLR will need auxiliary support. The LSM and its associated ASCs will accomplish the lion's share of the retail work needed at the ragged edge, but they will require replenishment. A direct support auxiliary vessel with stand-in characteristics needs to be allocated to the MLR to provide an umbilical cord between the LSM and legacy shipping operating outside of the weapons engagement zone. The Expeditionary

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Fast (EPF) Transport ship is the ideal platform to provide this auxiliary support.

The EPF is a shallow draft, all aluminum, relatively affordable commercial-based catamaran capable of intra-theater personnel and cargo lift providing combatant commanders high-speed sealift mobility with inherent cargo handling capability and agility to achieve positional advantage over operational distances. The EPF has a length of 338 feet, a beam of 94 feet, and a draft of 12.5 feet. The vessel can reach a top speed close of to 40 knots and has a range of up to 4,000 nautical miles at 20 knots. The EPF has a landing pad that can be modified to accommodate a V-22, can haul up to 600 short tons of cargo, and can carry up to 312 passengers.[4] Nicknamed the "Vomit Comet," the shallow draft and high-speed nature of the vessel make for a rough transit. The speed of the EPF is dramatically impacted by sea state. With a reinforced bow, the EPF can maintain 15 knots in sea state 4 and 5 knots in sea state 5.[5] The EPF is not a warship. It is categorized as an auxiliary vessel that is owned and operated by Military Sealift Command. It is crewed by civilian mariners. Military Sealift Command currently possesses thirteen of these vessels with three more under contract. A preliminary consideration has indicated that each MLR will need two of these vessels as a bridge capability until the LSM arrives.[6] Perhaps in an auxiliary support role, this need will endure.

These surface capabilities will form the maneuver and sustainment foundation of the MLR in this future operating environment. They will provide organic employment of MLR capability and accomplish the essential frequent maneuver requirements required to persist and survive within contested space. Figure 1 displays the notional surface capability dedicated to each MLR. Assuming there are three MLRs and accounting for additional platforms to ensure appropriate availability, there may be as many as 8 EPFs, 35 LSMs, and 75 ASCs as an enduring, maneuver, and sustainment direct support watercraft inventory positioned across the INDOPACOM Area of Responsibility.

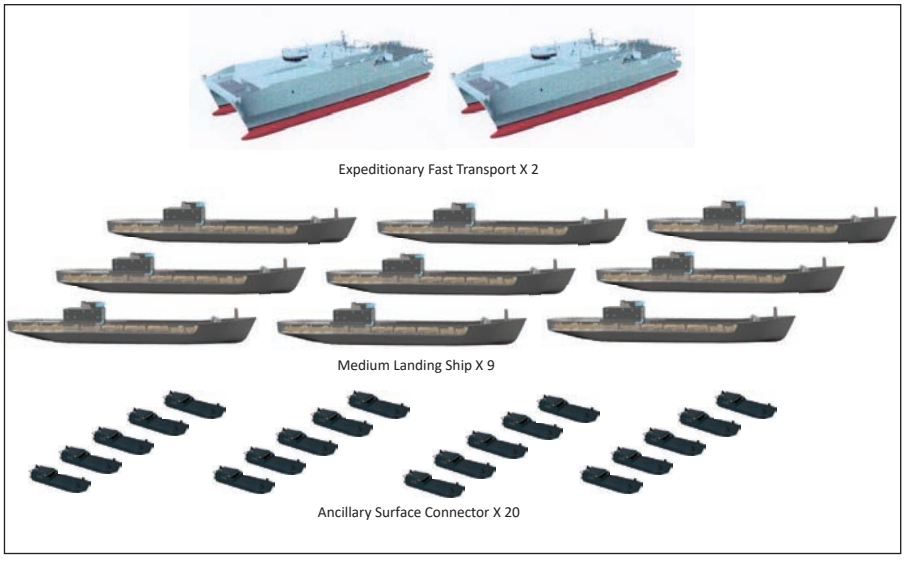

Figure 1. MLR complement of watercraft. *(Figure provided by author.)*

This surface capability will enable the independent operation and sustainment of numerous small units scattered across a wide maritime expanse necessary for the successful conduct of Expeditionary Advanced Based Operations. These capabilities will make swaths of key maritime terrain accessible and exploitable by the MLR. The need for these vessels is continuous throughout campaigning and critical to an enduring Stand-in Force.

The equipment that we currently possess and the employment methods that we have experienced are not what we need.

The equipment that we currently possess and the employment methods that we have experienced are not what we need. If the Marine Corps wants to be successful in the future operating environment, it will need new and different organizational constructs, skillsets, and capabilities. It will also need to become proficient in operating in a different domain, one that we must master organically. That will be the surface domain. For it is this domain that will allow us to maneuver, control sea lines of communications, deceive the adversary, exploit remote island terrain and support a tactical maritime defense-in-depth. When the next generation of Marines hears the term logistics trains, it very well might conjure up the smell of sea spray, a tinge of motion sickness, and success in the future operating environment.

Notes

1. Shon Brodie, Maritime Expeditionary Warfare Division, "Light Amphibious Warfare Update," (brief, Quantico, April 2022).

2. Ibid.

3. III MEF, "Littoral Platform Experimentation Program," (brief, Okinawa, March 2021).

4. *Information available at* https://www.NAVSEA.navy.mil/Home/Team-Ships/Expeditionary-Fast-Transport-(EPF).

5. *Information available at* https://www.globalsecurity.org/military/library/budget/fy2015/dot-e/navy/2015jhsv.pdf.

6. Karsten Heckl, *Need for Littoral Maneuver Bridging Solution in Support of Stand-In Forces*, (Quantico: July 2022).

Telemetry

The evolution of distribution through innovative modernization

by Mr. James Esteem

In major military conflicts, logistics matters are often crucial in deciding the overall outcome of wars. An understanding of logistics was key to the battlefield successes enjoyed by great leaders and militaries such as Alexander the Great, Emperor Napoleon Bonaparte, and the United States during World War II. During Operation Desert Storm, U.S. forces successfully overcame the challenge of providing supplies to a point in a geographically remote region with no preexisting agreements or infrastructure. In contrast, as recently illustrated by Russian forces in their conflict with Ukraine, an inability to provide continuous sustainment from strategic providers to forward elements will result in operational failure.

The core logistics functions are deployment and distribution, supply, maintenance, logistics services, operational contract support, engineering, and joint health services. The *Joint Publication 1-02* defines distribution as "the operational process of synchronizing all elements of the logistic system to deliver the 'right things' to the 'right place' at the 'right time' to support the geographic combatant commander." Today's global threats, accompanied by the need to plan and execute the movement of forces for deployment, redeployment, sustainment, and retrograde in support of global operations, make the distribution capability an essential logistics element.

Distribution management requires the ability to track, trace, influence, and execute the movement of materiel as it transits the Defense Transportation Systems at the strategic, operational, and tactical levels, including expeditionary, disaggregated, and distributed maritime operations. *Joint Publication 3-35* defines asset visibility as "the ability to determine the location, movement, status, and identity of units, personnel, equipment, and supplies. It facilitates the capability to act upon information to improve the overall performance of DOD logistics practices." Gone are the days of green logbooks, yellow legal pads, and Microsoft Excel spreadsheets to track the location and existence of materiel as it moves through the Defense Transportation System. We now have systems such as the Automated Manifest System Tactical, Integrated Development Environment/Global Transportation Network Convergence, and the National Radio Frequency-In

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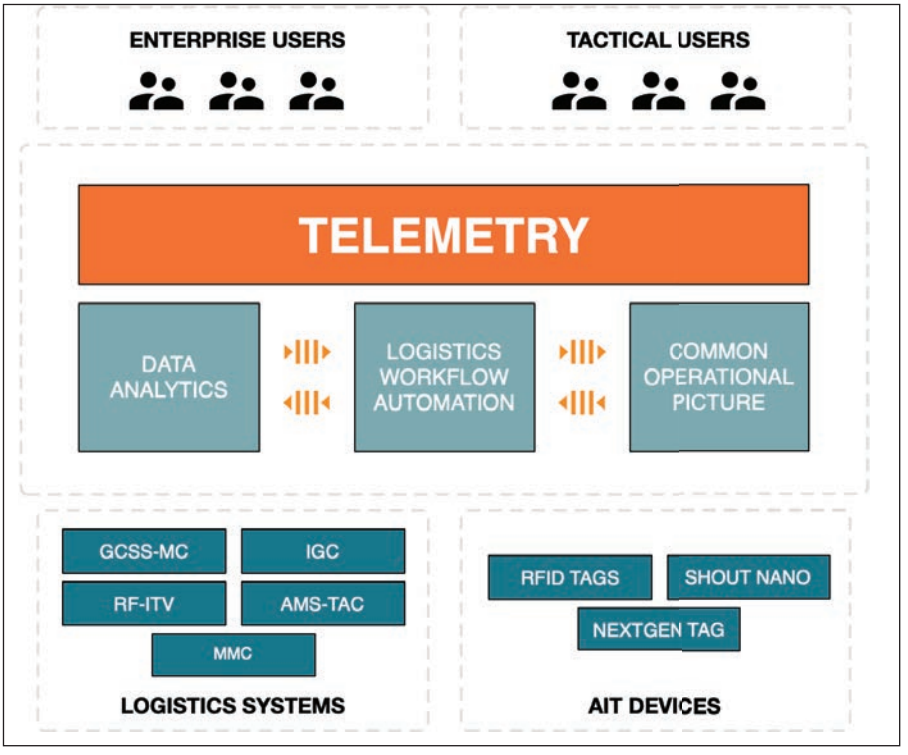
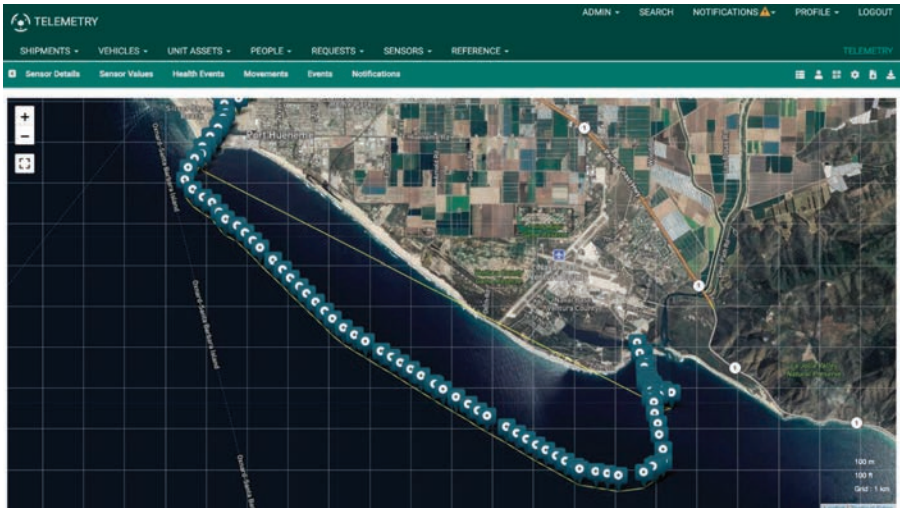


Telemetry leverages multiple authoritative data sources providing users with a holistic decision support tool that enriches data to provide a more robust decision-making capability.
(Image provided by author.)

Transit Visibility Infrastructure that provides asset visibility and the last known location while in transit. While these tools and infrastructure deliver a degree of asset visibility, this environment is constantly evolving.

Military commanders require the ability to track and know the status of equipment, whether in transit, in storage, in process, or in theater. The commander also requires the use of decision-support tools (DST) that provide the ability to be proactive rather than retroactive. As a Service, we must evolve and adapt to those external variables by implementing new processes and technologies that prepare us for the peer-adversary threat. Through data aggregation and improved processes, enhanced asset visibility will produce more effective distribution operations and increased customer satisfaction. Telemetry, an existing government-off-the-shelf application developed in support of the Small Business Innovation Research program, is a tool currently in the developer portal to meet the commander's asset visibility requirement. The application has surpassed our existing distribution systems by providing end-to-end visibility of Marine Corps logistics activities. Augmenting data from current Authoritative Data Sources such as Global Combat Support System-Marine Corps and Integrated Development Environment/Global Transportation Network Convergence with environmental insights delivers a complete DST accessing near realtime information. Telemetry will support collaboration across commands by developing advanced predictive analytics to provide Marines with near realtime insight into the supply chain.

The capabilities Telemetry provides, but are not limited to, include in-transit visibility, total asset visibility, and end-to-end visibility of Marine Corps Logistics activities by automating the data collection process while improving data quality. Over the years, providing Marines with the information they need when they need it has been a challenge. Focusing on the issues that come along with working in austere environments, Telemetry's design allows it to operate in a "low or no" bandwidth environment and minimizes data transmission when used over a tactical network.

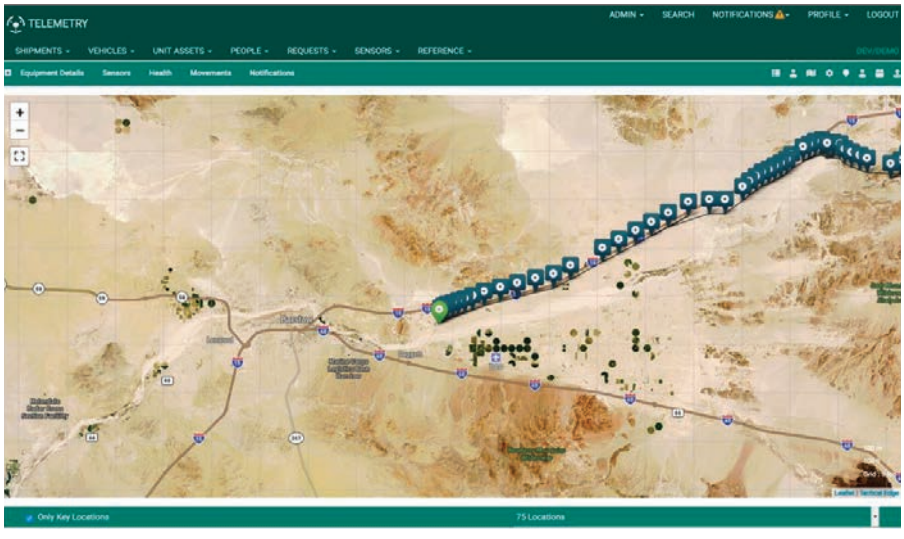


By deploying satellite and cellular-based trackers, Marines were able to track assets anticipate the arrival of the Maritime Prepositioning Force ship as it transitioned from one beach to another. *(Image provided by author.)*

The recent completion of Telemetry Small Business Innovation Research Phase II, also known as the "Prototype" phase, focused on Authority to Operate requirements and ongoing pilot programs. The Office of Naval Research initially introduced Telemetry to Marines in support of multiple government-sponsored events ranging from 2017–2020.

A few events were Marine Corps Warfighting Lab-sponsored exercises, including AGILE BLOODHOUND, INTEGRATED TRAINING EXERCISE 3, TRIDENT JUNCTURE, and PACIFIC BLITZ. After the conclusion of each event, Telemetry added enhancements with new capabilities and features to fit the warfighter's needs. INTEGRATED TRAINING EXERCISE 3 produced the requirement for convoy staging and planning. This capability was tested successfully during TRIDENT JUNCTURE, along with tracking 80 shipments,44 vehicles, and 108 passengers.

PACIFIC BLITZ allowed for the usage of a distribution DST during a Maritime Prepositioning Force exercise. The Telemetry team engaged with the



Rail movement tracking proved to be of great value in a device-agnostic application, allowing flexibility in the automatic identification technology selection. *(Image provided by author.)*

Maritime Prepositioning Force offload team, reviewing process flow and location management for movement, processing, and equipment distribution while also deploying satellite and cellular-based trackers throughout multiple scenarios. The Marines were able to track rolling stock from the point of embarkation to the point of debarkation using container-mounted trackers. They were also able to track and anticipate the arrival of the Maritime Prepositioning Force ship as it transitioned from one beach to another. There were also two pilot programs sponsored by Headquarters Marine Corps Installation & Logistics, Distribution Policy Branch with participation from I MEF. The MAGTF Materiel Distribution Center Marines utilized Telemetry to track shipments of high-value assets moving by rail while providing a chain of custody for shipments marked for delivery to Camp Pendleton and Marine Corps Logistics Command. Rail movement tracking proved to be of great value in a device-agnostic application, allowing flexibility in the Automatic Identification Technology selection. Telemetry's device-agnostic architecture enables the mission to dictate the required tracking device rather than restricting the capability to a small set of predefined devices. The significance of this capability addresses a common concern from many organizations on the modernization journey: how to employ technology available today while planning for emerging technologies. While mesmerized by the lure of new technology, organizations racing full speed toward modernization can quickly lose sight of their validated requirements. Focusing on requirements and processes should be the primary factor in technology selection.

Technology can be enticing but staying focused during our pursuit of modernization will ensure a solution that meets the warfighter's needs. A simple example would be if your organization was required to move a one-megabyte file for an upcoming operation. Still, you purchased an expensive mobile hotspot with data speeds of one gigabyte per second rather than a less costly twenty-megabyte-per-second device. This decision was prodigal and far from the focus of the requirement. Acquisition outside of the Marine Corps is only sometimes required. Currently, the Marine Corps utilizes numerous authorized technologies for various employments and functionality.

Telemetry supports the technologies currently in use within the Marine Corps while accounting for emerging technologies. The current Small Business Innovation Research Phase III contract will migrate Telemetry to the Marine Corps Enterprise Network and the DOD cloud environment supporting the Marine Corps' software modernization effort. The application is prepared to receive data feeds from automation devices such as handheld terminals, radio frequency identification tags, sensors, and Internet of Things technologies scheduled for incorporation into Marine Corps logistics functions. The flexibility to integrate and receive data, whether from software or hardware, requires adequate vetting to ensure that it meets security requirements. Telemetry's developer knows the security and integrity of data within the supply chain are paramount, and the system protects and validates this information at all points of integration and distribution. The data transfer gains encryption by establishing a secure connection to the server. The application provides audit logging and access management, ensuring data protection from adversaries at rest or on the move.

The MAGTF Materiel Distribution Center Marines utilized Telemetry to track shipments of high-value assets moving by rail while providing a chain of custody for shipments ...

Logistically, the ability to collect, transport, analyze, make well-informed decisions, and act on data while maintaining cybersecurity allows distribution management to influence and execute the movement of equipment as it transits the Defense Transportation systems at the strategic, operational, and tactical levels. Strategic distribution encompasses everything involved, from the time of requisition to the supply source. Operational-level distribution and logistics pair strategic resources with tactical units and enable force closure, sustainment, reconstitution, and redeployment of forces. There is a significant requirement to monitor, influence, and execute cargo movement at the tactical level within the theater. Theater distribution enables the movement of supplies and personnel from the initial points of debarkation to the initial theater distribution nodes to the point of need. Distribution at the tactical level drives Telemetry's requirement to work in contested environments. Commanders and staff at all three levels not only need to view and follow equipment from factory to foxhole but also need notification of anticipated issues as early as possible to facilitate proactive interaction and management by exception. This information is accessible in Telemetry across the entire supply chain, enhancing decision-making abilities and providing enhanced support for deployed units in operational environments.

Logistics influences our Nation's economy. Military operations are both expansive and expensive, affecting the economic impact of military operations. Innovation occurs when one questions current practices. With budgets constantly tightening, we must ask ourselves how we can innovate, remain mission ready, and maintain global sustainability. Logistics costs are always on the rise and become affected by external factors. However, the Marine Corps can get ahead of these changes by innovating. Changes occur globally, affecting our ability to support our troops logistically. Concurrent with global change,

examination of current business models and processes allows refinement of current and future requirements. Many legacy systems used for distribution face suspension without planned replacements in the pipeline. As new systems undergo research and development, legacy systems face concerns regarding duplication and redundancy. Redundancy in a new system is a good thing despite the meaning. It provides a solid foundation to expand upon and is the key to evolving distribution through innovative thinking.

When an organization looks at the word "redundancy" from a financial perspective without a clear understanding of the business processes and the supporting technologies, the similarities describe innovation negatively. Imagine wanting a child and hoping that your child will have your best attributes and leave your less-desirable qualities behind. Many consider the retained features redundant, but they will develop additional attributes beneficial to their environment as the child grows. Our legacy distribution systems have significant capabilities that have worked for many years and will provide us with the foundation to improve our distribution process.

As the DOD propels modernization, the requirements and demands of legacy distribution systems will not provide the necessary capabilities to keep up with modern logistics operations. The initial push to move from "Silo" systems to cloud-housed "enterprise" systems enables interoperability amongst multiple units or organizations to support a common objective. Telemetry builds on the enterprise's capability to enhance force agility and information accuracy through data analytics and graphic displays of total asset Visibility on National Imagery and Mapping Agency products. The predictive analytics and increased information accuracy create a positive feedback loop to assist Marines within the distribution community in executing duties. Currently, Telemetry has holistic benefits for multiple stakeholders in the logistics community. The application uses a modern open-architecture methodology that allows the system to be software agnostic, pulling data from numerous authoritative sources. Telemetry also provides an array of data that has value based on the user's position or perspective. The immediate benefit is a dramatic reduction in the number of times a Marine must interact with multiple systems. Telemetry provides a common operating picture of several logistics activities.

How many automated information systems are required to make well-informed decisions? Multiple systems proven and streamlined over time play a vital role in logistics. These systems are not systems we should look to eliminate; alternatively, there is value in an interface. Telemetry leverages multiple authoritative data sources providing users with a holistic DST that enriches data to provide a more robust decision-making capability.

With the influx of technology into the dispersed and distributed naval battlespace, the need to monitor assets through the distribution pipeline is more relevant than ever.

With the influx of technology into the dispersed and distributed naval battlespace, the need to monitor assets through the distribution pipeline is more relevant than ever. The ability to use machine learning and predictive analytics provide commanders with the essential information they need when they need it. The time, human resources, and money saved by being proactive rather than reactive are invaluable to the Marine Corps' modernization effort. To many, modernization is a journey, not a destination. As we embark on the *Force Design 2030* journey and beyond, Marines should focus significantly on validated requirements and current business practices while not forgetting lessons learned from history.

Understanding where we came from will help us to evolve and adapt technologies and processes to prepare us for the new security environment. A continued understanding of logistics and supporting technology is key to battlefield successes of great leaders and militaries of the future. We must not use history as a blueprint or a roadmap but as the context of a situation or problem that helps accompany a nimble mind to make justified decisions.

USMC

Casualty Treatment in Tomorrow's War

Insights into the future of medical logistics and mobile surgical capabilities in the Indo-Pacific region in a post-OEF/OIF environment

by LCDR Trevor Tompane

>LCDR Tompane, the lead author, is an Orthopaedic Surgeon with the 1st Medical Battalion at Naval Hospital, Camp Pendleton. He deployed with CLB-5 in support of MRF-D 22.2. The author would also like to acknowledge the contributions of LCDR Chris Cosentino, LT Jack Cline, HM1 Micol Zabala, and LTJG Stephanie Meads.

While plotting a U.S. military invasion of Bougainville Island in 1943, medical planner LtCol Ashley Oughterson devised a novel plan to drastically reduce battlefield fatalities. He imagined a system that would deliver surgical care very close to the front lines in the early stages of the Pacific Island Campaign against Japan. According to Dr. Thomas Helling's detailed anecdotes in *Desperate Surgery in the Pacific War; Doctors and Damage Control for American Wounded, 1941–1945*, LtCol Oughterson envisioned surgical teams leap-frogging one another, keeping up with the front and operating on the move.[1] Surgery in the portable hospitals would be performed under tents at best, under palm trees more likely, and amidst the buzzing sounds of mortars and live rounds. The forward surgical teams would fill in behind the advancing front, saving lives and limbs. The plan was perfect, like all best-laid plans, until it was not.

Five days after D-Day in November 1943, the medical planner found that his teams still lacked surgical, blood transfusion, and laboratory equipment. LtCol Oughterson lamented the sight of his surgical teams struggling without supplies in the conditions on Bougainville, a dense jungle that would have been a miserable place to keep patients alive, even without the threat of artillery and enemy infiltration on all sides. The forward surgical teams attempted to compensate for logistical shortcomings. Still, the Bougainville Campaign would be marked by one of the more tragic figures in the South Pacific within two short months. Forty percent of all Marine Corps casualties died. For reference, the percentage of casualties resulting in death on Iwo Jima was estimated at 25, and the whole of World War II averaged a fatality rate of 33 percent.

None of this story should detract from the valiant warfighting and lifesaving efforts of Marines hopping between islands in the Pacific to change the course of World War II. It should, however, paint a clear picture of the complexities in medical logistics and the impending catastrophic losses if they are not planned precisely. Sending skilled practitioners forward means little if they deploy without their tools and supplies.

In the decades following World War II, the nature of conflicts fought by the U.S. military changed. Casualties in Iraq and Afghanistan sustained more injuries from explosive mechanisms than gunfire and artillery. A paradigm of ready access to air and ground evacuation developed as Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) progressed. The traditional Role 2 military treatment facility rose in prominence during OIF and OEF to provide readily accessible trauma resuscitation for casualties incurred during the maneuver phases of the war. In the waning years of war in the Middle East, the Marine Corps began preparing for modern warfare against a peer or near-peer enemy. The CMC embraced the idea of planning for such a future in *Force Design 2030*, emphasizing the need for maneuverability of medical equipment and personnel within the weapons engagement zone. In the following pages, the leaders of Combat Logistics Battalion-5 and the Role 2 medical platoon offer a summary of lessons learned during the Marine Rotational Force–Darwin (MRF-D) 22.2 deployment. This article seeks to disprove the words of LtCol George C. Thorpe in 1917 that "history repeats itself, war after war, giving the world story after story of muddled preparation of the means of fighting."

MRF-D 22.2 Initiatives and Role 2 Integration

From April through October 2022 in Darwin, Australia, MRF-D 22.2 served as a forward-postured, partnered MAGTF. The objective was to rapidly respond to crises and contingencies, increase combined warfighting capability, and strengthen shared alliances and partnerships. The 2022 iteration of MRF-D aimed to employ the full complement of forward medical and

surgical capabilities throughout joint exercises with the Australian Defense Force. Historically, MRF-D training exercises utilized a component of the Role 2 hospital to augment joint training exercises for a period of time during the deployment. The previous rotations, belonging to III MEF, were tasked as a Deployed for Training force. The 2022 iteration evolved into a forward force with a posture of readiness. The new mindset and mission of MRF-D and the Marine Corps drove a reworking of the concepts for damage control resuscitation and damage control surgery.

The MRF-D 22.2 Logistics Combat Element tasked the Role 2 medical platoon with creating Role 2 Light Package (R2LP) and Role 2 Medium Package (R2MP) to test the mobility and scalability of each footprint during joint training exercises. These packages were devised with respect to equipment and personnel to improve mobility inside the weapons engagement zone as a tactical advantage. The packages were also designed with consideration for the mission, supplies on hand, and local health and infrastructure requirements.

At baseline, the traditional Role 2 hospital structure is transported in 22 Quadcons, housed under 9 305 tents, and occupied by 66 personnel. The R2MP was designed to fit within 8 Quadcons, under 4 tents, with 38 personnel, and supported by an ambulance. Those personnel include (at least) a shock trauma platoon with four beds and two emergency physicians, a Forward Resuscitative Surgical System (FRSS) with two surgeons and one anesthesiologist, a holding/enroute care bay with two nurses, and a command suite. The R2LP was designed to fit within four Quadcons, under two tents, and staffed by nineteen personnel. The structure was intended to house a combined STP and holding area with an emergency physician and an FRSS with a general surgeon and an anesthesiologist. As one might expect, scalable hospitals offer differing capabilities. The R2LP is thought to be capable of treating up to four patients simultaneously and up to seven surgical patients before resupply is required. The R2MP is theorized to offer care to seven patients at a time and ten surgical patients before resupply.

Configuration of a shock trauma platoon and adjoining Forward Resuscitative Surgical System, which formed half of a Role 2 Medium Package or the entirety of a Role 2 Light Package as tested during MRF-D 22.2. ***(Photo provided by author.)***

Logistics Support Challenges Encountered at MRF-D 22.2

Although the training exercises of MRF-D 22.2 were designed with a somewhat notional nature, the R2LP and R2MP were deployed with the intent to provide real-world care in the event of a mass casualty event. That intent quickly illuminated barriers to providing even the lowest standard for safe and effective health care. Principal among these barriers was the acquisition and storage of whole blood, the most effective resuscitation measure for a hemorrhaging casualty. Whole blood must be obtained from donors in bags containing a preservative that allows it to be stored for 21 days in a refrigerated unit before it expires. While a theater-level asset does exist within INDOPACOM for distribution, the logistics of ordering and receiving Low-Titer O Whole Blood (LTOWB) proved grossly inadequate. As a result, LTOWB was either available far too early for the planned exercise, causing it to expire before exercises even began, or far too late. To compensate for this shortcoming, Role 2 leadership activated the Walking Blood Bank, ordinarily the last resort, to obtain an initial supply of whole blood. It was a temporizing measure for a problem that demands a more sustainable solution, especially if the Marines face casualties on the scale expected for a peer or near-peer conflict.

Role 2 personnel HM2 Lass and HM2 Bard facilitate the collection of whole blood via the Walking Blood Bank initiative, in preparation for joint training exercises with the Australian Defence Force during MRF-D 22.2. ***(Photo provided by author.)***

Appropriate storage of LTOWB is an energy-intensive necessity to avoid loss of efficacy, but adequate storage and expiration concerns only begin with whole blood. All medications utilized in a trauma resuscitation scenario must be stored below a temperature that typically tops out at 77°F, or else it becomes as good as expired, if not worse when high temperatures alter the chemical compounds irreparably. Some critical medications and laboratory reagents harbor more stringent requirements for cold chain support, a theater-level asset currently underdeveloped within INDOPACOM. While storage temperatures may seem trivial in warfare, the problem would be quite difficult to ignore if anesthetic agents no longer put patients to sleep before surgery or antibiotics ceased to prevent infections, leading troops with battlefield wounds to undergo amputations for ordinarily reconstructable open fractures. Lest the logisticians forget, the transport and storage of critical tools for trauma resuscitation is not just an energy-intensive problem with current resources; it may become a near impossibility in a paradigm of electronic warfare.

Traditional forward surgical hospitals rely on ready transport of fuel and class VIII supplies to sustain their responsiveness to mass casualty events. For example, Role 2 FRSS teams in Afghanistan were accustomed to using surgical instruments sterilized on-site or shipped back and forth from the sterilization units at Role 3 Combat Surgical Hospitals. In a forward environment without that resource, surgical teams rely on a chemical product that only allows fourteen days of maximal repeated uses to achieve semi-sterile conditions. The chemical proves exceedingly difficult to acquire in Australia, and a resupply has not yet been obtained due to onerous hazardous material shipping restrictions. Admittedly, such barriers are likely to be trivial or nonexistent in a wartime scenario, but they mimic the inaccessibility to resources that expand the maximum throughput of a field hospital. The MRF-D 22.2 FRSS personnel established an agreement with the Australian dental clinic to utilize their sterilization facilities, a training environment solution that would hardly be useful in an active conflict. These are only a few things that threaten to revert a 21st-century forward surgical hospital to a 20th-century one. Of course, surgeons, doctors, nurses, and corpsmen will operate and resuscitate as long as they remain awake and breathing. However, no amount of effort can ford the rivers of unpreparedness if they flood.

Role 2 personnel HM3 Grant and HM1 Dorsainvil sterilize surgical instruments in collaboration with the Australian Defence Force at the Dental Hub, prior to joint training exercises at MRF-D 22.2. ***(Photo provided by author.)***

Management of Logistics Support in OIF and OEF

World War II, OIF, and OEF taught us that the battlefield's maturity determines the logistics involved with patient movement and class VIIIA/B resupply. Schrager, Branson, and Johannigman discussed how combat operations differed in the transition from Iraq to Afghanistan.[2] A lack of roadways prevented ground evacuation for critical casualties. As a result, transport time from the point of injury to Role 2 or Role 3 military treatment facilities steadily increased to a span of hours. While "Golden Hour" is largely misunderstood and probably an inaccurate reflection of survival time for the most common cause of battlefield death, it conveys the importance of delivering expeditious medical care with maximal resources allowable. In OIF and OEF, serious efforts were made after 2009 to restore the speed of medical evacuation through the air. As the battlespace matured, ground transport became a valuable asset in supply delivery to forward medical units and evacuating critically injured casualties to higher levels of care. This begs the question: how did the U.S. military manage medical logistics throughout OIF and OEF? What might be learned from the most recent wars?

During the early planning stages of OIF, a conference was held between the Army, Air Force, Navy, and CENTCOM surgeon's medical logistics planner. At the conference, the Army was named the Single Integrated Medical Logistics Manager and declared responsible for providing medical supplies to all services in the area of responsibility. The decision was intuitive: the Army possessed the largest medical logistics structure in the DOD and would establish a class VIIIA distribution center in Kuwait and a warehouse in Qatar that would be stocked for a war with Iraq. I MEF used two medical logistics companies within the 1st Force Service Support Group (now 1st Marine Logistics Group) to pull supplies from the Army's 424th Medical Logistics Battalion at the distribution center in Kuwait and

issue those supplies to their respective medical units. All level I and II class VIIIA supplies were distributed to battalion aid stations via ground convoys from Kuwait. Beyond that, the level III supplies for deployable hospitals were delivered from the warehouse in Qatar via air assets. It seemed, from a medical planning perspective, to be straightforward.

