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Special Edition: Focus on “Training and Equipping”



**Training & Education: Preparing
Marines for Future Challenges**

**Acquisition: Modernizing the
Corps’ Materiel Solutions**

THE MODERN DAY MARINE EXPO: JUNE 27–29, 2023

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107 Cover Article
Training the Marine Littoral Regiment across all capabilities and domains requires a modernized integrated live, virtual, constructive training environment. (Photo by Sgt Israel Chincio.)

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President & CEO

LTGEN CHARLES G. CHIAROTTI, USMC(RET)
www.mca-marines.org/gazette • 1-866-622-1775

Publisher, Editor, & Chairman, Ed. Adv. Panel
COL CHRISTOPHER WOODBRIDGE, USMC(RET)
c.woodbridge@mca-marines.org Ext. 163

Deputy Editor

MAJ VIC RUBLE, USMC(RET)
v.ruble@mca-marines.org Ext. 109

Layout/Editorial Production Coordinator

CHARLENE K. MONROE
c.monroe@mca-marines.org Ext. 139

Assistant Editors:

WILLIAM TREUTING
w.treuting@mca-marines.org Ext. 193

CARRIE EMERSON-COYLE
c.emerson-coyle@mca-marines.org

Publishing Assistant

TAI FRAZIER
t.frazier@mca-marines.org Ext. 180

MCA Support Center: 1-866-622-1775
Membership Information & Customer Service

Advertising Queries:

Contact: VALERIE PRELETZ: 703-640-0107 or
LEEANN MITCHELL 703-640-0169
Advertising@mca-marines.org

Editorial Advisory Panel

COL AARON A. ANGELL

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JUNE 2023

Editorial: Focus on Training and Equipping

This month's special edition focuses on two of the Commandant of the Marine Corps' responsibilities and authorities as a Service chief—training and equipping Marines and Marine Forces. We examine these two areas required to produce combat ready MAGTFs with capabilities relevant for a broad range of crises to include competition with a peer adversary to provide “ground truth” on the Corps' modernization efforts from the Marines and their leaders executing the plan. Also, as our cover highlights, the Association and our partner—the Marine Corps League—will co-host this year's Modern Day Marine Military Exposition from 27 to 29 June at the Walter E. Washington Convention Center in Washington D.C. This month's *Gazette* provides complementary content and context to enhance the range of panel discussions, symposia, and displays of equipment, weapons, and technologies associated with training and equipping expeditionary forces for the future.

We begin with a series of articles from across the schools and formal learning centers of Training Command. On page 6, BGen Farrell J. Sullivan leads off with a letter introducing thirteen articles covering the initial MOS and skill-progression training of Marines from various occupational fields including infantry, engineers, aviation and communications. Noteworthy articles include “The Infantry Marine Course” by the Combat Instructors of SOI-West on page 24, “Marines Awaiting Training” by Col Jayson M. Tiger, et al., on page 36, “Every Marine a Rifleman” by LtCol D.E. DeTrinis and Col D.C. Emmel on page 40, and “The Expeditionary Communicator” Maj Paul L. Stokes on page 44. Advances in Enlisted PME are also featured including a “Forward” from the Sergeant Major of the Marine Corps, SgtMaj Troy E. Black, on page 7 followed by “Preparing Marines for the Unknown” by SgtMaj Daniel N. Heider.

Next, messages from the Commander of Marine Corps Systems Command, BGen David Walsh, and his sergeant major, SgtMaj Allen Goodyear, introduce twelve articles from the diverse team of Marines, sailors, and civilians who equip and sustain Marine forces with the most capable and cost-effective systems for current and future expeditionary and crisis-response operations. Highlights include, “The Marine Corps Acquisition Workforce” on page 65 by Mr. Rob Cross, the Deputy Program Executive Officer Land Systems, “A Revolution in Marine Corps Acquisition” by LtCol Jay Zarra and Col Alex Ramthun on page 70, “Advanced Manufacturing” by Maj Matthew Audette, et al., on page 86, and on page 100 “Harnessing Data to Revolutionize Marine Corps Maintenance” by Maj Adam T. Deitrich

As the Corps' professional journal, we have also included articles addressing subjects from the lowest to the highest levels of the profession of arms—Marksmanship and Strategy and Policy. On page 118 in “Not Invented Here,” Mr. Andy Stanford examines combat firearms training outside the military, and on page 110, “Know Thy Enemy” by 2ndLt David T. Tung provides historical analysis of the People's Liberation Army in combat.

The need for modernization to ensure the Marine Corps can generate forces that add capabilities relevant to a maritime campaign against a peer competitor to the broad set of existing “general purpose” crisis-response capabilities is undeniable. Self-education, sharing fact-based critiques and proposing feasible alternative solutions that enhance the implementation of change are fundamental to a culture of learning. The *Gazette* provides a forum and the resources for this learning and exchange of ideas. The Association, together with our co-hosts provide the premier venue for engagement with today's leaders and tomorrow's capabilities. We hope to see you at Modern Day Marine 2023.

Christopher Woodbridge

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Innovation

▣ The Marine Corps prides itself on a history of innovation but often forgets that innovation is not reactive. Rather, it is based on recognizing the need for change and mustering the courage to step forward into the uncertainty and messiness that innovation entails—the greater the need for change, the more passionate the conversation, the messier the process.

Unsurprisingly for a Naval Service in a maritime nation, Marine Corps inflection points are driven by naval problems. The creation of battalions to seize advanced naval bases in the Spanish-American War reflected the operational logistics requirements of a naval campaign. That those same battalions were employed to police an American empire over the following decades does not supplant the purpose of their design. Similarly, that a Marine Corps designed to penetrate strongpoints from the sea to support naval campaigns came to be used for counterinsurgency in Vietnam does not supplant its design purpose either.

Today, the need of our maritime Nation is to compete and deter in the contact and blunt layers of which sea control and denial are major, global requirements. This naval problem—coupled with changes in warfare and the designation of a pacing threat—demonstrate that an inflection point is again upon the Marine Corps. As always, innovation is messy, and the force we design today may end up being used in any manner, but that laundry list of possibilities cannot be our set of planning factors.

This is why *Force Design 2030* is not a designated objective force but rather a goal or end state. In fact, it is merely the public face of an internal Service conversation about change going back almost a decade—remember *Expeditionary Force-21*, the *Marine Operating Concept*, and nascent information papers on expeditionary advanced base operations? It is why the Service eliminated a lot of cannons and then brought some back to cover the gap until different ways of providing all weather fires are adopted. Why the infantry battalion dropped to

735 people and then settled at 811. Why the Service eliminated legacy combat engineering equipment but has opened the opportunity to get after new, innovative ways of crossing gaps.

Recently, one of the most public faces of Marine Corps innovation, the Marine Littoral Regiment, participated in a MAGTF Warfighting Exercise. A word is necessary about these events.

Now entering their fourth year, these semi-annual events pit Marine units at the battalion, regiment, and division levels against each other in umpired, force-on-force contests with real penalties for failure. This competition is the innovation engine for the Marine Corps.

In their desire for victory, units have embraced signature management, borrowing from the Navy to establish tactical situation models and emissions control statuses. They are learning to conduct combined arms across multiple domains, how to command and control this tactical system, and to survive and thrive amidst shifting domain advantage and disadvantage.

They are learning what the baseline of all-weather fires must be for success while discovering the opportunities that layers of sensors of all types and loitering munitions can provide and how to survive and hide within those layers. Artillery batteries are splitting and splitting again, learning how to deliver continuous fires while under the constant threat of discovery and counter-battery fires. Units are experimenting with ways to be effective while remaining under the risk-worthy floor of enemy fires—how to survive the approach march to put maneuver units in a position of advantage.

Amid this environment, the 3rd Marine Littoral Regiment was tested to operate in competition and then to sense, make sense, and engage maritime targets, and then, during the MAGTF Warfighting Exercise, to work with additional units to resist the pressure of an enemy force trying to interfere and dislodge it. It successfully validated its baseline concepts while providing insights into additional requirements.

It was successful in terms of its design function: to disperse and distribute

across hundreds of miles in a host nation; to survive and thrive within a weapons engagement zone; to sense and make sense across multiple domains for the naval and Joint Force; and to engage risk-worthy maritime targets. But it is also successful as a Service-innovation test case that went from mature idea to market in a timeframe measured in months—42 to be exact.

Most importantly, the MLR demonstrated that while the Service is at an inflection point, it does not face binary choices. The Service is not choosing to be *either* a coastal artillery force *or* a maneuver element on the central plains of Poland. Rather, the Service is choosing to directly compete and deter its pacing threat *and* support global competition and crisis response.

The phenomenal pace of learning in the Marine Corps is an organizational success story—relying largely on horizontal communications across units and commanders. At the MEFs, in the MAGTF Warfighting Exercises, the FMF is moving forward with the actual tactical and operational problems the combatant commanders are presenting them, not the ones they would like to have. They are being driven to provide value as a Naval Service to their maritime and joint partners. In that context, the recent success of 3rd MLR is not the end of the story, but another set of points on the scoreboard.

Innovation is messy. The conversation can be discordant. But the innovative success demonstrated by the MLR at a Service-Level Training Event should highlight how quickly and effectively Marines are recognizing the need for change, distilling best practices from so many different options and distractors, and driving the *Force Design 2030* process. This is not a time fraught with anxiety, but a wonderful opportunity to help write the next chapter of Marine Corps history—we should not be wringing our hands over what once was but looking forward to helping bring into being what will be.

Scott Kinner

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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A MESSAGE FROM COMMANDING GENERAL, TRAINING COMMAND

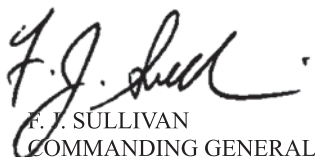
In the recently published *Training and Education 2030 (TE2030)*, the Commandant has clearly identified the imperative for change in the training environment with the following: “the changing character of war demands more of today’s Marines on tomorrow’s all-domain battlefield. Our training and education (T&E) continuum must evolve to continue preparing individual Marines and units to fight and win.” With the Service responsibility to provide initial and advanced MOS training, this mandate applies directly to Training Command (TRNGCMD). Fortunately, the *Commandant’s Planning Guidance* and guidance from Commanding General, Training and Education Command foreshadowed the direction of *TE2030* and we have already initiated actions to meet the Commandant’s intent.

The Marine Corps is an organization focused on our people and TRNGCMD is no different. Consistent with my predecessors, I have identified TRNGCMD’s center of gravity as our instructor cadre—drill instructors at Officer Candidates School, combat instructors at the Schools of Infantry, enlisted warfighting instructors at The Basic School, instructor pilots, and formal school instructors at the 88 formal learning centers that comprise TRNGCMD. These Marines, sailors, and civilians bear the principal responsibility to facilitate the learning of the approximately 55,000 to 60,000 individual entry-level and advanced students who attend TRNGCMD courses each year. We have invested considerable effort and additional resources in the preparation of our instructors through the creation of the Center for Learning and Faculty Development. While it may appear counter-intuitive, instructor preparation at Center for Learning and Faculty Development prioritizes a shift in focus from an instructor-centered model of learning to a learner-centric model that enables the development of individual learners. These Marines and sailors return to the FMF as highly qualified and experienced experts in their MOS, further bolstering FMF readiness and prepared to continue their role as instructors at the unit level.

Over the past few years, TRNGCMD has initiated multiple projects to modernize the learning environment in support of our instructors and their efforts. Two areas of focus for this modernization have been the reduction or elimination of passive learning experiences and taking advantage of persistent access to online learning materials through the internet. Both entry-level and advanced students access digital content and build background knowledge outside the classroom/training area/range and then apply that knowledge to solve more problems than was formerly feasible—developing technical readiness as well as working towards developing a maturity and an intellectual edge required to prevail over our peer adversaries. Problem-based approaches—supported by simulation where available—build automatic muscle memory for the known (the science of the profession) with the creativity and judgment needed for the unknown (the art of the profession). This shift to an active, learner-centric environment, combined with an approach focused on learning outcomes, further supports another objective outlined in *TE2030*—to develop Marines who are “cognitively agile, intuitive problem solvers, capable of making bold and consequential decisions in an uncertain environment.”

The virtue of TRNGCMD’s organizational construct with seventeen subordinate O-6 commands is the opportunity for multiple centers of innovation to operate in parallel. Within TRNGCMD, we have found repeatedly that the results of experimentation in one school or MOS inevitably are applicable in another learning environment or occupational field. A culture of learning and sharing best practices contributes to a healthy and positively competitive dynamic where each team seeks to build on the successes of each other to further our collective goal of delivering the best-trained Marine that we can to the FMF, with the resources available. The contributions of multiple individuals and commands from TRNGCMD in this issue clearly depicts that dynamic.

Lifelong learning is an essential attribute for all Marines and sailors, but within TRNGCMD, we recognize that learning must serve a practical purpose. For us that purpose is to guarantee the maintenance of our unending history of uncompromised success on the battlefield. Every decision we make is deliberately intended to increase lethality of the force while also increasing the maturity of the individual. We appreciate the opportunity to share our ideas and look forward to the continued dialogue on how we can best support the combat readiness of the FMF. *Semper Fidelis!*


 F. J. SULLIVAN
 COMMANDING GENERAL
 TRAINING COMMAND



Forward

By Sergeant Major of the Marine Corps Troy E. Black

The professional development of every Marine is a requirement as we move to a more mature and capable force. Today we are confronted with real-life threats and encountering aggressions that our Marines must prepare for. Our adversaries continue to agitate our partners, allies, and national interests in every domain at this very moment. I am confident we are ready to fight and win today, but we must continue to prepare for tomorrow. The recent publication of *Training and Education 2030* highlights the requirement to improve enlisted development, professional military education in particular. As we look to the future, the College of Enlisted Military Education is meeting the need and modernizing to continually improve the leadership development, warfighting competency and maintaining the profession of arms associated with the success of the Marine Corps for over 247 years.

The investment in our high-quality instructors, valuable time, and resources will continue to ensure enlisted leaders maintain the initiative, seek innovative ways to solve complex problems, and lead the world's finest fighting force. Moreover, continued support across the Marine Corps will ensure that our enlisted Marines are the best *Trained and Educated*.

Semper Fidelis,

TROY E. BLACK

19th Sergeant Major of the Marine Corps

Preparing Marines for the Unknown

Readiness for the next fight

by SgtMaj Daniel N. Heider

MCDP 1, *Warfighting*, describes the nature of war and stresses the importance of understanding it. Every Marine a rifleman or, better yet, every Marine a warfighter, are not just words—they possess a deep philosophical meaning manifested in every Marine’s fighting spirit. The insatiable desire and will to defeat the enemy begins with the mind. Developing the requisite mental faculties to cope with unknown and complex situations is critical to the Corps’ ability to out-think any adversary. It is auspicious, then, that the Marines charged with providing professional military education to the force are highly motivated, disciplined leaders with a penchant for

>SgtMaj Heider is currently assigned as the Director of the SNCOA Camp Lejeune. He has deployed several times in support of the Global War on Terrorism and the III MEF area of responsibility via the Unit Deployment Program. His current assignment includes overseeing the facilitation of professional military education of enlisted leaders within the Camp Lejeune Area of Responsibility.

developing others. The importance of education and those who deliver it cannot be overstated; they are critical to the warfighting effort. The faculty advisors and the curriculum developers have a far-reaching impact on the readiness posture of the Marine Corps.