However, during the earliest maneuver phases of OIF, units were deploying with significantly fewer supplies than they required. As a result, army warehouses in the United States lacked the surplus of supplies they needed to support the volume of units moving forward simultaneously. The distribution center in Kuwait thus found itself struggling to make up for the difference when units arrived in-country. To be fair, predicting casualty counts and expected casualty severity is a notoriously difficult task. And by proxy, stocking sufficient medical material for unpredictable demand would puzzle some of the more robust corporations in the world. In World War II, demand for supplies fluctuated in different geographic zones at different phases of offensive action. Rapid increases in the number and types of units deploying, coupled with the relative immaturity of the warehouse and distribution centers, created a near supply crisis.

Logisticians struggled to keep up as the Army War Reserve Automated Process ordered supplies for the warehouse in Qatar; because the supplies were ordered through a third-party vendor, the warehouse had difficulty tracking what was due in and what they received.[3] The hectic environment was also challenged by the warehouse location in Qatar. Had it been in Kuwait, coupled with an adjoining distribution center, much of the supply accounting and distribution would have been streamlined to the forces who landed on the ground before their incursion across the Iraqi border. Perhaps it would be best to consider the supply chain for OIF a near-miss. Mercifully, transportation was the most straightforward part of a medical logistician's work. A more pessimistic scenario would be one in which the U.S. military lacks transport avenues on the ground and through the air while casualties pile up at an unprecedented rate as in, say, a near-peer conflict.

A Way Forward

The opening act of every war the U.S. military entered over the last 80 years was plagued by a phenomenon known as the "Peacetime Effect," an unfortunate finding that case fatality rate (the number of fatalities divided by the total number of injured soldiers) exceeds the low point of the previous war.[4] Something happens in the periods of relative peace between wars that allows more soldiers to die than expected. While no one quite knows the cause of this phenomenon, it is fair to wonder if disorganized supply chains contribute to the slow start.

Medical logistics are complicated, whether the subject is patient care, patient movement, or delivery of class VIII-IA and B supplies. The nature of medications, consumables, and equipment mandate transportation in accordance with temperature and storage requirements. Preserving the safety of highly technical and sensitive equipment involves planning that may differ from the delivery specifications for a particular medication or a unit of LTOWB. To our knowledge, the Marine Corps does not possess robust predictive models for operating theaters where medical supply chains are strained, and consumption rates are unknown. Perhaps analytical models can be developed to incorporate active warehouse stock, casualty generation rates, and supply expiration rates for wargaming purposes. Perhaps technological investment can streamline the delivery of supplies and their subsequent storage at medical facilities. Dedicating resources to solving these problems will undoubtedly pay real dividends in warfighter survival.

Although it may not seem accurate at first glance, MRF-D 22.2 represents a genuine accomplishment for medical logistics in the Marine Corps. Like a fighter sparring in the ring, joint training exercises in the confines of Northern Australia exposed our weaknesses so that they might be turned into strengths. As Maj Galuszka noted in a 2006 review of medical planning during OIF, "logistics must be the same in peace as in war. If the military does not "practice like they play," units will not understand proper procedures when they deploy; garrison practices must strive to replicate field practices."[4] And so they have.

Medical logistics are complicated, whether the subject is patient care, patient movement, or delivery of class VII-IA and B supplies.

Notes

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Energizing the Future

Who needs fuel, power, and water?

by Capt Timothy Lang, CWO3 Anthony Cercone, CWO2 James Nieves, CWO2 Agrepina Diego, CWO2 Matthew Wilson & CWO2 Juan Villar

Imagine being given the opportunity to form what was once an idea and is now a reality! In 2021, 3d MLG tasked subordinate commands with creating a company that would improve fuel, power, and water sustainment to address concerns with operational design and contested logistics. In less than 30 days, Energy Company became the first of its kind. The idea of combining the MOSs of utilities and bulk fuel Marines under one formation suddenly became real. In July of 2021, the first "off-the-shelf" energy company formed from an amalgamation of bulk fuel company and utilities platoon, 9th Engineer Support Battalion (9th ESB). During the life cycle of Energy Company, senior leadership made decisions to better facilitate the general support mission to III MEF, including realigning the company under Combat Logistics Regiment 3, instead of their original 9th ESB hierarchy. Most recently, the company was redesignated under 3d Landing Support Battalion (3d LSB).

The history of Energy Company is comparable to a ship venturing into unexplored waters. Now, the Marines of Energy Company, 3d LSB, seek to embody the Marine Corps legacy of innovation. Forging an unbeaten path, it is evident that the current structure, capabilities, and outlook for future energy companies are not perfected.

However, because of the lessons learned during this experiment, it is our opinion that cohesive and multidiscipline small-unit teams led by a dedicated headquarters element with energy subject-matter experts are the bid for success to distribute fuel, power, and water in a contested logistics environment. To fully comprehend this thesis, it is imperative to first understand Energy Company's framework, specifically its organizational structure.

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>>CWO3 Cercone is a Utilities Officer and is serving as an Energy Platoon Commander.

>>>CWO2 Nieves is a Bulk Fuel Officer and is serving as an Energy Platoon Commander.

>>>>CWO2 Agrepina is a Utilities Officer and is serving as Utilities Operations Officer.

>>>>>CWO2 Wilson is a Bulk Fuel Officer and is serving as Bulk Fuel Operations Officer.

>>>>>CWO2 Villar is a Bulk Fuel Officer and is serving as an Energy Company Executive Officer.

For the past 21 months, bulk fuel and utilities Marines have been working alongside each other, cultivating an environment of efficiency and interoperability in garrison and field operations. This professional rapport has proven valuable in ways that result in a smaller deployable footprint of Marines that speak the same language. Energy Company's first experimentation with internal structure started with one energy platoon from both communities led by a bulk fuel platoon commander and a utilities chief. These Marines interacted and learned each other's occupations daily. In the year this platoon was together, they supported four major exercises by deploying integrated teams led by small-unit leaders. In turn, those small-unit leaders gained the confidence and trust required to employ their Marines from both communities across the Indo-Pacific Command Area of Responsibility. However, the energy platoon's initial capacity was too limited and required augmentation from the other utilities and bulk fuel platoons to have adequate

In 2021, 3d MLG tasked subordinate commands with creating a company that would improve fuel, power, and water sustainment to address concerns with operational design and contested logistics.

Cpl Brenden Hill, a bulk fuel specialist with Energy Company, supervises the refueling of a CH-53 at a FARP during Resolute Dragon 2021. *(Photo by CWO2 Juan Villar.)*

personnel and equipment to support operational requirements. Exploiting a second year of experimentation, Energy Company built on the successes, experience gained, and identified shortfalls in the integrated platoon. The entire company was restructured into two large energy platoons led by the senior bulk fuel and utilities chief warrant officers and their bulk fuel and utilities chiefs. Each platoon has integrated bulk fuel/utility squads of approximately 24 Marines designed as a base unit, capable of deploying, disaggregating, or scaling with additional squads to provide tactical energy support across multiple sites. As Energy Company structure's quality, performance, and reliability continue to be tested, we must reevaluate significant changes to company capabilities and limitations.

Energy Company exercising insert, setup, and displacement of water points, refuel point, and water site recon with WQASP. *(Photo by CWO2 Agrepina Diego.)*

Energy Company was tasked with the mission to provide general support, tactical-level fuel, water, and power sustainment through procurement, quality assurance, storage, and distribution to enable III MEF maneuver. This wide range of tasks across III MEF's expected maneuver space and increasing demand for energy capabilities in small teams will require Energy Company Marines to perform at a level senior to their current tenure. Energy Company has been empowering those Marines as squad leaders and allowing them to cultivate the skills required to operate effectively in a training environment. Their knowledge base could be further emboldened by the incorporation of higher-level concepts earlier in professional military education and follow-on military occupational schools.[1]

A network of long-distance and varied distribution sites will need to be established and operated concurrently to retain the element of surprise as the warfighter advances, allowing them to maneuver with cover and concealment in the battle space.[2] Various methods of logistics will be tested to insert fuel and utilities assets to the fight. Energy Company capabilities will be required from the forward edge of the battlefield to the combat sustainment area.[3] This includes the joint effort of prepositioning assets using surface, subsurface, and aerial nodes of transportation to rapidly deploy resources to the conflict.[4] The current formation of Energy Company must retain a balance of resources to support the Indo-Pacific Command key players to include the MEF and newly developed commands such as Marine Littoral Regiments. The main limiting factor is that the company's structure is a combination of two legacy formations, specifically 9th ESB's bulk fuel company and utilities platoon structure, not a unit built out of the requirements levied on it from its mission. Tactics, procedures, and technology will continue to be refined to provide critical utility and bulk fuel support in the III MEF Area of Responsibility.

We would be remiss to not address concerns for Energy Company's hierarchy within the LCE. The question remains: under which echelon of forces

would Energy Company best support III MEF's scheme of maneuver? Current Force Design guidance implies 9th ESB will experiment and transition into a pioneer battalion. 3d LSB is postured under the Marine Logistics Support Group concept to become a regional support battalion, in contrast to the distribution support battalions in I and II MEF. The Logistics Experimentation Campaign Plan for Fiscal Year 22 to 25 has energy capabilities resident within pioneer battalion as it takes on missions to open infrastructure and enable freedom of maneuver in the littorals.[5] In crude comparison, it appears that pioneer battalion will cut new paths for the force and the future LSB will use those paths to sustain the force. Energy Company could exist and provide support to the MEF within either of these formations, but LSB's specific focus on deploying sustainment capabilities is closer to the operational requirements placed on Energy Company. Combat Logistics Regiment 3 repositioning the company under 3d LSB's general support mission to III MEF is a measured effort to test this theory. Energy Company employment under a regional support battalion may give MEF slightly more advantage and enable pioneer battalion to focus on an already diverse mission set during the challenges of great power competition in a contested logistics environment.

Initial Force Design trends showed separate utilities and bulk fuel squads spread across the combat logistics battalion structure within the combat logistics companies.[6] These disconnected squads may be able to provide some organic ground sustainment capacity to the battalions internally. However, the squad organization and equipment template as they exist would have insufficient capacity to support the Class III fuel requirements of a MEF. Especially in view of the time, terrain, and distance challenges of the Indo-Pacific Command Area of Responsibility, we argue that a cohesive unit akin to Energy Company will provide better support in a general support mission to the MEF versus disaggregated organic squads under the combat logistics companies. Although the idea of a consolidated energy company appears contrary to the argument for empowering small-unit leaders, the reality is that the squad leaders will be more proficiently trained, equipped, and ready when supported by staff noncommissioned officers and chief warrant officers from within their occupational fields. Energy-focused platoon and company leadership will enable squad leaders to gain more training opportunities in garrison and reach back to deeper subject-matter expert experience while deployed. Energy capabilities can best sustain the FMF when employed as a unit that can arrange its support in concert with the MEF's priorities.

Increasing the presence of utilities joint training will reinforce relationships with host nations and retain a foothold to salvage and preserve critical resources for our allies and troops on the ground.

Joint and bilateral training with DOD agencies and host nation personnel are also an investment for success. Mission essential tasks are being revised and tested to accommodate warfighters to remain competitive in the near-peer fight. Utilities personnel are in high demand to test entry-level skills to forage power and water in an unknown, foreign, and contested environment. Increasing the presence of utilities joint training will reinforce relationships with host nations and retain a foothold to salvage and preserve critical resources for our allies and troops on the ground. Non-commissioned officers are heavily relied upon to conduct reconnaissance and initiate innovative methods of employment with little to no resources in the theatre of operation. Additionally, Energy Company does not yet have the capability or training to identify fuel facility infrastructures or conduct quality assurance of fuel sources, including those that are unknown. This limitation impedes our ability to enhance operational-level energy requirements and resiliency in support of contested logistics energy distribution. As Energy Company squads deploy in support of contingency operations, it is imperative that each team be capable to assess fuel infrastructure, interoperability, and compatibility of equipment and identify the type of fuel within the foreign or allied nation. These new concepts of employment for sustainment, using a combination of conventional and unconventional tactics to gain the advantage, will enable the Marine Corps to better support maritime forces.

Energy Company's future is by no means definite, but unlike a lost vessel at risk to run aground in uncharted waters, we have a deliberate bearing. The concept behind an integrated squad is to create a more agile capability package with a joint effort of utility and bulk fuel fire teams to provide critical energy to the warfighters. The company and platoon-level leadership will focus on coordination and transition between operational logistics entities and providing quality and compatibility assurance on foreign water treatment, power, and fuel infrastructure.[7] Squad-level leadership will focus on providing the pacing commodity and critical life support sustainment in the realm of tactical logistics while experimenting with maximizing capabilities to maintain mission readiness and incorporating tactical signature management discipline to mitigate operations within the weapons engagement zone.[8] Additionally, rotating squads will compensate for high operational tempo while enabling a cycle of resource preparation and increasing combat readiness. As one squad supports exercises, another prepares for deployment in garrison, a third performs essential maintenance, and a fourth expands the limit of the company's capabilities through experimentation. Realigning deployment and

Follow on experimentation will include nonstandard capabilities and procedures to reduce physical and electromagnetic signatures in comparison to legacy set ups. *(Photo by Sgt Levi J. Guerra.)*

formation concepts are not limited to conventional equipment sets. Energy Company Marines have employed unconventional warfighting capabilities that meet the demands of the ever-changing competition continuum. Although this article is not the venue to discuss in detail, these capabilities include platoon water purification systems, battery, and solar power sources, new potable water storage and distribution systems, as well as fuel additive injection capabilities to increase the sustainability and recoverability in the region. We hypothesize the combat service support provided by the company will be more self-sufficient and agile for future units using this employment approach and future capabilities.

Energy Company Marines have employed unconventional warfighting capabilities ...

Cpl Taylor, a water support technician with Energy Company, Combat Logistics Regiment 3, primes the raw water pump during Exercise Resolute Dragon 22 at Kamifurano Maneuver Area, Hokkaido, Japan. *(Photo by Cpl Moises Rodriguez.)*

It is our opinion that an organization compiled of subject-matter experts focused on providing tactical power, water purification, and fuel will be a key enabler to the FMF. In this dynamic environment, marked by changing missions and unit structure poised against a backdrop of great power competition, we request that Marine Corps stakeholders consider these lessons learned and the innovative capabilities that Energy Company brings to the fight while refining Force Design.

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Modernizing MARCORLOGCOM

An industrial base for the Information Age

by Maj Jon Thomas

The year is 2043, 3d Marine Littoral Regiment is conducting a named bilateral training exercise with a partner nation in the INDOPACOM Area of Responsibility. Five days prior to the culminating training event, a Navy-Marine Expeditionary Ship Interdiction System (NMESIS) live fire, two of the NMESIS equipped Joint Light Tactical Vehicles (JLTV) designated for the exercise are determined to be safety deadlined and cannot be utilized for the live fire. 3d Littoral Logistics Battalion (LLB) has been tasked with replacing the platforms. At a glance, the 3d LLB operations officer is able to view a secured dashboard that provides total asset visibility of all Marine Corps equipment in theater—depicting equipment locations and quantities, maintenance statuses and histories, and the owning entity. Quick research shows one NMESIS-equipped JLTV located nearby at Global Positioned Network (GPN) site "X" which is managed by Blount Island Command-Pacific Detachment and another available NMESIS-equipped JLTV held on Okinawa by Marine Force Storage Command Pacific. Using the same total asset visibility platform, the 3d LLB Operations Officer can see that the GPN Site "X" JLTV has been recently overhauled in theater through Marine Depot Maintenance Command's next-generation processes, and the Marine Force Storage Command Pacific JLTV has received all required care of supplies in storage services 43 days ago. Both JLTVs are suitable to address the 3d Marine Littoral Regiment problem set. Through service requests on secured Global Combat Service Support–Marine Corps 2030, which is tablet enabled and is networked to the same total asset visibility platform, 3d LLB initiates the requisition of both assets, coordinates remote data enabled Joint Limited Technical Inspections, and sources intra-theater distribution with an estimated delivery timeline of four days—an operational logistics solution to a tactical problem.

So how do we get here?

>Maj Thomas is currently executing his Naval Postgraduate School utilization tour as a Plans Officer in the MARCORLOGCOM G-3/5. He is a 0402 Logistics Officer whose previous assignments include 1/7 Mar, the Marine Corps Mountain Warfare Training Center, and Combat Logistics Battalion–2.

To equip distributed FMFs in peer-contested environments, the Marine Corps requires a modern organic industrial base with Information Age capabilities.

Modernizing MARCORLOGCOM

To equip distributed FMFs in peer-contested environments, the Marine Corps requires a modern organic industrial base with Information-Age capabilities. The introduction of *Force Design 2030* by the 38th CMC provided a catalyst for Marine Corps Logistics Command (MARCORLOGCOM) to examine its processes and procedures, business practices, organizational construct, workforce competencies, and the modern data and information technologies needed to maximize materiel readiness and sustainment support to the future force. As the Service-level Inventory Control Point and Supply Depot, MARCORLOGCOM provides command and control over depot-level maintenance, storage, and prepositioning operations to ensure combat-ready equipment and supplies are available so the FMF can conduct and sustain military operations. Over the last three and half years, MARCORLOGCOM has taken a hard look at how the organization conducts these three core competencies. The paragraphs below provide an overview of how and where MARCORLOGCOM has applied new technologies and processes to modernize the Marine Corps Organic Industrial Base to fully enable the future force.

Depot Maintenance

Force Design has necessitated significant changes to the Marine Corps' approach to lifecycle sustainment and depot-level maintenance. While the Industrial-Era practices of large-scale overhaul and remanufacturing will certainly continue in the near term, new approaches to the Service-equipping strategy and lifecycle decisions will demand modernization of the organic

industrial base and require these capabilities to be pushed as close as possible to the point of need. Marine Depot Maintenance Command has undertaken a deliberate modernization campaign that enhances the effectiveness and efficiency of existing operations while creating new opportunities that will directly impact readiness within the FMF in realtime. At both production plants at Albany, GA, and Barstow, CA, digitization has formed the backbone of the overall modernization effort. One key improvement includes a state-of-the-art shop floor control system where virtual and actual data match in near realtime, enabling more informed decision making for depot resource use. Additionally, Marine Depot Maintenance Command is actively experimenting with the application of digital-twin technology in plant operations, employing modeling and simulation to inform maintenance decisions, improving data-capture techniques, vetting systems for material flow and key performance metrics, and continuing advancements in additive manufacturing. The modernization efforts discussed above are not pipe dreams—they are active, funded efforts that are all in various states of implementation with the sole purpose of achieving a best-in-class organic industrial base capability ready to support the needs of our Corps.

Enterprise Storage

The capability to store equipment and sustainment in a serviceable, easily accounted for state, and then subsequently distribute it to the point of need in a timely manner is the crux of how the Marine Corps holistically generates warfighting readiness. Marine Force Storage Command (MFSC) is the MARCORLOGCOM subordinate command tasked with this critical mission set. As the largest account of gear and equipment across the Marine Corps, MFSC executes enterprise storage through its various subordinate activities and commands to include the accountability of Class II items in all Unit Issue Facilities across the globe, the Materiel Management Operations Group co-located within each MEF, and 1st and 2d Force Storage Battalion located in Barstow, CA and Albany, GA. To enable these activities and formations, MFSC has initiated a multifaceted warehouse modernization effort with the intent of creating improved storage conditions that support accountability, auditability, faster inventories that require less manpower, and ultimately the rapid and accurate fulfillment of customer orders. Using the private sector as a model, MFSC has optimized existing spaces and facilities by implementing narrow aisles, adjustable racking, and modern material handling equipment and techniques. Additionally, MFSC has supplemented improvements in physical space utilization with complementary systems and technology

to include handheld scanning devices widely used in commercial applications, optical character recognition, passive radio frequency identification, autonomous technologies, and most notably the Marine Corps Platform Integration Center—a system that has reduced inventory times of military equipment by 99 percent. Both facets of warehouse modernization have been synchronized through overall process improvement. The continually improving use of data management and analytics reduced audit risk by $1.2B in FY21, providing a far more accurate site picture of where inventory is located, the most efficient way of accessing it, and how MFSC can quickly distribute it to the end user in the FMF.

Prepositioning

The Marine Corps' prepositioning activities are largely overseen by another of MARCORLOGCOM's subordinate commands, Blount Island Command (BICmd). BICmd maintains oversight of the Service's ashore sites to include the Marine Corps Prepositioning Program–Norway and MEU Augmentation Program–Kuwait which reached end of mission on 30 September 2022, as well as providing support to the Maritime Prepositioning Force afloat program. In response to directed actions levied by the May 2022 *Force Design 2030 Annual Update* and continued reductions in U.S. Navy fiscal support to Maritime Prepositioning Force shipping, BICmd has been re-scoping and modernizing current prepositioning activities as well as planning to support the implementation of the GPN. BICmd has used vessels placed in Reduced Operating Status to improve selective offload configurations, essentially conducting a rehearsal of concept to validate effectiveness while simultaneously refining afloat supply and maintenance concepts to better enable sustainment functions provided by the Maritime Prepositioning Force during campaigning. Additionally, BICmd has begun the initial groundwork to experiment with level I and II UAS to both equip drones with Marine Corps Platform Integration Center components (facilitating more efficient equipment inventories) as well as examine ship-to-shore UAS sustainment from a Maritime Prepositioning Squadron vessel to forward-deployed elements. BICmd has been deeply involved with the GPN planning effort and is examining how and where the organization should be modified to support a more dynamic and dispersed ashore prepositioning construct. The BICmd staff has also explored the interoperability between the Offshore Support Vessel and other commercial connectors with the Maritime Prepositioning Squadron. Much like Marine Depot Maintenance Command and MFSC, BICmd has aggressively leaned into the application of new technologies, refinement of existing procedures, and detailed planning to best facilitate the *right* operational-level logistics solution for the future force.

Command Data and Analytics Office

To enable the modernization, experimentation, and technology implementation efforts described above MARCORLOGCOM will require sound processes and procedures for capturing and managing vast amounts of logistics data to support decision making. MARCORLOGCOM formally established a Command Data and Analytics Office (CDAO) on 1 October 2022 to tie together these lines of effort with aspirations to achieve a level of realtime transparency and connectivity outlined in the opening vignette of this article**.** Although the command is still early in the process, some early steps have been taken. First, we have formed a relationship with the recently established Marine Corps Service Data Office with the purpose of making data a *Service capability*. We also continue to support Installation and Logistics–Logistics Division and the Field Supply Maintenance Analysis Office with required data sets while transitioning to a more formalized governance structure provided by the CDAO. Internal to the organization, the CDAO has initiated an analytics consortium drawn from our subordinate commands, staff sections, and centers to formalize the management, process improvement, and reliability of the command's data. Upon maturation, MARCORLOGCOM's CDAO effort will improve the speed, tempo, and accuracy of leadership's decision making to facilitate better business outcomes and overall mission accomplishment.

As the operational logistics provider for the Marine Corps, MARCORLOGCOM exists to facilitate the right logistics solution for the service at the right place and time.

In Closing

Regardless of the century, conflict, or scale of warfare, battlefield success has been predicated on positioning the *right* formations, equipment, and sustainment in the *right* place, at the *right* time. As the operational logistics provider for the Marine Corps, MARCORLOGCOM exists to facilitate the *right* logistics solution for the service at the *right* place and time. While MARCORLOGCOM's modernization efforts and the data-governance structure required to implement them require continued refinement and experimentation, we are implementing them *now* to enable the FMF with the best logistics solution in campaigning, crisis, and high-end conflict.

USMC

PCS Pain

Bridging communication gaps in the PCS process

by Mrs. Krista Ickles, GS14 Fred Hyden, GS14 Mark Edwards,
GS13 Brian Imler & GS13 Julie Hendrix

Conducting a Permanent Change of Station (PCS) move is a mentally and physically challenging exercise that affects not only the Marine but the entire family. When questions arise and a move goes bad, the Marine Corps should support the Marine, but who supports the spouse? What can a command do to ensure a Marine's PCS challenges are addressed quickly? Where do spouses turn when it all becomes overwhelming? Communication gaps and unfamiliarity with policies and procedures that govern the moving of household goods and passengers often create more stress and challenges by letting a molehill-sized problem turn into a mountain. In an unprecedented level of cooperation, Installation and Logistics has partnered with the USMC PCS Advocacy Council (UPAC) to bridge the PCS communication gap by providing support and resources via social media to spouses and Marines on a global scale. What makes this more effective than past measures? UPAC is an organized team of spouses of active-duty Marines who understand the unique needs of the family because they PCS too. This article identifies the communication gaps in the PCS process, how that affects families, what commands can do to provide PCS support, and how Installations and Logistics is bridging the communication gaps by partnering with a team of volunteer spouse advocates to ease the pain of a PCS.

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Communication Gaps

Have you ever had a well-meaning friend say, "It's easy, right? The Marine Corps moves you." If you have ever been issued orders to PCS, you know it is far more complicated than that. Resources and funding are provided by the government, but every aspect of a relocation hinges on the Marine's family being prepared every step of the way. Communication gaps occur when roles and responsibilities are unclear, Marines do not seek the support provided, and spouses rely solely on personal experience to guide their move.

Responsibilities Are Unclear

Every move has three key players: the Distribution Management Office (DMO), Transportation Service Provider (TSP), and the Marine and family. Moves begin in Defense Personal Property System when the application to move is submitted and the TSP is assigned. Logistics and coordination begin, but who is in charge and who is responsible for the success of the move? A mental disconnect can happen when the government funds and assigns the

The UPAC provides Marines and their families global resources and support through social media. ***(Slide by Silha Bess, UPAC Media Lead.)***

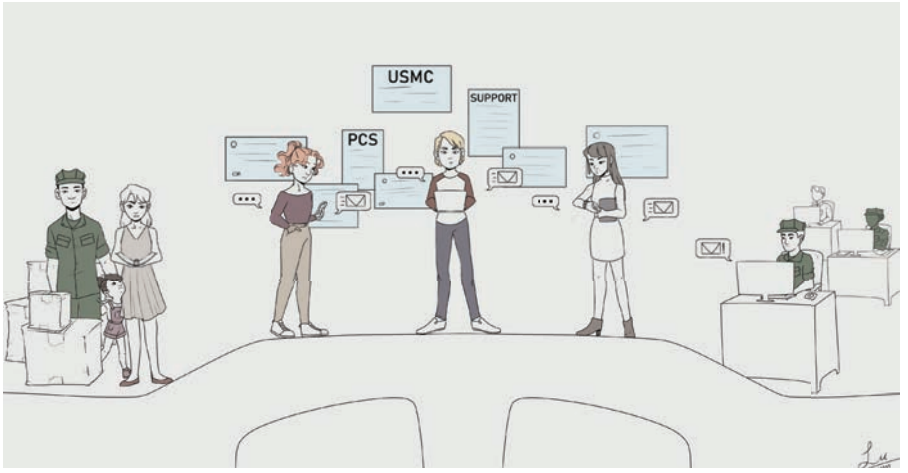
moving company, but the move belongs to the Marine. The Marine is the conduit for all coordination and communications and is responsible for the success of the pack, load, delivery, and claims. The lack of clarity on what the Marine is responsible for and where they turn for support can create challenges that turn a simple question into a problem to solve.

Not Seeking Support Provided

Marines and spouses are often unaware of the official resources for support that are provided for every move. A PCS, which is a personal experience unique to each family's needs, is governed by a set of policies and procedures that are inherently impersonal. Policy serves as the guide and rule book. Seasoned movers are often overconfident in this arena, believing they know the rules, but are completely unaware that the policy and procedures are updated and changed frequently. PCS support resources are abundant but must be sought out.

Personal Experience and Policy

A spouse can avoid participating in their Marine's career and every Marine Corps event, but it is nearly impossible to avoid participating in the move process. A spouse does not view their move as a logistical operation. They move the memories and treasures that make their house a home. Spouses need more than "official" support and will naturally turn toward other spouses they can relate to—often searching for answers on social media. Learning from each other's successes and failures is something that happens within our Marine Corps communities every day, but when it comes to a move, personal experiences do not always match up with what policy dictates. When spouses rely on the personal experiences of others and do not understand how the policy applies or what procedures are in place to assist when questions arise, tensions run high and molehill-sized problems turn into mountains. The spouse's role in the move is just as involved as the Marine's role, and often the spouse is carrying a larger role in preparing the household for the move.



UPAC serves as the bridge between the Marine Corps PCS administrative apparatus and the individual Marine, Marine spouse, and their families. *(Illustration by Alyssa Ickles.)*

Marines and spouses are often unaware of the official resources ...

Bridging the Communication Gaps

Closing communication gaps seems simple enough: provide a handout to explain policy, teach a class, or guide the Marine toward the subject-matter experts. All these measures have been implemented—yet, there are still gaps. Resources are a tool. Having a tool and understanding how to use that tool are very different things. Recognizing these communication gaps and noticing a social media storm of move challenges, Deputy Commandant, Installations and Logistics, began working with a group of Marine Corps spouse advocates to bridge the gaps. Improved official resources, command support, and spouse advocacy are proving successful in closing the communication gaps.

Using Official Resources

Empowering Marines and spouses to take control of their move is the first step to success and this happens when Marines and spouses have all the information they need. They should attend move classes provided by the installation Information, Referral, and Relocation program office and use official resources provided on Military One Source and Logistics Distribution Branch's (LPD) PCS Move Resources website to learn about PCS policies and procedures. These web resources

USMC PCS ADVOCACY COUNCIL
MISSION STATMENT

The USMC PCS Advocacy Council (UPAC) is an autonomous council with members that partner with Headquarters, United States Marine Corps (HQMC) to facilitate information flow between HQMC Installations and Logistics (I&L) department and Marine Corps service members and their families pertaining to the movement of families, personal property, and pets during a Permanent Change of Station (PCS). We work to identify trends and advocate on behalf of USMC families to reduce the negative effects of a PCS on quality of life and military personnel retention.

UPCA mission statement. *(Slide by Silhas Bess, UPAC Media Lead.)*

are quick to access and, among other things, provide moving checklists, an explanation of move entitlements, videos, podcasts, and links to their local DMO. Counseling is provided inside Defense Personal Property System but can also be arranged in person at the local DMO. The OCONUS sponsorship program is widely used during OCONUS moves but is underutilized for CONUS moves. Ensuring Marines and spouses are informed of and are using the most up-to-date official resources available will give them the confidence needed to be in control of their move.

Command Support

Commands play a large role in PCS support by providing the Marine adequate time to handle PCS paperwork, availability for moving obligations such as the pre-move survey and pack/load days, and guidance on seeking out Military One Source and the PCS Move Resources websites to assist during the move. Preparing for the logistical movements of a PCS takes time, and commands should afford the Marine adequate time to submit documents to DMO, attend move classes, and be present for pre-move surveys and on moving days. OCONUS moves are even more time-consuming with the need for passports, medical requirements for area clearances, pet transport, and passenger travel. Commanders need to support their Marines before, during, and after the move and be ready to provide support and offer guidance should the move develop complications anywhere in the process. Command participation provides the safety net should complications arise.

Spouse Support

Providing direct support specifically to spouses during a move is a new initiative and a huge leap forward in bridging communication gaps. In 2019, the DC, I&L began working with a group of volunteer spouses who were passionate about improving the PCS process. Initially, the intent was for spouses to communicate questions gathered from social media spouse groups to the LPD within I&L and LPD would provide official PCS resources to answer these questions. What started as a grassroots effort to help, has grown into a partnership where advocates and I&L's LPD work together to support families with specific needs during their PCS and advocate for changes to improve every move experience.

> ***"Thank you so much for your help. The resources you provided are so helpful. I feel like you are the person who cares about our move."***
> ***—UPAC group member***

The volunteer spouses of the USMC PCS Advocacy Council are organized into three tiers: lead advocates, advocate specialists, and advocate ambassadors. This team reports to local DMOs and LPD weekly and the DC, I&L monthly. Advocates are a diverse group of spouses of active-duty Marines who PCS regularly and can empathize with the challenges each family faces. Using social media spouse groups, advocates track trends and identify common issues being experienced by Marines. This allows LPD to make necessary changes and provide additional guidance as needed before issues grow out of control. Individual support is offered in the way of directing Marines and spouses to the appropriate agency for the help they need. Informative posts that provide official resources are published regularly in an effort to keep Marines and spouses up to date on PCS policy and procedure changes, making Marines and their spouses more informed consumers. The use of social media as a form of communication allows for a global reach. Having a direct line of

communication "straight to the top" allows advocates to provide the correct official resources and course of action for each family's unique needs. Their unique viewpoint offers a practical approach on how to implement official policy and procedures in a personal move. This unprecedented level of cooperation between HQMC and volunteer spouse advocates has created a direct line of open communication that was not previously there.

The USMC PCS Advocacy Council and LPD participate in a monthly panel hosted by the U.S. Transportation Command, J9 Defense Personal Property Program Management Office.

"The UPAC provides two very key services: Direct support to service members and their families during their PCS, and behind the scenes advocacy with the highest levels at HQMC. PCS moves place service members and their families in an extremely vulnerable situation-their entire lives and financial well-being depend on a well-executed move. Direct customer support empowers these customers with the resources they need to have a safe, successful move—and it's an indescribable feeling. We aren't just a call center reading from a script. We really know how to help, because we PCS too. Behind the scenes advocacy is equally rewarding. Sharing the challenges families experience in each step of the PCS with leadership has resulted in both immediate and long term policy changes. Knowing that the leadership at HQMC is not only listening, but passionate about streamlining the PCS process and easing the burden on the service member has reinstated my confidence in the USMC."