The Marine Corps’ ability to adapt, innovate, and exploit enemy weaknesses hinges on honing an intellectual edge. To successfully execute maneuver warfare, the Marine Corps’ demands intel-

ligent leaders who are dedicated to the profession of arms and have a bias for action. Marine leaders must be able to operate effectively in chaotic environments and deal with problems that seemingly lack solutions. The College of Enlisted Military Education staff prepares Marines to make decisions rapidly in ever-changing environments full of unknown variables and leaders are given tangible tools to carry out any mission. Education is the essential ingredient to the Marine Corps’ approach to warfighting. Preparing Marines to operate within situations full of unknowns is key to the Marine Corps maintaining its status as the Nation’s force-in-readiness.

Future threats, carried out by competent enemies, will require leaders with exceptional judgment. They must rapidly process information, synthesize it, and make connections across domains. Furthermore, leaders must be able to communicate and inspire their Marines to action. Their cognitive abilities (intellectual edge) and physical endurance will ensure Marines maintain the essential advantage over the enemy. The evolution of technology, strategy, and circumstances on the battlefield will always be fluid and ever-changing. The heart and soul of the Marine Corps’ ability to remain the Nation’s force-in-readiness will depend on combining fighting spirit with superior cognitive skills. Judgment, decision making,



Sergeant Major of the Marine Corps, SgtMaj Troy E. Black, speaks at the Staff Non-Commissioned Officer Academy, Advanced School. Professional military education is the foundation for developing Marines who can succeed in unknown and complex situations. (Photo by Sgt Victoria Ross.)

critical/creative thinking, initiative, boldness, discipline, and endurance will guarantee success regardless of the fight Marines face. The foundation of success in the Marine Corps' way of war is the dedication of its leaders to the profession of arms, their fierce loyalty to their legacy, and the empowerment of leaders at all levels. The enlisted professional military education apparatus is essential to upholding the necessary fighting spirit and intellectual edge to guarantee battlefield success.

In addition to enhancing critical thinking and its application to warfare, the College of Enlisted Military Education is uniquely suited to teach and reinforce those long-standing skills required to materialize commander's intent into action. This includes guiding, coaching, and mentoring junior officers, which requires confidence in their role as principal advisors. Likewise, enlisted leaders are entrusted to teach, coach, and mentor enlisted Ma-

rines throughout their careers while preserving longstanding traditions, ceremonies, and customs that contribute to the legacy and martial discipline of the Marine Corps. Essentially, the academic program strives to balance the theoretical with the concrete realities of the profession of arms. For instance, the faculty advisors seize opportunities to teach practical drill and ceremonies and inform them of uniform regulations through routine inspections, which contributes to learning the art of discipline. Furthermore, the curriculum highlights the importance that the enlisted leader has in aiding in the professional development and talent management of their Marines. This instruction comes in the form of educating the students in areas such as the Performance Evaluation System, strategies to maximize talent management, the Leadership Development Program, various administrative responsibilities, and human performance to name a

few. The human performance package combines classroom instruction with a diverse physical fitness program. These areas, where faculty advisors can provide kneecap-to-kneecap coaching and mentoring, are foundational to the development of staff non-commissioned officers. These fundamental tools are an essential aspect of professional and leadership development. This holistic approach prepares enlisted leaders for the challenges they will face inherent in the exigencies of future battles.

The College of Enlisted Military Education enterprise is charged with providing programs that enhance leaders' ability to lead, think critically, communicate, and uphold the standards of the Marine Corps. Its faculty advisors simultaneously ensure that students are well-versed in warfighting doctrine. Like any organization, success is based on the culture and the people within it. The College of Enlisted Military Education is full of dedicated profes-



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signals passionate about developing the Corps' leaders. According to *MCDP 7*, there should be a heavy focus on finding the right Marines to educate the force. It is crucial that only the most capable leaders are assigned as educators—as an investment in the warfighting effort. The curriculum developers and faculty advisors who volunteer to serve in these key billets are committed learners and passionate about developing others. They are screened and undergo a competitive interview process consisting of a board and an in-depth record review. These Marines tend to have diverse backgrounds that comprise the spectrum of MOSs from across the MAGTF, special duty assignments, and deployments. Combined with committed learnership, these leaders exude credibility to students. Their experiences and leadership abilities are pivotal to the success of educating Marines. In addition, they must exhibit character beyond reproach and exceptional leadership abilities.

Tours at the Enlisted College and Staff Non-Commissioned Officers Academies may be more associated with giving back to the Marine Corps and junior Marines, but there are also many benefits of being faculty advisors and curriculum developers. Most prominently, these Marines have a voice and role in improving the curriculum. They directly inspire the Corps' current and future leaders. Moreover, as educators, they greatly enhance their personal leadership capabilities and obtain a diverse and unique skill set. Following a tour at the College of Enlisted Professional Military Education, they become true assets to future commanders and command senior-enlisted leaders because of their ability to implement professional military education programs and develop leaders. While participating in the program, the staff has an intense but predictable schedule, which affords them numerous opportunities for self-growth. Additionally, most of the staff enhance their learnership by pursuing advanced professional military education opportunities and off-duty education, which promotes intellectual growth and sets an example for others to follow.

Once selected for the program, the candidates attend the Faculty Advisor Course and are subject to an intense developmental process consisting of several levels of qualifications. The qualifications are Basic Faculty Advisor, Junior Faculty Advisor, Senior Faculty Advisor, and Master Faculty Advisor. The Master Faculty Advisor Program aims to enhance their capabilities, thereby maximizing the finite time they have with the students. They must be well-versed in each educational pillar, which includes warfighting, leadership, and communication. They are expected to be physically fit and exemplify the institutional expectations of leadership. Throughout their progress, they are required to master lessons, develop effective teaching techniques, and, above all, spark intellectual curiosity among the students. Moreover, they take on mentoring roles and shepherd students through a vast amount of information, which results in a strong bond between teacher and scholar. They go above and beyond the curriculum and spend countless hours teaching, mentoring, and driving home the importance of professional and personal readiness.

The methodology of education that the faculty advisors use is challenging because it must spark intellectual curiosity among the students, facilitate debate, and draw them to the learning outcomes. The most experienced and effective faculty advisors immerse themselves in the subjects they teach and implement innovative and creative ways to educate the students. This leads to students taking ownership of their learning and improving their critical thinking skills. The faculty advisors are exceptional Marines who work tirelessly to enhance *esprit de corps*, intensify the warrior spirit, and set a learning environment that promotes growth. Curriculum developers are highly competent and intelligent Marines who work behind the scenes to set conditions for success at the academies. All personnel involved in the education process are essential to the Marine Corps' ability to adapt and win over any adversary.

The College of Enlisted Education maintains an exceedingly high promotion selection rate due to various fac-

tors. At the outset, the academies do an exceptional job identifying and recruiting Marines of the highest caliber. Then, the curriculum developers and the faculty advisors are immersed in a competitive ecosystem that produces highly resolute professionals who exemplify what they teach. The notion that *steel sharpens steel* provides an analogy of how the breeding of success occurs within the organization. They embody the Marine Corps leadership ideal and are model stewards of the Marine Corps profession of arms. The highly competitive environment requires them to perform at an elevated level, which culminates in them being exceptionally qualified for promotion. Case in point, in the most recent E8/E9 promotion board, nineteen Marines from the College of Enlisted Military Education were selected as first sergeant or master sergeant. To put this number in context, the College of Enlisted Military Education comprises a small percentage of the eligible population. The promotion success highlights the caliber of the Marines in the organization and the distinctive culture that maximizes potential and fosters growth. This small group of exceptional Marines educates more than 8,800 Marines a year.

Faculty advisors and curriculum developers are the vanguards of Marine Corps educational readiness. Their sense of fulfillment comes from seeing their students grow as leaders and the mentorship bond that is created. They have a far-reaching impact on the institution, and their efforts, directly and indirectly, lead to success on the battlefield. The faculty advisor's emphasis is preparing and readying for the next fight. Their contribution to the Marine Corps force-in-readiness and the joint operations are immeasurable. The educational process leads to a dynamic force that will continue to lead the Marine Corps into future challenges. They are the catalyst that ensures Marines can cope with the nature of war and have the versatility to continue to outthink the enemy. The Marine Corps mission is in great hands due to the exceptional Marines charged with delivering professional military education to the force.



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Reducing Education and Training Roadblocks

Unlocking the Marine Corps high-performance learning organization

by MSgt Timothy J. Humm

The 2022 *National Security and National Defense Strategies (NSS/NDS)* have clearly outlined the need to increase DOD modernization to compete with the pacing threat of China and Russia in the immediate future. Although this requirement has already been identified by the Marine Corps with the Commandant's *Force Design 2030* policy, there is a need to radically change the way the Marine Corps trains and educates in preparation for future warfare. The need to improvise, adapt, and overcome the evolving capabilities of China requires forward thinking not just in equipment and unit structures but in the way Marines perceive and process the immense amount of information in the modern battlefield. Professional military education (PME) is the means of identifying what the Marine Corps already has, which is approximately 266,000 independent, creative, innovative, thinking machines that are able not only to meet but exceed the pacing threat. The Marine Corps needs to become a high-performance learning organization to realize the full potential that every properly informed and purposefully challenged Marine can achieve.

China and Russia, who have been preparing for competition with the United States arguably since the last time the countries engaged in conflict (the Korean War and the Cold War), have taken advantage of the past twenty years of conflict where the Marine Corps has been engaged in the Middle East. The challenge of shifting focus and keeping up with the speed of innovation is a daunting task that the Marine

>MSgt Humm is currently serving as a Master Faculty Advisor at the Staff Noncommissioned Officer Academy, Advanced School.

Corps must meet with the veracity it does with all the challenges it faces. The exponentially growing information battlespace along with technology such as drones, hypersonic missiles, cyberspace, and artificial intelligence are challenges that are not being met in the current training environment. Policies, acquisition processes, and financial restrictions constrain the Corps' ability to rapidly develop, test, and adopt new technology. As is outlined by Christian Brose

in *The Kill Chain: Defending America in the Future of High-Tech Warfare*,

The entire basis by which the US military understands events, makes decisions, and takes actions how it 'closes the kill chain' will not withstand the future of warfare. It is too linear and inflexible, too manual and slow, too brittle and unresponsive to dynamic threats, and too incapable of scaling to confront multiple dilemmas at once."¹

Gen Berger has placed this book at the top of the *Commandant's Professional Reading List* along with many other thought-provoking works to invoke a change in the Corps' current training and education paradigm and to encourage a shift to a more flexible organizational structure. Rapidly advancing the



In accordance with the 2018 and 2022 National Defense Strategies, the Commandant has focused modernization efforts on the pacing threat—the People's Republic of China. Competing against and defeating a peer adversary requires the Corps to become a high-performance learning organization. (Photo provided by author.)

Marine Corps to achieve the strategic advantage ahead of the projected 2030 deadline requires a focus on creating immediate positive impacts and value-added training and education throughout the Corps.

The current curriculum at the Staff Noncommissioned Officer Academy (SNCOA) Advanced School and the Advanced Maneuver Warfare Course is an example of the forward-thinking direction that PME can move toward. The curriculum at the Advanced School encourages scholarly research within the profession of arms and provides concentration on critical and systems thinking as it applies to maneuver warfare throughout all seven warfighting functions against the pacing threat. This coupled with collegiate-level writing and advanced professional communications allows the gunnery sergeants to create clear and concise recommendations for all levels of command. This type of education provides

an opportunity to bring the experience, thoughts, and innovations from subject-matter experts throughout the FMF and Fleet Marine Corps Reserve to appropriate-level commands that can make value-added changes now. The Advanced Maneuver Warfare Course creates an environment of uncertainty and demands a high level of knowledge sharing among the students who range from staff sergeant to lieutenant colonel.² This andragogical approach, which is underutilized in training environments, leans heavily on the experience of the students to achieve a greater learning outcome. This same method is being introduced in the Advanced School with paradigm-shifting results.

In *The Catalyst: How to Change Anyone's Mind*, Jonah Berger points out that reducing mental and organizational policy roadblocks to create understanding and encourage trust amongst all members within an organization is the most effective way to invoke change.

This requires a review and update to the current Marine Corps education and training model, which has already begun in recent months. The College of Enlisted Military Education was given a fresh look by the Sergeant Major of the Marine Corps Zero-Base Review Summit, which was held at Camp Lejeune in July 2022. The attendees included eight sergeants major and four civilians including the Center of Distant Education and Training. The outcome of the review has not been published yet, but the courses of action were discussed by the Sergeant Major of the Marine Corps, SgtMaj Troy E. Black, during the Brute Krulak Center for Innovation podcast (*Brute Cast*) on 17 September 2022. SgtMaj Black stated that “time is the constraint”³ regarding enlisted PME. This sentiment is even more relevant since the release of the *2022 National Security and National Defense Strategies* and considering the ongoing recent global events. Because of



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The Sergeant Major of the Marine Corps identified that “time is the constraint” in developing a comprehensive enlisted PME program. (Photo provided by author.)

the limited number of weeks allocated to the enlisted training continuum, the importance of what is presented at the academies is vital to future mission success. However, he stated that “the pendulum has swung too far in one direction,”²⁴ and that a refocusing on fundamental training and tactical proficiency is needed to prepare for future warfare. This review was conducted only eight months after the current Advanced School curriculum came out of pilot and before the FMF fully understood what the curriculum entailed. The term “re-green”²⁵ has been an old and recurring statement used when defining the training that occurs within the SNCOA. This saying highlights a fundamental problem that is addressed in the current curriculum at the Advanced School. If it takes the SNCOA to bring a Marine back to training expectations, then what is happening at units across the FMF? As is stated in *Force Design 2030*, “The Marine Corps is not organized, trained, equipped, or postured to meet the demands of the rapidly evolving future operating environment.”²⁶ To borrow phrasing from the book *Moneyball: The Art of Winning an Unfair Game* by Michael Lewis, “if our training works so well, why doesn’t it work so well?”²⁷

Maneuver warfare as stated within *MCDP 1* is “the philosophy which distinguishes the Marine Corps. The thoughts contained here are not merely

guidance for action in combat but a way of thinking.”²⁸ Training focuses on an attainable skill and falls within education; however, education itself is meant to increase knowledge and understanding and is ultimately focused on how to think. In PME, the latter should help develop the former. This does not mean that the College of Enlisted Military Education should be focused on collegiate accreditation to prove its educational value. This should not be the motivation moving forward, as it deters from the urgency of the need to modernize and meet our pacing threat. SgtMaj Black further stated that “management of the force, understanding talent, appreciating how we develop and understanding our Corps, its warfighting competencies, those are as important as future concepts.”²⁹ The amount of time and study that is demanded of students within the Advanced School challenges their current understanding of maneuver warfare. The scholarly research that goes into Sun Tzu’s *Art of War*, Carl von Clausewitz’s *Theory of War and Victory in Contemporary Conflict*, John Boyd’s *Patterns of Conflict* lectures, and *A New Concept of War* by Ian T. Brown provides an advanced understanding of the theory of maneuver warfare. This in-depth but condensed course can be likened to what is received at Expeditionary Warfare School but contained within the Advanced School seven-week curriculum. The educational value of

viewing the mental models of Boyd, the structured approach of Clausewitz, and the systems thinking view of Tzu provide invaluable knowledge that can be quickly distributed throughout the Corps. The only roadblocks that dampen the results are the overwhelming “that’s the way we’ve always done it” mentality that persists throughout the Corps. The unrealized innovative potential of not only gunnery sergeants but of all active and reserve Marines can drastically improve the Corps but requires a faster maneuverist learning process.

In the book *Learn or Die: Using Science to Build a Leading-Edge Learning Organization* by Edward D. Hess, “the increasing pace of change [cyberspace and information] creates volatility that diminishes the life cycle of most competitive advantages.”¹⁰ Making the Marine Corps into a high-performance learning organization will remove roadblocks to learning and enable continuous improvement, increase innovation, and allow a much higher level of operational excellence. The concept of “learnership” needs to be widely understood, accepted, and allowed to thrive in the Corps. Current training does not provide effective results for critical thinking, innovation, or talent management; however, the answers of talent management do not require elaborate training and education systems. They do not need months and years of formal schoolhouse instruction to reach a tipping point in the Marine Corps. Each one of the hundreds of thousands of Marines throughout the Corps adds value to the capability of future warfare. Forward-thinking and diversity of thought, not only in one rank but all ranks and every MOS throughout the Corps. Each Marine has the potential to make improvements across the Corps, but they often go unnoticed. Right now, there is a gunnery sergeant who knows how to create a quadrotor drone with a 3D printer and a Raspberry Pi for \$500, a sergeant who knows how to hack into every network system the Marine Corps has within 10 minutes, and a lance corporal who knows how to build a Linux network from scratch to link them all together.

The Commandant asks every Marine to be a strategic thinker at every level to sense, make sense, and make a difference in the effort to modernize the Marine Corps.

A review of how the Marine Corps conducts training is necessary. With the divestment of manpower throughout the Marine Corps, the need to invest in the potential of individual Marines is critical in maintaining the lead in the world of military competition. Marines are like every other citizen of America, with expectations, a desire for challenge, and a drive to be part of something bigger than themselves. In the book, *The 7 Hidden Reasons Employees Leave: How to Recognize the Subtle Signs and Act Before It's Too Late* by Leigh Branham, it is clear that the same reasons Marines exit the Corps to go into the civilian workforce are the same reasons civilians leave the workforce and enter the Marine Corps. The number one reason is "The job or workplace is not as expected."¹¹ This sentiment has been expressed before in a 1976 *Marine Corps Gazette* article called "Leadership Failures," "[The] retention problem is commonly approached from the standpoint of importing base facilities, raise in pay, and making the uniform look flashier. None of these efforts will attract or retain a worthwhile caliber of Marine ... disenchanted Marines want more job satisfaction, not more luxurious surroundings."¹² Even if a Marine is not in a combat MOS, they have the potential to impact the institution in a way that contributes to warfighting in a very direct and meaningful way. There is unrealized talent walking amongst the hundreds of thousands of Marines.

Professional military education is the means of identifying what the Corps already has, which are "individuals, with different skills strengths interests and motivations."¹³ The current curriculum at the SNCOA Advanced School provides students with the cognitive tools necessary to communicate innovative solutions to commands, apply maneuver warfare theory to challenge current training throughout the FMF to meet greater threats, and to seek out and extract the inherent value and talent throughout the Marine Corps.

This curriculum is not the solution but is the right direction and needs to become an example for the Corps to become a high-performance learning organization. If time is the constraint, how much longer will the current policies and roadblocks of "that's the way we've always done it" be maintained? Learning from each other and sharing an immense amount of knowledge and experience, when given a wicked problem to solve, can result in rapid learning and an increase in potential solutions and capabilities. The sum is greater than the parts. The need to make drastic movements toward modernization of the training and education of the force is now. If the educational approach of the current SNCOA Advanced School and Advanced Maneuver Warfare Course is adapted throughout the rest of the Marine Corps' training and education continuum the Marine Corps will be more effective, efficient, and credibly lethal, and will outrun any pacing threat every time.

Notes

1. Christian Brose, *The Kill Chain: Defending America in the Future of High-Tech Warfare* (New York: Hachette Books, 2020).
2. Interview between Timothy Humm and John Lewis on November 30, 2022.
3. Ian T. Brown, "SgtMaj Troy Black, Sergeant Major of the Marine Corps," *Brute Cast*, Podcast audio, September 17, 2022, <https://podcasts.apple.com/us/podcast/sgtmaj-troy-black-sergeant-major-of-the-marine-corps/id1550881429?i=1000579780480>.
4. Ibid.
5. Ibid.
6. Gen David H. Berger, "Force Design 2030: The Future of the Marine Corps," *Marines*, May 2022, <https://www.marines.mil/Force-Design-2030>.
7. Michael Lewis, *Moneyball* (New York: W.W. Norton & Company, 2004).
8. Headquarters Marine Corps, *MCDP 1, Warfighting* (Washington DC: 1997).



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9. "SgtMaj Troy Black, Sergeant Major of the Marine Corps."

10. Edward D. Hess, *LEARN or DIE: Using Science to Build a Leading-Edge Learning Organization* (New York: Columbia Business School, 2019).

11. Leigh Branham, *The 7 Hidden Reasons Employees Leave: How to Recognize the Subtle Signs and Act before It's Too Late* (New York: Amacom, 2012).

12. Maj M.T. Hopgood Jr., "Leadership Failures," *Marine Corps Gazette* 60, No. 8 (1976).

13. "Force Design 2030: The Future of the Marine Corps."



Modernize Learning

The Marine Corps Center for Learning and Faculty Development

by Mr. Robert McGee

MCDP 7, *Learning*, asserts that we must learn faster to out-cycle the enemy. Our historical successes have shown that we are more than proficient with training and education. However, we must accelerate our learning environments to gain an intellectual edge. We must change how we think and learn to gain this advantage, starting with the learner and scaling to the Service level. Change at the individual level is challenging, but this is a strenuous lift at the organizational level. The Marine Corps Center for Learning and Faculty and Development (MCCLFD) is analyzing the enterprise learning process through the warfighting lens to identify cultural and mental models of human terrain and problems of practice to target areas that are determined to have the most effects toward advancing our faculty and schools into the new model of modernized learning. As we have pursued this new direction, we are discovering there is more to it than just a mental model or problem of practice; it is a *cultural shift* of wicked problem proportions. The scale and scope go beyond the instructor; it is the range of school operations (ROSO), including the training and education (T&E) ecosystem, a system of systems where each node can be a source of support or friction to change. Experiencing this friction has led to more questions: *What are the potential impacts on the T&E system as MCCLFD pursues the intent and end state of the 38th Commandant's Planning Guidance and Training and Education 2030 (T&E 2030)? How do we design for the learner while enabling the instructor? How do we find the learner amid the legacy instructor/content-centric model? What are the key learning cues (indicators and*

>Mr. McGee is the Acting Director Marine Corps Center for Learning and Faculty and Development/G7/ Training and Education Command.

warnings) in the newly designed learning environment?

What are the Potential Impacts on the T&E System as MCCLFD Pursues the Intent and Endstate of the 38th Commandant's Planning Guidance and T&E2030?

First, the MCCLFD has taken a radical departure from the norm. Typically, students are conditioned to expect PowerPoint lectures, demonstrations, practical applications, and multiple-choice testing, primarily targeting rote memorization. Instead, the MCCLFD decided to take an atypical approach to “flip the classroom” and redesign our programs of instruction (POI) using an Andragogic design to target higher-order thinking skills and long-term retention. The design of our POIs exploits and leverages learning science, concepts, strategies, and techniques to provide a real-world-relevant experience that allows students to take risks and fail in a non-attributional setting. For example, the journaling process enables them to chronicle their learning experience, reflect, and take lessons learned back to their job.

Furthermore, to mitigate culture shock and accelerate team productivity, students participate in transitional interventions before a complete immersion into the experiential design of our POIs. The culmination of this design accounts for real-world problems, existing systems (e.g., Marine Net, MS Teams, Moodle, MCTIMS), common

pitfalls, misconceptions, and misunderstandings that the learner would experience on the job while performing tasks associated with assigned billet requirements, thus reducing the initial learning curve. The bottom line: Marines gain an advantage and leave our programs confident and energetic, with the necessary competencies and acceleration to immediately execute their duties.

As a result of this change, MCCLFD has observed accelerated learning in our classrooms, both at our learners' individual and cohort levels, with exponential learning as faculty teams. Starting with a focus on instructors, The Facilitating Learning Experiences (FLEX) Course graduates have demonstrated that they are gaining more time within their resource-constrained POIs. In some cases, they have converted up to sixteen hours of lecture into one to two-hour, more effective activities with better student outcomes within fewer training days. This increased capability of the instructor leads to developing a more deadly learner in *any clime or place* with increased retention, transfer, and critical thinking. In addition, learners are honing how to adapt and learn more efficiently, increasing their learning lethality capability. We may have started with the instructors, but that is only one node in the systems of systems within our organizational T&E ecosystem. Graduates of FLEX are signaling that they are experiencing resistance from other nodes in the system that still need to be made aware of the instructor's increased capability and resulting insights.

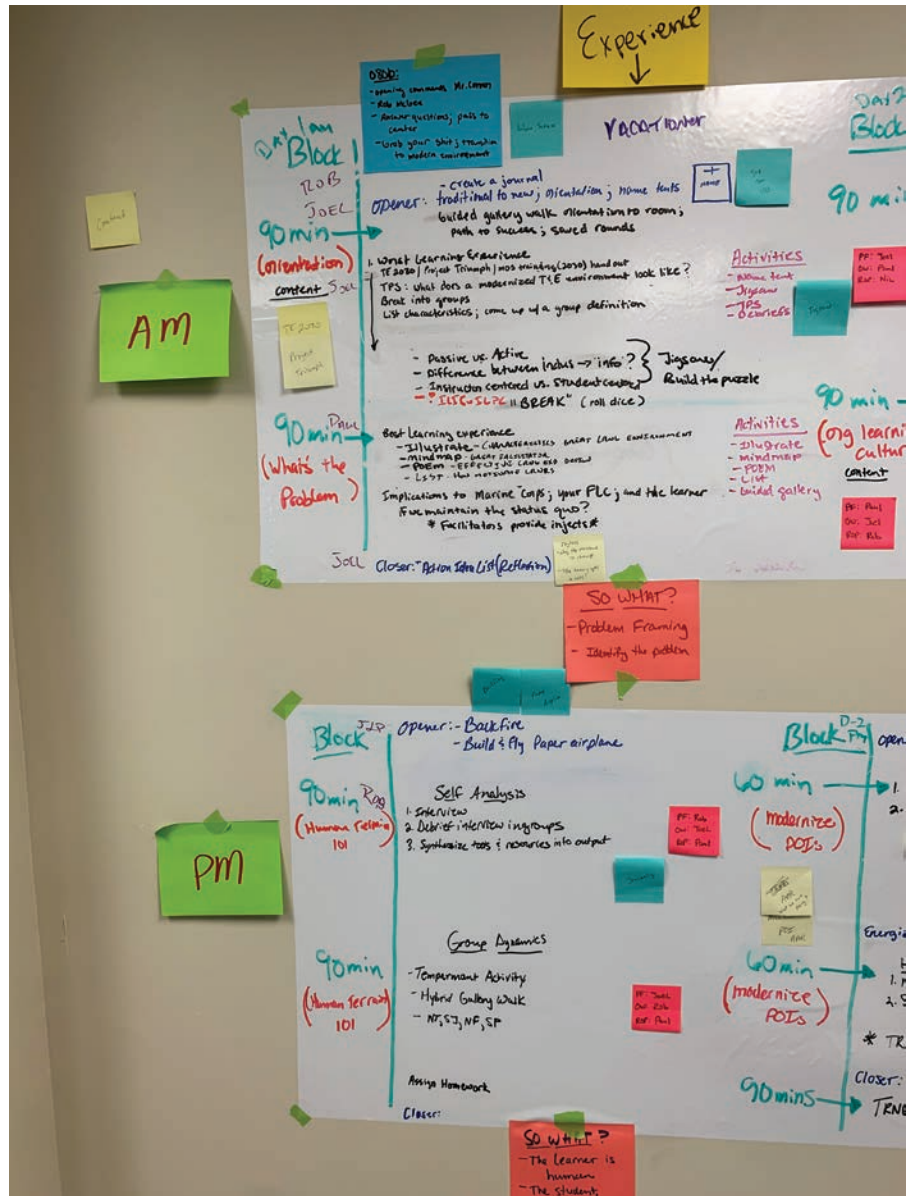
How do We Design for the Learner while Enabling the Instructor?

Focusing on instructors and redesigning lessons within legacy POIs only attacks the margins of our battlespace.

To be effective, we are taking an intense look at other system nodes that support the instructor as the main effort. In addition, we are analyzing and preparing to build new courses to address specific staff billets and T&E functional areas (e.g., school leadership teams, front-end analysis, task analysis, assessing learning, etc.). Finally, to accelerate our change, we took an iterative approach in our remaining legacy POIs, such as the Formal Schools Manager Course and the Curriculum Developer Course, by integrating the students into the problem-solving process as we experiment with new techniques.

For example, we set up the new Designing Learning Experiences (DLEX) Course within the current Curriculum Developer Course time and space to meet the unique requirements while maintaining current standards. However, we have discovered that how we taught curriculum developers in the past will not meet our new required metrics for success and needs to be updated. We must reorient the lens (shift) from developing content and delivery to an emphasis on designing around humans, the learning process, and how to cycle learning at a rate that reaches objectives, sets a standard, and increases retention. Learning being a social phenomenon, leveraging group dynamics and teamwork to accelerate learning leads to a better learning experience design. Science demonstrates that groups learn faster than individuals under almost all conditions. Therefore, rather than chunking content within time and schedules, learning experience designers apply *stress by design* to increase attention and emotional quotient and extend retention beyond the classroom by making learning meaningful to real-world job requirements. To get after the complexity of the *T&E 2030* tasker and the ROSO, we had to expand our efforts to address nodes that stand in support of or in the way of our instructors winning the battle in the classrooms.

To address the leadership node within the ROSO, we created and piloted the Commanding Formal Schools Course. The design of the Commanding Formal Schools Course accelerates



The future of PME is designing learning experiences and developing curriculum to benefit both the learner and the instructor. (Photo provided by author.)

leadership's orientation to the T&E ecosystem, typical school terrain, indicators and warnings of the modernization model, and leverages teamwork to create immediately actionable items for quick wins specific to their schools. Commanders graduate the course with a better understanding of their FLEX graduates' capabilities and key cues to identify the "frozen middle" within their school that is friction to the required change. As a result of Commanding Formal Schools Course graduates' feedback, we designed and are providing commander's assist visits

via mobile training team in the form of a two-day staff cohesion workshop that commanders can request to surgically strike the frozen middle within their schools and accelerate staff and faculty cohesion while transitioning to the *T&E 2030* requirements.

How Do We Find the Learner Amid the Legacy Instructor/Content-Centric Model?