—UPAC Advocate Specialist

Advocacy at the DOD Level

The USMC PCS Advocacy Council and LPD participate in a monthly panel hosted by the U.S. Transportation Command, J9 Defense Personal Property Program Management Office. The Defense Personal Property Program Military Spouse Advisory Panel allows Service spouses to advocate for larger policy changes. U.S. Transportation Command, J9 Defense Personal Property Program Management Office owns the Tender of Service that is agreed to by every TSP, also known as the moving company, the government uses. Their position on the panel allows for requesting better move resources to be published on Military One Source and advocating for changes that improve every service member's PCS move. Recent changes implemented by U.S. Transportation Command, J9 Defense Personal Property Program Management Office, which were a direct result of a UPAC recommendation, include the addition of washers and dryers to the list of essential items when doing an essential items claim and better contract language to hold the TSP accountable when electronics are damaged in a move. Advocates continually engage policymakers with requests for clearer and improved PCS policies. Entitlements and allowances should not be difficult to understand. Advocates, working together with LPD, try to make understanding them easier for Marines and their spouses throughout the move process.

For more information on the USMC PCS Advocacy Council and to join their PCS support groups visit: https://www.iandl.marines.mil/Divisions/Logistics-Division-LP/Logistics-Distribution-Policy-Branch-LPD/PCS-Move-Resources/USMC-PCS-Advocacy-Council.

For DOD and Marine Corps-specific personal property and passenger travel information, visit the PCS Move Resources webpage: https://www.iandl.marines.mil/Divisions/Logistics-Division-LP/Logistics-Distribution-Policy-Branch-LPD/PCS-Move-Resources. Looking for the Official Personal Property page on MilitaryOneSource.mil? Visit: www.militaryonesource.mil/personalproperty.

One Marine, Any Vehicle

Bridging logistics gaps in the First Island Chain

by Maj Rachel E. Cummings & LtCol Douglas T. Pugh

>Maj Cummings is the Executive Officer of 3d Transportation Battalion. She holds a Master of Business Administration from the Naval Postgraduate School and has deployed to AFRICOM and CENTCOM as a logistician.

>>LtCol Pugh is the current 3d Transportation Battalion Commanding Officer with a background serving as a Logistician in I, II, and III MEF.

In *Back to the Future II*, Doc Brown famously quipped, "Roads? Where we're going, we don't need roads." However, the 21st-century reality fails to meet the high expectations of Brown's fictional 2015, and physical infrastructure remains a very real requirement for logistics and transportation: a reality that has particular relevance for operations on islands. The capabilities of road networks and supply chains in the first island chain (FIC) tilt the scales against a military force that relies on heavy, cumbersome, and fuel and maintenance-intensive vehicles for sustainment. A naval expeditionary force-in-readiness requires "resilient capabilities that enable us to operate for extended periods of time with limited outside support."[1] However, the infrastructure and supply chains in the III MEF area of operations (AO) do not support the current inventory of Marine Corps vehicles, and the logistics combat element must look beyond its organic equipment set and leverage local assets to provide seamless logistics support with or without roads.

Background

Operations in the FIC, especially expeditionary advanced base operations (EABO), are characterized by the use of mobile, persistent, low-signature, and economical Stand-In Forces that are integrated with naval operations.[2] This poses a challenge to logisticians as constructing iron mountains to sustain EABs is not wise, and relying on organic military equipment and supply chains may not be feasible inside the weapons engagement zone. *Force Design 2030* identifies logistics as "both a critical requirement and a critical vulnerability," and the April 2022 update is even more explicit, clearly labeling logistics as a pacing function in need of "systemic change" to enable successful execution.[3] Logistics must be delivered over long distances to distributed forces while maintaining a low signature and leveraging local resources to minimize the frequency of need for assistance from rear logistics-support areas. Within the III MEF AO, this support will often require transport along local surface lines of communication. Analyzing transportation requirements in the AO led to three principal problems.

Problem 1: Infrastructure. A 2012 assessment of the Philippine road network reported that 85 percent of roads were classified as national (or public); of that 85 percent, only 18 percent were paved with asphalt or concrete. Furthermore, only twenty percent of local roads were assessed as being in "good or fair" condition.[4] Road networks throughout the III MEF AO are often narrow, crowded, and poorly suited for the weight, size, and maneuverability of the current fleet

Actual road in Northern Luzon. Do you want to drive a Medium Tactical Vehicle Replacement here? *(Photo by LtCol Douglas Pugh.)*

of Marine Corps vehicles. Moreover, many bridges in the AO do not meet the load classification to support heavy and medium-lift Marine Corps assets.

Problem 2: Getting there. Embarkation and deployment of Marine Corps forces and equipment in the III MEF AO are far from guaranteed in an emergency given the lead time and lack of available sea and airlift assets. At present, C-130s are the only organic Marine Corps connectors in the U.S. Indo-Pacific Command AO, and cargo aircraft of any kind require operational, secure runways. Military sea lift is also extremely limited to Marine Corps units based on low inventory, competing service priorities, maintenance cycle times, and accessibility in the AO. The reality is that intra-theater lift will not support the timely deployment of Marine Corps forces, and forces operating inside the FIC should plan to fight only with the equipment available on their island.

Problem 3: Sustainment. Even if they arrive ashore, the fuel requirements to operate Marine Corps vehicles and generators are prodigious and will unduly burden forces by taxing supply chains and exposing them to enemy observation. Moreover, resupplying fuel puts forces in danger, as seen in Iraq and Afghanistan where these types of resupply missions accounted for ten percent of U.S. casualties.[5] The average price the Marine Corps paid for a gallon of fuel during Operation IRAQI FREEDOM and Operation ENDURING FREEDOM was $29.15 and surged as high as $1,000 per gallon.[6]

Additionally, driving long distances over poorly maintained roads leads to increased maintenance requirements. Repair parts for Marine Corps vehicles, like our fuel, are often unique and cannot be sourced locally unless prepositioned. Also, like fuel, repair parts are costly. For example, the hood assembly of a medium tactical vehicle replacement is $11,975, a front door is $1,054, and the wheel assembly is $4,241.[7] While ground vehicle repair parts are far cheaper than aviation repair parts, the procurement costs remain steep compared to local alternatives where the average cost of a 5-ton, 16-foot bed cargo variant vehicle in FIC can be purchased for under $15,000 (often with warranty).[8] Against peer adversaries, the likelihood of having to replace assets due to attrition is high. Our current Marine Corps vehicles fall short of *Force Design 2030*'s vision "because they are difficult to transport and operate in the littorals, they require significant quantities of fuel, and they are challenging to maneuver on fragile host-nation infrastructure."[9] Successful EABO rely upon minimizing the amount of outside sustainment required, and every drop of fuel and each repair item from distant sources increases the signature of stand-in forces.

... EABO rely upon minimizing the amount of outside sustainment ... every drop of fuel and each repair item from distant sources increases the signature of stand-in forces.

Current initiatives: One Marine, Any Vehicle

Fortunately, the Marine Corps is not defined "by equipment, aircraft, vehicles, or organizational structures."[10] Throughout our history, we have demonstrated our ability to innovate, harness ingenuity, and weaponize flexibility to fight and win our Nation's wars. The *Tentative Manual for EABO* calls for the employment of "numerous, small, versatile transportation assets [that] permit naval logistics to disperse, enables maneuver and mobility, and provides resilience across the force."[11] While our current inventory does not fit this bill, locally available transportation assets that are suited for local transportation networks and supported by existing supply chains are abundant in the III MEF AO (e.g., cargo vehicles, material handling equipment, small boats). Additionally, procuring these items infuses money into local economies, improving relationships between the populace and Marines. The "One Marine, Any

Civilian cargo flatbed. *(Photo by LtCol Douglas Pugh.)*

Vehicle" (OMAV) initiative seeks to use those readily-available assets to bridge logistics gaps in austere environments between the limits of our current equipment and the forces needing support. The OMAV program trains Marines to assess, procure, and use local vehicles and equipment while sustaining them on indigenous supply chains.

Initiative 1: Stick shift training. The OMAV initiative began at 3d Transportation Battalion (3d TB) in June 2021 when leadership identified a need to operate civilian cargo vehicles to bridge the gap in the FIC between where organic Marine Corps vehicles could and could not travel to sustain forces. Also, since the majority of locally available cargo vehicles in the III MEF AO have manual transmissions, 3d TB saw a need to train motor-vehicle operators to drive a stick shift, since 3531s are not trained to operate manual transmission vehicles at the schoolhouse. In August 2021, the battalion established a manual transmission course that familiarizes Marines with the basics of driving manual transmission vehicles, involving a three-day curriculum consisting of classroom instruction, practical application, and a test for licensing. To date, over 100 Marines from across III MEF have graduated, and the course is sustained by integrated cooperation with Combat Logistics Regiment 3 and its subordinate battalions. In April 2022, 3d MLG established a contract to allow units to rent local cargo vehicles for training and exercises. The manual transmission course sets the foundation for 3531s to apply their skill set to any motor vehicle—as any operator knows, if you can drive a stick shift you can drive an automatic but not necessarily vice versa.

Initiative 2: Small watercraft. In November 2021, 3d TB and Combat Logistics Battalion-4 expanded OMAV to include small-boat operations to provide the MLG additional operational flexibility and sustainment capabilities in the III MEF AO, as most of its islands have locally available watercraft that Marines can use to provide transportation support where road networks are poorly maintained or do not exist. This idea came from 3d TB's Motor Transportation Company unit with vast experience operating throughout the FIC.[12] Developing this skill set also reduces the requirement to rely on sibling services for watercraft in the littorals. Expeditionary Operations Training Group facilitated combat rubber raiding craft coxswain courses for motor vehicle operators from 3d TB and Combat Logistics Battalion-4 in November and December 2021. These courses provided the initial capability required for follow-on experimentation with small boat-driven logistic support tactics, techniques, and procedures (TTPs). In February 2022, these coxswains, along with support from CLR-3, 3d Landing Support Battalion, and the Air Force, successfully used small boats to conduct class I resupply to 4th Mar by retrieving air-delivered packages from open water in the East China Sea and delivering it to supported units ashore in Okinawa.

Small boats as logistics vehicles. *(Photo by LtCol Douglas Pugh.)*

Way Ahead

The OMAV initiative aims to strengthen the Marine Corps' ability to leverage the principles of logistics—responsiveness, simplicity, flexibility, economy, attainability, sustainability, and survivability—during EABO. It increases persistence by reducing "reliance on fixed bases and easily targetable infrastructure," and improves survivability by reducing easily recognizable military footprints and fuel consumption requirements.[13] There are several viable avenues to expand the initiative and maximize its benefit across the

In November 2021, 3d TB and Combat Logistics Battalion-4 expanded OMAV to include small-boat operations to provide the MLG additional operational flexibility ...

force, including local MHE and power generation and power storage.

As the number of combat rubber raiding craft coxswain course graduates increases, we will incorporate small boats into more training exercises to move Class I and IX, develop TTPs, and identify shortfalls. We also seek to establish a maritime leader's course to further develop small-watercraft capability and provide this skill set to commanders. The maritime leader's course, similar to mountain leaders' and jungle leaders' courses, would create Marines capable of advising commanders on how to incorporate watercraft into their logistics plans. Course requirements would include the coxswain course, small engine repair courses, water navigation training, and advanced education on boat maintenance and capabilities. With the manual transmission course serving as an initial building block, the next step is to "take this show on the road," testing the concept in realtime by integrating locally procured vehicles into field training events and bi-lateral or multi-lateral training exercises. Further experimentation under realistic conditions is required to refine TTPs and identify the sets of conditions that favor either local procurement or organic transport options. Local procurement reduces mobility footprints, but it does not entirely replace organic equipment and sustainment models, as there is a time and place for both. We are actively training field ordering officers and working with 3d MLG's Expeditionary Contracting Platoon for solutions to better support this vision.

It may be argued that a weakness of civilian cargo vehicles and watercraft is they lack the force protection and defensibility of organic military equipment and that they are not suited to existing TTPs. Additionally, one could point out the risks of relying solely on local supply chains and resources to support military forces. We counter that the vision of OMAV is not to replace but rather to augment our current force with a low-signature, low-cost, sustainable solution that bridges the gap where our organic assets are either unsuited or incapable of operating. EABO simply requires certain logistical methods our organic assets do not provide. Furthermore, regarding defensibility, these locally procured assets are cheap enough to be abandoned and replaced when our forces are threatened—they are not meant to become an Alamo.

... whether it is accomplished by medium and heavy-lift tactical vehicles, small boats, or local cargo trucks, sustainment success is ... delivery of the right things, to the right place, at the right time.

The current set of Marine Corps ground vehicles is ill-suited to operate in many parts of the III MEF AO, especially the FIC. At its core, OMAV fosters a mindset of adaptability and develops broadly applicable skill sets that embody the characteristics of EABO. While emerging acquisition models may address this obstacle, OMAV offers the ability to bridge the gap *now.* Further experimentation and the resources to execute that experimentation in a wide variety of realistic environments are essential to identifying and mitigating drawbacks to using locally procured assets. Ultimately, whether it is accomplished by medium and heavy-lift tactical vehicles, small boats, or local cargo trucks, sustainment success is measured not by the mode of transport but by the effective delivery of the right things, to the right place, at the right time.

Notes

1. Gen David H. Berger, *Force Design 2030 Annual Update: April 2021*, (Washington, DC: April 2021).

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5. Theodore Shanks and Alexander Gard-Murray, "Fossil Fuels are the Achilles' Heel of Warfare. Just Ask Russia," *Defense News*, May 3, 2022, https://www.defensenews.com/opinion/commentary/2022/05/03/fossil-fuels-are-the-achilles-heel-of-warfare-just-ask-russia.

6. Maj Andrew Butler, "Optimizing Marine Corps Energy," *Marine Corps Gazette* 106, No. 2 (2022).

7. Prices current as of March 2022 per Global Combat Support System-Marine Corps.

8. MCIPAC Camp Butler Regional Contracting Office contract bids on behalf of 3d TB in spring 2022. Authors maintain pricing bids.

9. Gen David H. Berger, *Force Design 2030 Annual Update: May 2022*, (Washington, DC: May 2022).

10. Gen David H. Berger, *The 38th Commandant's Intent*, (Washington, DC: 2019).

11. *Technical Manual for Expeditionary Advanced Base Operations*.

12. The idea came from 1stLt Alexander Crape, 3d TB Motor T Company Executive Officer. It was supported by 3d Expeditionary Operations Training Group Commanding Officer LtCol Christopher Frye.

13. *Technical Manual for Expeditionary Advanced Base Operations*.

Obstacles to Predictive Logistics

A method for sustainment in a communication-challenged environment

by LtCol Roy L. Miner

One of the problems confronting logisticians today is the execution of predictive logistics and sustainment in a communications-denied environment. How does the logistician ensure supported units receive sufficient sustainment to conduct persistent operations when the supported unit cannot communicate its requirements? Would it be a push system for sustainment? A pull system? Or some type of hybrid system? Additionally, how does the logistician provide sustainment while managing the physical signatures and patterns of life resupply actions of the supporting and supported units to frustrate adversary sensing and targeting activities? Does the future operating environment diminish the relevancy of employing scheduled resupply run concepts? This article discusses a hybrid push-pull model that bases the provision of sustainment on probability using pre-established cache site locations known to both the supported and supporting units in a communication-denied or degraded environment, effectively demonstrating enhancements to sustainment success despite operating in an environment of uncertainty.

The following scenario illustrates how to construct and analyze a simple hybrid push-pull model. First, assume the supported and supporting units are unable to communicate with each other. Second, assume there are three pre-positioned cache sites full of the required sustainment materiel for a supported unit in a hypothetical area of operation. Third, assume that the supported unit can only make one trip to any one of the three cache sites in a given time interval to retrieve the sustainment material. Fourth, assume that the supporting unit can only make one trip to any one of the cache sites in the same given time interval for the purpose of replenishing the cache site. If the cache is empty, the supporting unit replenishes the cache. If it is full, the supporting unit does not replenish the cache. Fifth, for simplicity, assume the supported unit attempts to retrieve the sustainment material before the supporting unit attempts to replenish the cache site. The completion of one retrieval and one replenishment attempt is considered one turn. Figure 1 depicts an example of one turn. Here a yellow-colored cache indicates a cache full of sustainment material in a hypothetical operating environment. The full turn sequence displayed in Figure 1 is initial sustainment conditions, retrieval attempt by the supported unit, replenishment attempt by the supporting unit, and resulting sustainment conditions to start the next turn.

In the Figure 1 example, the supported unit randomly chooses cache

>LtCol Miner is a Logistics Officer currently serving with Operations Analysis Directorate within Combat Development and Integration. He recently completed an assignment at Marine Corps Warfighting Lab's Wargaming Division where he served as the government lead for logistics-related wargames. A version of this article originally appeared in the December 2020 issue of the* Logistics Innovation Office Newsletter*, a monthly publication discussing innovation efforts focused on enhancing the Marine Corps logistics community.

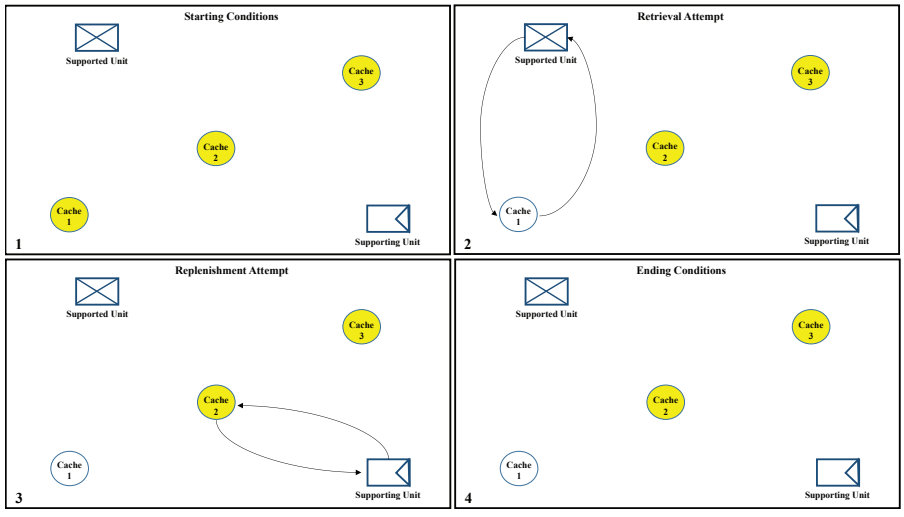

Figure 1. Sustainment Turn example. *(Figure provided by author.)*

1 to attempt to retrieve sustainment material and is successful. The supporting unit randomly chooses cache 2 to replenish; however, it is already full of sustainment. This leaves two caches full of material before the supported unit makes its next attempt to retrieve sustainment material.

What will the success rate of the supported unit be in retrieving sustainment material from the cache if it simply guesses what cache to retrieve the required sustainment from and the supporting unit also guesses what cache to replenish? To answer this question, we can employ a technique known to operations research analysts as a Markov Chain. A Markov Chain is a stochastic model that represents a sequence of probable events where the probability of the next event occurring only depends on the current conditions or state (a *chain* of events). Events that occur before the current conditions will have no effect or influence on the probability of what will occur next in the sequence of events. Table 1 depicts the scenario described above after one turn represented as a Markov Chain.

	1	2	
1	55.6%	44.4%	0.0%
2	22.2%	66.7%	11.1%
3	0.0%	66.7%	33.3%

Table 1. Cache random retrieval and replenish (after one turn).

The numbers to the left of the table indicate the possible states before the execution actions of the supported and supporting units in a given turn. That is the possible number of pre-positioned caches that are filled with the required sustainment material before the supported unit randomly chooses a cache to attempt to retrieve sustainment material. Using the example in Figure 1, the appropriate state to reference in Table 1 based on the starting conditions of having all three cache sites full of sustainment will be the third row.

The numbers along the top of Table 1 indicate the possible states after the execution actions of the supported and supporting units at the conclusion of a given turn. That is the number of pre-positioned caches holding sustainment material after the supporting unit attempts to replenish one of the three caches. Using the example in Figure 1, the appropriate state to reference in Table 1 will be the second column indicating two caches remain full at the end of the turn.

The percentages within the table cells represent the transition probabilities of the system during a single time interval encompassing one resupply attempt and one retrieval attempt. Each percentage represents the probability that the system will transition from containing the number of filled caches given on the left of the table to the number of filled caches given at the top of the table after the completed actions of one turn.

Thus, Table 1 demonstrates the possible future outcomes of caches filled with sustainment material as indicated by the column headers. The supported unit chose to retrieve sustainment material from cache 1 and left cache 1 empty. When the supporting unit randomly chooses to replenish one of the three cache locations there is a 66.7 percent chance they will choose a location already containing sustainment (cache 2 or cache 3), which results in only two caches being full the next time the supported unit attempts to retrieve sustainment (highlighted in red in Table 1). There is a 33.3 percent chance the supporting unit chooses to replenish the location from which the supported unit retrieved sustainment material (cache 1). This would leave three caches full the next opportunity the supported unit attempts to retrieve sustainment material (highlighted in blue in Table 1). Additionally, given our assumptions outlined at the beginning, no matter what cache the supporting unit chooses to replenish, there is a 0.0 percent chance there will only be one cache filled with sustainment during the next opportunity the supported unit attempts to retrieve sustainment material (highlighted in green in Table 1).

We can use this same Markov chain to determine the probabilities of how many caches will have sustainment after two attempts by the respective units simply by multiplying the matrix above with itself one time. Table 2 below shows the results of that matrix multiplication and demonstrates the probabilities for the number of caches we can expect to be filled with sustainment two time intervals from now (after two turns) given the supported and supporting units are randomly attempting to retrieve and replenish the caches. For example, given we started with three caches full in our example above, we would reference row three of Table 2 and observe there is a 14.8 percent chance there will be only one cache with sustainment after the units make two attempts at retrieval and replenishment (represented by the third row's first column in Table 2). There is a 66.7 percent chance there will be two caches filled with sustainment (represented by the third row's second column in Table 2) and an 18.5 percent chance there will be three caches filled with sustainment

What will the success rate of the supported unit be in retrieving sustainment material ... if it simply guesses what cache to retrieve the required sustainment from ... ?

	1	2	
1	40.7%	54.3%	4.9%
2	27.2%	61.7%	11.1%
3	14.8%	66.7%	18.5%

Table 2. Cache random retrieval and replenish (after two turns).

(represented by the third row's third column in Table 2) after the units make two attempts at retrieval and replenishment.

As mentioned, the Markov Chain is a memoryless model. Previous events have no bearing on the probabilities of future outcomes. Going back to the example of Figure 1, if we wanted to know the probabilities for full caches at the beginning of the next turn (that is the beginning of the second turn) after our first turn yielded the condition of only having two caches full, we simply look at the second row of Table 1 to determine the probabilities of the resulting caches for the next immediate step.

If we were to conduct this matrix multiplication over and over again, we can find the probability of the future number of expected filled caches after any number of attempts to retrieve and resupply sustainment by the supported and supporting units. In fact, after multiple matrix multiplications, we find the transition probabilities within the matrix converge to steady states. This means at any given current state for the number of caches filled, we can calculate the expected probability that there will be one, two, or three caches filled after a number of attempts at retrieval and replenishment by the supported and supporting units. Table 3 shows the steady states for our current cache sustainment system.

	1	2	
1	30.0%	60.0%	10.0%
2	30.0%	60.0%	10.0%
3	30.0%	60.0%	10.0%

Table 3. Cache random retrieval and replenish steady-states.

In this instance, where the units are randomly selecting which cache to retrieve or replenish, the Markov Chain steady-state probabilities converge within +/- two percent of the steady-state probabilities shown in Table 3 after four iterations of retrieval and resupply attempts by the supported and supporting units. This means after four turns or more, no matter how many caches are filled (the initial state), we can expect only one cache will be full of sustainment material 30 percent of the time, two caches will be full 60 percent of the time and all three caches will be full 10 percent of the time. Thus, the expected value of full caches at a given time is 1.8 (the math for this is simply [.30*1] + [.60*2] + [.10*3] = 1.8) and the steady state probability of success for the supported unit in retrieving sustainment, in general, is 60 percent (1.8 divided by 3). This assumes there are no other interfering variables such as actions from an adversary or weather which an analyst could introduce into the model's complexity to achieve a new expected probability for successful resupply. This example demonstrates a fundamental method to gain insight toward successful sustainment if employed in a degraded or denied communication environment between the supported and supporting unit.

In choosing the number of caches to employ, the logistician faces a tradeoff between the success rate of sustainment attempts and the variability in the pattern of life achieved by the supporting and supported units. Using the scenario above, a one-cache system would improve the steady-state probability of success for the supported unit retrieving sustainment material to 100 percent. However, there would be no variance in the pattern of life for the supported and supporting unit in retrieving and replenishing sustainment. A two-cache system has a 66.7 percent steady-state success probability for retrieving sustainment. In this instance, the system balances a decrease in the success probability with a small increase in the pattern of life variability. A four-cache system drops the probability of success to approximately 57 percent with a convergence to steady-state probabilities occurring after seven iterations. Despite the drop in the probability of success, there is an increase in the supported and supporting units' ability to vary their pattern of life when attempting to retrieve and replenish sustainment in the caches. Finally, as the number of caches employed in the system increases, the steady-state probabilities converge in a manner that suggests a 50 percent success rate for the supported unit in retrieving sustainment material from a cache. The number of iterations required to achieve steady state probabilities also increases and we can calculate the expected number of iterations before achieving a steady state regardless of whether the system started with all cache sites full, some full, or even all cache sites empty.

In choosing the number of caches to employ, the logistician faces a tradeoff between the success rate of sustainment attempts and the variability in the pattern of life ...

Obviously, the Markov Chains and the associated probabilities outlined in this article are specific to this scenario. The probability of success would change if, for example: the supporting unit makes two attempts to replenish for every one attempt of the supported unit to retrieve; if there were three supported units and only two supporting units involved in the sustainment system; or if there was a chance the supported or supporting unit did not make an attempt to retrieve or resupply sustainment from a cache site for any reason (which would mandate the introduction of a possible event where no cache sites are full which would be reflected as a zero to the left of the table and a zero across the top part of the table representing our Markov chain). Additionally, the probability of success increases when supporting and supported units can communicate their intentions. Nonetheless, if resupply and replenishment were completely random due to communications denial,

we have shown that the success rate for the supported unit retrieving sustainment (once achieving a steady state for the system) in the above scenario will range between 50 percent and 100 percent depending on the number of caches employed. How quickly the system converges to these steady-state probabilities depends on several factors. In our single supported unit and single supporting unit example, the primary factors are the number of possible cache sites and the number of caches filled at the beginning. However, whatever the system variables are, we can model the system with a Markov Chain once we determine the transition probabilities.

With the employment of Markov Chains in planning for a communications denied or degraded environment, logisticians and operating units can use the resulting probabilities to determine how much material using units should carry to minimize the risk of depleting on-hand sustainment, how many caches to employ to vary the pattern of life and minimize detection, how many attempts should be made to retrieve and replenish, and how much sustainment to place at caches as well as other logistics planning considerations. Markov Chains are not just limited to retrieval and resupply models. They can be applied to maintenance models to determine expected future readiness, manpower models to determine expected retention rates, and detection practices to determine rates of success and failure in finding a target, as well as other applications. In short, Markov Chains can enhance the understanding of logistics conditions in the planning and execution of operations in a variety of ways. In the scenario described in this article, we demonstrated a fundamental method of circumventing the difficulties of sustaining operations in an environment where the supported and supporting units are unable to communicate with each other.

Markov Chains can enhance the understanding of logistics conditions in the planning and execution of operations in a variety of ways.

USMC

21st-Century Medical Readiness

Lessons from MWX

by Maj Andrew P. Kettner

>Maj Kettner is a Logistics Officer currently serving as a Lead Instructor with Marine Corps Logistics Operations Group. He deployed in support of Operation Enduring Freedom with Marine Wing Support Squadron 272 in 2011 and with Combat Logistics Battalion 11, attached to 11th MEU, in 2019.

In 2019, the Marine Corps embarked on processes to streamline its combat service support structure to increase the flexibility and lethality of the MAGTF. The targets of reduction focus on ways to minimize fuel consumption and storage, ammunition requirements, and ground transportation. However, while there are many noteworthy discussions about the reduction of these combat service support functions, a larger logistics function is health service support. The lack of survivable, affordable, and redundant negatively impacts maneuver elements as witnessed at the MAGTF Warfighting Exercise (MWX), the largest and most dynamic peer-on-peer, free-play exercise in the DOD. Tactical through strategic health service support, as executed in accordance with joint, operational, and strategic publications, to include *MCDP 1-4, Competition*, should be updated. Currently, the Marine Corps purchases Navy billets for MEF's medical battalions to maintain high-demand, low-density medical specialties such as emergency room physicians, anesthesiologists, nurses, and surgeons, at the ready for FMF tasking. These sailors are often sent on temporary orders to support base hospitals. This is an example of talent mismanagement in relation to the needs of the FMF preparing for conflict and applying an expensive price for Headquarters Marine Corps in competition. Fundamentally, there is a dichotomy between the desire to maintain the best in worldwide medical care while reducing personnel and equipment in the weapons engagement zone with a smaller physical space maneuver. These observations are in addition to the complex, high-demand/low-density requirements of medication supplies. Ammunition management is simple when compared with the regulations surrounding narcotics or the means in which to provide lifesaving drugs, at the right time, for every Marine throughout the globe. To support more effective management and placement of health service support capabilities for the geographic combatant commander (GCC), the DOD must create a larger pool of volunteer surgeons, emergency room physicians, and anesthesiologists in the competition phase for deployment worldwide in the crisis and conflict phase.

Marines, sailors, and the American public expect the best medical care in locations of need to preserve life and limb and a full reorganization of the current DOD medical system is required. Small steps have already been taken but much more is required. Combat readiness is medical readiness in the fight now and in the future.

During the most recent three MAGTF MWXs, medical battalion forward resuscitative surgical system and shock trauma platoons (approximately 22 sailors) were noticeably relegated or absent. Often lifesaving medical capability was represented by four to five corpsmen. The Marine Corps' medical platoons were often small footprints, preventing commanders from having to truly manage the large authorized medical allowance list and support structure required to support medical care supplies that were needed to care for the notional injuries.

Discussions within the training audience of the MAGTF MWX focused on how close or far away the forward resuscitative surgical system should be established to care for what ultimately leads to less than twenty notional wounded in action. The most recent MWX did not provide in-depth medical scenarios for the assigned battalion corpsman to practice their craft. These examples demonstrate the ease to plan away—through the lack of Medical Battalion participation and game rule design—and the very difficult application of health service support in the conflict phase.

One positive takeaway from the most recent MWX, which was not seen in earlier iterations, was commands' attempts to regain combat power through the use of the battalion aid station. Reality aside and previously noted this clearly demonstrates the need to make the lifesaving capabilities present at the lowest maneuver commands. Lifesaving cases should no longer be viewed as an exquisite capability but instead should exist in every battalion during the conflict phase of operations. In support of a

clear need but lack of ability for a more responsive health service support solution, the DOD should advocate for the establishment of a health service support functional command, adjacent to the GCC and tasked with support to the command's requirements. The Department of the Navy should also make a change to current recruiting processes for specific medical professionals in the competition phase, as well as a reorganization of medical capabilities within the MAGTF. These proposed changes will ensure more effective medical and combat readiness facilities by a DOD health service support command. The Marine Corps and DOD should accept if the technology existed to make medical equipment and medications smaller, faster, and cheaper, the civilian economy would have done it already. The DOD, and the Marine Corps as an advocate, should make bold changes now to better prepare for the next conflict.

To gain the funding needed to recruit and maintain a much larger pool of medical professionals the Department of Navy, Department of the Air Force, and Department of the Army should no longer manage the training and management of health service support within their Services. A separate and new functional command will take on the task of managing and assigning correct capabilities to the GCC for execution. The recommended newly established functional command will coordinate with assigned GCC's assigned logistics lead services throughout the globe to support base operations support integrator requirements. Finally, the recommended new functional command will manage all U.S. military hospitals and assigned primary care physicians. The functional command will coordinate with Tricare to manage training opportunities for high-demand, low-density doctors with needs of the active-duty forces' preventive and routine medical requirements throughout the phases of the competition continuum. On behalf of the Marine Corps and Navy, the Department of Navy will advise the newly established health service support function to meet requirements.

The Department of Navy will continue to support Title 10 recruiting efforts for medical personnel. Corpsman recruiting processes are unchanged in this recommendation. However, in the future, DOD and the new health service command will provide funding to public and private hospitals to support doctor and nurse training. The DOD will also require recruited doctors at those hospitals to sign agreements to serve during periods of crisis or conflict, determined by the DOD. These doctors and nurses will enter an inactive commissioned status during the competition phase. Similar to the program used by the DOD with United States-flagged airliners, the Department of the Navy will coordinate with the health service support functional command to activate highly trained and specific capabilities from civilian hospitals when needed during crisis and conflict.

An example of this future process would involve the GCC providing a requirements capability to the health service support command. The functional command could then activate a doctor or nurse as an O-3 or O-4 paygrade, and then following a short military indoctrination course, deploy. At the proposed short military indoctrination course, if a doctor or nurse is slated for deployment in support of the Army, the individual would review peculiarities to that Service—same with the Space Force or Marine Corps. If this proposal was enacted, the new structure would increase medical specialties across the phases of conflict, reduce the price of maintaining redundant health service support for the Services, and reduce the need to manage base hospitals.