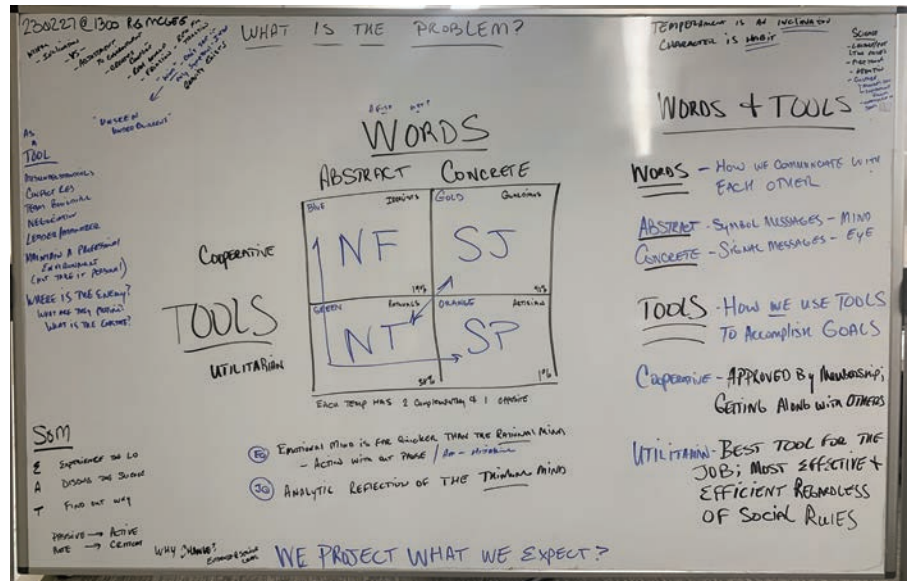
The MCCFLD started with instructors at the ground level, focusing on our old model delivery techniques steeped in easy methods that led to just transfer-

ring information to a passive student. Then, we shifted our development of instructors from content-centric, passive methods to learning-centric and active learners. Observing and targeting the daily and hourly interactions between instructors and students with the learners focused on the objectives.

For years we trained instructors to focus on passive techniques and methods that did not adequately support accelerated human learning, as mentioned above. Furthermore, these techniques centered on content transfer within an industrial mindset absent of the information and advances we possess due to current research and understanding of learning science. As a result, it could take instructors half to three-quarters of a tour to build situational awareness and recognize the indicators and warnings of learning success. With the new FLEX Course, we provide instructors with the capability and lexicon to communicate and identify what it means to observe and orient to the learners' needs up-front, reducing the instructors' learning curve in the classroom environment.

Before the current shift in direction, our Service-level policies allowed instructor customization. However, even when instructors identified the need to adjust lesson plans at the tactical level, our legacy instructor POIs needed to provide a fundamental understanding of designing effective and engaging learning experiences and identifying the school culture required to support such changes. Recognizing the instructors' dilemma in the culture of the industrialized system and the entrenched support staff uncomfortable with change, the FLEX empowers the instructor to see the contrast between the old model and the new model, understand the human learning process, and empower the instructor to be a change agent in their position in the fight by being capable of redesigning lessons quickly within the existing time and resources.

By enabling instructors to quickly redesign and retool at the micro or lesson levels within POIs, they can systematically update POI lessons without violating current policy or seeking authorization. Instructors can now adapt



The new design approach to the learning environment reveals differences in how we use words to communicate and tools to get things done. (Photo provided by author.)

faster to our learner's needs and put new methods in place quickly to support on-the-spot adjustments in an active, experiential learning environment.

What are the Key Cues (Indicators and Warnings) of Learning in the Newly Designed Learning Environment, and What Are We Learning through Experimentation?

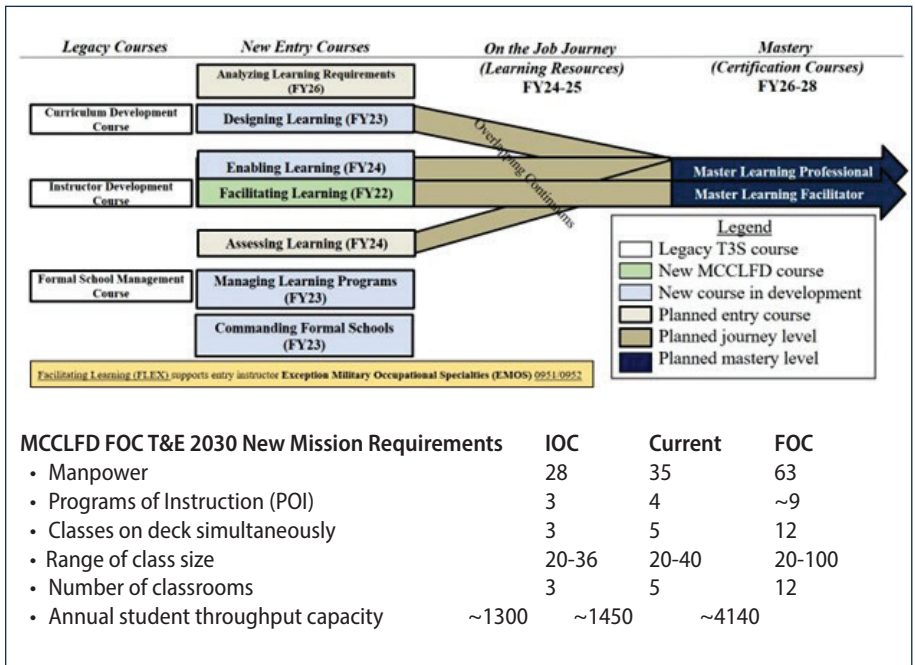
The new design approach has revealed previously elusive differences in how we use *words* to communicate and *tools* to get things done. Identifying and demonstrating this to learners upfront accelerates learning. Empowering instructors with the indicators and warnings of accelerated learning in the new model better positions them within the learning environment to adapt and advance towards objectives, vice training to time and a schedule. As mentioned above, groups learn faster than individuals, so accelerating group dynamics up-front primes the learning environment to cycle more quickly. Finally, designing around humans in an experiential learning environment construct provides more opportunities for instructors to be the *guide on the side* as they leverage teachable moments, paradigm shifts, and memory markers during activities.

Additionally, as we advance in our modernization efforts, we are discov-

ering that our current learning management systems and organizational processes, writ large, are challenging and need updates. We are wrestling to capture the results of our experimentation and new experiential-designed POIs while capturing resourcing requirements within the current systems. Furthermore, our current valuation models must adequately support active, learner-centered design, so we are designing new assessment and evaluation models and tools to inform us of our progress better.

So What?

We are here to support you within our current capacity. The MCCLFD, formerly known as Train the Trainer School, provides value to the institution as the Service-level training solution for Training and Education Command's formal school billets across the five major subordinate commands and ~93 schools. As a result of the 38th Commandant's Planning Guidance and T&E 2030, MCCLFD is redesigning how we prepare future instructors and school billets to modernize our Marines' learning experiences across the enterprise. At initial operating capability, the MCCLFD has gained time and efficiencies to maneuver through resource-constrained POIs by utilizing asynchronous self-study with account-



ability, learning opportunities aided by technological capabilities, and advanced experiential learning designs. As the MCCLFD transitions into the new modernization model, we will continue to refine our position towards increased support to the T&E ecosystem and the full ROSO. The below image depicts the program development plan to reach full operational capability FY26–28.

Additional Resources

- MCCLFD/G7 SharePoint Site: G-7 - Home (sharepoint-mil.us)



MCCLFD FOC T&E 2030 New Mission Requirements	IOC	Current	FOC
• Manpower	28	35	63
• Programs of Instruction (POI)	3	4	~9
• Classes on deck simultaneously	3	5	12
• Range of class size	20-36	20-40	20-100
• Number of classrooms	3	5	12
• Annual student throughput capacity	~1300	~1450	~4140

The MCCLFD way ahead. (Image provided by author.)

Commander's Intent

You're doing too much
by Capt Brian T. Zitterkopf

In maneuver warfare theory, commander's intent is the overarching guidance that harmonizes small unit initiative on a chaotic and ever-evolving battlefield. It is the clear, concise, and easily understood purpose of an operation "that allows subordinates to exercise judgement and initiative ... in a way that is consistent with higher commander's aims."¹ Does the current structure of the operation order as taught by Marine Corps formal schools achieve this effect?

Where Did We Start

The concept of commander's intent was introduced to the Marine Corps with the publication of *FMFM1, Warfighting*, (now *MCDP 1*) in 1989. *MCDP 1* defines commander's intent as "a device designed to help subordinates understand the larger context of their actions." It describes the intent as the predominant part of any mission statement and explains, "There are two parts to any *mission*; the task to be accomplished and the reason or intent behind it. *The intent is thus a part of every mission.* A commander normally expresses intent as part of the mission statement assigned to a subordinate." The commander is given the *what* and *why* of his unit mission in his mission statement. He explains the *what* and *why* of his subordinate commander's missions in their tasking statements. He provides the overarching vision of *how* these subordinate missions support his intent through the concept of operations.

Where Are We Now

Today, the Basic Officer Course (BOC) teaches commander's intent as a sub-paragraph in the execution paragraph consisting of three components: "the *Purpose* of the operation, *Method*

"We cannot ... issue long-winded orders, either written or oral. Whatever order we ... issue must be short and ... clear. If we hope to do this in war we must practice it in peace."

—Adolph von Schell, Battle Leadership

>Capt Zitterkopf is a Company Commander with the 3d LAR Battalion.

of exploitation, and desired *End State*." The BOC student outline describes the *purpose* as a reiteration of the "in order to" portion of the mission statement that is restated to "ensure subordinate comprehension." The BOC student handout describes the *method* as a "statement of the commander's over-arching plan for exploitation of the enemy's critical vulnerability and mission success." This section directs students to include the enemy center of gravity, enemy critical vulnerability, and exploitation plan. The BOC student handout describes *end state* as an area where, "The commander will describe what he envisions after the dust of the battle has settled. This end state is relative to enemy units, friendly units, and terrain."²

How Did We Get Here

Our doctrinal foundation, published roughly 30 years ago, described commander's intent as an inherent component of the mission statement and subordinate tasks. Today, we teach a separate sub-paragraph within the execution paragraph with a formulaic articulation of the commander's intent.

How did this concept change over the intervening period?

Let me begin this analysis by stating that I was not present in the room nor serving in the Marine Corps when these evolutions occurred. I recognize my ignorance of the conversation's full nuance and am likely missing other key points along the path. However, I have found two published articles that serve as benchmarks in the broader evolution of formal school instruction of commander's intent.

In 1993, Capt Michael Ettore published an article describing a definition of commander's intent developed during the Marine Corps University Quarterly Curriculum Review Board. This new definition addressed a "need for a standard definition of the subject as well as specific guidance for its use during the conduct of Marine Corps operations worldwide." The new approved definition stated, "The Commander's Intent statement will be depicted in a formal operations order in paragraph 3a (1) followed by the concept of operations in paragraph 3a (2)." It required the commander's intent section to "include a statement of the battlefield as it relates to his force, the enemy force, and the terrain." In his article, Capt Ettore explains that "the commander's intent statement is intended to be written in narrative form, not by listing elements 1 through 5. It is a statement, not a

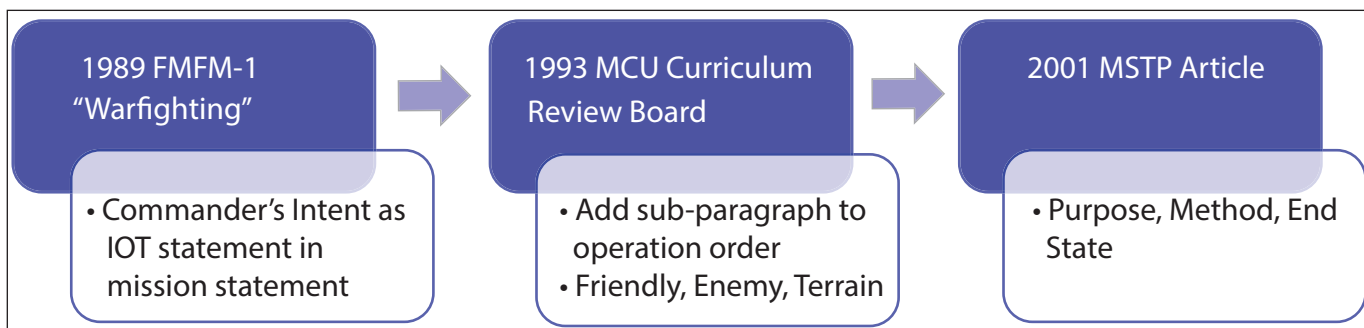


Figure 1. (Figure provided by author.)

format.” He provides the following example to demonstrate what this new commander’s intent should look like: “Final result desired is to block the enemy north of Route 1 in order to allow the unimpeded movement of Company C to BLT Objective Alpha.”³

A 2001 *Marine Corps Gazette* article, titled “Commander’s Intent: Easy to Understand, Tough to Articulate,” addressed recurring shortfalls the MAGTF Staff Training Program saw

with commander’s writing their commander’s intent. MAGTF Staff Training Program found that commanders utilizing the narrative format developed in 1993 wrote intent that was “too wordy or lacks focus.” They recommended that “an effective technique for expressing commander’s intent is the purpose-method-end state format.” They argued that intent expressed in this format is “more easily understood and facilitates planning.”⁴

Why the Current System is Flawed

Purpose: Every mission statement requires two primary components: a task and a purpose. The purpose already exists in the mission statement and restating it adds no substantive value to the order. The purpose section of the commander’s intent subparagraph is even taught as a regurgitation of the purpose from the mission statement “to ensure subordinate comprehension.”⁵

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Method: The center of gravity and critical vulnerability analysis already exist in the situation paragraph of the order. The scheme of maneuver subparagraph of the execution paragraph outlines the method by which the commander intends to complete the assigned mission and is thus already an explanation of the commander’s exploitation plan.

End state: Missions should be tied to actions or effects achieved on the battlefield. Tying operations to specific terrain or enemy forces inherently limits the flexibility of subordinate commanders. *MCDP 5* tells us that “directives should convey the minimum amount of instruction necessary for effective execution.”⁶ The friendly, enemy, and terrain construct is overly prescriptive to subordinate commanders and potentially restricts them to actions not necessary to achieve mission success.

Two of the three components of the formal schools commander’s intent subparagraph already exist in the order. Rewriting these points unnecessarily lengthens the operation order, and the implication they need to be repeated “to ensure subordinate comprehension” discredits the intelligence of subordinate commanders. The third component either unnecessarily restricts the flexibility of subordinate commanders or is not an actual required end state and is merely stated to pass an arbitrary schoolhouse rubric.

Field Marshall Slim tells us that the intent phrase of the mission statement “is the one overriding expression of will by which everything in the order and every action by every commander and soldier in the army must be dominated.”⁷ An additional commander’s intent articulated in purpose, method, end state format that expands upon the mission statement with prescriptive requirements not necessary for the accomplishment of the mission detracts from the unity of effort and operational clarity.

Recommendation

Eliminate the commander’s intent subparagraph as a requirement from the order’s instruction classes. To “convey the



The current structure of combat orders—including commander’s intent as taught in the Corps—does not deliver on the promise of our maneuver warfare warfighting doctrine. (Photo by LCpl Manuel A. Serrano.)

minimum amount of instruction necessary for effective execution,” the commander’s intent subparagraph should be eliminated. A well-written mission statement will capture the commander’s intent in a clear, concise, and easily understood manner. If you remove “final result desired” from Capt Ettore’s 1993 example of a well-written commander’s intent subparagraph, you are left with “block the enemy north of Route 1 in order to allow the unimpeded movement of Company C to BLT Objective Alpha.” This is a textbook *task statement* for a subordinate unit. Appropriately crafted tasking statements for subordinate commanders are the only thing necessary to convey the intent of their mission.

Conclusion

The current format of commander’s intent in the operation order taught at formal schools is not in keeping with the spirit of *MCDP 1*. It is a formulaic approach to orders development that adds no substantive value to the operations order. Most of it is redundant and the parts that are not redundant are susceptible to the inclusion of contradictory guidance and extraneous information. A well-thought-out mission statement coupled with well-written tasking statements is the key to articulating a clear, concise, and easily understood com-

mander’s intent. Commanders writing orders utilizing the current formal schools’ requirements are doing too much. Do less.

Notes

1. Headquarters Marine Corps, *MCDP 1, Warfighting* (Washington, DC: 1997).
2. Marine Corps Training Command, *Combat Orders Foundations B2B0287 Student Handout* (Camp Barrett: n.d).
3. Michael Ettore, “Commander’s Intent Defined,” *Marine Corps Association*, April, 1993, <https://mca-marines.org/blog/gazette/commanders-intent-defined>.
4. Staff, “Commander’s Intent: Easy to Understand, Tough to Articulate,” *Marine Corps Association*, February 2001, <https://mca-marines.org/blog/gazette/commanders-intent-easy-to-understand-tough-to-articulate/#:~:text=MCWP%205%2D1%20defines%20commander,when%20satisfied%2C%20accomplish%20the%20purpose>.
5. Marine Corps Training Command, *Combat Orders Foundations B2B0287 Student Handout* (Camp Barrett: n.d).
6. Headquarters Marine Corps, *MCDP 5, Planning* (Washington, DC: 1997).
7. Ibid.





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The Infantry Marine Course

Supporting Force Design 2030 with enhanced infantry Marines

by the Combat Instructors of Infantry Training Battalion-West, School of Infantry-West

1 100 UTC/Zulu Time, 19:00 Local Time. Somewhere in the USINDOPACOM Area of Responsibility January 2032

The lights were back again. Slow-moving and just off the horizon, they flickered just beyond the frequent driving rain squalls that made everything worse. SSgt TJ Boyd swore under his breath. He was on day fourteen of an eventful two weeks on the island. Frankly, he was looking forward to extract. With a linkup grid already passed, he was a few hours away from beginning his squad's displacement to a platoon rally point just off the beach. But the lights complicated things. SSgt Boyd's well-tuned baseline told him they were too far out to be the local fishing fleet. Those guys normally stuck pretty close to the reef, and something about the back-and-forth course corrections bothered him—too precise, too deliberate. Timelines for extract were normally tight, and the small boat guys were touchy about reprogramming their unmanned surface drones. Especially this late in the process of callbacks to support a beach landing site (BLS). Boyd decided right then and there to get ahead of the problem and roll L-hour for extract by 24 hours. Pro-words were passed via a data transmission mirroring the local electronic spectrum, and an alternate BLS was selected to better support tidal forecasts for the following night. His company commander told him after the OPORD to trust his instincts and adjust the plan when needed, and he was going to do precisely that. But that was weeks ago in the well deck and way before the actual shooting started.

Boyd called over his assistant patrol leader, Sgt John Taylor, already busy putting together the final touches on

route planning for the night. Boyd got him working on a new timeline and established a hasty priority information requirement for the Stalker extra lite on the integrated battalion collection plan. Forty-five minutes later, they caught a break in the weather and were running an offset reconnaissance approach on the problematic offshore lights. "What the hell is that thing?" Boyd wondered aloud.

battalion composite warfare commander's problem to solve. Boyd's problem lay closer in, just inside the horizon to the platoon BLS.

Several overhead searches of the nearest extract site confirmed his fears. Two small boats approached Boyd's location with what looked like an enemy reconnaissance team's worth of dismounts. Boyd called in his team leaders and passed a

His company commander told him after the OPORD to trust his instincts and adjust the plan when needed, and he was going to do precisely that.

He suspected the Peoples Armed Forces Maritime Militia, as he knew the enemy used non-combatants to skirt rules of engagement, screen, collect, and support targeting across the division's battlespace. Moments later he identified myriad antennae bristling above the retrofitted fishing vessel, clearly illuminated on his handheld feed. Boyd's suspicion was confirmed. Identified Peoples Armed Forces Maritime Militia presence in the area of operation was an identified commander's critical information requirement and required a report to higher thereby breaking his squad's communication window. A burst data transmission was discretely passed on battalion TAC relaying the updated enemy sit, complete with a recommended search zone offset around a hastily named area of interest. Boyd was not only worried about the Peoples Armed Forces Maritime Militia ship but also what else might be lurking further offshore. Fortunately, that was the surface

basty WARNO: prep two loitering munitions, complete pre-combat checks for a possible night ambush, heavy weapons load-out, and procure additional water. His team leaders moved out smartly to prepare for combat, which gave TJ a minute to think and complete his plan. They would act decisively, combine old techniques with new tactics, and destroy their enemies. Boyd produced a weathered waterproof notebook he had kept with him since his earliest days at entry-level training in Southern California. The notebook now served as his de-facto leadership handbook. Something about having his handwritten notes from years of experience was a comfort in the chaos of war. His memories drifted back to his experience at the School of Infantry as he flipped slowly through his debrief notes from ten years prior.

The Combat Instructors, MOS 0913, of the School of Infantry (SOI) deliver infantry Marines to the FMF

who are ready to fight and win tonight. We believe these Marines will go on to serve as the more capable future squad leaders and platoon sergeants envisioned by *Force Design 2030*. While points of uncertainty remain in the Marine Corps' effort to change, the 0913 works daily to develop tactical skills and decision making the future demands. We believe the skill of the infantry Marine will be called upon soon, with short to no notice, and likely while serving as part of a Marine Corps Stand-In-Force—all while under persistent enemy observation, threat, and detection. To develop tougher, more lethal grunts the Commandant directed Training Command to improve the process of building entry-level infantry Marines. The combat instructors of SOI believe we are achieving this end state and in the process developed an adult-learning model for training that is highly transferable across the Service. In writing this article, SOI hopes to describe many of these new methods of instruction that proved useful and effective in improving entry-level infantry training. A process that resulted in an improved instructor culture, which was a critical requirement to implement change. SOI is certain that the Marine Corps is beginning to make significant gains in its infantry capability, through a better-developed, tougher, and more realistic infantry training program. This article describes in greater detail, and to a wider audience, the enhanced entry-level infantry training conducted during the new fourteen-week Infantry Marine Course (IMC).

On 27 January 2021, Infantry Training Battalion completed in-processing for the first pilot class of IMC. Over the last 24 months, we have gone from piloting a course and continuous experimentation to an approved Marine Corps Program of Instruction (POI).

The IMC POI resulted in a drastic improvement to entry-level training, yet in many ways, IMC re-established what many would consider traditional Marine Corps concepts. IMC stresses the importance of maneuver warfare

try Marine. Infantry competencies range from traditional skills such as employing the service rifle, patrolling, and land navigation to more subjective, whole Marine concepts skills including: “embodying the Marine Corps’

Warfighting Philosophy.” Through a process based on input from the three Marine divisions and our Service’s Training Command, a subset of twenty infantry competencies or behaviors were prioritized as a requirement for entry-level training. The twenty infantry behaviors selected became the foundation to develop the new IMC POI and the first pilot of the fourteen-week course.

IMC is built on an outcomes-based learning approach that implements 21st-century learning techniques. In a simple description, outcomes-based learning is a model that evaluates a Marine’s quantitative and qualitative ability on each of the 20x infantry behaviors. This model provides a wildly better ability to assess a Marine’s capability to perform individual and collective skills in a more realistic and dynamic combat

environment. Outcomes-based learning is a recognition that just because somebody has passed the minimum requirements in a skill set, they by no means have achieved mastery. In the current unit training management construct, individuals and units are evaluated via a binary assessment of mastery or non-mastery, with no other options. This effectively leaves no room for recognizing and evaluating talent. How does a trainer compare a talented combat marksmanship coach’s shooting skills against a young Marine who barely qualified on the range? They have both *passed* the necessary shooting assessments with the service rifle and are equally *good*. We do both Marines a disservice by not accurately breaking out skill sets. The Marine who struggles

“Look at a man the way he is, and he only becomes worse, but look at him as if he were what he could be, then he becomes what he should be.”

—Johann Wolfgang von Goethe

Behavior	IMC SAL
Employ the Service Rifle	Competent
Conduct Fire and Maneuver	Adv. Beginner
Embody the Marine Corps Philosophy of Warfighting	Novice
Conduct Field Craft	Novice
Optimize Human Performance	Novice
Navigate to an Objective	Adv. Beginner
Patrolling	Adv. Beginner
Perform Tactical Combat Casualty Care	Adv. Beginner
Employ Machine Guns	Novice
Employ the Grenade Launchers	Adv. Beginner
Employ Anti-Armor Weapons	Novice
Manage Signature	Adv. Beginner
Employ C4I Systems	Adv. Beginner
Develop Combat Orders	Novice
Defend a Position	Adv. Beginner
Employ Demolitions	Adv. Beginner
Scouting	Novice
Operate in Compartmentalized Terrain	Novice
Operate within an Aquatic Environment	Adv. Beginner
Employ Mortars	Being Developed

Figure 1. Marine Corps 20x entry-level infantry behaviors taught during IMC and their required skill acquisition levels. (Figure provided by author.)

philosophy, non-commissioned officer-led and developed training, tactical decision games, uncompromising physical standards, and a laser-like focus on practical application. These have become the new watchwords at SOI. As of January 2023, IMC is the only course offered for entry-level 0311s, 0331s, 0341s, and 0352s (weapons MOS Marines conduct an additional four weeks of training on machineguns, mortars, or anti-armor weapons at the Infantry Weapons Course or IWC).

As a first step in developing IMC, the Marine Corps embarked on a deliberate process to identify skills believed necessary in a future fight against a peer adversary. Through this process, the Marine Corps developed 39 infantry competencies required of every infan-

does not get the training he needs and the Marine who excels is not recognized for exceptional performance.

Outcomes-based learning provides an opportunity to highlight the difference in a Marine's learning. Each Marine's skill in a particular behavior is graded on a scale. This scale is separated into five tiers we call skill acquisition levels (SALS): novice, advanced beginner, competent, proficient, and expert. A detailed grading rubric with highly quantifiable metrics and word picture descriptions aids the instructor in rating the SAL a Marine achieves for each behavior. Generally speaking, as SAL levels increase, Marines can perform each behavior with less supervision, execute the skill in more complicated and dynamic environments, and ultimately become teachers and experts. To graduate from IMC, each student must achieve the minimum SAL for all twenty infantry behaviors as depicted in Figure 1.

Outcomes-based learning also calls for the continuous assessment of a student's skill across all twenty infantry behaviors. In our old eight-week POI, Marines were given three opportunities to master a training and readiness task. Following evaluation, they were given pass/fail feedback on performance and were then never assessed on that skill again. Cramming for the test and moving on to the next event is a poor method for skill retention over time. During IMC, students are continuously evaluated, tracked, and counseled using a report card to identify, by behavior, a student's strengths, weaknesses, and opportunities to improve. At the conclusion of the course, these report cards become a warm hand-off tool for Marines reporting to the FMF and are used to support talent management at the squad and platoon levels.

IMC also improved the way instructors teach new infantry Marines. We based this process on an updated adult-learning model. Historically, end-of-course critiques and retention tests revealed a shockingly low return on large classroom instruction and specifically highlighted zero value in PowerPoint lectures. Marines at IMC now invest those training hours in small group

<p>[Competency]: Conduct Fire and Maneuver: Marines execute the cycle of the infantryman, immediate actions and combined arms battle drills within a unit while engaged with the enemy. Marines will be able to identify supported and supporting relationships between all elements within the unit. This event includes the employment of organic infantry weapons within their capabilities and their ability to assess effects. The Marines possess a complete understanding of the infantry unit and the battlefield.</p>				
Novice	Advanced Beginner	Competent	Proficient	Expert
<p>Has introductory understanding to the principles of fire and movement but needs heavy supervision within a controlled environment.</p> <p>With the aid of coaching can perform in supporting or supported roles at the buddy pair or fire team level to include immediate actions and high explosive battle drills.</p> <p>Does not yet possess the experience or depth of knowledge to operate effectively with mission type orders.</p> <p>Does not understand, but has been introduced to the basics of the cycle of the infantryman.</p> <p>Most likely will display poor judgement within the application of fire and movement.</p>	<p>Has a basic understanding to the principles of fire and maneuver and fire and movement but needs limited supervision within a controlled environment.</p> <p>Without the aid of coaching, is able to operate as a supported or supporting unit (as appropriate) to facilitate closure with and destruction of the enemy through immediate actions and high explosive battle drills.</p> <p>Demonstrates the fighter leader concept when engaged with the enemy. Displays a limited understanding of the cycle of the infantryman.</p> <p>Without coaching will struggle with the application of fire and maneuver in dynamic situations.</p> <p>Does not yet possess the experience or depth of knowledge to operate effectively with mission type orders.</p> <p>Most likely will display good judgement within specific/limited aspects of employment.</p>	<p>Has knowledge of the principles of fire and maneuver and fire and movement.</p> <p>Operates as a fighter leader within the fire team or rifle squad. Maintains situational awareness and executes appropriate actions under basic battlefield conditions.</p> <p>Possesses the fundamental knowledge and skills required to move beyond the need for coaching.</p> <p>Understands the cycle of the infantryman and is able to employ a fire team with experience, but has limited experience and basic knowledge in the employment of the rifle squad.</p> <p>Displays good judgement in dynamic situations without detailed instruction.</p> <p>Needs no supervision within this behavior</p>	<p>Has in-depth knowledge of the capabilities and limitations of the rifle squad and supporting assets.</p> <p>Capable of coordinating team and squad actions in support of closure with the enemy and in keeping with commanders intent.</p> <p>Has limited experience and basic knowledge in the employment of the rifle platoon.</p> <p>Able to employ his unit in dynamic environments with little to no supervision and capable of operating with mission type orders.</p> <p>Capable of coaching others in the application of fire and maneuver.</p>	<p>Has deeply rooted knowledge of both friendly and enemy capabilities.</p> <p>able to adapt knowledge and capabilities to overcome any situation.</p> <p>Has an intuitive understanding of the capabilities and limitations of the rifle platoon and supporting assets.</p> <p>Intuitively reacts to dynamic situations while engaged with the enemy in order to achieve commanders intent.</p> <p>incorporates all organic and non-organic munitions necessary to destroy the enemy's will to fight.</p> <p>Able to supervise all others in the application of this behavior.</p>

Figure 2. Example grading rubric for the Conduct Fire and Maneuver infantry behavior with defined skill acquisition levels. (Figure provided by author.)

interactions provided directly by their combat instructors, who serve as a training squad leader. Our classes are conducted in unit squad bays or directly in a field environment outside of a lecture hall. Ample time is afforded for questions from the students. Small group "class" instruction is always followed by extensive practical application and interaction with the material, equipment, and combat instructors. Student participation is an absolute requirement, and their buy-in and commitment to the process are extremely encouraging for the future of the Service.

Enhanced evaluation via SALs, an outcomes-based approach, and adult-learning techniques all provided a solid foundation to change the way we did business at ITB. However, to really achieve the end state of a better, more lethal entry-level infantry Marine, we needed to improve the instructor culture. We believed that entry-level infantry training methods required a complete overhaul. With this honest self-assessment, ITB moved from an instructor climate that presupposed every student was actively striving to fail, to a course anchored on the principle that every student has exceptional potential. Our students are Marines who raised their hand and volunteered to serve their country, and they should

be treated, trained, and developed like adults. Specifically, they should be treated like members of a rifle squad in an FMF infantry battalion. Fostering this type of training environment required an update in the instructor-to-student relationship developed during an IMC class. We had to move instructors from the role of unapproachable passive observers to actively involved coaches, trainers, and mentors. The IMC combat instructor serves as the squad leader for fourteen weeks in a process that is highly similar to Marine officer training at The Basic School. The IMC squad leader billet is loosely fashioned on the new lieutenant, staff platoon commander dynamic for our entry-level officers.