While Naval Logistics Integration efforts between the Marine Corps and Navy continue to improve, an area sorely lacking is the medical logistics system. Effective and responsive in the competition phase, the current pull system and the requisitioning process will not support medical supply requirements in crisis or conflict. Particulars of planning health service support are not a high-priority training and readiness standard with logistics Marines and commissioned officers. The closest Navy medical planner for a battalion is found at the major subordinate element. Tactical logistics planning factors are understood regarding the use of 5.56 mm rounds but under the current construct, narcotics, and even notional required antibiotics quantities are foreign to Marine planners until absolutely needed. To support training that is more effective and gain familiarity with the medical logistics process, the Marine Corps should change the table of organization and move the current medical battalions under the MEF Divisions. This newly structured medical battalion will maintain a training allowance" of fifteen percent of current-day organization but could adjust based on the health service support functional command and FMF expectations. This training allowance of capability will primarily serve the role of training the FMF leadership and participating in select training events outlined by the GCC, MEF, or division—like the training and readiness team currently embedded with the Marine Logistics Groups.

There are issues within the Department of Navy, which negatively impacts medical and combat readiness. MWX demonstrates a lack of realistic tactical health service support considerations. This is not due solely to a lack of effective equipment but also a mismanagement of talent. The Department of Navy should advocate to the DOD and Congress to establish a new functional command. The Marine Corps should create a new training element or battalion within MEF Divisions. The littoral logistics battalion is assigned to a division regiment, why not a medical battalion? These implemented recommendations will reduce fiscal strain in the competition and increase FMF medical and combat readiness in the competition through the conflict phases of war.

USMC

Functional Medicine for a Functional Force

Military healthcare and readiness

by LtCol L. Terrell "OC" Watts

A functional medicine approach to military healthcare is the next progressive step toward ensuring the readiness of the force. For many, if you were like me a year ago, when I started to experience what I believed were just signs of aging, you may have never heard of functional or integrative medicine. Terminology such as allopathic or osteopathic may be completely foreign to you unless you happen to be one of our many great military medical professionals. If we truly want to maintain a healthy and ready force, I argue that these terms should become part of the normal lexicon and practice within military health care. If you experience difficulty sleeping, joint pains, brain fog, high blood pressure, or any other number of physiological or psychological issues, the great news is functional medicine and nutrition may be able to put your body back into a state of overall wellness.

Too many service members spend their days suffering in silence because our allopathic approach to medicine fails to get to the ailment's root cause. The *Merriam-Webster Dictionary* definition of allopathic is "relating to or being a system of medicine that aims to combat disease by using remedies (such as drugs or surgery), which produce effects that are different from or incompatible with those of the disease being treated." I argue allopathic, or western medicine, plays a critical role in military medicine when it comes to acute injuries that commonly occur in combat. If someone breaks a limb, has a head trauma, or any number of injuries, we need specialized medical professionals capable of stabilizing and treating those injuries at the moment to ensure survival and eventual recovery. Allopathic medicine has its place but not to the exclusion of all else. The problems that lead to life-long suffering come post-initial injury or once a disease has set in well enough to manifest active symptoms. If the medical establishment (i.e., medical schools, institutions, legislation, and policies, etc.) broadens its perspective on an evolutionary way of thinking, training, and practicing a more osteopathic approach, we can optimize medicine to promote healing and longevity.

The *Merriam-Webster* definition of osteopathy is "a system of medical practice based on a theory that diseases are due chiefly to loss of structural integrity, which can be restored by manipulation of the part and/or supplemented by therapeutic measures (such as, use of drugs or surgery)." In layperson's terms, the human body is a complex system in which degradation in one part creates problems throughout the entire mind/body system. In order to ensure excellent health, the entire human mind/body has to function properly. If you were to talk to a doctor of osteopathic medicine, they would tell you that the body has a phenomenal ability to heal itself if you can get to the root cause of disease or disability and fix it. In our current medical system, we typically do not fix root causal factors; instead, treat symptoms with medication and accept that the body has to adapt to the problem vice repair itself. Medication serves a role but imagine a world in which the body heals permanently because we remove the factors that inhibit healthy internal functionality.

Too many service members spend their days suffering in silence because our allopathic approach to medicine fails to get to the ailment's root cause.

From my personal experience throughout the last 21 years in the Marine Corps, I can definitely say holistic healing is possible and not difficult to accomplish. Fifteen years ago, while undergoing Officer Candidate School, well-intentioned medical providers gave me medication to control the blood pressure issues I was having during training. At the time, I was told that I was healthy and already living a good lifestyle so medication was the only option. Fast forward fourteen years, and while dealing with other health issues, I developed a professional

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An osteopathic physician at Naval Hospital, Jacksonville, provides an alternative modality to evaluate and treat patients in a hands-on fashion. *(Photo by Jacob Sippel.)*

relationship with a talented civilian, a doctor of osteopathic medicine, who talked to me about the body as a system, the importance of gut health, the microbiome, DNA gene expression, reducing/eliminating chronic inflammation, and toxins in the body in order for the body to start to heal itself on a cellular level. One of the doctor of osteopathic medicine's first recommendations was a diet change aimed at inflammation reduction. In my case, I changed my diet by eliminating gluten and processed foods, reducing sugar intake, and a few other things. A short 48 hours later, my blood pressure went down without medication, and it has remained consistently excellent for over one year now. I just wonder had if any of the military medical professionals I have worked with during the previous fifteen years had taken an osteopathic approach, would I have been healthier in general? In addition to fixing my blood pressure, using food as medicine also fixed my vision issues, joint pains, brain fog, and sleep quality issues that I had simply associated with getting older. If we take a functional medicine approach and focus on health and longevity, getting older does not have to mean deteriorating.

Ponder how many people you are in contact with every day who are dealing with some sort of ailment that could be fixed if the time was taken to discover the root cause. I have personally talked to Marines who have trouble sleeping, chronic pain, hypertension, and a slew of other issues for which they believe nothing can be done except taking medication that does not always seem to help or worst sometimes invite new symptoms. They may never be introduced to things like Photobiomodulation (Red Light Therapy), Frequency Specific Microcurrent for pain management/elimination, body detoxification for mitochondria health, or food as medicine.[1] If knowledge, and application of that knowledge, is power, then we must empower our health care system and its professionals through functional medicine training to create greater general health within the DOD.

Every year service members are required to do a physical health assessment in which we talk to a doctor about what, if anything, is wrong physically or emotionally. I would offer that part of our yearly evaluations should be a series of tests that look at nutritional levels, toxins, and the diversity of the microbiome, which has a tremendous effect on brain health. We already look at heart health, dental health, visual acuity, and hearing, due to their importance, and so that we have a baseline from which we can track unhealthy deviation. The additional stool, urine, and blood tests, recommended in an osteopathic approach, would provide further insight. The individual health of each service member would be better assessed and addressed at the yearly physical health assessment conversation with the doctor and would in turn become a more productive means to enhance longevity and health, thus increasing the longevity and fighting strength of our military forces.

As demonstrated by Continuing Medical Education, there is always room for medical professionals and systems to grow and evolve. The military too must evolve in its management of the health of military personnel. My personal story of improved health while dealing with early-onset Parkinson's disease is anecdotal proof from one person that an osteopathic approach works. In the near future, using a functional medicine approach I will be symptom-free. The process of true healing has begun!

Notes

1. Ari Whitten, *The Ultimate Guide to Red Light Therapy: How to Use Red Light and Near-Infrared Light Therapy for Anti-Aging, Fat Loss, Muscle Gain, Performance, and Brain Optimization* (Scotts Valley: CreateSpace Independent Publishing Platform, 2018); Michael Hamblin and Ying-Ying Huang, *Photobiomodulation in the Brain Low-Level Laser (Light) Therapy in Neurology and Neuroscience* (Cambridge: Academic Press, 2019); Carolyn McMakin, *The Resonance Effect How Frequency Specific Microcurrent is Changing Medicine* (Berkeley: North Atlantic Books, 2017); and Dave Asprey, *Super Human The Bulletproof Plan to Age Backward and Maybe Even Live Forever* (New York: Harper Wave, 2019).

Bridge to Nowhere

How the divestment of bridging capabilities has limited our ability to maneuver and sustain

by 1stLt Katherine Schumann

Combat engineers currently conduct mobility, counter mobility, engineer reconnaissance, and general engineering missions. Those tasks require ingenuity, determination, and wit. In the past, gap-crossing operations consisted of Improved Ribbon Bridges (IRB) and Medium Girder Bridges. After *Force Design 2030*, engineers are without those tools at our disposal. *Force Design 2030* rewrote the playbook for engineering with the diminishing of engineering capabilities for gap crossing and breaching with the divestment of standardized bridging and armored breaching vehicles. Seeking to adjust the non-expeditious pieces of equipment from the table of equipment is expected as one of the interior bays of the IRB weighs approximately 14,000 pounds and is 6.92 meters long and 8.63 meters wide. This piece of equipment can take up quite some space on a ship. While the IRB is colossal, the IRB or some gap-crossing engineering asset is necessary for future operations in a distributed environment in littoral areas of operation.

An IRB is used for tracked, wheeled, and foot traffic to cross a body of water. While there are many other applications for the IRB, we will primarily focus on gap crossing as a highly valued asset for the next fight. The IRB is a two-way aluminum roadway that floats on the water with two variations: a continuous span and a raft formation. A continuous span reaches from one shoreline to the next; the bridge can span up to 210 meters in one IRB platoon. In the rafting formation, the IRB can adjust from a maximum of a seven-bay raft to a four-bay raft. A seven-bay raft can be assembled, in its entirety, in twelve minutes. The seven-bay raft can transport up to 140 military load classification from shore to shore. The raft is propelled by Bridge Erection Boats (BEB) on either side of the raft that can cover a 300-meter gap in 16 minutes with a full load.[1] The bays which make up the bridge assembly can be transported most commonly by LVSR-18s or CH-53s.

>1stLt Schumann's bio was unavailable at the time of printing.

Force Design 2030 *rewrote the playbook for engineering with the diminishing ... capabilities for gap crossing ...*

While conducting wargaming operations over the past three years, the question of gap crossing continues to be brought to light. In multiple scenarios to cross rivers and intercoastal waterways spreading through different countries, the mainstay was the need for an expeditious dependable gap-crossing asset. IRBs provide a means to cross a gap, whether from island to island or in a situation to maneuver a force forward in a contested environment. New doctrine focuses on *Force Design 2030* and places more of an emphasis on integration with the Navy with continued integration at all levels.[2] Currently, the Marine Corps does not have autonomous gap connectors, vice air, to bring supplies from one EAB to another; this could cause severe logistics and resupply chain issues.

"Distributed Lethality is the condition gained by increasing the offensive power of individual components of the surface force (cruisers, destroyers, littoral combat ships [LCSs], amphibious ships, and logistics ships) and then employing them in dispersed offensive formations known as hunter-killer SAGs."[3] Ship-to-shore maneuver is one of the most challenging operations due to the lack of concealment; therefore, the need for offensive power projection on littoral connectors arises as one of the most prominent necessary features for effective maneuver to shore. The 9th Engineer Support Battalion conducted HIMARs employment from an IRB and achieved effects on target from the water, making this a protection method while conducting ship-to-shore operations. BEBs are the boats tied to the side of the IRB and maneuver the floating bridge to the landing site, and the BEB can support a 240B machinegun as another method of deterrence. Distributed lethality on other ship-to-shore connectors is not currently available.

Our constant pursuit of over-the-horizon deployment requires ship-to-shore connectors to travel a further and further distance; the CMC's vision is to fill this gap with the Stern-loadable Light Amphibious Warship, but what is the solution in the meantime? There are currently two alternatives for littoral connectors with the IRB's decomissioning: the Landing Craft Air Cushion and the Littoral Craft Utility. The Navy owns the Landing Craft Air Cushion, and the Marine Corps uses them to provide ship-to-shore transportation. They have a 200 nautical mile (nmi) range with payload and consume 5000 gallons of fuel. With the requirements for maneuver increasing in a pacing threat technology challenge, the range for the Landing Craft Air Cushion has

Gap-crossing capabilities are required to enable ground mobility in the littorals. *(Photo provided by author.)*

a growing concern with the amount of fuel consumed from on trip to shore. The Landing Craft Utility is the other alternative and is a slow-moving behemoth that takes up to four hours to move inland from the ship. Maneuver from the sea doctrinally becoming the main effort and with a growing desire for speed and massing forces ashore to create expeditionary advanced bases; littoral connectors need to be efficient and swift.

Additionally, distributed lethality requires maneuver space on the battlefield; many fresh and saltwater rivers cascade through the coastal and intercoastal regions. Dry or wet, require engineering bridges to gain access and quickly impose our will on the enemy. The distribution of forces in the EAB concept will require quick emplacement of small nodes that will require transportation to and from their location, and this requirement will need some gap-crossing capability for any wheeled, tracked, or towed asset ranging from ULTVs to HIMARs. Speed is the cornerstone of lethality, and without the capability to pass over gaps quickly, there is no expeditious way to cross a gap vice a rope bridge, which does not offer a way to cross rolling stock.

The Marine Corps continues to conduct humanitarian efforts globally with food, water, and medicine. Over 90 percent of today's population live within 10 kilometer of a waterway or coastline. At the 8th Engineer Support Battalion, the IRB platoon conducted a proof of concept to deliver fuel and water across a wet gap in 2020. Three 3,000-gallon bladders were placed on the raft and transported across the New River waterway with Bulk Fuel Company. On the other side of the waterway was a 20,000-gallon bladder; after two trips, the IRB had successfully replenished the fuel supply across the New River. In December 2020, IRB enhanced its capability by providing the Battalion with over 3,000 gallons of fresh water from the raft over five days. The implications of this feat are endless with the ability to provide fresh water to a population during a humanitarian crisis up and down a coastline or waterway and maintaining multiple floating rafts for multiple mobile water points. Within those hubs for water, we could also replenish the population with MREs and other food and first aid sources. Maintaining a trauma center on the raft is also possible with BEBs providing transportation to and from the mobile hospital cell, allowing a central location for trauma care. In addition, the doctors could provide patients with level III trauma care while traveling to another casualty collection point. The humanitarian capabilities of the raft are limitless and could provide constant care during a humanitarian crisis.

Combat engineers are enablers of maneuvering in a contested and rigid terrain environment. Gap-crossing assets are necessary for speed and lethality on an objective in an expeditious environment, specifically near waterways. The lack of gap crossing assets the Marine Corps currently is equipped with lacks the foresight for a gap-crossing challenge. IRB systems are critical to the future fight no matter the mission; a replacement needs to be prioritized for speed and massing forces on the objective, whether that be a hostile or humanitarian objective. Bridging is a necessary component of the MAGTF and cannot be overlooked or understated.

Notes

1. Headquarters Department of the Army, *TM 90-13 River Crossing Operations,* (Washington, DC: September 1992).

2. Headquarters Marine Corps, *Technical Manual Expeditionary Advance Base Operations,* (Washington, DC: 2021).

3. Thomas Rowden, "Distributed Lethality," *Proceedings* 141, No. 1 (2015).

AI, Robotics, and Process Automation

Can emergent technologies change the way we look at Marine Corps logistics?

by MGySgt Jose J. Sanchez

Imagine you are currently forward deployed to support a military operation as part of a logistical unit. The Marines you are supporting need two critical components for an aircraft to ensure the plane remains operational. You receive the request and track it in the system as it has already been input due to predictive analytics and with the help of telemetry. Immediately, the system finds several of the parts in multiple locations within a ten-mile radius. The system then performs analytics reports to ensure the part will be taken from the section that indicates less usage per day of that particular part, thus not interfering with other operations. Once all of these actions are complete, a signal is sent to the part's location where a robot is deployed to retrieve the part and then hand it off to a Marine who packages it and prepares it for movement. Concurrent with all these steps, an autonomous drone takes off to retrieve the part and deliver it to its final destination.

The second part is identified by the system to be located in the Camp Lejeune Supply Management Unit. Immediately, a robot is deployed to retrieve the part and hand it over to a Marine. The Marine scans the item, and it provides choices for the various modes of transportation the item will require based on what it will endure on the way to its final destination. For example, the Marine knows this part will go from Camp Lejeune to Norfolk, VA, via truck and then be sent to a different destination by plane. Based on this information, the Marine performs only the necessary flexible packaging needed to account for the movement by truck and aircraft, thus avoiding unnecessary packaging while maximizing aircraft space and fuel consumption. The Marine is also able to print all required customs, hazardous materials documents, and marking requirements to avoid frustrated cargo while en route. Once the item has completed the first leg of the trip and upon review of the item's information, a Marine ascertains that the part will be now taking a short trip by water, where it will be picked up by a drone for transport to the final destination. The Marine understands that the packaging necessary to ensure the part is not damaged while being transported by water is different from the current packaging used to get it there by plane. Further, the Marine also understands that the drone transport will require subsequent packaging. The Marine performs the implementation of the flexible packaging and sends the item by boat. Once it arrives at the short destination, another Marine removes the outer packaging, leaving only the packaging required for transport by the drone. The autonomous drone picks it up and delivers it to the destination. All this was initiated by a message sent by the part indicating a malfunction and Marines managing the systems to ensure the process ran smoothly.

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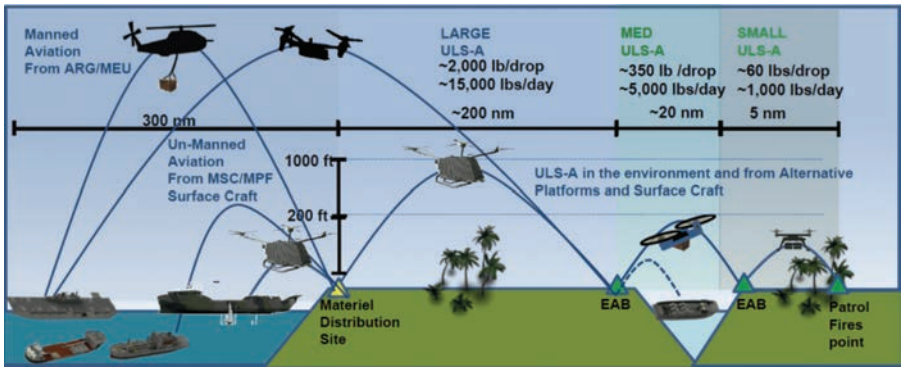
"Our intelligence is what makes us human, and AI is an extension of that quality."
—Yann LeCun

Early Uses of AI

Artificial intelligence (AI) and robotics are not new concepts. In fact, these technologies have been part of our daily lives for the past two decades.



Autonomous drone employment in tactical logistics. *(Photo provided by author.)*

These technologies have been utilized as far back as the mid-1970s for military applications. Particularly for the logistics field, one of the first broadly used AI was during Operation Desert Storm. The DOD, in collaboration with private industry, introduced the Dynamic Analysis and Replanning Tool (DART), an AI program designed to optimize the scheduling of supplies and personnel as well as manage logistics hurdles faced during the Gulf War. The U.S. Transportation Command implemented Dynamic Analysis and Replanning Tool, and after its launch, the Dynamic Analysis and Replanning Tool delivered positive results resulting in millions of dollars saved.

While machines/robots and AI have been part of our lives, we often do not acknowledge their widespread use because we imagine a robot to be something like in the movies, where they talk, think, and, in some cases, even take over the world. However, think of your kitchen. Most of us have dishwashers, microwaves, ovens, and refrigerators. These items are examples of early robots and facilitate and spare us from many laborious tasks while making them look easy and convenient. Another example is traffic lights, which measure and help manage the traffic conditions on our roads. Traffic lights can adjust depending on traffic, all while maintaining a level of safety for both pedestrians and drivers. So, if technologies such as these are part of our daily lives and have been for so many years, why are so many people—especially military members—still skeptical?

"Artificial intelligence is the future and the future is here."
—Dave Waters

What are Robotics, Robotics Process Automation, and AI?

Robotics is the study of robots, and robots are machines designed to do specific tasks or processes. These jobs can either be accomplished by the machine or with the help and interaction of a human.

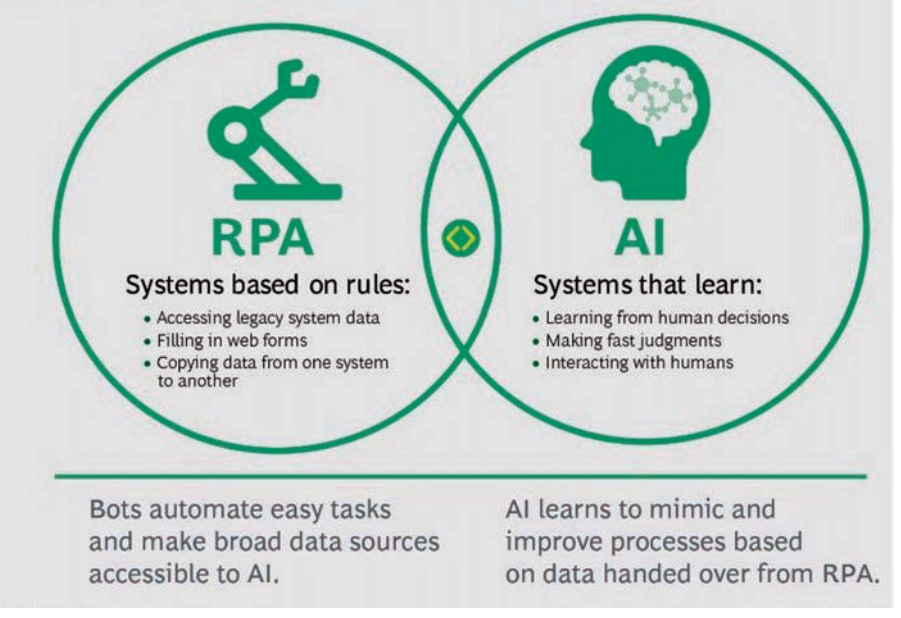
Robotic Process Automation (RPA) is software robotics that uses automation to mimic back-office tasks of individuals, such as extracting data, filling in forms, and moving files. RPA can autonomously complete the execution of many jobs. Think of RPA as a software robot that lives in your computer doing the things you do not like doing.

AI is a branch of computer science that can imitate human intelligence, but "human intelligence" is one of those footlocker words. The definition of intelligence can be debated, and the answer will most likely change. However, for this article, AI provides functions like reasoning, learning, problem-solving, and even quick decision making.

Can the Marine Corps Logistics MOSs Remain Competitive Against Our Future Enemies Without Maximizing Technology?

With all the hype surrounding AI, many industries claim to operate with AI technology by pointing to just about anything a computer can do. This includes traditional programs like a statistical database or even accounting. Unfortunately, many in our MOSs have the same misunderstanding of AI, robotics, and RPA, including the many benefits these technologies can bring to our current jobs. To that point, how can we implement something we do not quite understand? While we may not fully understand this technology and the full breadth of what it can do for and with us, we do already use robotics in the Marine Corps and the large warehouses. In the supply units, specifically the Supply Management Unit, they have a section called "carrousel." This section is an early implementation of robotics and helps the Marines operating it to find orders and bring supply items for distribution and processing. When the carrousel is fully operational, it brings plenty of advantages by eliminating human errors, improving accuracy while maintaining speed, and reducing time constraints. Other uses of robots are forklifts, pallet jacks, and car lifts. Why do we still have reservations when it comes to AI or robotics?

I argue the main reason Marines are skeptical is the deficient performance and reliability of poorly developed systems in the past, such as the Global Service Support System (GCSS) Marine Corps. I have been in the Marine Corps for over 21 years, and the problems identified when I was a young Marine in GCSS continue to be an issue today. GCSS has become one of those too-big-to-fail programs in which, unfortunately, some active-duty and many retired senior officers and enlisted



AI (machine learning) and robotic process augmentation. *(Image provided by author.)*

"GCSS's antiquated technology fails to maintain the pace with our near-peer competitors. It lacks the ingenuity required to meet future force objectives. Specifically, align Expeditionary Advanced Base Operations (EABO) with Marine Corps Logistics. In better words, the Corps does not have a logistics system equipped to support the future fight!"

—MGySgt Jeff Gibson

Marines continue to advocate on the program's behalf. This continued misplaced support of a failing system has caused many Marines to resist innovation without sound reasoning. Still, with all the technology available today, we in the logistics fields should not allow past experiences to dictate the approach we take moving forward.

"By far, the greatest danger of Artificial Intelligence is that people conclude too early that they understand it."

—Eliezer Yudkowsky

Can the Marine Corps Take Advantage of Current Technology and Change How We Do Logistics?

One of the challenges we face is the fallacy of believing process improvement and automation of a current process are the answer to our future challenges. To combat the future fight with near-peer adversaries, we need to re-engineer the way we do logistics completely. While words such as "hybrid" logistics can be encouraging and open the door for "new" ways to do business, they need to be banned from our minds as they now do more harm than good. Instead, we need to take advantage of technology fully and leverage our industrial base. We need to re-engineer our processes to match the capabilities of the technology vice having the technology try to match our antiquated methods, which have not changed since World War II. Currently, two of our processes are *Just in Time, Logistics*, and *Hub and Spoke*. These methods were developed to provide cargo management while in theater (moving cargo in between several areas designed to increase transportation efficiencies and in transit visibility to reduce order ship time). They have proven to be effective in a passive semi-contested environment. However, it still has many issues, such as a fragile distribution process and an easily targeted logistics supply chain. Having a balance can be challenging; however, AI can help us navigate by cutting through our biases to look at things in a more pragmatic way and stay ahead of our near-peer adversaries. Our old processes, while still playing a vital role, should take a back seat and make room for our main effort: AI.

I have been in the Marine Corps for over 21 years, and the problems identified when I was a young Marine in GCSS continue to be an issue today.

AI, robotics, and RPA can give us the flexibility to combine occupational fields and become more effective. For example, machines can now perform a big part of many logistic MOSs. I am not advocating for getting rid of MOSs; instead, I am advocating merging fields and filling the gaps with AI, robotics, and RPA. Let the machines do what the machines do best and let Marines do what they do best. Let the aggregate of the two be more significant than each individual combined. As defined in business terms, let one plus one equal three or four!

"Building advanced AI is like launching a rocket. The first challenge is to maximize acceleration, but once it starts picking up speed, you also need to focus on steering."

—Jaan Tallinn

Is It Time to Start Thinking About the Differences Between How We Operate in Garrison And How We Will Operate While Deployed?

Many Marines would argue, what would happen when we deploy and do not have the convenience of technology? While the adage, *we train how we fight* is a genuine concept, many have misunderstood its roots. Technology is part of the new world, we should embrace it and master it. Perhaps allowing technology to help us navigate our daily tasks during times of peace could free our Marines to train for the inevitable fight in a contested environment where technology is not available. Machines do not need rest, only maintenance. These machines can operate 24 hours a day, 7 days a week, which can reduce customer wait time tremendously and with minimum human interaction. We should get used to the idea of doing business one way when we are in garrison and train a different way for when we deploy. We must remember, the enemy has a vote, and

it is clear they are embracing AI at an aggressive rate. Our senior leaders need to be open-minded to the complexities of the informational world we live in. Simply discarding AI because they do not understand it is irresponsible. AI is here to stay, and it will continue to progress rapidly.

Artificial intelligence will reach human levels by around 2029. Follow that out further to, say, 2045, we will have multiplied the intelligence, the human biological machine intelligence of our civilization a billion-fold."

—Ray Kurzweil

Where Do We Go from Here?

As a Service, we need to shift the way we procure systems. Why do we have to purchase everything? Why not lease the technology and use the appropriate funds instead, and dispose of those systems as we please to leverage technology and its constant change? We need not be afraid to let AI be the catalyst of the logistical process. The Service needs to collect data from every widget possible in the form of streaming telemetry. Telemetry can be defined in a flexible and robust manner, in a way that is most convenient for the Service. For example, when requesting a part, we should know the date it was manufactured, when it was last used (if ever), have a functionality check to determine its viability, coordinates for easy location, etc. This information would facilitate the logistical process as well as allow for AI and RPA-enabled predictive analytics. Every widget should have an Internet Protocol Version 6 address, some form of wireless communication, intelligence to enable telemetric beacons, and access to a global network infrastructure to allow

"By exploiting the technical revolution in autonomy, advanced manufacturing, and artificial intelligence, the naval forces can create many new risk-worthy unmanned and minimally-manned platforms that can be employed in stand-in engagements to create tactical dilemmas that adversaries will confront when attacking our allies and forces forward."

—Gen David Berger, 38th Commandant of the Marine Corps

telemetry to be harvested, warehoused, and ultimately analytics performed on it. AI can also help us with the complexity of the linear process we currently have with the theater distribution and

The Marine Corps ... needs to take drastic steps to sunset systems that no longer work ...

resupply of fuel and water or the forward air resupply point until we are not as dependent on fuel and have invested in electric or hydrogen. The implementation of this level of technology can allow service members to concentrate on agile logistics/distribution processes instead of focusing on mundane tasks that can already be performed better by machines.

The example provided in the introduction is already happening in companies such as Amazon. While their mission is different, we can leverage their technology and take what works for the Service. AI can enhance military decision making in many areas, including strategic logistics. AI will certainly change the character of mobile logistics by offering those who embrace it a critical advantage. AI can provide a system in which data can move seamlessly between air, space, land, maritime, and cyber forces in realtime. In a logistical space in a contested environment, information is critical to the mission, we must consider the extent of interoperability of all systems, (Joint Logistics) to include our partners in the private industry, and any bandwidth constraints.

We have used AI and robotics to various degrees in the past and those endeavors have yielded excellent results as was the case in DESERT STORM. It is time to invest in our logistics fields by re-engineering the process from top to bottom with an eye toward leveraging the technology throughout to match and surpass our peers. The Marine Corps, as a Service, needs to take drastic steps to sunset systems that no longer work and some that may never work while making a substantive effort to maximize our human capital investments by educating our senior Marines, both officers and enlisted, to the many benefits AI can bring to the international supply-chain interdependencies we have created.

USMC

Who is the Real Thief in the Marine Corps?

Recapturing the investments in missing or stolen Stock List 3 items

by Capt Christian Thiessen & Capt Ben Cohen

>Capt Thiessen is an Infantry Officer and a recent graduate of the Naval Postgraduate School. He currently serves as the Technical Information Operations Officer of the 13th MEU.

>Capt Cohen is a Logistics Officer and a recent graduate of Naval Postgraduate School. He currently serves as the NavalX TechBridge Director in Southern California, where he assists in bringing dual-use technology to the Marine Corps and Navy.

Amidst changing operational environments and budget shortfalls, the Marine Corps prides itself on doing more with less. However, there is a downside to this can-do attitude. One such downside is the outdated process by which non-serialized equipment is issued and accounted for. To be more specific, we estimate that every year, each Marine infantry battalion spends $150,000-to-$250,000 on missing, stolen, or lost Stock List 3 (SL-3) equipment such as magazines and slings. Extrapolate this number across each infantry battalion and the Marine Corps sees an average annual net loss of $3.15–5.25 million in operations and maintenance (O&M) funds.[1] While a sizable portion of the equipment is, and should be, considered expendable, a noteworthy amount of materiel is lost because of outdated and non-standardized accountability processes. Therefore, the Headquarters Marine Corps Deputy Commandant for Installations and Logistics (DC I&L) should commission students at the Naval Postgraduate School to analyze this process and make recommendations to improve current accountability methods.

Why are SL-3 Inventories Important?

SL-3 items are issued to Marines and sailors to ensure that a principal end item (PEI), such as a weapon or vehicle, can function properly.[2] Without SL-3, the PEI may be useless, or at a minimum, less effective. The Infantry Automatic Rifle (IAR) is one such PEI and its SL-3 inventory includes magazines, blank-firing adapters, slings, and bipods—all of which are non-serialized, yet integral to the proper operation of the IAR. The process for issuing serialized and non-serialized equipment is inefficient. Currently, to track SL-3, Marines use physical paperwork that is filed and held at the company level.

The process for issuing serialized and non-serialized equipment is inefficient.

Figure 1. Typical SL-3 issue for Marines. ***(Source: Armslist.com.)***

For instance, when a Marine is issued an IAR, it remains in the armory unless checked out by the Marine specified on the paperwork. The SL-3, however, remains in the user's possession. Throughout this process, neither the PEI (e.g., the IAR) nor the SL-3 are tied to a Marine's digital ID (e.g., Common Access Card).

Headquarters Marine Corps considers SL-3 to be ancillary equipment that is required for Marines to successfully carry out their mission. This requires units to provide the appropriate SL-3 for each PEI to Marines and sailors, and considering the current accounting methods, this is basically a guessing game. Although DC I&L does not directly account for SL-3, it is an inspectable item in the Field Supply and Maintenance Analysis Office inspection program which DC I&L oversees.[2] This program carries significant weight and can cause commanders to be relieved if the battalion fails the inspection. Although SL-3 is ancillary equipment, if there are no appropriate quantities for each PEI, it can end careers. Thus, it is incumbent upon the individual battalions to determine when and how to keep their SL-3 fully stocked, which leads to repeated SL-3 inventories where

Marines and sailors conduct time-consuming and redundant inspections.

How does the *Status Quo* Impact Operations?

When an infantry battalion replaces over $150,000 in SL-3 equipment, the money comes directly out of O&M funds, the same funding line which pays for training equipment and ammunition. This expenditure results in lackluster training because there are not enough O&M funds available to purchase extra ammunition or materials. Ultimately, this wasted money fails to prepare Marines and sailors for the rigors of combat. To rectify this, many battalions adopt procedures to limit "lost" SL-3 items, but in doing so, they fail to address the real problem. The paperwork process is outdated, which wastes time, money, and effort. Additionally, the misfiling of paperwork allows Marines to (intentionally or unintentionally) misplace government property without recourse. Currently, the money spent on missing or stolen SL-3 items only accounts for the paper losses to purchasing new SL-3. We estimate this loss at up to $5.25 million per year for all infantry battalions. However, when factoring in the non-infantry battalions across the Marine Corps and the manpower costs associated with searching for missing and stolen SL-3, we estimate that the Marine Corps could be losing 100 million dollars per year on SL-3.