The center of gravity of IMC is the small-unit leadership provided by the IMC squad leader. On training day one, fourteen students are assigned a seasoned combat instructor who will be their coach and mentor for the duration of the course. As the training program progresses in difficulty, these squad leaders shift roles from instructor to tactical leader of the squad. IMC squad leaders take their Marines through patrols, supported live-fire attacks, urban combat, and force-on-force exercises. This close relationship with a combat instructor allows students to develop a

deeper understanding of what they are taught while receiving immediate, constructive feedback. Instructors build trust with their students in the process, fostering a highly accelerated learning environment. The squad leader now has time to ensure that every student *becomes what they should be*. Many of our squad leaders describe class graduations as a bittersweet event. Seeing their Marines complete the course and depart for the FMF leaves many instructors wanting to continue the onward journey with their students. All with the understanding that many of our students will begin a daunting training workup and follow-on deployment upon arrival at an infantry battalion.

“IMC Marines conduct a small group discussion on MCDP 1, Warfighting, with their Squad Leader.”

IMC’s increased focus on the individual Marine comes at a cost, most notably in time and instructor manpower. IMC is an additional investment in a Marine’s initial training pipeline and a significant increase in combat instructor hours. The new course is not simply longer than our previous eight-week offering. IMC gets more out of our students over each training day across the longer fourteen-week program through a more efficient training schedule. To reduce time spent waiting around, ITB-W implemented a block scheduling process—similar to how a civilian high school might schedule classes. The block schedule is broken down by platoon to eliminate the phenomenon of the large 300-man class milling about smartly. Training is broken down into three platoons and across multiple topics to ensure students stay engaged with different kinds of material during an average training day. Instead of spending an entire ten-plus hour training block on marksmanship, IMC students receive smaller two- to three-hour blocks focused on different infantry behaviors.

A typical training day might include blocks for swimming instruction, live-fire training, field craft skills, and radio programming. This approach to scheduling improves student retention by providing manageable amounts of information before students reach oversaturation. It also enhances student recall on demand by providing multiple, repeated, and increasingly complex touchpoints with all evaluated infantry skills. The block schedule, a spiraling approach or “non-linear pedagogy” in education speak, is a proven better way to learn as an adult. The skills trained in week one of the POI carry on through the end of the course and are assessed continuously.

IMC students also receive improved training by layering infantry behaviors together. For example, radio and land navigation behaviors are provided during the same training event. Tactical combat casualty care will occur during a patrolling exercise. Layering skills provide students who might struggle with specific topics multiple opportunities to demonstrate competency. This model accommodates students who have a different, often longer, learning process than others. These simple changes in course ideology and method are producing visible results in our students. Our initial feedback from the FMF highlights a tactically improved, more mature, decision-making infantry Marine.

Initial FMF feedback on IMC students highlights a stronger, more physically fit entry-level Marine. The development of IMC offers our Service a springboard toward establish-

ing quantifiable standards for service as an infantry Marine, where previously very few existed. IMC requires a minimum fitness level to begin training, an absolute must considering the arduous nature of the course. Infantry Marines are now held to a much higher physical standard to graduate. Marines earning the 0311 infantry MOS will be required to achieve first-class scores on the Physical Fitness Test and Combat Fitness Test. They will also achieve a minimum swim qualification of Water Survival Intermediate and pass an evaluation on the Shallow Water Egress Trainer, which simulates procedures for evacuating a sinking aircraft. Several IMC graduates completed Water Survival Advanced during the course, the highest Marine Corps swim qualification. Student outcomes in SALs at IMC are not capped and exceptional performers are given the opportunity to exceed minimum requirements. Student physical graduation requirements also include a grueling weeklong warfighting exercise, a ten-kilometer combat endurance assessment, and completion of a 20km hike with a 75-pound fighting load.

To accomplish this litany of new and improved physical standards, ITB developed a more innovative physical training (PT) plan. PT cards, swim cards, and ruck training are designed under a progressive overload model, which builds up physical fitness beginning at boot camp and continues through IMC through increased weight, distance, and exercise repetitions. IMC class hikes are also conducted as an individual effort without a company structure to set the

Week 5 (1st Platoon Schedule)					
	Mon	Tues	Wed	Thurs	Fri
Morning				CEA (Full)	Active Recovery
PT	Grenade/AA	Swim Card #3	Run Card #3		
Block 1	M320	Anti-Armor	Anti-Armor	Anti-Armor	Mortar LF
Block 2	Sig Man	Grenade LF	M320 LF	Anti-Armor	MAAWS LF
Block 3	Remedial	Fld Crft	Scouting	TCCC	Scouting
Night	Land Nav		M320 LF		Quiz

Figure 3. Example IMC block schedule for one of three platoons in a training class. (Figure provided by author.)

pace. Marines are thereby forced to participate, understand the route, and take care of their feet as part of the process. They can no longer blindly go internal during physical evaluations. In adding responsibility and freedom to loaded movements, hike times and failures have markedly decreased. All graduates from the course have exceeded the Marine Corps training and readiness standard for a forced march.

Swim training cards are broken out between beginner, intermediate, and advanced swimmers, which improves every student regardless of the skill level they bring to IMC. Our swim training has proven wildly effective in developing Marines who are more comfortable in the water and is not a one-size-fits-all workout program. Pool PT sessions provide the added benefit of de-loading wear and tear on joints. We hypothesize this is a factor in the limited overall injury rate for IMC students. Students also conduct an active recovery period once a week, which is spent stretching while their squad leader discusses whole-Marine-concept topics, including moral leadership, personal accountability, and resiliency. Our PT program is one element of a highly-integrated plan that we believe can help produce the more mature, better-thinking Marine that will be an asset on arrival to the fleet.

Decision making and maturity are areas where we believe IMC Marines can outpace our peer adversaries. One of the foremost complaints concerning young Marines arriving in the fleet is their inability to think for themselves. At ITB we believe new Marines often make questionable decisions because we have failed to provide them with opportunities to think and creatively solve problems. Previous entry-level Marines were conditioned, through a model of Industrial-Age education, to regurgitate facts on command without any thought given to circumstances or conditions. Marines were taught a specific solution to a specific situation rather than being able to critically assess a problem and develop a creative solution. This generated a mindset of learned helplessness. Even when options were available, Marines chose not to act. Individual Marines who can think and decide quickly

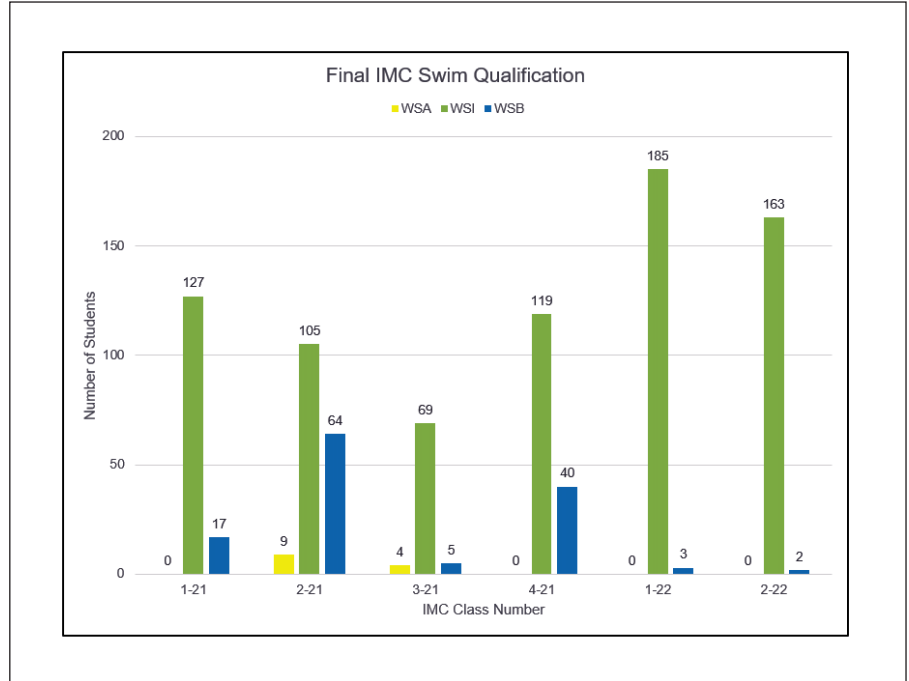


Figure 4. IMC swim qualification scores. (Figure provided by author.)

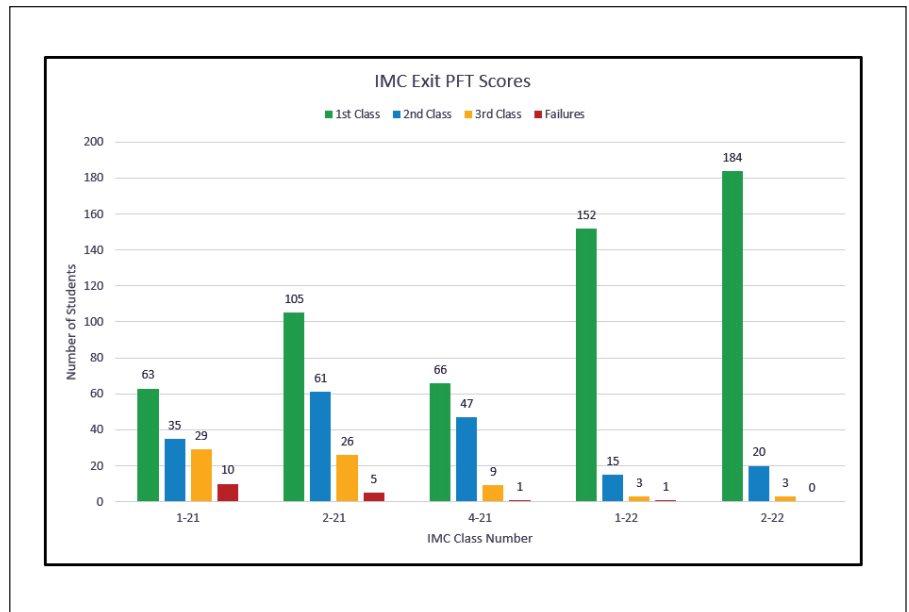


Figure 5. IMC Final PFT Scores. Following class 2-22 all students graduating IMC are afforded remedial attempts on the final PFT. All have graduated with 1st class scores (>235 points). (Figure provided by author.)

have always been—and will remain—a force multiplier on the future battlefield. Faster decisions generate tempo by exercising speed overtime against our enemy. The initiative of IMC Marines to take appropriate action at their level can generate combat power. Their actions in training are integrated by an overarching commander’s intent, a

concept introduced and continually reinforced during IMC. ITB also uses a constraints-led approach to instruction to maximize decision-making opportunities for students.

Specifically, a constraints-led approach to training provides a student with a problem, followed by the things they are not allowed to do. It then asks

“As a lifetime serial learner, I have found that ordinary people can do the extraordinary who are committed to experiential learning, are intellectually curious, and possess an unquenchable desire to acquire new knowledge ... this may be our only advantage in the future fight.”

—BGen Lorna M. Mahlock, MCDP 7, Learning

the student to solve the problem as they see fit, within the provided constraints. Our course does not tell the Marine exactly what they must do to solve a training problem. We surmise this is a more realistic approximation of actual combat. We tell them what is not allowed and make them use their own judgment to think within the bounds of safe training. The constraints-led approach develops student decision making, judgment, and maturity by forcing them to be problem solvers and applies to all skills layered across IMC. The combat instructor will always debrief the student's solution to provide immediate, individualized feedback and solidify any learning points. Peers in the course observe training as well to accelerate their own learning and to provide peer coaching—a surprisingly important learning tool for Gen-Z Marines. By the end of the course, students make thousands of decisions and receive feedback for most of them from both combat instructors and peers, increasing the experiential basis for sound decision-making.

In the cognitive domain, we are developing an entry-level Marine steeped in initiative, creative in generating outside the box options, who has the maturity to assess first- second- and third-order effects, and is decisive enough to choose the best course of action. Building a Marine with this overall maturity and ability is a complex process and requires re-framing how students think. We currently focus the students on how their actions as individuals shape and impact the collective unit. The overarching method for accomplishing these tasks requires an approach to teaching and learning that emphasizes a safe operat-

ing space for students to make mistakes. Ultimately, the responsibility for the student's success falls on the instructor and is achieved through close mentorship and teaching.

Learning experts generally agree that successful adult education occurs when students have a purpose for what they learn. IMC begins with a “Road to War” class that highlights peer adversary capabilities and geopolitical dynamics. We believe this reinforces why each infantry skill provided to IMC students is vital in a future fight. The Road to War class is immediately followed by a combat order for an amphibious assault. After receiving the task and purpose, students are asked to solve a problem in the form of a tactical decision game. While the students do not always provide a sound plan, this exercise forces them into a decision-making role and immediately sets a precedent. They will be required to think during IMC and must plan and execute actions based on their assessment of the situation. The students always discuss their plans with the squad leader, receiving personally tailored, constructive feedback.

Additionally, during IMC, we hold small group discussions on *MCDP 1, Warfighting*: the Marine Corp's premier contribution to military doctrine. We believe it is essential that junior Marines develop a solid foundation in maneuver warfare and begin to internalize the countless leadership lessons contained in the pages of *MCDP 1*. Marines who graduate from IMC possess the motivation to seek information and the responsibility to hold themselves and their peers accountable. To further develop this personal responsibility, IMC students are given a base

set of rules to operate on, known as the “Standing Orders of IMC”. The Standing Orders combine timeless principles like individual accountability, understanding task and purpose, weapons and field discipline, with new aspects of the current operating environment such as understanding your electronic signature. A daily warning order is posted each night to set the tone for every day of the course. This drives students to seek additional information and make initiative-based decisions as they participate and prepare for each training day.

While IMC is building a better decision maker, it also produces a significantly more lethal Marine. IMC graduates are trained to a significantly higher standard in rifle marksmanship. They are subject-matter experts and combat capable in all environments with the M27 Individual Automatic Rifle. They are also trained in the employment of medium machineguns, grenade launchers, anti-armor systems, and light mortars—all of which are new weapons skills for 0311s. Each squad conducts multiple non-illuminated, night squad-supported live-fire attacks. Students act as both the maneuver element and support by fire element on live-fire ranges. To develop a basic understanding of combined-arms techniques and battlespace geometry. These collective skills develop a *next Marine up* mindset and provide every student with a basic level of leadership experience. It also provides each student with the ability to pick up any company-level weapon system and become relevant in a firefight. By better training individual Marines, we sought to develop a course that would aid the infantry battalion operational tempo. By reducing the time required for new Marines to be ready to participate in collective and Service-level training events, we hope to provide battalions with a new ceiling of training opportunities and increased flexibility. Marines arriving at a unit do not require remedial training on basic skills. After receiving an update on specific unit standard operating procedures, Marines are ready for more complex collective live-fire training at the squad and platoon levels.

The Marines are prepared and ready to be immediate impact players in a rifle company on their first day in the fleet.

The success of our students at IMC is also not limited to the schoolhouse. Lessons learned in the training environment are directly relevant to their experience at an FMF battalion. SOI improved this learning trajectory during a Marine's first enlistment, through a squad-cohort shipping model. Graduating Marines arrive at their battalions in the same training squad. Marines now arrive as a cohesive team and are provided a warm handoff from their IMC squad leader to their gaining battalion. IMC squads that are kept together in these same training formations benefit from months of implicit communication, peer mentorship, and camaraderie. They are ready to receive NCO leaders and take training opportunities to the next level.