This problem also manifests itself in the outdated account turnover process commanders undergo. The current process dictates that commanders go line-by-line with a highlighter through hundreds of pages of serial numbers, which is simply not a valid way of doing inventory in the 21st century. Under the current process, new commanders spend days and even sometimes weeks inspecting equipment from the outgoing commander. Additionally, the lack of standardized accountability programs leads to serial numbers being scratched onto equipment or written in faded sharpie, making the numbers nearly impossible to read. Because they are bogged down by the lack of useful technology and outdated paper processes for SL-3 account turnover, company and battalion commanders ultimately lose the precious time that should be devoted to training their Marines for war.

Figure 2. The "Gunny Locker." *(Figure provided by author.)*

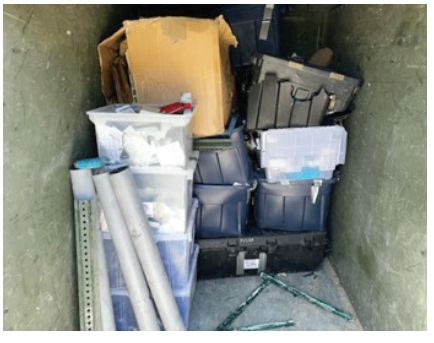


Figure 3. A typical storage container for Field Supply and Maintenance Analysis Office or account turnover. *(Figure provided by author.)*

Who Benefits from Technological Innovation?

It is time for the Marine Corps to adopt new technologies and practices to augment the antiquated SL-3 issuing and accountability processes. As an example, the Marine Corps could implement QR codes or scannable stickers that are linked to a master database. The Marine Corps already implements these types of procedures at the warehouses where Marines receive their individual gear issues (i.e., individual issue facilities). While the current information system used by the individual issue facilities may not be an exact fit for the battalions, we argue it could provide a model for SL-3 accountability at the battalion and company levels.

Units in the FMF and Training Command would benefit from a technological solution to this challenge. The most immediate beneficiaries of a solution to this problem are the infantry battalion commanders. Infantry battalions must issue significant quantities of SL-3 to individual Marines because of the sheer number of weapon systems. Implementing a digital accountability system would immediately save money and time, allowing battalions to reallocate O&M funds for mission-essential training. Additionally, small-unit leaders to battalion commanders would benefit by reducing the number of man-hours wasted discussing, or searching for, missing SL-3. By using a digital solution to catalog SL-3, leaders could enforce better equipment accountability and spend less time on unnecessary paperwork. Beyond the battalion level, a digital solution would benefit DC I&L and Marine Corps Logistics Command through cost and material savings and ease the burden on local supply warehouses. Lastly, the Marine Corps, with the potential to save approximately $100 million per year, can reinvest these cost savings into other warfighter-centric

programs that directly enhance FMF readiness.

The Way Forward

In summary, the Deputy Commandant for Installations and Logistics should commission a working group to study (in greater detail than we have here) how the Marine Corps tracks its SL-3 equipment. As the functional advocate for logistics-related information systems, DC I&L can enable the acquisition of technologies and systems that are effective in tracking ancillary equipment.[3] This working group can begin with students at the Naval Postgraduate School to capture the O&M and opportunity costs associated with missing and stolen SL-3 items. A student thesis could identify the amount of money the Marine Corps loses in O&M funds on an annualized basis. Another student thesis could develop an atlas (i.e., roadmap) for solution adoption to streamline the Marine Corps' current processes.[4] In his initial planning guidance, the 38th CMC spoke of leveraging technology to improve the Marine Corps' readiness through the modernization of both processes and technology.[5] Modernizing how the Marine Corps accounts for SL-3 would not only save money but would enable the MAGTF to conduct realistic training more frequently by fully leveraging their limited funding.

Modernizing how the Marine Corps accounts for SL-3 would not only save money but would enable the MAGTF to conduct realistic training more frequently ...

Notes

1.LtGen F. Panter, *MARADMIN 363/12, Equipment Accountability and Visibility: Class VII Principal End Item Management*, (Washington, DC: July 2012).

2. Headquarters Marine Corps, *MCO 4400.201-V-3: Retail Supply Management*, (Washington, DC: June 2016).

3. Ibid.

4. John D. Schmaltz Jr. and Benjamin T. Cohen, "An Atlas for Navigating the Innovation Ecosystem: Hybrid Airships as a Use Case to Engage the Commercial Sector," (thesis, Naval Postgraduate School, 2022).

5. Gen David Berger, *38th Commandant's Planning Guidance*, (Washington, DC: 2019).

Should the United States Retain its Forces in South Korea?

The future of USFK

by Maj Andrew Krebs

With a renewed emphasis on security in Europe and evolving strategies to face great power competition throughout the world, the United States must consider the proper allocation of forces and capabilities to meet global security challenges. Since the Korean War, the United States has retained a sizable number of troops in South Korea to deter and counter acts of aggression from North Korea. The deployment of United States Forces South Korea (USFK) has supported power projection in various countries throughout the world to serve American interests since the end of World War II. While the United States maintains forward deployed forces in many countries on nearly every continent, USFK is significant in that it consists of the third largest contingent of American bases on foreign soil—only behind Germany and Japan.[1] The primary reason for the relatively large presence of troops has been a response to a clearly perceived threat—an attempt by North Korea to unify the Korean Peninsula under the Kim regime; analogous to the reason for a large presence of troops in Germany—an attempt by the Soviet Union/Russia to annex European nations. But while the impetus for the forward deployment of American troops to these two countries is universally understood and justified, the continued presence of troops in both countries may not be justified. The military power relationship between South Korea and North Korea has evolved differently than the military power relationship between Russia and Europe. Russia's military capabilities, intentions, and great-power status make it a persistent threat to a relatively weak Europe, whereas South Korea's conventional capabilities have exceeded North Korea's to the point where a conventional conflict would result in North Korea's defeat.[2] In fact, South Korea has pursued a policy of "self-reliance" in response to the North Korean threat by which South Korea increases its strategic independence from the United States.[3] Thus, if South Korea is currently able to defeat a North Korean conventional threat and is increasingly improving its ability to do so without the United States, should the United States retain forces in South Korea? After all, nearly 30,000 troops and requisite capabilities could be gainfully employed elsewhere.

However, a narrow analysis of the relative advantages and disadvantages of each side's conventional forces does not consider North Korea's multi-faceted asymmetrical capabilities and the power dynamics of the neighboring states beyond the peninsula. To come to a better conclusion on this issue requires abandoning the very narrow focus on the demilitarized zone and zoom-out to a broader view of East Asia. From this viewpoint, it becomes evident that the United States should retain forces in South Korea in order to mitigate South Korea's capability gap against North Korea's asymmetric threat, counter Chinese power, and reinforce the credibility of the alliance system.

As a response to South Korea's conventional superiority, North Korea has pursued asymmetric capabilities such as cyber, ballistic missiles, and most notably, nuclear weapons.[4] Therefore, the United States should retain forces in South Korea to mitigate South Korea's capability gap against North Korea's asymmetric threat. As the following shows, South Korea is making efforts to close the gap but is not there yet. In 2006, South Korea shifted its military doctrine and strategy away from solely preventing a military incursion across the DMZ and instead toward more advanced capabilities.[5] Reforms such as *Defense Vision 2050* and legislation enacted in 2021 devote resources to grow the defense industrial base and make South Korea a future military power over the next decades.[6] Specifically, the industry plan "features fourteen key tasks, including strengthening research and development capacity, expanding the size of the industrial base, providing

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Today, U.S. Marines and ROK Marines continue their shared history of combined training and combat operations dating back to 1949. *(Photo by Cpl Tyler S. Giguere.)*

greater support for defense exporters, and job creation initiatives."[7] Capability development and purchases reflect a desire to own capabilities once solely the purview of the United States as well as a desire to replicate American information-networked warfare doctrine. Such examples include continuing acquisition of F-35 Joint Strike fighters to support long-range precision strikes should pre-emptive attacks against North Korea be warranted, and launching the "Korean Positioning System to aid satellite navigation technologies."[8] One area in which South Korea is determined to follow its new policy of self-reliance and not rely on the United States is Ballistic Missile Defense. South Korea has continued developing the Korean Missile Defense System to defend against North Korean ballistic missiles and aircraft instead of relying on the American Theater High-Altitude Air Defense system.[9] As to North Korea's nuclear weapons program, one can assume that remaining under the American nuclear deterrence umbrella sufficiently addresses the issue in the immediate term. While South Korea has made significant strides to develop capabilities to counter North Korea's asymmetric threats, the name Defense Vision 2050 accurately implies that this endeavor will take many years. Thus, until the slowly closing capability gap is completely closed, the United States should retain its forces in South Korea.

The past decade has witnessed China make significant efforts to expand its influence and power throughout the world, especially in its own East Asian neighborhood. After a decade of fighting Islamic terrorist groups across the world and various conflicts in the Middle East, the United States executed a strategic pivot back to the Pacific out of concerns over China's behavior and growing influence.[10] Those two decades focusing on the Middle East at the expense of the Far East afforded what a Chinese leader described as "a period of strategic opportunity."[11] John Mearsheimer has opined that China will not rise peacefully, with the view that it will use its growing economic power to grow its military power with the aim of regional hegemony.[12] In the face of China's growth and with the geo-strategic location that South Korea affords American military assets, the continued presence of U.S. troops in South Korea would be a counterbalance to China. Countering Chinese influence is necessary to maintain a stable economic-security nexus that is vital for the East Asian region to prosper.

The past decade has witnessed China make significant efforts to expand its influence ...

The East Asian region is continuing to experience much more economic interdependence than in past decades and its reliance on outside markets, such as the United States, has been declining.[13] In his paper, "China, the U.S., and the East Asian Security Order," Feng Liu of Nankai University observed, "Because of the rapid development of China's economy and its geographical proximity to the ASEAN countries, China's contributions to East Asian economic development have surpassed those of the United States."[14] Thus, one could conclude that the future prosperity of many East Asian nations is tied to China; therefore, these same nations are much more vulnerable to Chinese power and influence in its quest for hegemony. Though economically speaking, East Asian countries are more interdependent and oriented toward China, they have not abandoned the United States and do not necessarily favor China's rise. In the same article, Liu observed "many of the East Asian states trust the United States more than they trust each other," and "East Asian countries do not share a common vision, with the exception of a common concern about China's growing economic strength."[15] Former Secretary of Defense Ash Carter echoed the latter sentiment in an article in *Foreign Affairs*: "[C]ountries across the region are voicing concerns-publicly and privately, at the highest levels, in regional meetings, and in global forums-about China's actions."[16]

The relationship between economic dependence and fears of rising China forms a nexus between economics and security in East Asia. No country in the region can compete with China militarily; therefore, a nation with a high degree of economic dependence on China without the benefit of a third-party security provider is vulnerable to

Chinese domination. Liu expounds on how nations have gone about dealing with this predicament:

> Although many countries in East Asia hope to expand their economic relations and cooperation with China, they are still skeptical of China's strategic intentions. A reasonable choice for them is to offset the pressure from China's rising power and uncertain intentions by strengthening their security cooperation with the United States, as the U.S. security guarantee will give them the confidence to benefit from developing their economic ties with China.[17]

Therefore, for the region to continue to develop and prosper economically, several East Asian nations need continued, forward-deployed American forces to guarantee security. In fact, East Asian nations have made their preference for continued American presence known, "to do more, not less in the region" as noted by Defense Secretary Carter.[18] Specifically, South Korea is concerned about China's aggressive actions that threaten to destabilize the region, despite the fact that China is its largest trading partner.[19] A cursory look at a world map reveals the vital geographic position South Korea affords American forces vis-à-vis China. USFK occupies the closest American military presence to Beijing and links U.S. installations in Japan and the Ryukyu Islands to dominate the East China Sea while American positions in the Philippines and Thailand overlook the South China Sea. While this vital geographic position is a consequence of the Korean War, and as mentioned previously may no longer be needed to defeat a conventional North Korean attack, it does serve as a prime platform to project power throughout the region. That power serves as security in the nexus with economics that has allowed the East Asian region to develop, prosper, and look to the future with optimism. Therefore, in order to maintain a stable economic-security nexus, undoubtedly an American interest, the United States must retain forces in South Korea to counter Chinese power.

A fundamental underpinning of security guarantees is the faith that a partner nation will do what it says it will do. Nowhere is this more important than in international alliances. Patrick Morgan, in his article for *Pacific Focus,* notes, "[A]lliances are a central feature in the history of international politics. In the realist tradition they are a key pattern of state interaction, central to the security interactions that dominate the international system."[20] Alliances are partnerships of mutual benefit though not always of the same kind of benefit for each partner. In the alliance between the United States and South Korea, South Korea benefits from security and economic exchange while the United States benefits from power projection and from having a democratic partner in East Asia. As the only relatively un-damaged victor in World War II, the United States was well positioned to create many of the alliance systems to further its global security interests. In fact, these alliances were very necessary to American strategic interests—the two vast oceans which protected the United States from harm during World War II also made it difficult to quickly project power overseas unless other nations agreed to pre-positioned American forces on their soil. As beneficial as some American alliances may have been upon their creation, Morgan offers some drawbacks of alliances, saying,

Annual training exercises on the peninsula have evolved over time, and today, Combined Forces Command, USFK, United Nations Command, and their subordinate component commands conduct the Ulchi Freedom Shield exercise. *(Photo by Debora Henley.)*

> an alliance constrains autonomy, restricting somewhat a government's freedom of action, which may well be unwelcome. An alliance can also drag a state into a conflict, or deeper into one, than it wants, bringing risks and costs it would rather avoid and perhaps did not anticipate.[21]

Considering the possible drawbacks and the fact that South Korea's military is conventionally superior to North Korea, does the United States need to have forces in South Korea to maintain its alliance with the latter? One could say technically no—the United States maintains an alliance with Israel without positioning troops on Israeli soil. However, that answer constitutes a narrow focus, and once again one must embrace a broader view—a view of the system of alliances and security partnerships that the United States maintains throughout the world. The continued presence of U.S. forces in South Korea reinforces the credibility of the U.S.-led global alliance system.

Undoubtedly, the American withdrawal from Afghanistan brought into question American resolve and commitment to the security interests of other states. Even though the withdrawal was

announced well in advance, it was the chaotic scene at the airport that evoked images of abandonment. Further, the idea that America could still effectively project power absent forces in Afghanistan was brought into question after a drone strike mistakenly killed many civilians. As East Asian nations watched the events unfold at Hamid Karzai airport, many must have questioned American resolve. Morgan comments on the importance of American credibility in its alliance with South Korea and the perception that rests with its commitment,

> US interest in the ROK also reflects the interdependence of American commitments—American deterrence rests on credible alliance commitments and one sign of American reliability and effectiveness is sustaining its commitment to the ROK. The USA maintains that commitment in part because it is so long-standing, dropping it would be very disturbing to others who rely on the USA.[22]

While the United States is very unlikely to drop its commitment to South Korea as a matter of policy, in light of recent events the credibility of the commitment more than likely rests on whether or not American forces remain in South Korea. As Un Heo of Kyung Hee University observed, "USFK plays a tripwire function that leads to 'automatic' U.S. intervention."[23] The credibility of the alliance system absent forward deployed troops rests more on whether or not South Korea and other East Asian nations believe the United States will intervene on their behalf, not on what the United States says it will do. South Korea's historical memory is haunted by the Taft-Katsura Memorandum in which the United States affirmed Japan's interests in Korea as Japan affirmed U.S. interests in the Philippines. This opened the door for the painful Japanese occupation of Korea at the beginning half of the twentieth century. More recent memory may pessimistically interpret Defense Secretary Carter's choice of words to describe American security commitments in the Pacific: "the U.S.-Japanese alliance remains the cornerstone of Asia-Pacific security," "the U.S. commitment to the Philippines is ironclad," and "the U.S.-South Korean alliance took a major step forward in 2014."[24] Whether or not Secretary Carter's comments are indicative of American policy, a casual observer would conclude that his description of the alliance with South Korea was weaker compared to those made about Japan and the Philippines. Therefore, in the future security environment that consists of a rising China and questions about America's commitments abroad, the United States should retain forces in South Korea to reinforce the credibility of the alliance system.

While the above justifications point to the benefit of American troops stationed in South Korea from an international security standpoint, it is also important to assess the effects of the U.S. troop presence in South Korea itself. After all, USFK is not completely isolated from the civilian population, and there are various costs in exchange for the security benefit. A cogent counterargument to the American presence is to highlight the negative externalities that South Korea suffers in exchange for security benefit. In his article on the American military's effect on South Korea's economy, Un Heo points to four areas in which the presence of American troops has a negative effect on South Korea. Heo describes these negative externalities as generally more indirect than direct, in that they pertain to negative social and environmental effects.[25] First, he points toward the prevalence of prostitution and crime in the vicinity of American military bases.[26] Next, he assesses that the opportunity cost of land occupied by American bases hinders local development, assessing the value of the land at more than $12.5 billion.[27] Lastly, Heo highlights the frequency with which toxic waste has leaked from USFK bases—80 times in a 10-year span.[28] All of these are very relevant and lasting issues that come as a negative social and economic consequence of hosting American forces.

However, an analysis of the economic effects of the American presence cannot be limited to only the negative externalities—the positives must be weighed as well. First, it is assessed that the forward deployment of U.S. troops ultimately reduces South Korea's defense expenditure; their removal from the country would require South Korea to double its defense budget to roughly ten percent of its GDP.[29] Secondly, more than 125,000 Koreans are employed by USFK, and the Americans primarily purchase South Korean products and agricultural produce. All this leads to increased aggregate demand in consumption and a higher level of employment.[30] Finally, foreign investors are sensitive to the presence of American troops to ensure a stable security environment and therefore a stable economy; they view USFK as protecting their investment.[31] While there are drawbacks to the presence of USFK, there are also vast benefits besides security. Hence, further analysis is needed to determine if American troops are a net positive or net negative to life in South Korea.

The American troop presence has been a predominant factor in East Asian security for the last 70 years and has been an everyday reality for the people of South Korea practically since the birth of their nation. Its original justification, to prevent a reoccurrence of North Korean aggression, is no longer very persuasive as South Korea has evolved its conventional capabilities to exceed the adversary on the other side of the DMZ. However, new and larger threats have emerged in the security environment—a nuclear North Korea and an increasingly more aggressive China. The role of USFK now stands to help mitigate North Korea's asymmetric threat and counter Chinese power in the region. USFK also acts to reassure our alliance partners, whose faith in our commitments may have been shaken recently. It is within this broad and continually evolving context that it is to the benefit of the United States, South Korea, and the East Asian region that American forces remain in South Korea.

Notes

1. Claudia Kim, "Bases That Leave: Consequences of US Base Closures and Realignments in South Korea," *Journal of Contemporary Asia*, 48, No. 2 (2018).

2. *South Korea Armed Forces* (Jane's Sentinel Security Assessment, 2021).

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4. *South Korea Strategic Weapons* Systems (Jane's Sentinel Security Assessment, 2021).

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17. "China, the United States, and the East Asian Security Order."

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20. Patrick Morgan, "American Grand Strategy," *Pacific Focus*, Vol. XXIV, No. 1 (2009).

21. Ibid.

22. Ibid.

23. Un Heo and Yun, Seongyi, "U.S. Military Deployment and its effects on South Korea's Politics and Economy," *Journal of Asian and African Studies* 56 (2021).

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27. Ibid.

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29. Ibid.

30. Ibid.

31. Ibid.

How Well Does Your Adversary Know You?

Assessing PRC and PLA reactions

by Col Scott E. Stephan & Mr. Conor M. Kennedy

The Marine Corps has made headlines over the past few years due to the development of operational concepts designed to provide expeditionary, stand-in forces and the transformative changes proposed and pursued under *Force Design 2030*. The Assistant Commandant of the Marine Corps, Gen Eric Smith, recently addressed the impact of 3d Marine Littoral Regiment by stating, "Adversaries do not like this concept at all."[1] Is this assertion true? How would we know?

Assessing People's Republic of China (PRC) and People's Liberation Army (PLA) positions is complicated by language barriers and classification levels in both countries. Few Marines or sailors speak or read Chinese, and it is difficult to access U.S. intelligence community products. The good news is that there is a great deal that can be learned from unclassified, public material published by PRC defense sources.

This article has three purposes. First, to highlight PRC and PLA commentary on Marine Corps operational concepts and Force Design initiatives. To do so, the first section presents a sample of recent unclassified PRC-based Chinese-language sources. Second, the article will identify creditable unclassified English-language sources Marines and sailors can tap into to follow the conversation. Lastly, it seeks to inspire follow-on conversations about China studies in general, and the PLA specifically, in forums such as the *Marine Corps Gazette* that reach a wide audience. While there are limitations on the information, analysis, and conversations that can be presented in unclassified settings, Marines and sailors can learn a great deal by accessing publicly available Chinese-language sources and English-language analyses of the PRC and PLA.

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>>Mr. Kennedy is a Research Associate at the China Maritime Studies Institute of the U.S. Naval War College.

Chinese-Language Sources Discussing Marine Corps Development

The first question one may have is whether PLA and PRC experts study and understand the Marine Corps reforms currently underway. The answer is a resounding yes, with a few caveats. Firstly, we do not have access to internal PLA discourse on the subject, such as concept development and wargaming proceedings. This study is drawn from open sources, but the discussion reveals the level of interest in Marine Corps and Navy developments. Second, there is no unitary verdict among Chinese-language sources. They are likely engaged in a debate just as the Marine Corps is, albeit from the opposite side focused on threat assessment. Third, the sources examined here are of varying authority. This is explained where appropriate and the attention given reflects a balance of authority and depth of analysis demonstrated by the various authors.

PRC-based writings demonstrate that they regularly follow the latest changes to the Navy and Marine Corps. Updates are frequently posted in service newspapers, academic journals, news sites, and television shows noting milestones, failures, and general trends. PRC-based observers are keenly aware of the purpose of Force Design changes and joint operational concepts such as Distributed Maritime Operations, Littoral Operations in a Contested Environment, and Expeditionary Advance Base Operations (EABO). Articles written in official PLA sources include detailed descriptions of major line-item changes happening within the Naval Service, such as reductions to specific aviation units, the divestment of tanks and cannon artillery, modifications to unmanned aerial vehicle squadrons, and the acquisition of Maritime Strike Tomahawk missiles and Naval Strike Missiles.[2]

PRC writings also demonstrate a sober recognition that these concepts are focused on China. One commentator states rapid and dispersed deployment of small-scale units capable of long-range surface strikes onto numerous islands will constitute "a dense, multi-directional intersecting kill zone over large areas west of the island chain," intended to hem in PLA Navy (PLAN) forces and even directly attack mainland coastal targets such as PLA combat

units crossing the sea or ports.[3] The recently conducted U.S.-Japan large-scale joint exercise Noble Fusion held in the Luzon and Miyako Straits has been described in one nationalistic outlet as validating EABO concepts and associated equipment and "tactics specifically tailored against China."[4] These sentiments are unsurprising however since DOD and Marine Corps publications refer to the PRC armed forces as important priorities guiding development.[5]

PLA and PRC observers generally agree with the logic behind the current reforms. Many articles recognize the urgency for reform and the impact the wars in Iraq and Afghanistan had over twenty years. One *Navy Today* (当代海军) article from mid-2020 states the Marine Corps' amphibious landing capabilities gradually atrophied to the breaking point. The authors note the Marine Corps is ill-prepared to deal with a stronger adversary, having faced enemies with no structured air forces, modern air-defense systems, or large-scale armored forces. They argue the Marine Corps' overall combat capabilities were reduced in its "duplication of army roles," and its force structure is unsuited to modern warfare.[6]

Some interpret the changes in force structure as a major boost for the Marine Corps. Authors in a *China Military Online* (中国军网) article note that despite reductions in the force's ability to conduct large-scale ground warfare, the post-reform Marine Corps will be "even more suited to the requirements of amphibious operations, with an overall increase in mobility and firepower and a large improvement in its rapid response capabilities."[7] Another author writing in the PLAN's official newspaper, *People's Navy* (人民海军), finds that greater integration with the Navy should bring increased flexibility and combat power to the Marine Corps. This observer points out that "the current reductions in personnel and armaments is by no means a contraction in the size of the force or a weakening of its combat functions. Nor can it be regarded as a second-best choice due to tightening defense budgets."[8] The *China Military Online* article recognizes the significance of the Marine Corps' reforms, especially the creation of the Marine Littoral Regiment. They note the combination of modern and traditional tactics into a contemporary version of "island hopping" and regard the 31st MEU's exercises since 2019 as initial testing of this concept.[9] The creation of the Marine Littoral Regiment is seen as an attempt to integrate existing and developing Marine Corps capabilities, such as further integrating the F-35B and manned ships with unmanned systems and anti-ship missile batteries, to form a new combat system for littoral operations.[10]

Some observers point out the importance of Marine Corps concepts to the larger U.S. strategy of "containing" China. One source from *Tank and Armored Vehicle* (坦克装甲车辆), a magazine sponsored by China North Vehicle Research Institute, states functioning expeditionary advance bases can amplify the effectiveness of conventional large-scale forces, which will have to pay a heavy price to get inside the anti-access/area denial zone without them. Having its own anti-access/area-denial system in place will effectively blockade China, prevent its military from entering the Western Pacific and even shut off commercial and trading activities.[11] Another observer states in *Military Digest* (军事文摘) that CMC Berger's concept for Stand-in Forces will not only combine cognitive and kinetic effects but also apply political pressure against the PRC by forcing decision-making dilemmas prior to the fight ("stepping on and testing red lines").[12]

It is not difficult to find PRC-based sources that describe the Marine Corps as a key element of the U.S. military and a creditable threat. However, equally important are the voices that doubt the aspects of successfully implementing these reforms or the effectiveness of new Marine Corps tactics.

What is the likelihood of success in the Marine Corps' transformation according to PLA sources? Apart from the expected indignation resulting from the perceived aim of the Marine Corps' shift toward great power competition, there are PLA-affiliated perspectives doubtful the endeavor will succeed. Authors in *Navy Today* expressed the following risks to *Force Design 2030*. The ten-year redesign of the force will require CMC Berger's successor to hold a similar mindset, otherwise "the newcomer will have to start from scratch." Further, another war or crisis could greatly disrupt this transformation, a fair possibility over ten years. The authors also highlight concerns within the United States that current initiatives are overly focused on great power competition to the detriment of the Marine Corps' ability to respond to other more likely contingencies in the Middle East and other remote regions. They note that this plan could simply be wishful thinking because of complications from inter-Service battles for funding, the Marine Corps' longstanding low-budget allocation, and its position within the Department of the Navy. Lastly, they point out the difficulty the Marine Corps has in determining what equipment to develop and acquire, citing examples from both Gulf Wars.[13]

In addition to official publications, the PRC has a robust community of unofficial defense analysts. While authoritative PLA sources are often restrained in voicing concerns or opinions, unofficial commentators provide in-depth analysis and discussion. For example, a longtime contributor to *Shipborne Weapons* (舰载武器), a journal sponsored by China Shipbuilding Industry Corporation, provides an analysis of how the PLAN can counter the threat posed by EABO. Demonstrating a thorough understanding of the core elements of the concept, the author, an analyst writing under the pseudonym Tianying (suggesting military affiliation), presents the main problem for the PLA: finding, identifying, and monitoring in realtime the movements and actions of small-scale forces in parts of the First Island Chain and the Near-Seas.[14] This author hits the nail on the head. The reconnaissance and counter-reconnaissance game (scouting and screening) that could play out in the western Pacific will be critical to the Navy and Marine Corps' success within the PLA weapon engagement zone, especially considering the PLA's impressive array of shooters.

Other unofficial articles focus on

specific systems. One frequent PRC military commentator conducted a focused analysis published in the magazine *Modern Ships* (现代舰船) in early 2022 on the Marine Corps' use of unmanned ground vehicle-based fires to gain sea control. After a close analysis of ROGUE Fires and the features of the Navy/Marine Corps Expeditionary Ship Interdiction System, the author argues the system still has vital flaws. These include its relatively short range of 185 kilometers, of which an opponent need only account for greater distance from enemy coastlines and islands during campaign planning, physically avoiding the threat. The author also argues for boosting ship defenses against this threat by strengthening sensors and interception capabilities. Nonetheless, the author concludes this system deployed in the First Island Chain could become a shackle on the PLA, and if not effectively countered, could lock the PLAN in the Near-Seas.[15]

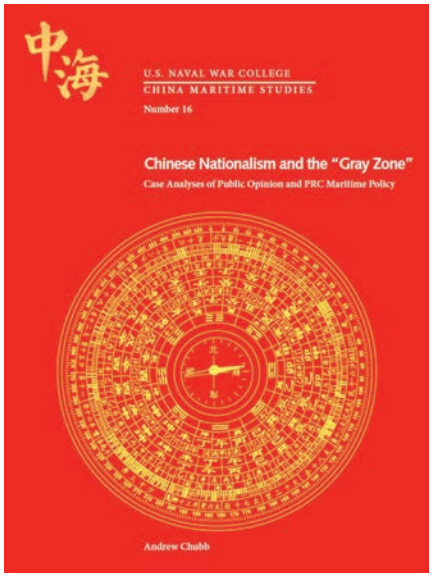
While it is too early to discern the PLA's overall views of Marine Corps initiatives, this section highlighted the wide-ranging PRC writings covering the subject. The perspectives examined are not final and will evolve as Marine Corps concepts materialize in major exercises and deployments, and PLA counters are developed. At a minimum, these sources provide important feedback for the Marine Corps and Joint Force deterrence and warfighting efforts.

Resources for Marines and Sailors

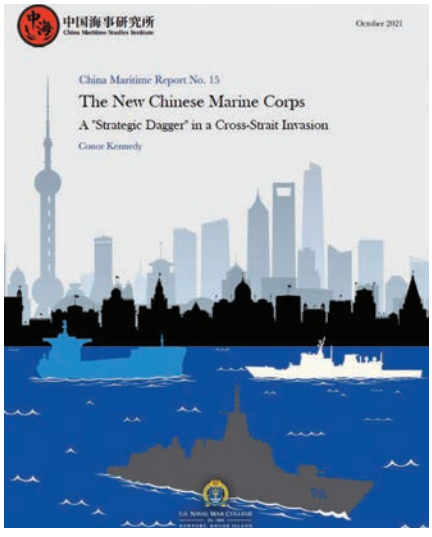
The second purpose of this article is to identify unclassified, English-language resources available to Marines and sailors. There are so many sources and so much material available for the Indo-Pacific, the PRC, and the PLA that it is difficult to know where to begin. The challenge has only increased as attention shifted to the region over the last ten years. Rather than trying to provide an exhaustive list, the following section identifies sources that are accessible and appropriate for a general audience.[16]

Websites of Interest

- **China Maritime Studies Institute (CMSI)** at the U.S. Naval War College. CMSI scholars perform academic research using Chinese language sources to develop deeper insight into key aspects of China's growing maritime power. Research is published to inform the Navy and engage the nation: https://usnwc.edu/Research-and-Wargaming/Research-Centers/China-Maritime-Studies-Institute.

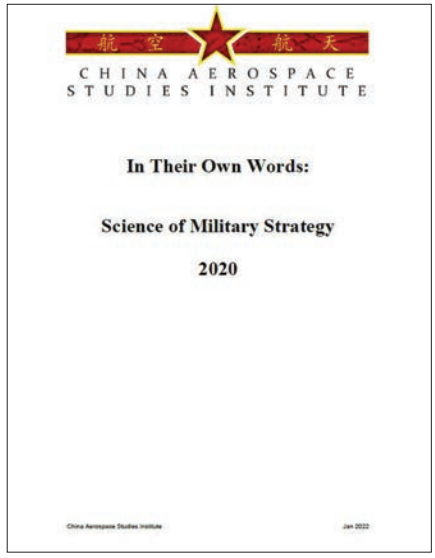


***China Maritime Studies "Red Book" No. 16* Chinese Nationalism and the "Gray Zone," Case Analyses of Public Opinion and PRC Maritime Policy.[17]** *(Photo provided by author.)*



***China Maritime Report No. 15*–"The New Chinese Marine Corps, A 'Strategic Dagger' in a Cross-Straight Invasion."[18]** *(Photo provided by author.)*

- **China Aerospace Studies Institute (CASI)** at the Air Force Air University CASI is a hub for PLA studies with a focus on aerospace capabilities. Its mission is to advance understanding of the strategy, doctrine, operating concepts, capabilities, personnel, training, and organization of China's aerospace forces and the civilian and commercial infrastructure that supports them. CASI provides expert research, analysis, and translations of Chinese language sources: https://www.airuniversity.af.edu/CASI.



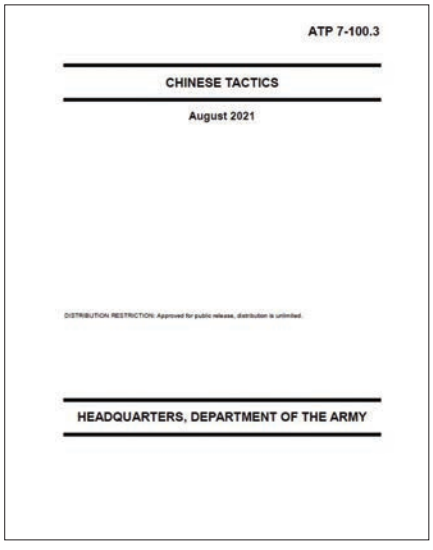
In Their Own Words: Science of Military Strategy 2020.[19] *(Photo provided by author.)*

"Unrestricted Warfare" is Not China's Master Plan.[20] *(Photo provided by author.)*

• **Strategic Studies Institute (SSI)** at the U.S. Army War College-SSI is the U.S. Army's institute for geostrategic and national security research and analysis. SSI publishes a variety of sources related to China and regional studies: https://ssi.armywarcollege.edu.

• **Operational Environment Watch** at U.S. Army Training and Doctrine Command. A monthly publication produced by the Foreign Military Studies Office at Fort Leavenworth, KS. Operational Environment Watch provides translated material and expert analysis: https://oe.tradoc.army.mil/oe-watch.

• **Chinese Tactics, Army Techniques Publication** (ATP) 7-100.3. A starting point to understand how the Army expects PLA ground forces to think and act in tactical operations. Assessments are based on Chinese source documents and observations from recent events: https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1023379.


ATP 7-100.3

CHINESE TACTICS

August 2021

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HEADQUARTERS, DEPARTMENT OF THE ARMY

***ATP 7-100.3* Chinese Tactics.** *(Photo provided by author.)*

• China at **RAND**-RAND's China experts conduct research and provide analysis on a wide variety of issues related to the PRC, including the relationship between national policy and military power: See https://www.rand.org/topics/china.html.

• **Indo-Pacific Security at the Center for a New American Security** The Center for a New American Security Indo-Pacific Security Program addresses transnational opportunities and challenges in the region: https://www.cnas.org/research/indo-pacific-security.

• **China and Indo-Pacific Security Affairs at the Center for Naval Analysis**. The China and Indo-Pacific programs provide research and analysis addressing the relationship between all sources of national power. "The Center for Naval Analysis' China and Indo-Pacific Security Affairs Division is one of the nation's largest non-governmental Asian security analytic groups, with over three dozen analysts with language skills and in-country experience."[21] See https://www.cna.org/centers/cna/cip/china.

• **Asia Maritime Transparency Initiative (AMTI)** at the Center for Strategic and International Studies. "AMTI aims to promote transparency in the Indo-Pacific to dissuade assertive behavior and conflict and generate opportunities for cooperation and confidence building. AMTI aggregates information from news sources, as well as specially designated research and nonprofit organizations, public sector institutions in Asia, and individuals."[22] See https://amti.csis.org.

• **China Brief** at the Jamestown Foundation-China Brief provides wide-ranging research and analysis based on indigenous language sources: https://jamestown.org/programs/cb.

Conclusion

This article led off with a simple yet complicated question. Are Marine Corps initiatives causing anxiety in our adversaries, in particular the DOD's pacing threat: China? Ultimately, it is challenging to provide a simple and direct answer. China is a nation of 1.4 billion people, and the PLA is a complex bureaucracy—much like the U.S. military. What can be said definitively is that the PRC's defense establishment is watching the Marine Corps closely. Cautious in their assessments, observers know they will need to continue to monitor the development of concepts like EABO as it involves changes to the Marine Corps system and organization that are still being tested and proven.[23] Similarly, U.S. leaders need to carefully listen to the evolving perspectives and discussions contained within PRC Chinese-language sources to gauge the effectiveness of deterrence initiatives.

This article will have achieved its three purposes if readers have an increased awareness of the conversations that are occurring in PRC sources, know where to find English-language material related to those conversations, and have an interest in learning more about how the United States' primary competitor in the Indo-Pacific views the Marine Corps. "China Hands" will rightly point out that there are many additional sources available, perhaps some that are better than those listed here. The authors hope this article will spark further conversation.

Notes

1. Philip Athey, "Marine Corps Launches New Littoral Unit that US Adversaries Reportedly Hate," *Defense News*, March 2, 2022, https://www.defensenews.com/news/your-marine-corps/2022/03/02/marine-corps-launches-new-littoral-unit-that-us-adversaries-reportedly-hate.

2. 麻晓晶 [Ma Xiaojing], 以战略眼光透视 深度变革－解读美国海军陆战队未来十年的转型规划 ["A Strategic Perspective on Deep Transformation–Interpreting the Transformation Plan of the US Marine Corps in the Next Ten Years"], 人民海军 [*People's Navy*], April 28, 2020.

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5. Commandant Berger stated "We are Modernizing the Marine Corps using the PRC as a benchmark" on page one of the May 2022 Force Design 2030 Annual Update. Also see: Department of Defense, "Fact Sheet: 2022 National Defense Strategy," *U.S. Department of Defense*, March 28, 2022, https://www.defense.gov/News/Releases/Release/Article/2980584/dod-transmits-2022-national-defense-strategy.

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8. 以战略眼光透视 深度变革－解读美国海军陆战队未来十年的转型规划 ["A Strategic Perspective on Deep Transformation–Interpreting the Transformation Plan of the US Marine Corps in the Next Ten Years"].

9. *Marine Corps Times* reports that the 31st MEU conducted a "simultaneous split operation" in 2019 spanning over 4,000 miles as well as additional dispersed logistics exercises meant to test operations in a contested littoral environment. See: Philip Athey, "31st MEU Put Corps' Littoral Tactics, '21st Century Foraging' to the Test," *Marine Corps Times*, January 21, 2020, https://www.marinecorpstimes.com/news/2020/01/22/31st-meu-put-corps-littoral-tactics-21st-century-foraging-to-the-test.

10. "Born Out of Power."

11. 席淑桢 [Xi Shuzhen], 剑指中国的两栖部队 ["The Amphibious Force Aimed at China"], 坦克装甲车辆 [*Tank and Armored Vehicle*], No. 20 (2021).

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14. "Breaking Bonds."

15. 王笑梦 [Wang Xiaomeng], 美国海军陆战队 "以岛制海"无人车家族深度分析 ["An In-Depth Analysis of the United States Marine Corps Unmanned Vehicle Family for 'Controlling the Sea from Islands'"], 现代舰船 [*Modern Ships*], No. 1 (2022).

16. The sources identified reflect the authors' views and are not necessarily endorsed by the U.S. Naval War College or the Department of the Navy. Further, they are not listed in any order of priority.

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Antarctica

That's some high-quality H2O

by Col Curtis Ebitz, USMC, CAPT Jeff Juergens, USN,
Col Chris Robinson, USAF & CMSgt A. Bueno, USAF

The Antarctic Treaty System (ATS) has served the international community well since 1959. However, ongoing geopolitics, particularly those focused on resource exploitation, threaten to derail the ATS before it expires in 2048, and there is a high potential for expanded resource exploitation.[1] Disagreements over Antarctica will continue and are centered around three blocks of claimants: pre-treaty claimants, reserved claimants, and non-claimants. If portions of Antarctica (land or sea, claimed or unclaimed territories) are seized by force or deception, those actions will set the conditions for a potential global conflict. The problem or question posed relative to Antarctica's geopolitical polarization is: *With Antarctica's vast natural resources in the Earth's last ungoverned continent, how can the United States keep its competitive advantage while mitigating future global conflict?*

An extensive review of relevant documents associated with Antarctica's history, geography, the ATS, natural resources, international policies, and the probability of global conflict was required to gain a better perspective and understanding of what lies ahead for Antarctica's future. This article's research and analysis of Antarctica applied a methodology consisting of five basic lines of inquiry: the ATS foundation, Antarctica's geography, wealth (natural resources), policies, and competition and future outcomes in relation to the interconnected geopolitical world we live in today.

Several key questions and assumptions were posed to shape the assessment of how Antarctica will evolve leading up to the expiration of the ATS in 2048.[2] What impact will Antarctica's wealth have on the global economy and current/future claims? Which nations are currently competing for resources in Antarctica? What nations will be seen as emerging competitors? What is the future of Antarctica leading up to 2048? How does it affect U.S. policy?

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Pre-treaty claimants	Reserved claimants	Non-claimants
Argentina	Peru	China, India, Japan
Australia	Russia	South Korea, Pakistan
Chile	South Africa	Bulgaria, Ukraine, Italy
France	United States	Czech Republic, Germany
New Zealand		Belgium, Sweden, Poland
Norway		Romania, Uruguay
United Kingdom		Ecuador, Brazil

Figure 1. Chaitanya Giri, Gateway House, 2012. ***(Figure provided by author.)***

How does the United States mitigate future conflict and how will the United States keep its competitive advantage in Antarctica?

According to the United Nations Department of Economic and Social Affairs and Worldometers, as of February 2020, the world population was 7.77 billion and is projected to reach 9.74 billion by 2050.[3] With the projected growth rate, the global demand for natural resources—including food and water—will continue to rise. Combined with the potential diminishing agricultural productivity around the world, the projected global population increase has the potential to create even greater competition for an already scarce supply of resources. If history is a guide, this scarcity will likely prompt many countries, particularly rising powers, to seek out new areas to satisfy their thirst for natural resource requirements.[4]

ATS Foundation

Antarctica is administered internationally through the ATS. This system was signed in 1959 by 12 countries whose scientists had been active in and around Antarctica at the time. Since then, 37 counties have now signed the treaty looking for research and opportunity. However, the political road map of Antarctica continues to change and intensify today; after 61 years of peaceful multilateral research initiatives, nations with nefarious desires would like to gain an upper hand and more control. Antarctica remains a region full of potential that is rich in minerals, oil/gas reserves, and many other natural resources that have been untouched.[5]

History

Antarctica was the last continent on the planet to be discovered, has no indigenous population, and there is no evidence that it was seen by humans until the 19th century. In 1773, James Cook circumnavigated Antarctica, and although he did not sight land, he found deposits of rock on icebergs—giving him the belief that a continent may exist. Antarctica was not discovered in an official capacity until January of 1820 when two admirals in the Imperial Russian Navy, Fabian Gottlieb von Bellingshausen and Mikhail Lazarev, spotted the shoreline of Antarctica (the Fimbul ice shelf) during a global circumnavigation exercise. From the late 1800s and up to the mid-20th century, many expeditions followed suit. These were mainly marine explorations, and in this same period, sealers and whalers from all over Europe started hunting in various parts of Antarctica and the sub-Antarctic Islands. However, Antarctica remained largely neglected until recently because of its harsh, cold environment, lack of easily accessible resources, and isolation.

In 1895, the first confirmed landing was conducted by a team of Norwegians. Norway has since played a tremendous role in Antarctica's history, as well as that of the Arctic Ocean. Norway accomplished many firsts in Antarctica: the first person to reach the South Pole, the first person to be buried in Antarctica, the first person to develop a mental illness in Antarctica, the first person to pioneer the use of sled dogs for transportation in Antarctica, and the first person to ski in Antarctica. As a result of Norway's political status in the late 19th and early 20th centuries (it was part of both Denmark and Sweden until 1905 when it declared independence), Norwegians performed most of their Antarctic tasks under the flags of imperial powers.

Assumptions:

- ***There will be a rush for resources in Antarctica when the treaty ends in 2048.***
- ***Treaty signatories will continue to adhere to the treaty until 2048.***
- ***Chinese and Russian influence will continue to expand.***
- ***Technological improvements and global warming will make resources easier to extract.***
- ***Fresh water will become the "new gold," and become more relevant and important in growing crops (rice/wheat) and personal consumption.***
- ***Hydrocarbons, animal protein, fish, and krill will be readily available.***
- ***Rare Earth metals will be found in Antarctica.***
- ***Livable land will become available for population expansion.***

Figure 2. Merco Press, 2019, Original 12 signatory nations shown in the inner ring, remaining 37 consultative nations shown in the middle and outer rings. *(Figure provided by author.)*

Geography and Natural Resources

As the Earth's southernmost continent, Antarctica contains the geographic South Pole and is situated in the Antarctic region of the Southern Hemisphere, almost entirely south of the Antarctic Circle, and is surrounded by the Southern Ocean. With 5,500,000 square miles, Antarctica is the fifth-largest continent and nearly twice the size of Australia. About 98 percent of Antarctica remains covered by the Antarctic ice sheet that contains over 6.48 million cubic miles and averages 1.2 miles or 6,200 feet in thickness extending to all but the northernmost reaches of the Antarctic Peninsula.[6] While the ATS has thus far prevented the exploration of the continent for mineral resources, we know the continent has 90 percent of the world's ice. This equates to 80 percent of the world's freshwater locked in Antarctica's ice and some of the world's most productive fishing grounds are in the waters surrounding Antarctica. If all this ice melted, sea levels would rise about 200 feet.[7]

Antarctica is divided in two by the Transantarctic Mountains close to the neck between the Ross Sea and the Weddell Sea. The portion west of the Weddell Sea and east of the Ross Sea is called West Antarctica and the remainder East Antarctica. These names roughly correspond to the Western and Eastern Hemispheres relative to the Greenwich meridian. Antarctica is also the coldest, driest, and windiest continent and has the highest average elevation of all the continents. Most of Antarctica is considered a polar desert, with annual precipitation of 7.9 inches along the coast and much less the further inland one goes. It is believed that there has been no rain in the inland area for almost two million years, yet it is estimated that 80 percent of the world's freshwater reserves are stored there. The temperature in Antarctica has reached -128.6 degrees Fahrenheit, though the average for July–September (the coldest part of the year) is -81 degrees Fahrenheit. Anywhere from 1,000 to 5,000 people reside at research stations scattered across the continent throughout the year. Organisms native to Antarctica include many types of algae,

Figure 3. David Spratt, Climate Code Red, 2017, showing East and West Antarctica divided by a mountain range. *(Figure provided by author.)*

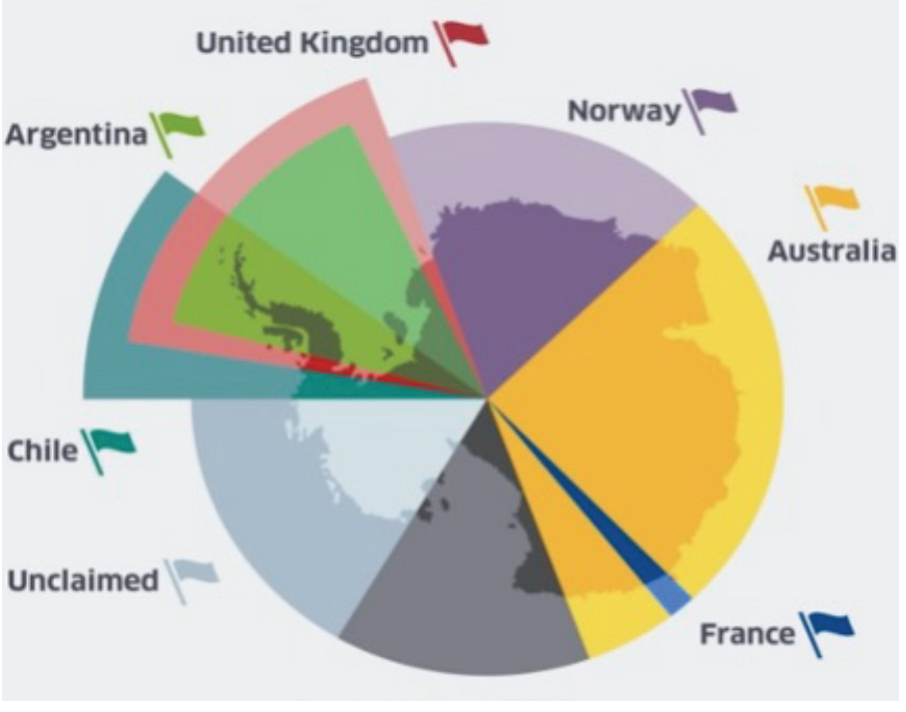

Figure 4. Making claims, discovering Antarctica. The seven nations that made original claims on Antarctica. *(Figure provided by author.)*

bacteria, fungi, plants, protista, and certain animals, such as mites, nematodes, penguins, seals, and tardigrades. Vegetation, where it occurs, is tundra. In addition to the known resources, many experts believe that Antarctica has vast stocks of oil, coal, hydrocarbons, and rare minerals.[8]

Climate

In 2014, the Intergovernmental Panel on Climate Change reported, "Warming of the climate system is unequivocal and, since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and the sea level has risen."[9] These global warming trends will make accessing the Antarctic easier and possibly a necessity for some nations as droughts force nations to look for new freshwater sources and food scarcity drive nations to venture further south in search of seafood. Stations monitoring climate change across the continent reported sea temperatures have increased by one to two degrees Celsius in the last 100 years.[10]

These rising temperatures have the potential to produce changes in fish migration patterns, driving some populations to become locally extinct, which could lead to a large-scale ecosystem disruption:

> Perhaps the most pertinent example relates to krill, which 'according to Gurney' underpins a large proportion of food webs, where it has been noted that a large-scale and long-term projection for the Southern Ocean shows that, within a century, important krill recruitment habitats could be seriously affected.[11]

With krill as a great source of high-quality protein, all nine essential amino acids, and omega 3s, it will also become increasingly more relevant and important to the world community as the Earth's population continues to grow exponentially.[12]

Treaties

During the 1950s, a spike in activity on the continent of Antarctica exposed a need to establish a treaty to prevent conflict, foster international cooperation, and allow for scientific exploration.[13] In 1959, the states of Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the former Soviet Union, the United States, and the United Kingdom signed the ATS. The ATS "entered into force in 1961 and applies to the area south of 60 degrees south latitude including all ice shelves. The ATS guarantees freedom of scientific research in Antarctica, placing on a permanent basis the system of peaceful international cooperation.[14] The ATS banned all military activity, nuclear weapons testing, and disposal of radioactive waste. Furthermore, it allows for the inspection of all facilities in Antarctica to ensure treaty compliance.

Seven nations established territorial claims before the ATS was signed. One of its provisions states that no acts or activities carried out while the ATS is in force will constitute a basis for a claim. The claims of Argentina, Chile, and the United Kingdom all overlap in the Antarctic Peninsula. One sector comprising about fifteen percent of the land area remains unclaimed. Other states active in Antarctica neither assert nor recognize such claims, though both the United States and the Russian Federation, as successor to the former Soviet Union, maintained the basis for a claim.[15] These territorial claims have the potential to become a flash point, not only between the nations with overlapping claims but also between those with claims and those who have been shut out.

When disputes arise, nations may bring these issues to the Antarctic Treaty Consultative Meetings (ATCM), which provide a venue to discuss or respond to challenges in the Antarctic. There are now 27 nations that have full participation in the ATCM as Antarctic Treaty Consultative Parties. There are an additional eighteen nations that participate in ATCM as non-Consultative Parties.

The ATCM has been a successful forum thus far and has generated several separate agreements to stabilize the Antarctic. The Convention for the Conservation of Antarctic Seals prevents commercial harvesting of seal populations. The Convention on the Conservation of Antarctic Marine Living Resources addresses the need to preserve a balanced ecosystem and establish healthy limits for marine life and related species. The Convention on the Regulation of Antarctic Mineral Resource Activities prohibited the exploration and mining of mineral resources that may be found on the continent except for scientific research. Of note, since its adoption in 1991, no nation has ratified the Convention on the Regulation of Antarctic Mineral Resource Activities. Finally, the Protocol on Environmental Protection to the ATS protects fauna and flora and limits waste disposal in Antarctica or into Antarctic waters. Furthermore, parties are required to respond to environmental emergencies.[16]

Policies

Australia claims 42 percent of the continent and has invested an additional $2.2 billion to protect its interests. Their stated goal is to preserve Antarctica for peaceful scientific exploration. To reduce the potential for

Antarctic Treaty Consultative Parties:
Argentina, Australia, Belgium, Brazil, Bulgaria, Chile, China, Ecuador, Finland, France, Germany, India, Italy, Japan, the Republic of Korea, the Netherlands, New Zealand, Norway, Peru, Poland, the Russian Federation, South Africa, Spain, Sweden, the United Kingdom, the United States, and Uruguay.

Non-Consultative Parties:
Austria, Canada, Colombia, Cuba, the Czech Republic, Denmark, Estonia, Greece, Guatemala, Hungary, the Democratic People's Republic of Korea, Papua-New Guinea, Romania, the Slovak Republic, Switzerland, Turkey, Ukraine, and Venezuela.

strategic competition, Australia wants to maintain an indefinite ban on mining and oil drilling and keep pressure on conserving marine resources.[17]

New Zealand, likewise, has a policy of preserving the natural environment and maintaining stability in Antarctica and the Southern Ocean. They remain committed to providing support for international scientific research and logistical support to Scott Base as well as to the United States and Italy through the Joint Logistics Pool.[18]

China has recently become very active in the Antarctic as well. While Beijing professes that its interests are only conducting scientific research, many experts believe that China's intentions are more nefarious. According to leading Antarctic scholar, Anne-Marie Brady,

> Chinese foreign policy is aimed at commercial dominance (shipping lanes, fisheries, future resource exploitation), food and fuel security (potential oil and gas reserves, fresh water, biological resources), and combating Western influence. Beijing sees the region as a treasure house of resources critical for its continued economic growth.[19]

The United States' stated interest in Antarctica is maintaining its status as a continent reserved for peace and science. The United States has three scientific research stations manned year-round with more personnel than any other nation. The United States also conducts inspections of foreign stations, equipment, and vessels under rights granted in the ATS.[20]

Probability of a Global Conflict: "Could History Repeat?"

Late 19th-century Africa provides the basis for a good historical example that shares parallels with what could happen in Antarctica over the next century. Starting in the 1870s, European nations such as Great Britain, France, and Germany started the "Scramble for Africa."

While European powers had imperial designs on Africa since "Henry the Navigator" reached the Cape of Good Hope in 1488, real African colonization did not begin until the end of the 19th century. In 1870, only 10 percent of African land was under European control.[21] However, there were a number of reasons the European powers of Great Britain, France, and Germany were willing to invest heavily in the colonization of Africa.

When dissecting the colonization of Africa, history shows many similar parallels with what could happen in Antarctica. First, colonizing Africa opened access to new resources for European powers and their growing industrial sectors. Diamonds, gold, rubber, and exotic goods were all in high demand throughout Europe.[22] Second, expanding a country's territorial holdings was good for national prestige. Third, the colonization of Africa was an attempt to preserve the European balance of power and avoid war; basically, compete for lands and riches in Africa to prevent competition in Europe.[23]

However, the Scramble for Africa inevitably led to conflict: initially between France and Great Britain in Western Africa but eventually among all European powers throughout Africa. To prevent conflict from spreading back to Europe, leaders came together at the Berlin conference of 1884–1885 to establish a framework for negotiating future European claims in Africa. This led to a land grab that resulted in 90 percent of African territory being claimed by 1900.[24] While the Berlin conference prevented immediate large-scale conflict, smaller conflicts like the Boer Wars foreshadowed World War I and the great power competition shifting to Europe.

When the ATS expires in 2048, could the world see a rush to claim land and resources similar to what European powers did after the Berlin conference of 1884–1885? The possibility is certainly there. There is no doubt that, similar to 19th-century Africa, Antarctica has vast untapped natural resources. Countries will likely try to maintain claims or stake new ones in an effort to boost their economies or for a military advantage. Finally, any conflict in Antarctica has great potential to quickly turn into a regional or global conflict.

In 2016, Russia resumed Antarctic expeditions focused on oil and natural gas exploration.[25] China is actively mapping the location of natural resources on the Antarctic territorial seas, has four research stations on Antarctica, and is building a 5th.[26] China says that these stations are for astronomy, but one of China's stations is at Dome A, the highest point on the Antarctic plateau, a location that is one of the best on earth to collect signals intelligence.[27]

Many Antarctic experts believe China has already breached parts of the treaty by engaging in military activities, similar to their disregard for international law in the South China Sea.[28] China will likely use a three-pronged strategy in Antarctica. First, as climate change and technology make natural resources more accessible, China will rhetorically integrate Antarctica into its Belt and Road Initiative. Second, China will attempt to undercut the ATS by signing bilateral deals that increase their claims. Third, China will use the unresolved claims from other countries to expand its presence on the continent.[29]

Recommendations

With 2048 approaching, the international community must address what happens when the ATS expires. Certainly, some countries will want to extend the treaty. However, many Antarctic experts contend that such an extension is unlikely. The world is a fundamentally different place than when the treaty was signed in 1959. The international community was rebuilding after World War II, and the technology of the day was not advanced enough to survive the harsh climate and allow nations to extract Antarctica's vast resources. By 2048, climate change coupled with advances in mining, drilling, transportation, and logistics technologies will make extracting and sustaining commercial exploitation of Antarctica's resources much more economically viable. For China to continue its economic ascendancy, it must find new locations with available resources in order to expand into new markets. In the next three decades, it is probable that countries with and without claims will start to push the bounds of the ATS. It is likely we will see mining, and even permanent settlements, as the world stakes its claims.[30]

The United States must take action in Antarctica soon, develop a long-term strategy, and start enacting it through the following actions:

- Work multi-laterally through economic sanctions to counter and deter Chinese actions that are not in compliance with the ATS.
- Acknowledge territorial claims established prior to the signing of the ATS.
- Partner with Australia, France, New Zealand, Norway, and the United Kingdom to establish a United States territorial claim in return for the United States' security and logistical support.
- Lead negotiations for the renewal of the ATS.
- De-conflict territorial claims by Argentina, Chile, and the United Kingdom to prevent destabilization and conflict in the region.
- Reestablish research stations similar to the United States-operated Byrd Station in an effort to stake a claim in the remaining unclaimed territory.

Without prompt action by the United States, other countries, specifically China, will continue to push the bounds of the treaty. By the time 2048 arrives, China may have so many outposts and settlements that they would be the de-facto owners of large swaths of the continent. The United States must stake a territorial claim and become the leading nation in Antarctica. By doing so, the United States will be able to achieve a fair share of resources within Antarctica such as hydrocarbons, minerals, fisheries, and water that will allow the United States' economic prosperity to continue for decades.

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Officer PME

Equivalency for higher level degrees

by Maj Lee Jones

Over the last twenty-plus years of America's continuous engagement in fighting the Global War on Terrorism, the strategic landscape and global footprint have greatly changed. Striving to remain relevant and ready, the U.S. military, specifically the Marine Corps, has had major changes in the past couple of years—recently removing tanks, transitioning to a fifth-generation fighter, and creating a lighter, smaller and leaner infantry. As Marine officers continue to lead in this world of change, one constant has remained: the need for education. Many Marines are often told that continuing their education off-duty is not only good for their professional development and careers but also important for annual evaluations and promotion. More frequently, Marine officers are obtaining advanced degrees off-duty. This reality generates several questions that must be addressed. First and foremost, what is the desired end state for professional military education? Is it that all Marine officers obtain master's degrees? If this is the end state, what is the purpose for Marine officers to attend a resident professional military education course to obtain the same level of degree they already have? This article argues that equivalencies for PME should be granted to Marine officers if they obtain a higher-level degree related to the MOS they serve in.

Currently, every year, all eligible Marine major and major-select movers are screened by the Commandants' Professional Intermediate Board. This very competitive board selects approximately one-third of eligible officers, the "best and brightest," for seats in various schools, fellowships, and academic programs based on their future potential for the Corps. The vast majority of the Marines selected on the board attend one of the Services' schools as a resident student for one academic year with an additional two-year service obligation for attending—known as a pay-back tour. Other officers may be selected for academic or company fellowships which will provide them with PME completion in grade but not a master's degree upon completion in most cases.

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In his 2019 planning guidance, the CMC stated his commitment to ensuring every Marine is provided the best educational opportunity available. This education should be as academically rigorous as possible. Prior to this guidance, Marine officers attending Command and Staff College had an opportunity to earn a master's in military studies degree upon completion of the school. However, *MARADMIN 434/20* mandated participation in the master's in military studies degree program.

Subsequent to the Commandants Professional Intermediate Board, officers who were not selected for an in-person school or fellowship had to find an alternate means of completing their in-grade PME. Options available were through the distance education program and the blended seminar program. The distance education program took approximately two years to complete compared to one year for the blended seminar. The critical difference between these programs was that upon completion of either of these distance education PME courses a degree is not granted. If the same coursework was being completed for the different programs, the same completion awards and degrees should have been awarded for these programs.

When viewing this inconsistency, two important questions emerge: first, what can we do to level the playing field for all completions to receive the same accreditations; and second, are there alternate means that can be granted to officers for PME completion? The common thread that is viewed for both of these questions is the receipt of a master's degree, which aligns directly with the CMC's guidance of having an academically rigorous program. The answer to the first question seems simple and straightforward: If the academic curriculum is the same for distance programs, modify the distance education programs to include the additional requirements to earn a master's degree for the distance education.

The second question requires a modern view of education, and a nuanced perspective of how PME completion can be accomplished in keeping with the Marine Corps' stated purpose of PME. According to *MCO 1553.4B*, PME, "[equips]" Marines with the analytical skills necessary to exercise sound military judgment in contemporary operations." If the intent is to be challenged academically and obtain a master's degree, a degree in military studies, distant or resident, is no different from any other master's offered by an accredited university. An officer who completes off-duty education while also balancing their work duties and responsibilities is being challenged rigorously academically and professionally. *MCO 1553.4B*, last updated in January 2008, does not include the requirement of intermediate PME to include the receipt of a degree. It does however provide guidance in paragraph 5.d(3) that a request for equivalency review

can be submitted to PME Policy and Operations at Marine Corps University.

Additionally, officers must ask themselves: why is it that we complete PME? The answer is simple—to stay promotable among our peers. The standard for officer promotion is to hold the correct billets in your PMOS for every rank, demonstrate you have credibility and proficiency in your MOS, and ensure your PME is complete. The requirements hold true and should be completed to show why a Marine Corps officer should obtain the next rank in their PMOS. However, the third seems to be harder to demonstrate considering PME is not a requirement for promotion as an officer. Yet, it is an unwritten rule every officer knows is actually required. This is the main point of the argument of why we should allow those who obtain a higher-level degree, related to their MOS, to be counted as equivalent for PME completion.

The Marine Corps would only benefit from creating additional opportunities to show completion of PME by tying PME completion to rigorous study and degrees from accredited institutions.

The Marine Corps would only benefit from creating additional opportunities to show completion of PME by tying PME completion to rigorous study and degrees from accredited institutions. If an officer obtains a master's in a field closely aligned with their MOS, it only creates a more professional and capable officer corps. Additionally, it shows that they understand the importance of their job, how they want to make it better, and can only better those who will be led by a more educated officer. The burden of proof should be on the Marine to prove why they believe it is equivalent. However, until an order is updated or MARADMIN is published to serve as interim guidance, we should be working toward an overall goal that shows that obtaining a degree is of value.

USMC

Reinvigorating Amphibious Training and Education

Expeditionary Warfare Training Group, Atlantic
by the Staff, EWTGLANT

Throughout the annals of our history, the Marine Corps has protected our existence by remaining anchored on our ability to conduct amphibious operations across the globe. Historical amphibious assaults from Iwo Jima to Inchon act as centerpieces to showcase our ability to attack from the sea. Since 9/11, the Marine Corps has slowly departed from our amphibious roots. The protracted results of a twenty-year land war have left a chasm in amphibious expertise across the fleet. Ship availability, coupled with real-world contingencies, has forced the Navy and Marine Corps team to extend the time between Amphibious Ready Group/MEU composite cycles, resulting in less exposure to amphibious operations and training. Senior leaders reminisce over their periods at sea while many post-9/11 Marines have never embarked onboard amphibious warships. Field-grade officers and staff non-commissioned officers who once were expected to complete multiple sea-going deployments are now mid-grade leaders and being exposed to amphibious operations for the first time.

With the *38th Commandant's Planning Guidance* clearly focused on naval integration, we have uncovered a privation of institutional knowledge. Unfortunately, the concept of naval integration has morphed over time into an ill-defined series of statements loosely linked through individual experience levels. *Force Design 2030* is a seismic shift in terms of institutional focus and prioritization. The opportunity to return to the basics and cultivate resident experts in naval integration through experimentation across multiple domains is ripe for exploitation. The curriculum provided by Expeditionary Warfare Training Group, Atlantic (EWTGLANT) serves as a centerpiece in rebuilding our amphibious capability. Through formal instruction, training, and experimentation, EWTGLANT provides the required foundational knowledge needed to reinvigorate naval integration and assist in bringing elements of *Force Design 2030* into fruition.

The mission of EWTGLANT is "[t]o conduct training, instruction and assessment in the doctrine, tactics, and techniques of naval expeditionary warfare, with a focus on amphibious operations, in order to support operational commanders in maintaining forces ready to project military power from the sea." Although the depth and breadth of amphibious responsibility have collapsed over time, EWTGLANT still resides on the mantle of amphibious training and provides dedicated teaching, coaching, and mentoring on all facets expeditionary. Anchored on training and instruction as a core function, EWTGLANTs center of gravity revolves around its instructor cadre. The instructors, fresh from a fleet tour, return to the classroom to serve as subject-matter experts on a wide range of topics. A civilian instructor staff, many of whom are retired military, round out the operational expertise and provide continuity. This complementary team provides a diverse range of experiences and viewpoints that fosters a learning environment of lively debate and critical thought. In addition to in-person courses, EWTGLANTs mobile training teams allow for flexible training venues throughout the fleet. These mobile training teams allow fleet commanders the opportunity to bring in subject-matter experts to their home station or ship allowing for greater participation and cost reduction.