The Marine Corps continues to draw on a long history of innovation and experimentation. The Marines at SOI believe the daily work we do at IMC can help build momentum toward this ongoing effort to improve our Marine Corps. The combat instructor believes the enhanced skill required of these future infantry Marines is being developed today, time now, in the graduates of IMC. Providing this better infantry Marine is one way we can outpace our potential adversaries. While *Force Design 2030* is an ongoing process and the Marine Corps has multiple decision points that may impact the future force, the IMC is uniquely positioned to adapt. Pending Service-level Force Design decisions may shape the requirement for what constitutes an entry-level infantry Marine. The IMC methods described in this article are well suited to this dynamic environment as they are flexible enough to support our Service as it continues to evolve and improve. We also believe the highlights in this article about infantry training are highly transportable across other areas of the MAGTF and we look forward to our small contribution to building the enhanced FMF of *Force Design 2030*. A fleet of Marines that will remain the Nation's elite infantry community, ready for hidden challenges in an uncertain



IMC Marines train on all rifle company weapon systems to a high standard. (Photo by Sgt Lorenzo Martinez.)

future. The 0913 is confident the watch is passed to a generation of young Marines who were highly successful in an exceptionally demanding course, and who have done things never asked of entry-level students. This group of IMC Marines possesses the potential for outsized impacts across the Marine Corps.

A Sample of Commendatory Feedback We Have Received from the FMF

- 06 level commanding officer: *Without question, there was a tangible improvement with their tactical acumen, physical fitness, and enhanced field skills. In fact, they outperformed many of their senior Lance Corporals that have been in the unit longer. Additionally, we had very few casualties throughout this training.*
- 06 level commanding officer: *IMC graduates who struggle in the Fleet are a reflection of poor leadership ... We changed leaders and the Marines' performance took off.*
- 05 level commanding officer: *Sustain survivability and field craft from setting up individual packs and equipment ... They demonstrate a buy-in for part of the process as we evolve the infantry Marine and his training ... Their bias for action and bias for leadership is noteworthy ... They are critical of the training and critical thinkers on the range.*
- Battalion sergeant major: *The IMC Marines have shown an increased abil-*

ity to process information and tactically employ squad-based weapon systems. The IMC Marines have the ability to quickly rationalize the tasks at hand and complete evaluation checklists with minor corrections. The Companies have already begun incorporating IMC Marines into the Machine Gun sections. Their proficiency and understanding of employment considerations were viewed higher by leadership verse that of legacy Marines. The IMC Marines are more likely to apply input in the decision-making process. The legacy Marines have continuously been viewed as a standby for tasking and match intent type of mentality.

- 81mm Mortar Platoon Commander: *The new IMC Marines have a higher mental capacity to learn new weapon systems.*
- FMF Squad Leader: *IMC Marines have initiative like they were born with it.*
- FMF Squad Leader: *The lowest common denominator is now higher in my squad than it has ever been.*



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The Moral Imperative to Teach Marines to Swim

Soldiers of the sea?

by LtCol Jeffrey M. Brewer

As the Marine Corps wrestles with the complexities of manning, training, and properly equipping a stand-in force to persist at remote sites along key maritime terrain inside the first island chain (FIC), some challenges are clearly more daunting than others. Certainly, finding material solutions to solve our connector conundrum or developing viable communication pathways and small form factors to transmit across a vast distance in contested environments present unique, if not intractable problems. The Service *rightly* applies resources and expertise to solve what is *rightly* considered operational imperatives to find a way forward.

However, lurking below that more compelling threshold of fielding and

>LtCol Brewer is an Intelligence Officer and MAGTF Planner currently serving as Executive Officer at III MEF Information Group. Previously, he served as the III MEF Information Group Operations Officer and before that he worked in multiple MAGTF Planner roles at Marine Corps Forces Central Command. He has been a Marine Corps Instructor of Water Survival since 2012.

employing exquisite science and technology along the Western Pacific’s forward edge is an equally challenging but less interesting tactical problem the Service appears far less eager to address. Despite Marines’ renown as “soldiers of the sea” (see *MCDP 3, Expeditionary Operations*) trained to operate and fight in watery littorals, we are decidedly unserious in the way we go about building a stand-in force that can exploit the sea for advantage, let alone survive if

required to exist for a time in the ocean. Indeed, swimming is not a forte of our larger force—set aside reconnaissance Marines or pilots, who are among the few exceptions; rather, it is an organizational defect we have conscientiously not confronted these last several years, even as successive Commandants called us back to our ostensible amphibious and Naval Service roots.

Ask ourselves, were Marines today operating from a remote expeditionary advanced base played the hand dealt to Col Frank Goettege and his Marines at Guadalcanal in mid-August 1942, would they panic and crumble if swimming were *the only way* to maneuver and withdraw from a rapidly deteriorating situation? Or would they confidently exploit the sea to get back to friendly lines or—to take the thought experiment just a bit further—launch a defiant campaign of disruption from inland estuaries against an adversary who might have previously overwhelmed the expeditionary advanced base command post? Would they manifest the courage of Sgt Frank Few, Cpl Joseph Spaulding, and Sgt Charles Arndt, men who swam miles of ocean in the dark to get help for Col Goettege and fellow Marines under fire? We should like to hope so because these Marines were not reconnaissance or Raiders or some other special force outfit. They were infantrymen and in-



Is there enough emphasis on swimming and water survival for a naval Stand-in Force? (Photo by LCpl Maximiliano Bavastro.)



The Marine Corps does not fully enforce the published water survival qualification standards. (Photo by LCpl Colby Cooper.)

telligence Marines. They were logisticians and supply Marines.

Those were not rhetorical questions, either. If the Service intends to deploy small, self-sustaining teams of Marines forward to austere littoral terrain, where isolation and mortal combat is likely to occur in the throes of the next fight—especially when the Joint Force is slow to surge to the FIC—we must equip these Marines with serious swimming abilities. It is a moral obligation to our sons and daughters sent into the next breach to arm them with confidence in extreme and watery tactical conditions. To do less is immoral, and it is made especially so precisely because giving Marines the skills to thrive and exploit the water—today—costs a fraction of the dollars spent on missiles and light amphibious warships. This is low-hanging fruit, ripe for picking, here and now, as we ready for a fight in the very near term where we might just be outgunned and overmatched in attempting to blunt aggression.

Indeed, to date, the Marine Corps has insufficiently prioritized and resourced the Marine Corps Water Survival Training Program (MCWSTP). Despite token deference to maritime domain readiness in both strategic and Service-level guidance, we maintain an unacceptable status quo of water surviv-

al training and support for operational and supporting establishment forces. Pointedly, the Marine Corps does not enforce published water survival qualification standards; does not count these qualifications toward a promotion scoring system; does not support MCWSTP with Training and Education Command Minor Training Device or Program Manager-Training Systems funding for gear; bestows no Marine Corps Instructor of Water Survival specialty designation to officers; recognizes neither officer nor enlisted instructor credential with uniform devices; and does not resource the fleet with sufficient instructor-trainer structure. Of these, the latter can be easily addressed.

Marine Corps readiness deserves a resident Marine Corps Instructor-Trainer of Water Survival (MCITWS) in the FIC. Logic dictates Training and Education Command should support or advocate for an MCITWS in one of the Marine Corps' main concentration of forces, one which conducts water overflight or waterborne movement for every deployment from its forward-postured home stations. Even a single MCITWS would reinforce standardization in unit MCWSTP events, enable regional re-qualification of Marine Corps Instructor of Water Survival cadre without restrictive and costly

trips to the continental United States, act as a force-multiplier for Commanding General Readiness Inspections for the now-CORE functional area (FA) 1500.52, and could buttress water safety and water survival training efforts for the total force across the Marine Corps Installation–Pacific (MCIPAC) Installation Safety Offices.

The Marine Corps must add an MCITWS presence to the FIC by staffing an existing billet within the MCIPAC Regional G-3 Operations structure with a Training and Education Command-endorsed MCITWS. There the MCITWS can directly coordinate and liaise with MCIPAC Ranges, Marine Corps Community Service Aquatics Program, and Facilities offices to best leverage the use of installation aquatic facilities and Water Surface Area ranges to enable effective water survival training. Operating out of MCIPAC will also provide objective supervision and mentorship of Fleet 1500.52 programs and coordinate training/use of installation aquatic centers with Marine Corps Community Service leadership. An alternate course of action would be staffing the existing structure within III MEF G-33 given the commission and direct liaison authority with the aforementioned MCIPAC entities. The MCITWS would in turn enable forces who are *water ready* now, not after the call to action.

Correctly resourcing Western Pacific forces with an MCITWS does not just enable better unit swim quals and FA 1500.52 inspections; rather, effective MCWSTP expands operational flexibility through mobility options that deploy Marines in and over open sea lines of communication. Commanders will deploy the capability to advanced bases with more confidence that their Marines are effectively trained and evaluated in water survival fundamentals to warfight in key maritime domains.



Inspect the Training You Expect

Enforcing standards

by SSgt Anthony A. Coker

Inspect what you expect. The Marine Corps uses this popular cliché to say that a leader is obliged to enforce the standards they set. When a leader does not inspect what they expect, subordinates can become complacent from a lack of accountability, and as a result, the performance of the unit is decreased and mission accomplishment suffers. The Marine Corps is developing a pattern of not enforcing its training standards. Unless we correct this, it will damage our reputation for mission accomplishment.

The pattern started with small things, as they usually do. *ALMAR 023/20* is the newest in a series of published statements directing all Marines to read at least five books from the *Commandant's Professional Reading List*. The directive puts the responsibility for verifying that Marines are completing this task on the unit commanders. With no inspection, this expectation is consistently unmet, particularly in operational units where it is not a priority. The consequence is that Marines no longer feel that the *Commandant's Professional Reading List* is a "real" requirement. This necessarily undermines the ALMAR. The result is a Marine Corps with a narrower perspective that does not meet the intent of its Service chief.

This example is indicative of a much larger problem. The phrase that has become all too common in recent years is, "You should be doing that at your unit." When looking at the changes made to enlisted professional military education in recent years, this phrase has been used to explain the decreased focus on drill and ceremonies along with the

>SSgt Coker is a Signals Intelligence/Electronic Warfare Technician, currently assigned as the Company Gunnery Sergeant and Training Chief for Company H, Marine Cryptologic Support Battalion. He has deployed to Helmand Province, Afghanistan, in support of Operation RESOLUTE SUPPORT and the East Pacific for counternarcotics operations with the Coast Guard.

other, more traditional Marine Corps training that has gone the way of desert utilities. Despite the historical emphasis that the Marine Corps has placed on close order drill because of its impact on discipline and *esprit de corps*, many Marines no longer practice it outside of recruit training. The point here is not to say that the staff academies should focus on training over education. The issue is that if there is an expectation for Marines to be competent at close-order drill, or anything else for that matter, it must either be reinforced at standardized schools or be an inspectable program at units. Instead, the standard is not upheld, and the onus is placed on units with varying priorities.

This culture of displacing the responsibility for training has led to issues in the fleet. When new Marines arrive at a unit, many leaders start with a dangerous assumption: "You should have learned this in the schoolhouse." Rather than evaluating a Marine's individual proficiency, they are immediately assigned to a shop or platoon. Within their first year, many Marines are sent to support the fleet assistance program, serving as lifeguards, gate guards, or working in the gyms. When they return, there is again an expectation that they will be competent at their jobs but often without the training and evaluation needed to support that expectation. The result is that Marines within the

same unit have varying degrees of competency and are assigned to missions without an adequate understanding of their capabilities.

To address this shortcoming, three things must happen. First, unit commanders must communicate with the schoolhouses for their occupational fields. Next, commanders at all levels should institute standardized training for new Marines. Finally, leaders will evaluate all Marines on their proficiency in job-related tasks. As simple as these things seem, commands across the Marine Corps consistently fail to do them.

Communication between the schoolhouses and operating forces is the highest priority. The purpose of the schoolhouse is to prepare Marines to perform in the fleet. This requires two-way communication with the units they will be supporting. Instructors do their best with the resources available, but this does not align with command expectations. To remedy this, commanders should be well informed on the training their Marines receive before arriving in order to avoid dangerous assumptions. Once this happens, commanders can then work to influence the training in schoolhouses to better match the units' requirements. This synergy between instructors and commanders will lead to more prepared Marines in the fleet.

Note that not all units perform the same tasks and do not require the same training for their Marines. Some training that would benefit the Marines and their units is not feasible with the time and equipment allotted to the schoolhouses. This is why the next step is to introduce standardized training for new Marines. It should not be limited to Marines coming straight from their initial training. Marines that are coming back from the fleet assistance program, from another unit, or from a special duty assignment may be lacking expected skills. The solution is to institute standardized training for any Marine that is either new to the unit or is returning from a temporary duty longer than six months. The training would encompass any skills that are unique to that command, standard operating procedures, and a refresher on basic skills they are already expected to know. Even if the Marine is already well-versed in these, repetition will help to ensure brilliance in the basics. This training can and should also be further refined at the small-unit levels, down to the tactics, techniques, and procedures of an individual team.

Even after training, there should be no expectation that all Marines have equal competency in their professions. To assign Marines in accordance with their strengths, and to develop training plans to mitigate their weaknesses, leaders will need to conduct regular evaluations of their proficiency. The most common way this is currently done is through a performance evaluation checklist, but there are two issues with this. First, many Marines are only tested when going through the training pipeline for deployment. Second, this is a rudimentary tool that often does not encompass many of the specific skills required of Marines to perform operationally. This causes a general lack of preparedness among Marines that are not currently slated to deploy. Marines should instead be evaluated regularly on a variety of tasks, not as a means to replace performance evaluation checklists and Marine Corps Combat Readiness Evaluations but to augment them.

Ultimately, the proficiency of the Marine Corps' operating forces is di-

rectly tied to how well we uphold the standards we set. The way to do that is to inspect what we expect, especially when it comes to training. We started by accepting little things like not reading books from the *Commandant's Professional Reading List* or practicing drill, and it carried over into our expectations with training and readiness. If

we intend to compete with a pacing threat, we cannot become complacent. We must design, enforce, and evaluate training that meets the needs of every unit.



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Marines Awaiting Training

Using time wisely for professional development

by Col Jayson M. Tiger, 1stLt Stephen Grier & 2ndLt Alexandra Appel

Marines Awaiting Training

In naval aviation, there is a fictional character named Grandpa Pettibone. Borne out of desperation in World War II, this grumpy old codger would impart aviation knowledge to his readers with cartoon drawings and sarcastic humor in a desperate attempt to reduce flying accidents.¹ Every naval aviator since 1942 has learned some vital lesson from the cantankerous, pithy, and humorous old Grandpa Pettibone.²

If Gramps saddled up with his cane and book o’ knowledge to tour our training bases, he would probably say, “Jumpin’ Jehoshaphat Devildogs! Why aren’t your Marines awaiting training using this time wisely to further their professional development?”³

>>Col Tiger is an F/A-18 Pilot and the Commanding Officer of Marine Aviation Training Support Group 22 in Corpus Christi, TX.

>>>1stLt Grier is a Villanova University graduate and is awaiting jet training in Kingsville, TX.

>>>>2ndLt Appel is a Naval Academy graduate and a prior-service Nuclear Electricians Mate. She is awaiting primary flight training in Corpus Christi, TX.