EWTGLANT plays a critical role in preparing the East Coast ARG/MEUs over the entire life cycle of predeployment training. The instructor staff assists in training, mentoring, and assessing the Blue/Green team beginning with a two-week staff planning course. This course provides foundational knowledge on the Rapid Response Planning Process and immerses the staffs in an interactive scenario that presents real-world, multi-domain amphibious challenges. In addition to providing repetitions at amphibious planning, it provides a venue for the staffs to begin developing a personal and professional relationship that will last for the duration of the deployment. In concert with its higher headquarters, Carrier Strike Group 4, and II MEF's Expeditionary Operations Training Group, EWTGLANT continues its support to the ARG/MEUs by embarking aboard ship to provide training, mentoring, and assessment

of amphibious operations during all at-sea periods. This collaboration has bridged a gap between the Navy and Marine Corps assessment process and has received rave reviews from both II MEF and U.S. Fleet Forces Command and serves as the backbone of EWTGLANT's future contributions to the Naval Service.

While our primary focus is on the students and those preparing to deploy, EWTGLANT's facilities, systems, networks, expertise, and coordination with Navy and Marine Corps stakeholders provide opportunities for tailored naval training and live, virtual, and constructive support. The Joint Expeditionary Tactical Trainer at EWTGLANT provides Navy, Marine Corps, and coalition organizations with access to real-world Navy and Marine Corps command, control, communications, computers, and intelligence systems including Global Command and Control System, Command and Control Personal Computer, Advanced Field Artillery Tactical Data System, Theater Battle Management Core System, and many others including tactical data link and variable message format systems. Constructive simulations, including the Navy Training Baseline Joint Semi-Automated Forces and MAGTF Tactical Warfare Simulator, can provide synthetic forces, fires, and interactions to stimulate command, control, communications, computers, and intelligence systems. This allows Navy and Marine Corps training audiences to work with their operational systems and exercise staff processes, information flows, and decision making in a synthetic exercise built to meet specific training objectives. These training objectives can be present-day scenarios for preparing deploying units or future-informed scenarios that test proposed concepts.

JTAC students conducting simulator training in the CAVE. *(Photo by CTR Brandon E Holmes.)*

EWTGLANT also provides synthetic training opportunities to the individual such as with the Combined Arms Virtual Environment and the Deployable Virtual Training Environment. Ongoing efforts to enhance the interoperability and connectivity of these systems will allow these devices to be utilized with other systems and integrate task training and low-level coordination into larger events such as Fleet Synthetic Training events or future naval fires integration efforts.

Finally, live, virtual, and constructive simulation capabilities can also be integrated with other Navy and Marine Corps synthetic training centers, through the Navy Continuous Training Environment, a Secret Internet Protocol Router enclave which allows for the integration of command, control, communications, computers, and intelligence and simulation systems, to include voice traffic on digital radio systems, for distributed exercises. This capability proved itself in Fleet Synthetic Training exercises, such as Naval Large Scale Exercise 21, and in Marine Corps exercises such as Cope Javelin 21. Service-level advances in system and network interoperability will continue to increase the capabilities EWTGLANT can deliver for these live, virtual, and constructive exercises and provide critical opportunities for the fleet to integrate into a synthetic environment.

... twenty years of land wars and a decrease in amphibious deployment opportunities have left a dearth of amphibious expertise throughout the Naval Service.

In closing, twenty years of land wars and a decrease in amphibious deployment opportunities have left a dearth of amphibious expertise throughout the Naval Service. To "return to our amphibious roots," it is crucial to re-establish the foundational knowledge required to make naval integration successful. The education and training opportunities offered by EWTGLANT provide a critical linkage to ensure our ability to attack from the sea will remain a viable option for the Navy and Marine Corps team for decades to come.

USMC

"Read" or Get off the Pot

Changing how we view the time it takes to read

by Capt Karl Watje

I am not a fast or a good reader. I have had trouble reading and should have used a program to improve my reading abilities during high school. I spent more time playing video games and working out than reading. I did not enjoy reading or see any benefit to it. I, and many others, were poor readers because we did not read enough.[1] Twenty years later, all I do is read (I still work out too). I commonly hear from people in and out of the Marine Corps indicating they dislike reading or cannot find the time to read an entire book. The way we measure the time it takes to read or finish a book can and should be altered to be more attractive to the hesitant.

>Capt Watje is a Logistics Officer currently stationed at Camp Schwab, Okinawa with 3d Reconnaissance Battalion, 3d MarDiv. He possesses a Master's in Organizational Leadership and is pursuing a PhD in the same field of study. His only claim to fame is being the only "Watje" in the Global Address List.

There is a myriad of reasons why people do not read: short attention spans, lack of reading abilities, or the time it takes. Frankly, a book can have a hard time competing against Instagram, Meta/Facebook, Netflix, Disney+, Peacock, Amazon Prime, Hulu, HBOMax, TikTok, gaming systems, and other platforms contending for our attention. Do I think it is easier to watch an episode of *The Mandalorian* than read the *Federalist Papers*? *This is the way* (meaning yes). Sure, I get to relax and be entertained while watching the 45-minute show. The time in front of a screen watching the show along with the hours we put into social media and other entertainment services begins to add up. I do not learn anything from watching an episode or gain any secondary or tertiary benefits. I try to convince myself that watching movies and shows with subtitles counts as deliberate reading, but it is not. Documentaries are the one exception to watching to learn, but so much more detail and information is covered when reading a book.

How we spend our available time gives us an insight into the best opportunities to read. *(Photo by Sgt Joby Lach.)*

Benefits of Reading

There are multiple benefits of reading that may seem obvious, but others are more complex. From a professional standpoint, reading books improves vocabulary, reasoning, concentration, and critical thinking skills.[2] This would improve Marines' proficiency in verbal and written communication. From a social aspect, reading books increases empathy, social perception, and emotional intelligence.[3] As Marines, we have the responsibility to serve those around us as leaders or followers. Reading can help us improve our leadership skills for better communication and situational understanding. Reading also reduces stress, and one study showed reading for 30 minutes a day reduced mortal-

ity rates in people 50–90+ years old by 20 percent.[4] Reading for recreation is found to be beneficial for reading comprehension, which can lead people to academic and career success.[5] Regular reading can improve us as Marines, leaders, and people.

How We Spend Our Time

How we spend our available time gives us an insight into the best opportunities to read. I regularly ask people what they did over the weekend and they will tell me how they watched a movie/show or played video games. Cindy Holland, the Vice President for Original Content for Netflix, stated that their users watch their streaming services an average of two hours a day.[6] Research from the *Psi Chi Journal of Psychology Research Journal* indicates that individuals spend two to three hours a day on social media platforms.[7] The Entertainment Software Association reported people who play video games do so an average of 7.5 hours a week.[8] All this time and people cannot find the time to read? I now ask myself how many pages I could have read in that time. My average reading speed should allow me to finish the *Logistics in the Falklands War* within the 7.5 hours that would otherwise be devoted to video games. I am holding off watching *The Lord of the Rings: Extended Editions* for the 34th time because I know I would miss 11 hours of free time to read.

Reading Speeds

How long it takes someone to read a book can vary from person to person. The average person silent reads 238 words per minute (wpm) for non-fiction and 260 wpm for fiction.[9] The oral rate of reading is slower at 183 wpm.[10] Angela Duckworth's *Grit: The Power of Passion and Perseverance* is a 352-page book with an estimated 88,000-word count. The estimated time of completion is six hours and 16 minutes at 234 wpm. The audiobook takes 9 hours and 22 minutes (reading instead of listening to the book saves me three hours, maybe I will begin that *The Lord of the Rings* marathon). Where people can find six hours and sixteen minutes in their already busy week is difficult to fathom. Reading 10 pages (250 words per page) a day would take about 11 minutes; thus, it would take 36 days to complete a 352-page book. This would result in ten books a year! But where are there eleven minutes in the day to spare?

People can either continue to underutilize the time on the toilet or begin to use it to read. ***(Photo by Sgt Joby Lach.)***

Time Down the Drain

Before you wipe this article from your memory and flush it down the toilet, hear me out. The average amount of time people spend on the toilet averages 30 minutes.[11] In Atlanta, 62 percent of people surveyed on the time using the toilet for bowel movements said they spend 30 minutes or more and 28 percent of those surveyed spend closer to an hour.[12] On average, people have three bowel movements per day to three bowel movements per week.[13] If someone were to read during that time, they could easily hit the ten pages per day on just one use! Toilet readers could finish a book quicker than 36 days (up the fiber in someone's diet and think of the possibilities).

I would like to tell you that there are medical benefits to reading on the toilet, but there is no correlation between bowel movement health and toilet reading.[14] People can either continue to underutilize the time on the toilet or begin to use it to read. Yes, there is the possibility of hygienic issues if reading a hard copy book while someone uses the toilet, but we do the same activity with our phones. Better yet, read a book on a phone! For those who have a reading difficulty, the encouragement to read more is key to their development to be more proficient readers.[15] Those with reading difficulties may read 30 percent slower than those without a reading difficulty.[16] This means it takes fourteen minutes and twenty seconds to read ten pages, but can it still be accomplished while sitting on the toilet? This comparison to reading and sitting on the toilet is humorous and probably stinks. But if we begin to evaluate the different timeslots we have throughout the day, finding time to read becomes easier.

What About Audiobooks and Podcasts?

I cannot forget many people may use audiobooks or podcasts to learn. Audio-

books and podcasts can assist those who possess auditory or verbal dominant learning styles.[17] Using audiobooks is a great tool, and studies show that listening to books has the same learning benefits as reading a physical book.[18] For the sake of this article, I am advocating that reading provides more benefits than listening to an audiobook or podcast. Both options of reading and listening are proper uses of time. The multisensory experience of physically reading a book proves to have more benefits though.[19] Please, do not try to read and drive at the same time or do any other tasks unsafe when multitasking. Sitting on a toilet and reading seems safer than most activities. Reading, I argue, is a skill that can be developed. Having access to audiobooks or podcasts may not always be available for various texts or in certain environments. It is in our best interest to read books for improved health, leadership, development, and learning capabilities. The multisensory experience of physically reading a book proves to have more benefits though.[20]

Conclusion

The hope is readers of all levels will understand, through this unorthodox measurement of time and reading, the benefits of reading and how, with small changes to your routines, you can find time to do so. Regular reading will allow us to reach our full literacy potential.[21] Reading can be developed into a simpler task to accomplish and enjoy.[22] It is easier to complete a task when it is placed in many bites-sized elements instead of all at once.[23] This small act of self-benefit may even become so addicting you might find yourself reading outside of the bathroom. Lack of reading, in general, may be caused due to a lack of interest in a book or subject.[24] Finding the right book for a reluctant reader to enjoy may be the cure to recreational reading.[25] Creating a goal can help all readers find purpose in reading.[26] These goals can be concrete such as a time or page requirement. Other goals may not be specific but broader such as wanting to learn a certain topic. People have the time but do not realize it. All the unnecessary distractions during the week cause people to be one thing, clogged. Take the plunge and read.

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The MCU Women, Peace and Security Scholars Program

An inaugural year in review

by Dr. Lauren Mackenzie, Dr. Claire Metelits & Dr. Bradford Wineman

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Why should Marines care about Women, Peace, and Security (WPS)? Broadly speaking, because WPS is about recognizing the values diverse perspectives can bring to operational effectiveness. More specifically, WPS is about empowering half of the world's population as equal partners in preventing and managing conflict.[1]

During the 2021–2022 academic year, a select group of Marine Corps University students and faculty responded to this call to action by conducting a year-long exploration of gender and security issues relevant to the Armed Services. During the summer of 2022, the WPS Scholars Program was re-named the *Reynolds* Scholars Program. Named after LtGen Lori Reynolds, the primary objective of this program remains to advance the WPS effort in professional military education. The decision to rename it was made for both parity and longevity purposes. There are a host of other scholars programs at MCU—such as Grey Scholars—which are named after Marine Corps general officers. The Reynolds Scholars name is likely to last well beyond the WPS title, and it is very unlikely that the Marine Corps or any Marines would think of what she represents as a passing trend. In fact, it is Gen Reynolds' persistent willingness to *advocate* for change and communicate the importance of thinking about *diversity as a strength* that makes her name perfectly suited for the future of WPS initiatives across professional military education.

As part of this inaugural program, students, faculty, and staff discussed a range of issues pertaining to (1) the 2017 U.S. Government legislation, (2) how the DOD operationalizes its WPS implementation plan, and (3) how it could do better. The group, made up of both men and women, met monthly at the Krulak Center where they participated in discussions with military and academic WPS subject-matter experts.[2] The goal of this article is to share the Reynolds Scholars program with the broader Marine Corps community by discussing three overarching themes the group addressed throughout the year: what WPS is and is not, how WPS facilitates military effectiveness, and the way ahead for WPS.

What WPS Is and Is Not

The American legislation on WPS originates from UN Resolution 1325 (2000), the first international piece of legislation to formally acknowledge the inordinate impact conflict and conflict termination have on women and girls. Specifically, it highlights that "civilians, particularly women and children, account for the vast majority of those adversely affected by armed conflict, including as refugees and internally displaced persons" and affirms "the important role of women in the prevention and resolution of conflicts and in peace-building." The U.S. Government's National Action Plan for WPS identifies departments across the government tasked with implementing the principles of UN Resolution 1325, to include the DOD.[3] The implementation guidance for the DOD has three broad objectives, one internal-facing and two that reflect the department's policies and actions abroad. The first mandates the "meaningful participation" of women across the DOD, the second focuses on working with partner nation militaries to include women at all ranks, and the third emphasizes the importance of partner nations to protect the human rights of women and vulnerable populations during

LtGen Lori Reynolds leads the December 2022 meeting of the Reynolds Scholars with students and faculty of Marine Corps University. *(Permission given from the Krulak Center and Gen Reynolds.)*

conflict.[4] Within Defense Objective One, the DOD is tasked with identifying and integrating WPS principles into "relevant DOD policies, plans, doctrine, training, education, operations, resource planning, and exercises."[5] Marine Corps University's Reynolds Scholars Program is the most recent effort to incorporate WPS into the professional military education curriculum. The program introduces students to WPS concepts as they engage with the work of diverse WPS experts and explores the relevance and applicability of WPS for military operations applications.

The WPS Act (and the preceding resolutions and policies from which it is derived) is based on the premise that women experience war differently than men, and that including women in security practices (including peace agreements and security forces) leads to more positive conflict outcomes. It recognizes the unique perspectives women bring to the military's operational effectiveness, highlights the societal implications if women continue to be silenced or unaccounted for in the spectrum of conflict, and empowers women around the world as equal partners in preventing and managing conflict. Therefore, it recognizes that accounting for different perspectives improves the U.S. military's understanding of and ways to address complex security challenges in future wars.

While Defense Objective One of the WPS SFIP calls for the increased inclusion of women in the uniformed forces, WPS should not be perceived as a replication of diversity, equity, and inclusion. Both initiatives seek to promote the value of diverse populations and perspectives in the Joint Force. However, WPS is a much broader construct that highlights the role of women and their universal role in human conflict to better inform strategies and practices for the entire national security enterprise in pursuing global stability. To this end, WPS is not just about the protection of women or seeing women as victims. It is about recognizing that women and girls, just like men and boys, are both the victims *and* the perpetrators of violence during conflict and that their experiences in each differ. Understanding and accounting for these differences increase the lethality of our Armed Forces.

WPS as a Tool for Military Effectiveness

The WPS Act was the first time a global power put into a legislative document the positive effect that women have in negotiations ranging from armed conflict to peaceful political processes. Women make up a large portion of the global population and thus deserve to be incorporated in decisions and processes that may influence their welfare. More specifically, WPS directly contributes to the effectiveness of the armed forces.

Tangible examples of this connection include the September 2020 J-69 Women's Communication Symposium, which brought U.S. and African militaries together to discuss female roles in cybersecurity.[6] Domestically, the WPS initiatives were demonstrated during the fall of 2021, when the DOD deployed its gender advisory workforce to support Operation Allies Welcome. This operation helped in the evacuation and resettlement of Afghan allies throughout the United States. DOD gender advisors were placed at various evacuee camps to help task force military personnel and U.S. interagency partners recognize the unique needs of the differing populations in the camps. Gender advisors helped allocate resources, implement programming, and deal with critical incident needs on the ground.[7]

A more recent example is the promotion of female officer development in African militaries with the event in Morocco.[8] Additionally, U.S. Southern Command's Women, Peace, and Security Podcast, *Breaking Barriers*, which began in 2021, discusses the various WPS initiatives in the Southern Hemisphere.[9]

WPS demonstrates value in civil-military operations. Civil Affairs operators note that women are excluded from analyses because their roles and contributions are unjustly minimized. The result is an incomplete picture that creates flaws within the planning process and can lead to mission failure. During the execution phase of operations, civil engagements and civil reconnaissance is designed to confirm the accuracy of the information compiled during the planning process and fill information gaps. Not including women's perspectives and overlooking the roles women play can easily undermine efforts to gain an understanding of communities and their dynamics, thereby making Civil Affairs products inaccurate. Incorporating women's perspectives and acknowledging the critical roles women play in different societies can be paramount to our success. These concepts do not merely apply to preparation for and execution of combat operations but can be crucial to the success of near-peer or humanitarian operations we may find ourselves executing.[10]

By including women's perspectives in the initial planning process and by ongoing acknowledgment of the varied roles women play within populations, the armed forces build a more comprehensive analysis of the operating environment. Analyzing populations and the areas they inhabit is imperfect and far from straightforward. However, by ignoring or discounting women—approximately half the world's population—we hinder the accuracy of these analyses.

The Way Ahead for WPS

The title, "Women, Peace, and Security," has the potential to be politicized. Like many diversity initiatives, if it is not approached strategically, WPS will be grouped into the nebulous category of "women's issues" and promptly ignored by most men and thus delegated to a select group of women to "solve." If the U.S. Government is not deliberate in its implementation of WPS initiatives, the Act itself and its mandates become box-checking exercises whereby the role of women is factored in after the decision-making process is well underway. Therefore, a strategy that integrates WPS into national security and the operational military is the best approach. That said, WPS cannot be a stand-alone initiative but rather a concept seamlessly interwoven into recruitment, training, education, program drafting, and policy implementation across all elements of domestic and foreign security issues.

One of the most fruitful tools for WPS implementation lies in data. When rigorous research provides clear evidence that the inclusion of women in considerations of conflict and peace is critical for addressing the root of instability. Research finds, for example, that peace processes are better implemented and more durable when they involve women.[11] Studies also show that states with higher levels of gender equality are less likely to enter into conflict.[12] As part of this collection and analysis of data, however, research and assessment of domestic and international WPS initiatives are necessary. Research should look not only at the quantitative data (how many women are in a training program, for example) but at the qualitative and long-term effects of WPS efforts in military and peacekeeping operations.

Marine Corps University's Command and Staff College has begun integrating WPS roles and considerations into its planning exercises, as well as its civilian and military-led seminars. Moving forward, students participating in the Reynolds Scholars Program will be encouraged to [1] brainstorm how the CSC example might be extended across other MCU schoolhouses and [2] serve as a reach-back for faculty/staff looking to ensure gender is taken into consideration in all phases of planning and exercise execution. This program has the potential to serve as a force enabler in that it continues to bring together students, faculty, and staff from different learning levels and areas of expertise to pool their resources and examine warfighting challenges from diverse perspectives.

Conclusion

The integration of WPS into Marine Corps training and education will hinge on the effective messaging of its inherent value. Several years ago, an article by Heather Hurlburt and Jacqueline O'Neill exposed examples of assumptions about women in particular (i.e. "We Need to Think Harder about Terrorism and Gender. ISIS already Is"), and gender in general (i.e. "The Other Side of Gender Inequality: Men and Masculinities in Afghanistan").[13] Once Marines recognize the ways WPS exposes our many blind spots, widens the lens through which we view conflict; and gives the United States an *advantage* by offering more diverse resources for solving complex problems, the more likely its staying power will be.

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>Author's Note: The authors would like to acknowledge the contributions of Mercedes Allen, Shula Clark, Rebecca Duncan, Deb Pleitez, Jade Seabrook, Sharon Sisbarro, Brad Smith, Albina Stanislas, Kerrissa Torres, and Kaitlin Turk.

2022 Col Thomas M. O'Leary Writing Contest: First Place

Repurpose Naval Innovation

Unmanned surface vehicles

by LT Virgil Fermin, USN

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Throughout history, Marines have overcome emerging threats and technological constraints. As LtCol Lewis W. Walt specified in 1951, "the time is past when assault infantry can be placed as helpless victims aboard slow-moving landing craft, several miles from the shore, and expect that a sufficient number of them will reach a defended beach to initiate an attack."[1] LtCol Walt's quote remains equally relevant in light of pacing threats and the uncertainty surrounding the Amphibious Combat Vehicle (ACV) program.[2] Operationalizing Expeditionary Advance Based Operations (EABO) and Stand-in Forces (SIF) from concepts to reality remain a challenging endeavor. A lack of ideas or proposals has not delayed the transition to tangible solutions. The material solutions are simply not arriving at an appropriate velocity. The potential delay of the Light Amphibious Warship to the fiscal year 2025 is also evidence of this reality.[3] Therefore, tacticians and tactical-level leaders must think outside the acquisition system to achieve timely results.

Unmanned surface vessel* Sea Hunter *sits pierside at Naval Base San Diego, during the USDIV One establishment ceremony.* *(Photo by PO2 Kevin Leitner.)

Results are contingent on adequate, feasible, acceptable, distinguishable, and complete solutions.[4] As stated in *MCDP 1*, to "minimize research and development costs and fielding time, the Marine Corps will exploit existing capabilities 'off-the-shelf' technology to the greatest extent possible."[5] Accordingly, the Marine Corps should leverage the guidance provided in the *MCDP 1* to generate a creative change to existing formations.[6] The Marine Corps must partner, participate, influence, and endorse the Navy's Unmanned Surface Vehicle (USV) program. The Marine Corps can accelerate a course of action through seabasing to field the resources required to operate inside contested maritime areas.

Partner

Established in May 2022, the Navy's Unmanned Surface Division One (USVDIV One) is an adequate partner for the Marine Corps.[7] USVDIV One is the leading tactical organization for USV experimentation, fleet advocacy, and process development.[8] This situation also represents an opportunity for Marines to remain faithful to *MCDP 1*

and capitalize on USVDIV One's technological momentum. A mutually beneficial partnership with USVDIV One would also provide the Naval Services with an innovative mix of force capabilities. The Marine Corps has capable aviation assets, air-to-surface weapons, and quick-reaction force elements required to deter adversaries. Conversely, the Navy's best interest is to protect USVs from nefarious actors. The issue of USV protection became evident after the Islamic Republic of Iran Navy temporarily seized two Saildrone Explorer USVs in the Red Sea.[9] USV protection may not be the most exciting mission profile, but it could serve advantageous as the Marine Corps refocuses its efforts on maritime operations.

USV and amphibious force integration would also generate many maritime reconnaissance options. L-class ships can serve as floating multi-mission USV Expeditionary Advanced Base motherships.

Partnering with USVDIV One also aligns the Naval Services toward task cohesion in pursuing distributed operations.[10] Marine Corps and USV interoperability delivers the means to expand the operational range inside contested maritime spaces. This partnership will also produce a reduced signature and minimize risk to the force. At the tactical level, USVs can be utilized in littoral areas while naval vessels remain outside at varying ranges. VADM Roy Kitchener, Commander, Naval Surface Force, U.S. Pacific Fleet, openly stated, "USVDIV One will be a catalyst for innovation as we employ unmanned surface capabilities in the Pacific Fleet."[11] USVDIV One's focus on the Pacific Fleet compliments the Marine Littoral Regiments maritime domain awareness mission set.[12] The Naval Services have an opportunity to develop multidimensional solutions in a region of interest. The prospect of autonomous surface platforms integrating with traditional forces is growing at an accelerated pace. In the 5th Fleet, *Task Force 59* is currently shaping the future of uncrewed vessel integration.[13] Therefore, the current conditions are conducive to establishing a Memorandum of Understanding to advance the Marine Corps' role in this endeavor.[14]

Participate

Operationalizing from partnership to participation is feasible now with a Memorandum of Understanding in place. Thus far, a substantial amount of time has focused on USV integration with destroyers. In 2021, the Zumwalt class destroyer, *USS Michael Monsoor*, served as the USV command-and-control (C2) center during the Fleet Battle Problem exercise.[15] During RIMPAC 2022, destroyers partnered with four USVs.[16] Tasking a destroyer with the command of a USV is a familiar function, but there are alternative configurations worth exploring. In particular, L-class ships provide USVs with various unique resources and flexibility. Physical space on L-class ships is often marginalized exclusively as something reserved for equipment meant to disembark. However, physical space provides the flexibility to load USV operators, C2 systems, and engineering and logistical support. The physical space onboard L-class ships are significantly more adequate than destroyers for the embarkation of USVs. Often overlooked, well-decks on L-class warships are a unique variable that can transform USV deployment.

Seabasing USVs would directly impact the embarked MEU, but the benefits outweigh the cost. USV integration can be scalable and executed incrementally to minimize the impact on the MEU. The USVs can provide mutual and direct support to Expeditionary Advanced Bases, SIF, and fleet assets. Respectively, the L-class ships can conceal USV loads and serve as a conduit for operational flexibility. USV and amphibious force integration would also generate many maritime reconnaissance options. L-class ships can serve as floating multi-mission USV Expeditionary Advanced Base motherships. In essence, the partnership would be the tactical embodiment of ADM Zumwalt's hi/low mix concept introduced in the 1970s.[17] Amphibious forces would immediately gain organic assets that can readily participate with other fleet units. Further, USV MEU integration would validate the resiliency and durability of those systems outside the destroyer-centric configuration.

Influence and Endorse

According to the Director of the Asia Maritime Transparency Initiative, Gregory B. Poling, the Chinese maritime militia have increased their encroachment on other nations' exclusive economic zones and repeatedly violated the United Nations Convention on the Laws of the Sea in the South China Sea during the last two decades.[18] This trend represents a problem in the South China Sea and demonstrates how incremental actions influence the maritime domain. Based on Poling's report, he identified 122 vessels as Chinese maritime militia vessels and identified an additional 52 as probable militia members.[19] If Poling's report is accurate, the maritime environment has become more contested without employing long-range weapons. The Marine Corps can learn from the Chinese maritime militia and find its approach to influencing the naval domain.

Frequently non-kinetic missions are overlooked as a significant amount of energy and time is expended discussing the high-end fight and precision weapons. However, the non-kinetic shaping of the maritime environment is equally advantageous and influential. History is a reference point for the value of operations below the threshold of combat. Nearly two decades ago, *Task Force 714* revolutionized the employment of UAVs in Iraq.[20] *Task Force 714* utilized

***The large unmanned surface vehicle* Nomad *transits the Pacific Ocean to participate in Exercise* Rim of the Pacific *2022.* (Photo by Mass Communication Specialist 1st Class Tyler R. Fraser.)**

UAVs to conduct surveillance and identify and develop life patterns.[21] Correspondingly, the Marine Corps can leverage the lessons learned from *Task Force 714* and *Task Force 59* to influence the production of well-deck deployable USVs and payloads essential to the survivability of SIF. Notably, the Marine Corps' outcome would deliver reliant and resilient capabilities that support all naval forces. The expeditionary force can also influence the maritime environment through creative tactics and increase awareness of USVs.

The Naval Services can mutually endorse a USV surveillance, identification, and maneuver plan. The Marine Corps endorsement of a USV plan would be distinguishable because EABO and SIF are critical expeditionary functions. A Marine Corps-endorsed USV plan would also remove the assumption that USVDIV One is cohesively integrating EABO and SIF in their current efforts. Ultimately, endorsement leads to the development of a complete plan for all stakeholders involved. A mutually endorsed program also supports the operationalization of EABO and SIF. Increased operationalization of EABO and SIF will intertwine Marines with other fleet units and further legitimize the Marine Corps' warfighting initiatives.

> ***"Our ideas have a chance to make an impact in our organizations only if decision makers say yes to them."*** [22]
>
> ***—Jennifer Mueller, PhD***

Conclusion

The Marine Corps can continue to deploy MEUs on L-class ships under the current configuration and wait until the fiscal year 2025 for material solutions to arrive. In the meantime, we should note that the Chinese People's Liberation Army Navy is also not sitting back and waiting for capabilities to arrive. The People's Liberation Army Navy recently leveraged innovation and launched amphibious landing crafts from civilian ferries.[23] Conversely, the arrival of ACVs to the fleet does not transform maritime mobility for the Marine Corps. The prospective Light Amphibious Warship provides maneuver, but its ability to reduce force signature is debatable. The Marine Corps' procurement of the Metal Shark Long-Range Unmanned Surface Vessel is also promising but remains an immature capability.[24]

Change is necessary to create an advantage for the expeditionary force, and unpredictability is a discreet strength that the Marine Corps can explore further. In execution, USV integration with expeditionary forces will require the alteration of embarked MEU. However, there must be a willingness to trade off Marines and equipment in favor of shape-shifting capable formations.[25] The tradeoff could be replacing ACVs on a MEU or minimizing the ACV footprint in favor of Navy USVs. MEU USV implementation will result in the immediate integration of organic multi-mission capable assets. This concept is an upgrade from the inertia caused by funding constraints and programmatic bureaucracy. A formal partnership between the Marine Corps and USVDIV ONE will undoubtedly affect the character of seabased forces and operational art. Ultimately, this is achievable without requiring the Marine Corps to concede additional funding while minimizing research and development costs. In the end, if the concept does not work, the idea can be discontinued, and the MEU can reverse back to standard formation. We can all wait until the fiscal year 2025 for material solutions to arrive or try something tangible in the meantime. For now, momentum is contingent on the right people simply saying yes now.

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2022 Col Thomas M. O'Leary Writing Contest: Second Place

From Their Cold Dead Hands

Foraging weapons and ammunition

by Capt Michael Hanson

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According to the recently released *Concept for Stand-In Forces*, Stand-in Forces are defined as: "small but lethal, low signature, mobile, relatively simple to maintain and sustain forces designed to operate across the competition continuum within a contested area as the leading edge of a maritime defense-in-depth in order to intentionally disrupt the plans of a potential or actual adversary."[1] Operating entirely within an adversary's weapon engagement zone, these forces are to compete with adversary forces on the threshold of hostility, and if necessary, confront them during open conflict. However, once the shooting starts and missiles begin to fly, sustaining these forces to keep them in the fight will be perhaps the greatest challenge the force will endure. A 2019 document called *Sustaining the Force in the 21st Century, A Functional Concept for Future Installations and Logistics Development* bluntly states, "Since naval forces can no longer presume sea control or air and land superiority at the onset of a campaign, Marines must take a different approach to logistics integration and expeditionary force sustainment to mitigate risks."[2]

In the opening paragraph of his forward for this concept, then Deputy Commandant for Combat Development and Integration LtGen David Berger stated, "In the future operating environment, logistics will be the pacing function for the Marine Corps."[3] Now Commandant of the Marine Corps, Gen Berger has said that, "To persist inside an adversary's weapons engagement zone, our Stand-in Forces must be set and sustained by logistics capabilities designed for distributed operations over long distances in a contested environment."[4] It is a widely accepted fact throughout the DOD that traditional logistical methods that sustained previous campaigns will be untenable in a future conflict with a peer adversary.[5] Thus, the new *Concept for Stand-In Forces* requires a new concept of logistics as well—one that is lighter, leaner, more streamlined, and less targetable for the units needing resupply as well as for those bringing resupply.

The Concept for Stand-In Forces introduces a new logistical concept: avoidance. "Avoidance means the purposeful development of systems and related procedures that allow Stand-in Forces to operate effectively by applying capabilities that do not rely on logistical, maintenance, or personnel support inside the contested area."[6] In short, Stand-in Forces will need to be less reliant on sustainment from outside agencies and will need to be more self-sufficient because "Most active re-supply efforts would disrupt the signature footprint of the stand-in forces ... Forces can operate successfully and independently with low signatures as long as their organic capabilities can sustain them."[7]

Addressing this and other pressing issues in today's Marine Corps, Gen Berger recently visited the Center for Strategic and International Studies and the U.S. Naval Institute. As outlined by a reporter that covered the event:

> The Marine Corps, along with the Navy, is planning to operate with its forces spread out instead of concentrated in one place and inside an area where an adversary can more easily target them with weapons. But the service still needs the mobility and distribution means to move people and supplies within a contested area, Berger said. Because of this, it could be harder to get those Marines anything more than the most important supplies, leaving them to forage for food, water, and transportation."[8]

Speaking directly about the topic of sustainment within an adversary's weapon engagement zone, Gen Berger said, "You're going to go in there and get all that stuff and the only thing I'm going to fly you in? Ordnance. And maybe JP to refuel some aircraft, but it's just fuel and bullets, that's what I'm going to resupply. The rest you're going to have to forage."[9]

Foraging will be a vital pillar of logistics in a contested environment. Some things can be foraged easier than other things and some units will have different sustainment requirements than others. For an infantry unit in close combat with the adversary, jet fuel will not be a primary requirement. Most of

The ability to "forage" and employ foreign weapons can reduce the sustainment burden for Marine Stand-in Forces. *(Photo by Sgt Desmond Martin.)*

their resupply needs can be obtained locally. They will need chow, which can be cached and fallen back on; water, which can be obtained from local water features using pumps and filters in these sub-tropical and perennially wet regions; batteries, which can be recharged with solar panels and other improving technologies, and ammunition, which, as the Commandant said, is one of two things that outside agencies will have to transport in. Or is it? Might it be possible to forage weapons and ammunition?

In the war in Ukraine today, the biggest source of weapons and ammunition for Ukrainian forces is, according to some accounts, the Russian Army, which has abandoned vast stockpiles.[10] This is a much simpler solution for the Ukrainians' problem set than the challenges the Marine Corps faces in the First Island Chain as the Ukrainian military originated from the Soviet Military and, as such, is not only equipped with many of the same weapon systems as the Russians but additionally, Ukrainian troops are already trained in their use as well. Marines and adversary forces have completely different weapons and munitions, but this should not deter our Marines. Instead of resupplying Marines with fish, we should teach them to fish. Marines should be trained in the use of the pacing threat's weapons so that they may forage from those the adversary leaves on the battlefield. Perhaps this is not a long-term solution to the challenges of sustainment but may be a viable supplement to fall back on or at least a short-term remedy in a survival situation.

The Foreign Weapons Instructor Course ... is the Marine Corps center for ... the use of foreign weapons.

As a young Marine in the battle of Fallujah on my first deployment, I distinctly remember fellow Marines using enemy weapons such as AK-47's, RPK light machine guns, RPD and PKM medium machine guns, and rocket-propelled grenades, among others. None of our Marines were trained on any of these, they just used their own ingenuity to figure it out. Furthermore, they did not resort to enemy weapons out of mischief or curiosity but out of tactical necessity instead: because they ran low on their own ammo; because, as has been argued over for decades, the 5.56 NATO is a weak cartridge and did not put down enemies wearing body armor or who were hopped up on drugs; because fully automatic AK variants were more appropriate weapons for close quarter urban combat; because Marines were pinned down and needed a quick high explosive solution that an abandoned RPG within arms' reach could provide; and a hundred other urgent situations. Furthermore, I vividly remember the enormous caches we stumbled upon, completely abandoned by the enemy, which were subsequently disposed of. They were often enough to arm an entire platoon.

Turning an enemy's weapon against him was not unique to Fallujah or Iraq, as one can easily find images from other wars of Marines using captured weapons. The common thread throughout the wars was that Marines did so because they needed to and Marines in the future will find the need to use captured weapons systems when they run out of ammo and immediate resupply is untenable. The Marine Corps should prepare for this inevitability by teaching Marines how to employ captured weapons so they can fall back on their training rather than their ability to teach themselves on the fly.

The Foreign Weapons Instructor Course (FWIC) at the Weapons Training Battalion in Quantico, VA, is the Marine Corps center for knowledge, instruction, and practical application in the use of foreign weapons. In a two-week period of instruction, Marines learn the fundamentals of assembly and disassembly, loading and firing, as well as zeroing and maintaining weapons of foreign manufacture. The weapon systems Marines receive instruction on are mostly of former Soviet Bloc vintage and the course is geared toward creating instructors who can go back to their units and be the subject-matter experts on these weapon systems. Created during the height of the Global War on Terrorism, the course was intended to teach Marines how to train, advise, and assist partner nation forces equipped with these weapons systems more than to employ captured weapons in combat.[11]

FWIC is the logical starting point for instituting a concept of foraging captured enemy weapons. However, it is currently not enough. To begin with, the course material primarily focuses on former Soviet Bloc weapons, though an updated syllabus will soon include Chinese weapon systems, this will only feature classroom instruction and no time on the firing line. The course needs to make the pacing threat's weapon systems its primary focus. Furthermore, with a class size of 30 students per course and 6 courses per year, the throughput of the course is wholly insufficient, producing roughly only a company-size body of graduates a year.[12] Therefore, Weapons Training Battalion in Quantico should not be the only command that hosts the course. In addition to Quantico, the Advanced Infantry Training Battalions at the Schools of Infantry on both coasts should also offer this course to train fire team leaders through platoon commanders to become subject-matter experts on these weapons systems. Additionally, entry-level training courses should begin the process of familiarization with adversary weapons systems. Courses such as Marine Combat Training at the Schools of Infantry and the Basic Officer Course at The Basic School should train new Marines on the most basic knowledge of adversary weapons, such as weapon identification, the proper ammo for specific weapons, basic disassembly/assembly, and how to load and make ready. Second-stage courses such as those at the infantry training battalions and the Infantry Officer Course should expand on this instruction with familiarization firing of adversary weapons systems. Finally, the marksmanship training units at each Marine Corps base should maintain an armory of adversary weapons that Marines can schedule hands-on time with to maintain their proficiency. If the Marine Corps really is serious about the arms room concept then there needs to be an arms room for adversary weapons as well.

Resupply of Stand-in Forces is one of the greatest challenges our Marine Corps faces moving forward into this new era of interstate competition in the Western Pacific. Relying solely on foraging enemy weapons will only do so much, so this concept should not be our primary source of sustainment. However, when logistics are contested and Marines have to make tough decisions on which limited assets can be committed to resupply a myriad of units in the weapon engagement zone, a unit that can report that it does not need ammo resupply because it can employ captured weapons is a unit that just freed up a precious resupply to another unit in need and spared a resupplying unit from preventable risk. Thus, this alternate method of resupply, this concept of foraging, is worth the time and resources committed to preparing for it.

When this day comes, our Marines will thank the Corps for training them to improvise, adapt, and overcome in this manner—right after they thank their enemy when prying his weapon and ammo from his cold, dead hands.

... a unit that can report that it does not need ammo resupply because it can employ captured weapons is a unit that just freed up a precious resupply to another unit in need ...

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Being Faster

by Mr. Joseph Miranda & Dr. Christopher Cummins

MCDP 1-3 defines tactics as "*the art and science of winning engagements and battles. It includes the use of firepower and maneuver, the integration of different arms and the immediate exploitation of success to defeat the enemy,*"

One element of the tactical tenets is "being faster." Within this context, speed is a weapon. This functions on several different levels. A force which moves faster than its foe gains advantages with maneuver and surprise per John Boyd's OODA (Observe, Orient, Decide, and Act) Loop. Superior leadership or logistics provides a potential for faster operational tempo. There is also the psychological advantage of making surprise attacks, disorienting the enemy and making it difficult for them to respond.

One example of this is from Erwin Rommel's Gazala Offensive, May-June 1942, in which Panzerarmee Afrika launched a counteroffensive which first outmaneuvered British Eighth Army in Libya and then swept into the strategic port town of Tobruk, setting up the subsequent Axis drive on Alexandria in Egypt.

One of the reasons for this went back to Rommel's up-front leadership style. He was frequently to be seen with lead units or flying overhead in a light aircraft. This allowed Rommel to observe the situation on the ground, immediately determine the lines of attack, decide on which line would be optimal with what forces, and then implement the operation—the latter often by giving the orders personally to subordinates. Speed also provided a measure of security, as fast moving Afrika Korps columns could leave their flanks open because the British reaction cycle could not exploit such vulnerabilities.

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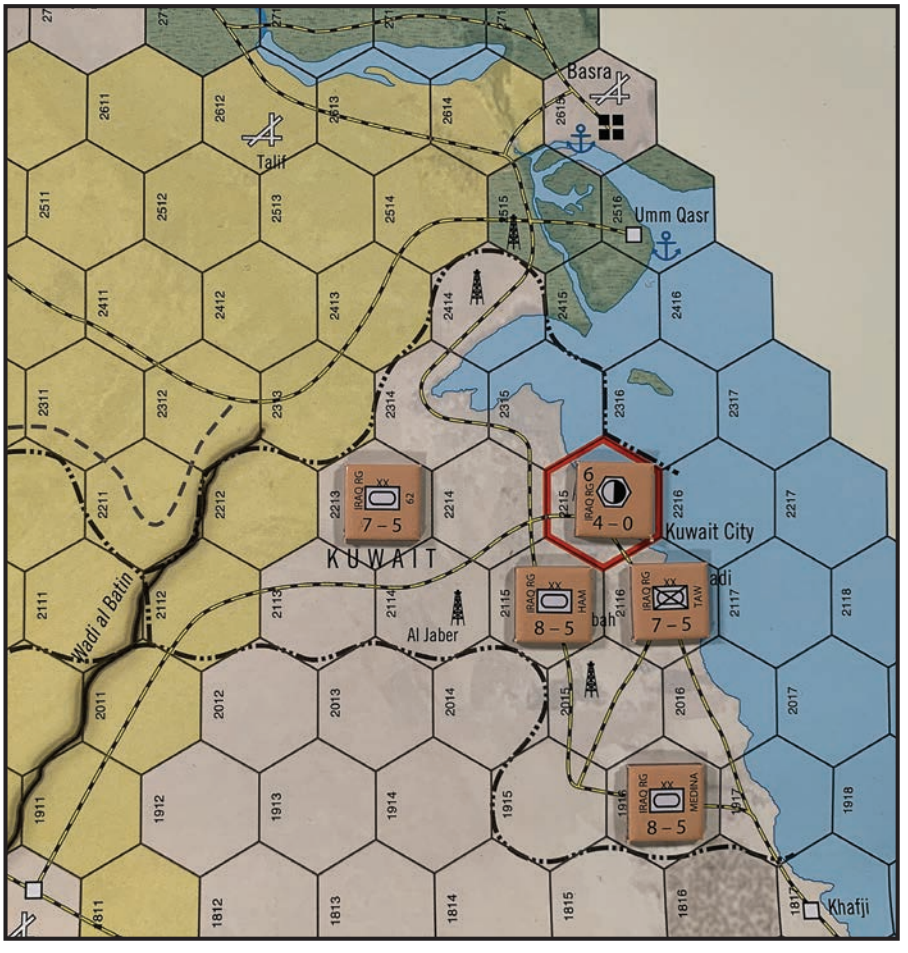
The British command system was not efficient with headquarters often well to the rear of operations. Eighth Army commander Gen Neil Ritchie was subordinate to theater commander Field Marshal Claude Auchinleck. Or-



"Theater of Operations." Objectives are outline in red. Situation is the Iraqis have completed their occupation of Kuwait City. This brings in a reinforcement corps which deploys in Iraq and will move south in the ensuing turns.

ders often had to go through multiple layers before they could be implemented. The result was Panzerarmee Afrika could move faster and hit harder, often leading to demoralization among British forces. One example of this was that the Tobruk fortress, which held out under a prolonged Axis siege back in 1941, surrendered as German-Italian forces reached its perimeter.

Conversely, the British Middle East Command paid much more attention to the speed of logistics than did the Axis in North Africa. British logistics staffs spent years building up a network of airbases, supply depots, maintenance shops, and rest camps in the Nile Delta. These provided the foundations for Eighth Army to win the battles of El Alamein later in the year. Axis logistics in North Africa could not compete when it came to refueling, rearming and moving forces, which turned the tempo of operations in favor of the Allies. To give one example, the British Desert Air Force had a higher turnover rate when it came to aircraft, flying more sorties than their German and Italian counterparts. British logistics allowed for sustained operations which eventually paid off in the Field Marshal Montgomery's counteroffensive which pushed Rommel back to Tunisia in 1943.

Let us see how this plays out in another desert war campaign, based on one which took place some five decades later.

Mobile War in the Persian Gulf

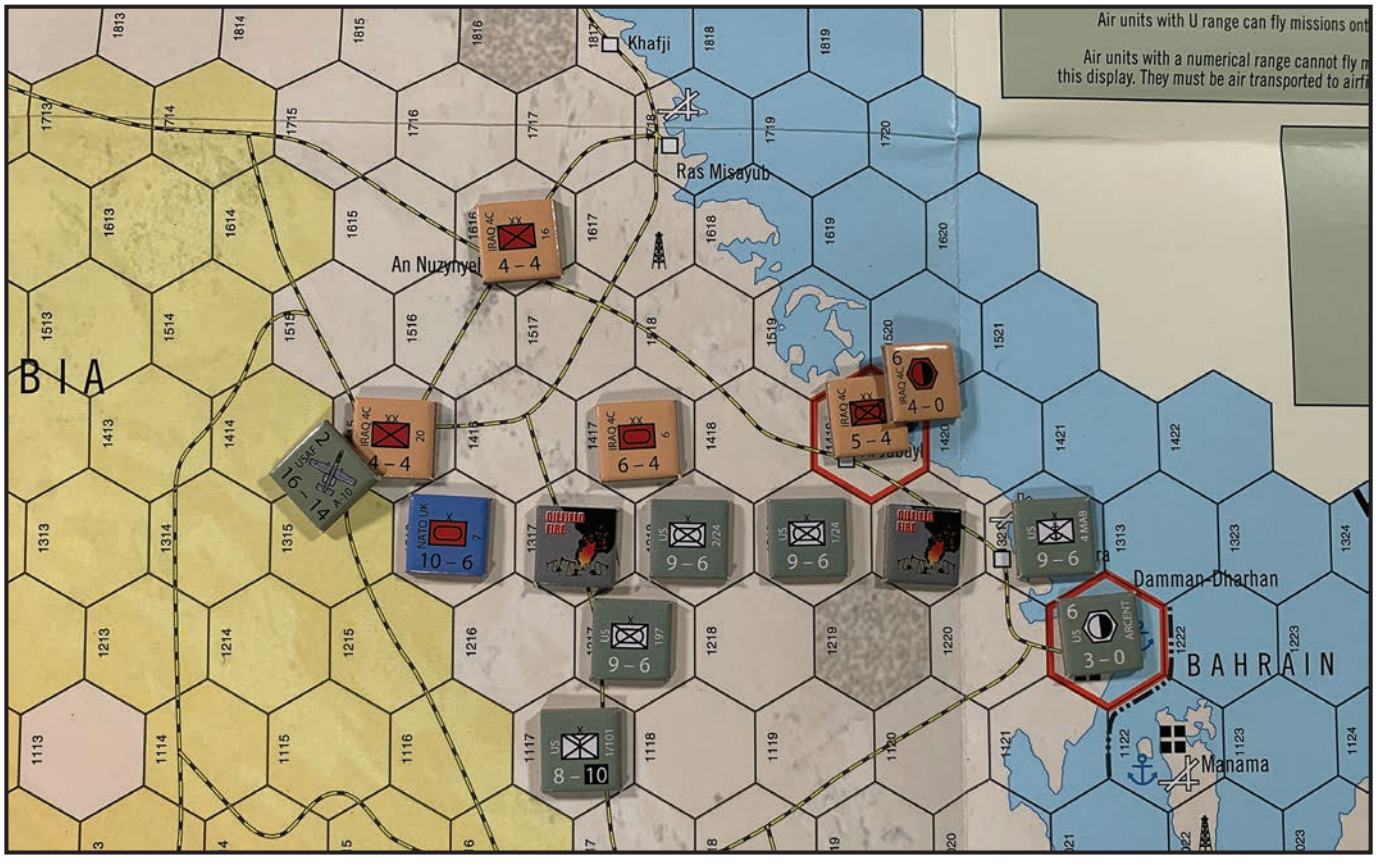
In August 1990 Saddam Hussein's Iraqi forces invaded and quickly overran Kuwait, then stopped to dig in and hold against the anticipated U.S.-Coalition counteroffensive. What if Saddam had decided to continue the offensive, driving immediately into Saudi Arabia while the U.S.-Coalition scrambled to meet his forces? *Strategy & Tactics* magazine issue # 339 includes a wargame on this topic, *Saddam Moves South*. In this hypothetical campaign, speed of combat operations and rate of logistics are major factors (as they were in the historical 1990-91 Desert Storm/Desert Shield campaigns).

Essentially, *Saddam Moves South* is a race against time for both sides in order to accomplish their respective missions. The Iraqis have to seize as much of Saudi Arabia as they can before the inevitable Coalition counteroffensive. The Coalition must establish forces in-theater and then retake ground lost before the clock runs out. Forces are asymmetrical, with the Coalition having the preponderance in the air and the Iraqis the numbers on the ground, at least initially.

The central game system revolves around logistics for both players. The Iraqis begin the scenario with two corps (each composed of specified divisions and brigades). They can bring on more corps via taking various objectives within Saudi Arabia.

The Iraqis are closer to their lines of communications, but their ability to conduct sustained offensives is

"Theater of Operations." Objectives are outline in red. Situation is the Iraqis have completed their occupation of Kuwait City. This brings in a reinforcement corps which deploys in Iraq and will move south in the ensuing turns.



"Exploitation at Al Jubayl." Coalition forces use deep battle to move to Iraqi flank to be in a position to outflank and destroy remaining Iraqi forces.

restricted by planning and logistical considerations. In the game, this is by making the capture of certain objectives in Saudi Arabia a prerequisite for bringing in reinforcement corps. The idea here is that these represent forward logistical points, allowing for the support of more forces. Also, as Saddam gains objectives, he is more likely to commit reinforcements to sustain the campaign in accordance with doctrinal considerations involving echeloned theater offensives.

To maintain operational tempo, therefore, the Iraqis have to move fast, pushing forces forward and following with additional echelons. Moreover, by taking ports and airfields, Coalition reinforcements are blocked from entry into certain sectors of the map.

The interrelationship between logistics and speed are modeled uniquely for the Coalition. The Coalition is given Air Transport Points (ATP), a quantification of total air transport capability. The player expends ATPs to deploy reinforcements onto the map, refit units disrupted in combat, and provide supply to forces once in theater. Effectively, ATPs generate operational tempo because the Coalition player must make decisions on how they are allocated. For example, the player might expend ATPs to build up forces in Saudi Arabia before launching a late game counteroffensive. Alternatively, the player could spend a couple of turns deploying a small force but then move quickly to counter the Iraqis before they can drive too deeply south.

Speed is affected by doctrinal factors. For example, ground units have a movement rate, the basic distance they can move in one turn. Generally, U.S. and NATO units have higher movement rates than other forces owing to superior command control and direct support logistics.

Coalition units have other advantages when it comes to operational tempo. One is that certain units, upon a successful assault, can exploit further via a special move (advance after combat). Also, U.S. and NATO units can make a second attack each turn during the Deep Battle phase; this models the contemporary Air Land Battle doctrine. Thus, the Coalition can exploit further and gain an advantage when it comes to superior action (OODA) cycles.

Marine and special forces units can exploit amphibious movement to seize ports behind enemy lines. Port control speeds up Coalition logistics and enhances overall mobility. They can conduct surprise attacks in the Iraqi rear, disrupting supply lines and slowing the southern offensive by diverting Iraqi forces to counter these intrusions.

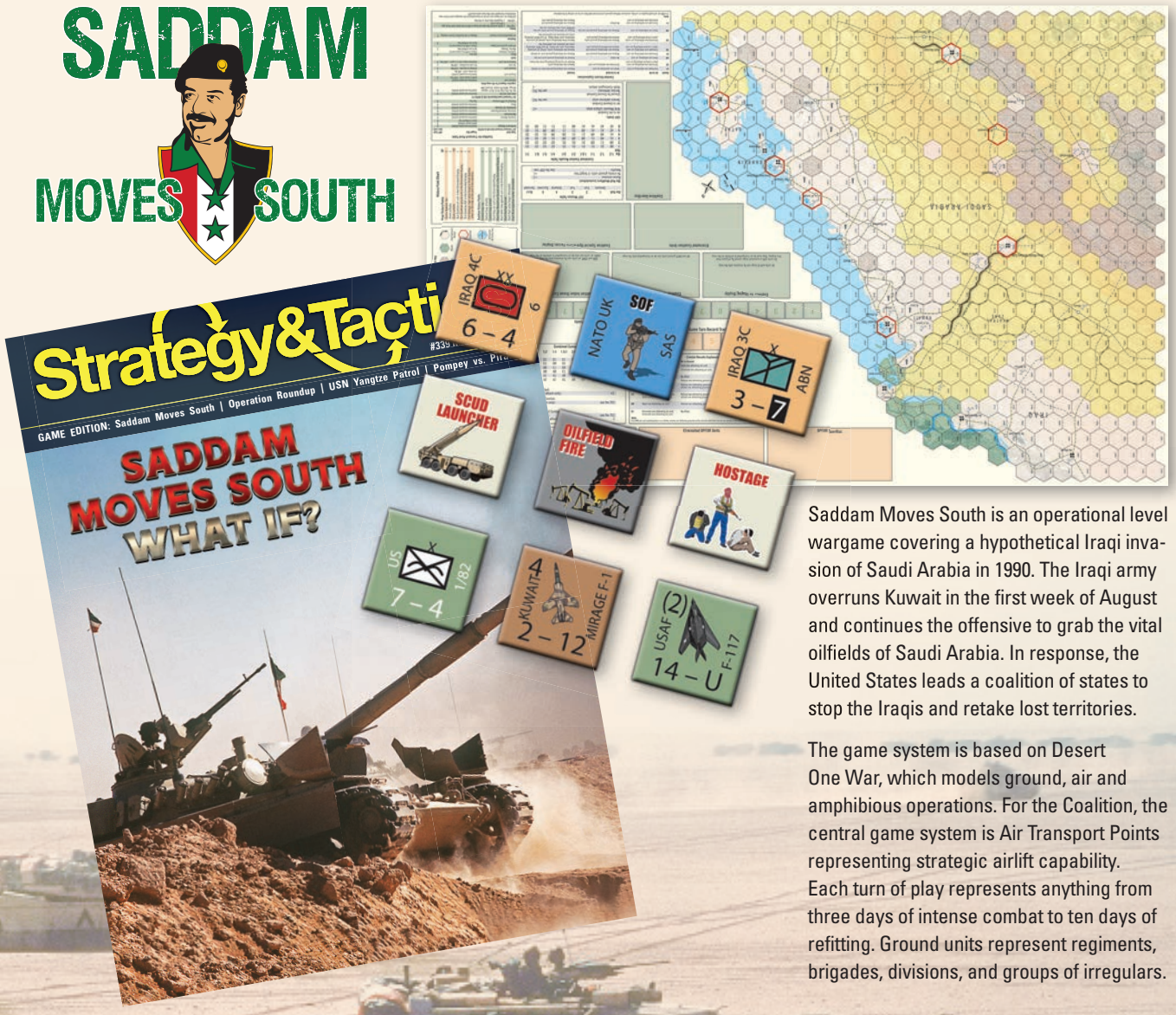
Friction factors affect the tempo. Certain Coalition reinforcements are randomized as to the turn they can appear. This is owing to a variety of factors outside the theater command's ability to control, such as political considerations (allies being enthusiastic or reluctant to commit forces) as well as the difficulties in moving forces across a hemisphere in the face of potential enemy action.

Oilfields are on the map and these can be subject to fires, creating massive clouds of thick smoke. Effectively, the terrain alters and players can find oilfield fires inhibiting their combat operations and ability to push forward supply lines.

And that is *Saddam Moves South*, where the side which can act and react faster than the other will win on the Arabian Peninsula.

This Issue's Game

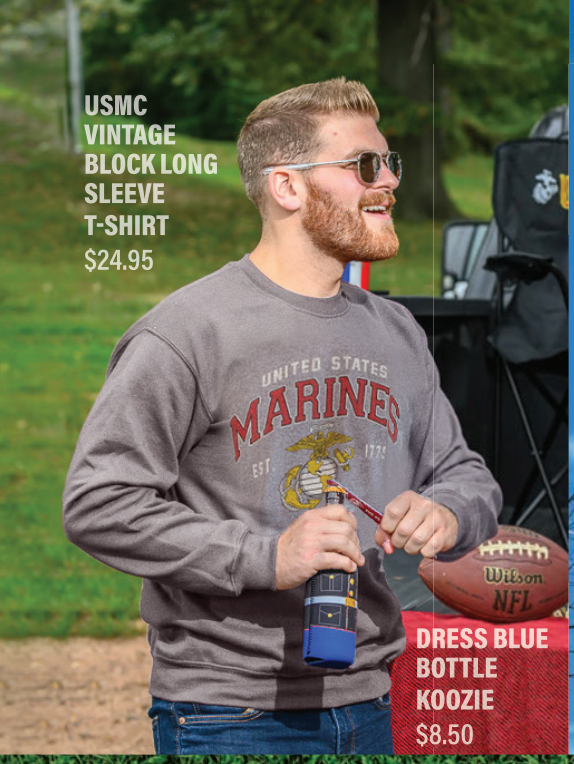
SADDAM MOVES SOUTH



Saddam Moves South is an operational level wargame covering a hypothetical Iraqi invasion of Saudi Arabia in 1990. The Iraqi army overruns Kuwait in the first week of August and continues the offensive to grab the vital oilfields of Saudi Arabia. In response, the United States leads a coalition of states to stop the Iraqis and retake lost territories.

The game system is based on Desert One War, which models ground, air and amphibious operations. For the Coalition, the central game system is Air Transport Points representing strategic airlift capability. Each turn of play represents anything from three days of intense combat to ten days of refitting. Ground units represent regiments, brigades, divisions, and groups of irregulars.

Players: 2
Hex Scale: 22 miles (35 km)
Components: 22×34 inch map & 224 9/16-inch counters
Designed by: Joseph Miranda



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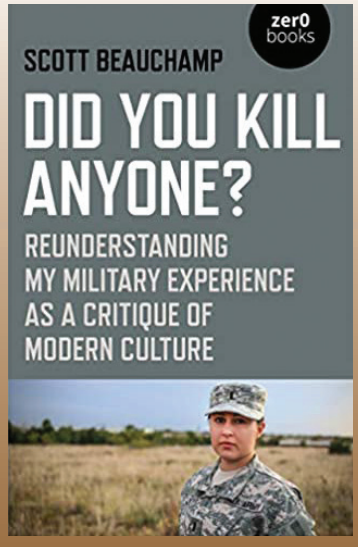
Did You Kill Anyone?

reviewed by Maj Benjamin Van Horrick



DID YOU KILL ANYONE? By Scott Beauchamp. Ropley: Zero Books, 2020.
ISBN: 9781785357862, 144 pp.

Did you kill anyone? Veterans often receive this question from grateful, well-meaning yet detached citizens. This question serves as the title of Scott Beauchamp's slim, insightful collection of essays focusing on his military service. His brief, often infamous career, in the Army during the Iraq War provides a welcomed vantage point to analyze the experience of the Global War on Terrorism enlisted veterans and modern life. Beauchamp's essays articulate the most poignant aspects of his military service underpinned by various numerous references to art, psychology, sociology, philosophy, and literature. Beauchamp gives voice to the most profound, visceral, and enduring aspects of military service while opening a line of communication with the cultural elite who remained detached from two decades of conflict.

The collection of essays consists of one-name titles such as "Boredom," "Ritual," "Honor," and "Smoking," providing the reader a detailed examination of enlisted life in a clinical manner showing how and why certain experiences brought meaning to Beauchamp's service. In his chapter on ritual, Beauchamp's deft description of his infantryman's initiation ceremony, complete with its songs and creed, "shows both the power of ritual and the sad emptiness of a world without it."[1] He writes during the ceremony, "I felt empty and new. Freed from irony and suffused with purpose. The vault of the sky felt within reach."[2]

Many veterans took a footlocker to combat zones, and Beauchamp filled his with books. Numerous lengthy excerpts from literature, sociology, psychology, and history support the intellectual heft of his arguments and narrative. These references provide the lay reader with little understanding of military life, supporting his argument and providing a connection to his lived experience to other works as a means of giving his experiences cohesion and form. Many in uniform shared Beauchamp's lived experience but do not possess his mastery of language and intellectual depth. Beauchamp's reflection gives voice to the often misunderstood and the difficult-to-articulate enlisted Global War on Terrorism experience.

Beauchamp's reflections on his service offer military recruiting commands and small unit leaders a guide for how the powerful experience of enlistment remains with servicemen well after their contract ends. Published right before the COVID-19 pandemic, this collection of essays comes as recruiters and small-unit leaders faced unprecedented challenges to achieving recruitment quotas and sustaining unit cohesion. As the youth of America continues to grapple with isolation, loneliness, and suicide following the pandemic, military enlistment continues to offer the promise of connection, cohesion, and significance—but only if recruiters highlight the unique connections military service forms and if small unit leaders build fire teams, squads, and platoons worth sacrificing for.

The book's rendering of Beauchamp's service offers the reader an intimate reflection on the emotions his service invoked in an earnest, apolitical manner. A generation of Global War on Terrorism enlisted personnel felt similar intensive emotions. Many veterans will recognize their own experience through Beauchamp's mastery of language and critical analysis. These essays do not just give logic and coherence to Beauchamp's service but paint a vivid portrait of enlisted life those in uniform will recognize, but could not several verbalize, while inviting inquiry from grateful civilians unsure how to best discuss military service. By giving voice to the most profound and evocative emotions that remain with veterans long after they have received their DD-214, Beauchamp elevates the enlisted experience. Rather than asking vets "did you kill anyone?" or simply saying the trite "thank you for your service," citizens should consider asking veterans what they miss from their service.

>Maj Van Horrick is currently serving at CTF 76/3 (3d MEB) as the current Logistics Operations Officer.

Notes

1. Scott Beauchamp, *Did You Kill Anyone?* (Winchester, UK: Zero Books, 2020).

2. Ibid.

Index to Advertisers

Editorial Policy and Writers' Guidelines

Our basic policy is to fulfill the stated purpose of the *Marine Corps Gazette* by providing a forum for open discussion and a free exchange of ideas relating to the U.S. Marine Corps and military and national defense issues, particularly as they affect the Corps.

The Board of Governors of the Marine Corps Association has given the authority to approve manuscripts for publication to the editor and the Editorial Advisory Panel. Editorial Advisory Panel members are listed on the *Gazette*'s masthead in each issue. The panel, which normally meets as required, represents a cross section of Marines by professional interest, experience, age, rank, and gender. The panel judges all writing contests. A simple majority rules in its decisions. Material submitted for publication is accepted or rejected based on the assessment of the editor. The *Gazette* welcomes material in the following categories:

- **Commentary on Published Material**: The best commentary can be made at the end of the article on the online version of the *Gazette* at https://www.mca-marines.org/gazette. Comments can also normally appear as letters (see below) 3 months after published material. BE BRIEF.
- **Letters**: Limit to 300 words or less and DOUBLE SPACE. Email submissions to gazette@mca-marines.org are preferred. As in most magazines, letters to the editor are an important clue as to how well or poorly ideas are being received. Letters are an excellent way to correct factual mistakes, reinforce ideas, outline opposing points of view, identify problems, and suggest factors or important considerations that have been overlooked in previous *Gazette* articles. The best letters are sharply focused on one or two specific points.
- **Feature Articles**: Normally 2,000 to 5,000 words, dealing with topics of major significance. Manuscripts should be DOUBLE SPACED. Ideas must be backed up by hard facts. Evidence must be presented to support logical conclusions. In the case of articles that criticize, constructive suggestions are sought. Footnotes are not required except for direct quotations, but a list of any source materials used is helpful. Use the *Chicago Manual of Style* for all citations.
- **Ideas & Issues**: Short articles, normally 750 to 1,500 words. This section can include the full gamut of professional topics so long as treatment of the subject is brief and concise. Again, DOUBLE SPACE all manuscripts.
- **Book Reviews**: Prefer 300 to 750 words and DOUBLE SPACED. Book reviews should answer the question: "This book is worth a Marine's time to read because..." Please be sure to include the book's author, publisher (including city), year of publication, number of pages, and the cost of the book.

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Writing Tips: The best advice is to write the way you speak, and then have someone else read your first draft for clarity. Write to a broad audience: *Gazette* readers are active and veteran Marines of all ranks and friends of the Corps. Start with a thesis statement, and put the main idea up front. Then organize your thoughts and introduce facts and validated assumptions that support (prove) your thesis. Cut out excess words. Short is better than long. Avoid abbreviations and acronyms as much as possible.

Submissions: Authors are encouraged to email articles to gazette@mca-marines.org. Save in Microsoft Word format, DOUBLE SPACED, Times New Roman font, 12 point, and send as an attachment. **Photographs and illustrations must be in high resolution TIFF, JPG, or EPS format (300dpi) and not embedded in the Word Document. Please attach photos and illustrations separately.** (You may indicate in the text of the article where the illustrations are to be placed.) Include the author's full name, mailing address, telephone number, and email addresses—both military and commercial if available. Submissions may also be sent via regular mail. Include your article saved on a CD along with a printed copy. Mail to: *Marine Corps Gazette*, Box 1775, Quantico, VA 22134. Please follow the same instructions for format, photographs, and contact information as above when submitting by mail. Any queries may be directed to the editorial staff by calling 800–336–0291, ext. 180.

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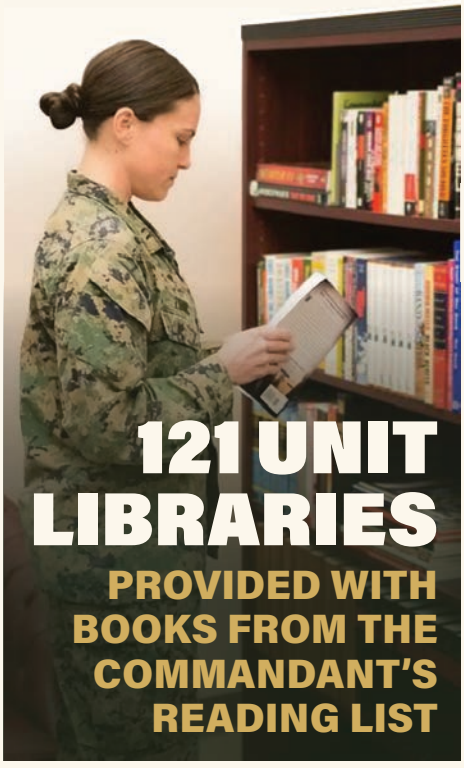

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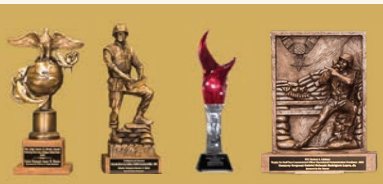

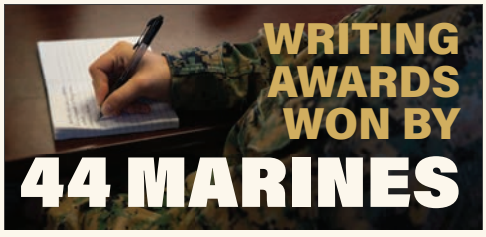

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