Commandant Berger would agree with Gramps. The Commandant’s five priority focus areas include force design, warfighting, education and training, core values, and command and leadership. Our Marines awaiting training focus on all five priority areas, with particular attention directed toward *education and training*.

From commissioning to winging as a fleet aviator, Marine student pilots can spend two years or more in a Marines Awaiting Training status. As Grandpa Pettibone says and the Commandant directs, this time must be used wisely. Marine Aviation Training Support Group 21 (MATSG-21) in Pensacola and MATSG-22 in Corpus Christi are developing unique, low-cost, low-overhead training events that intellectually develop Marines. Some of these events may also be useful to other commands with large student populations awaiting training.

Intellectual Development

The Marine Corps is a learning organization.⁴ *Marine Corps Order 1553.4B* states individual Marines are responsible for their own learning, and it is incumbent upon commanders to foster a culture of lifelong learning. This intellectual ability is cultivated through “active engagement with the brightest minds and the most challenging material, which forces Marines to contend with their assumptions, perceptions and concepts.”⁵

To foster a culture of lifelong learning, MATSG-22 executes a syllabus that teaches lieutenants to read critically,



While awaiting primary flight training, valuable time is available for preparation and broader professional development. (Photo by 1stLt Pawel Puczko.)

write articulate essays on their subject matter, and brief peers on the lessons derived from various works. Distilled from the Army, Navy, and Marine Corps War College syllabi, the MATSG syllabus focuses on both World Wars, Korea, Vietnam, Iraq, and Afghanistan. The final module focuses on military aviation history. Each module begins with a war college-produced lecture, available online and taught by resident experts that describe each war in detail. Students then read, write and think critically about lessons from the tactical, operational, and strategic levels of war.

The background students receive in reading, writing, and speaking critically about military history will support them throughout their careers. Confidence when briefing aviation operations as a captain, credibility with overseas partners as a major, historically based planning as a lieutenant colonel, and strategic-level depth and insight as a colonel are only some of the positive

one Congressional Staff who agreed to take our student's proposal and incorporate their solutions into the National Defense Authorization Act for Fiscal Year 2024. The success our students achieved exceeded all expectations in many cases. These lessons will serve our students well throughout their careers as they address complex problems in the Indo-Pacific region, Force Design implementation, naval integration, and more.

Tactical Training

To complement the intellectual development program, MATSG has implemented a three-tiered system that trains students in the tactical application of their profession.

Our primary tactical training period is called *MATSG-22 University*, focused strictly on flight training. This week-long course is taught by recent flight school graduates to those awaiting flight training. This course prepares

excellent military case studies, ranging from Mogadishu to Guadalcanal to the Chosin Reservoir. Students are selected to lead various case studies, leveraging the Marine Corps Association's pre-built case studies that describe the historical significance, tactical importance, and strategic implications of each battle. Each package includes detailed maps with the scheme of maneuver and terrain depicted with recommended articles, podcasts, videos, and books that complement the case study. Similar to the critical reading, writing, and speaking from the intellectual development module, students gain experience briefing and leading events among their peers, with guidance and structure provided by the instructor cadre.

The third tier of the tactical training module is Expeditionary Warfare School (EWS). Recently implemented and with direct assistance from the Commandant, Assistant Commandant, and Commanding Generals of Training and Education Command and Training Command, this program will aid students in completing their professional military education requirements while awaiting flight training. This program has enormous potential for newly winged aviators entering the fleet as senior first lieutenants and junior captains who must focus on the tactical employment of their aircraft while expeditiously completing their PME requirements prior to the promotion board. To compensate for each student's lack of real-world experience in the course, the Expeditionary Warfare School instructor selected senior Marines to augment the class so that students can leverage their experience. This "hybrid" approach to Expeditionary Warfare School will serve aviators and the Marine Corps well.

Real-World Training

"We must elevate our standards and deliver a more capable Marine to the FMF, while also incentivizing and expanding MOS-specific development opportunities afforded throughout the Marine's career."⁶ MATSG-22 turned commander's intent into action and sent students around the country and

Similar to the critical reading, writing, and speaking from the intellectual development module, students gain experience briefing and leading events among their peers ...

outcomes our students will achieve with their focus on critical reading, writing, and speaking.

To complement this intensive reading program, MATSG has experimented with critical thought workshops. Instructors and students recently participated in a two-week workshop in a live classroom setting with the Ground Truth Design Company, a private-industry program designed to equip leaders with tools, doctrine, and techniques to think critically and better solve complex problems. The initial results are promising.

Instructors and students were broken into five teams, each with a different problem to address. Using the techniques provided by the instructors, our teams set to work and contacted industry experts, general officers, and even

students for the rigors of flight school using books, lectures, chalk-talk, and simulator events. The desired end state of MATSG-22 University is to reduce time-to-train while producing higher quality aviators outside the official period of instruction. As with the intellectual development program, this is a low-cost, low-overhead, repeatable event taught by peers under the supervision of fleet instructors. The course delivery method also demonstrates a transition from the industrial-aged model of learning towards a student-centered, 21st-century learning style supported by Training and Education Command.

Battlefield staff rides, museum visits, and case studies provide the second tier of tactical training evolutions. The Marine Corps Association produces



Using time wisely while Marines are awaiting training can present opportunities focused on the next phases of pilot training, leadership development, and lifelong learning. (Photo by 1stLt Pawel Puczko.)

the world to support individual professional development while simultaneously supporting fleet commanders in accomplishing their mission.

One of the most anticipated events in MATSG’s arsenal to expand career developmental opportunities is the Weapons and Tactics Instructor Course, held semi-annually at Marine Aviation Weapons and Tactics Squadron One, in Arizona. Here, students

interpreter for Marine Forces Japan, enhancing joint interoperability between U.S. and Japanese naval forces. MATSG routinely pairs flight students with fleet units who can effectively leverage and employ their unique skills. Fleet units in need of temporary and specific skills are encouraged to contact MATSG-21 and MATSG-22 who can properly vet its 450 students awaiting training to support your mission.

Grandpa Pettibone would be proud to know our young leaders are dedicated, disciplined, and focused ...

gain an appreciation for graduate-level aviation employment as they observe flight line operations, live ordnance procedures, classified briefs and debriefs, realtime execution from secure facilities, and more. With great support from the MAWTS-1 Commander and his staff, and with proper risk-mitigation measures in place, this evolution is the most sought opportunity among all flight students awaiting training.

Other opportunities for temporary duty exist on a case-by-case basis. For example, a Japanese-speaking Marine flight student recently served as an in-

terpreter for Marine Forces Japan, enhancing joint interoperability between U.S. and Japanese naval forces. MATSG routinely pairs flight students with fleet units who can effectively leverage and employ their unique skills. Fleet units in need of temporary and specific skills are encouraged to contact MATSG-21 and MATSG-22 who can properly vet its 450 students awaiting training to support your mission.

Lastly, MATSG-22 began a monthly program where flight students interact with the Joint Staff J-3 via the Secret video teleconference network. These classified briefings from some of the Pentagon’s resident experts provide valuable insight for young officers interested in European, Middle Eastern, and Asian operations. This interaction sparks students’ intellectual curiosity and provides a frame of reference for the world they are about to enter once they graduate from flight training.

It is important to note the tremendous support MATSG receives from

senior leaders, MAWTS-1, the Joint Staff, Marine Aircraft Groups, the Marine Corps Association, and others that assist in mentoring, instructing, employing, empowering, motivating, coaching, and teaching young flight students awaiting training. Their efforts help develop a student’s intellectual curiosity and support critical thinking and builds the bench of future leaders needed to fight and win the Nation’s wars.

Conclusion

The Marine Corps requires leaders at all levels who can achieve intellectual overmatch against our adversaries.⁷ Names such as Alfred T. Mahan, U.S. Grant, John J. Pershing, George C. Marshall, Dwight D. Eisenhower, Chester Nimitz, John A. Lejeune, Matthew Ridgeway, O.P. Smith, and Colin Powell are noted for their ability to devise, implement and execute military operations at the tactical, operational and strategic levels. Today’s Marines must learn to do the same. MATSG-22 supports this endeavor with intellectual development exercises, tactical training evolutions, and real-world exposure events within a 21st-century learning construct. Grandpa Pettibone would be proud to know our young leaders are dedicated, disciplined, and focused on professional and intellectual development while awaiting flight training.

Notes

1. CAPT Rosario Rausa, “Jumpin’ Josephat! 50 Years of Gramps” *Naval Aviation News* (Jan–Feb 1993).
2. Ibid.
3. Ibid.
4. Gen David H. Berger, *Training & Education 2030* (Washington, DC: January 2023).
5. Ibid.
6. Ibid.
7. Ibid.





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Every Marine a Rifleman

Enhancing critical capabilities for the future operating environment

by LtCol D.E. DeTrinis & Col D.C. Emmel

In distributed and, specifically, maritime operations, non-infantry Marines will play a critical role in competition above and below the violence threshold. They may be employed in small units with few, if any, other Marines from their MOS or occupational field. Many will be completing tasks outside the scope of their MOS, and many may be employed in areas far removed from their infantry counterparts. It is with this in mind that the Marine Combat Training (MCT) Battalions at the Schools of Infantry transitioned how they develop Marines with the purpose of creating riflemen that embody the Marine Corps war-fighting ethos, possess an expeditionary mindset with a bias for action, and are adaptive critical thinkers who are mentally, morally, and physically resilient. These “new” riflemen are lethal with their weapons and knowledgeable in basic field skills with a foundational understanding of leadership, the basic tenets of maneuver warfare, and the future operating environment. However, graduating from MCT with these characteristics and skills is not enough. To ensure the Marines providing critical capabilities to the future force are best prepared to maximize their potential and meet mission requirements, the Marine Corps must invest in a training continuum to sustain and enhance rifleman skills throughout a Marine’s career.

During entry-level training, Marines are trained and educated in fifteen rifleman competencies derived from the infantry competencies that comprise the new Infantry Marine Course.¹ These competencies form the foundation for non-infantry Marine training. The Marine Corps Recruit Depots (MCRDs) are the initial trainers for three rifleman competencies. The MCT Battal-

>LtCol DeTrinis is an Infantry Officer and former CO for Marine Combat Training Battalion, School of Infantry-East. He is currently attending the Navy War College.

>>Col Emmel is an Infantry Officer and has served as the CO for the School of Infantry-East since June 2021.



The School of Infantry-East conducts the Combat Instructor Advanced Marksmanship Training Program. (Photo by LCpl Collette Hagen.)

ion at each of the Schools of Infantry sustains and evaluates two of the three competencies trained at the MCRDs while acting as the primary trainers for twelve of them.² The competencies are taught as outcomes-based components of the programs of instruction (POI) where Marines, regardless of MOS, must demonstrate their collective application. Assessments throughout the POI identify a Marine’s strengths and weaknesses with each competency for future focus and development using five skill acquisition levels, starting with novice and progressing to expert.³

Additionally, both MCRDs and MCT Battalions use the *Marine Attributes* to deliver feedback to students during evaluations by providing focused outcomes for training events.⁴ In relation to sustaining the transformation, the attributes characterize the foundation of the Marine Corps’ ethos and exemplify what it means to be a Marine rifleman.

Despite this foundation of developing core competencies in today’s Marine riflemen, there is currently no codified process by which Marines sustain or enhance the competencies taught at the recruit depots and during combat train-

ing at the Schools of Infantry. Following graduation from MCT Battalion, new riflemen continue their training by attending one of more than one-hundred formal learning centers (FLCs) within Training Command to learn their MOS. FLCs are divided among seventeen O-6-level commands comprising the MOS-producing schools primarily focused on training the technical aspects of Marines' future jobs. As a result, Marines currently devote little, if any, deliberate time sustaining rifleman competencies. Put another way, new riflemen spend anywhere from two months to a year-plus in these courses leading to significant atrophy of the knowledge, skills, and behaviors taught during recruit and Marine combat training.

A way to maximize learning and retention of the skills developed during the first two entry-level stages is to revisit the foundational knowledge, skills, and attitudes episodically and methodically. To do this, FLCs across Training Command must assess all training programs for opportunities to reinforce rifleman sustainment training where appropriate in their POIs. As an example, interweaving rifleman competencies into field training is a great way to aid entry-level Marines in retrieving stored information and providing further contextual learning. This could be as simple as using warning orders that explain the next day's training or as involved as having students build route overlays and patrol to events. Some FLCs can more seamlessly introduce rifleman sustainment training than others. For example, Engineer School and Communication Electrician School will likely have more opportunities to assess students on security operations, patrolling, and signature management than Personnel Administration School. This can be more problematic for those FLCs whose POIs fall under the authority of other Services. However, even Marine schools without significant field components in their POI or schools run by other Services can sustain at least some rifleman skills with a more deliberate approach.

To continue the rifleman training continuum, each FLC must evaluate

current POI through the lens of rifleman competencies, identifying where they may already be addressing them by chance so they can reinforce them as well as where best to introduce rifleman competencies with minor adjustments to the POI. For those FLCs that fall under other Services, systematic engagement with representatives at periodic course content review boards offers a means to persuade stakeholders to incorporate rifleman skills that complement and reinforce MOS training. Additionally, Marine representatives at the FLCs can also incorporate coaching, counseling, and mentoring opportunities with Marine students to help sustain key competencies. In either case, this deliberate analysis will highlight areas in POI that FLCs can modify with relative ease and in a way that does not distract from—but rather enhances—MOS training.

In addition to these approaches, FLCs can also create additive but complementary work that runs parallel to current POI outcomes. Follow-

... interweaving rifleman competencies into field training is a great way to aid entry-level Marines ...

ing MCT, each student has access to the MCT Moodle page, which has the full repository of classes, references, and interactive content available to students.⁵ At a minimum, all FLCs can easily target Marines awaiting training to offer supplemental course work that promotes retrieval practice to reinforce skills taught at Marine combat training. Refresher training, quizzing, and discussions as additional objectives to sustain learning would benefit entry-level students as they complete their MOS training and prepare for their time in the FMF. In this way, the rifleman training continuum must build upon the introduction of the rifleman

competencies during recruit and combat training, by deliberately sustaining these skills to some degree during attendance at FLCs and beyond.

Upon graduation from an FLC, Marines are assigned across the FMF to operational and supporting establishment billets where unit leaders must also sustain and enhance the individual skills and collective rifleman competencies established during the entry-level training pipeline. The FMF provides the primary opportunity to develop Marines because it is where Marines spend most of their careers. Training in the FMF takes many forms and is designed for various purposes. At a minimum, and most importantly, it focuses on a unit's mission-essential tasks, ensuring individual and unit readiness to meet operational requirements. This is where technical expertise, tactical employment, and leadership are developed, and it offers the primary venue for reinforcing the rifleman training continuum introduced in entry-level training. Additionally, "Unit training and exercises are often the best ways to develop horizontal [unit] cohesion,"⁶ which supports unit readiness while also sustaining the transformation. Well-designed, focused, tough training that produces tangible results improves retention, enhances esprit de corps, and leads to mission accomplishment. For the rifleman continuum to be most effective, it must permeate all waypoints of a Marine's career and leaders must maximize training opportunities during time spent in the FMF.

Once Marines complete entry-level training, they serve in the FMF or supporting establishment for years with the intermittent opportunity for professional or occupational career development. Periodic attendance at follow-on professional military education schools and advanced MOS schools offers additional occasions to enhance rifleman training that are not currently exploited. These are ideal opportunities to establish curricula that enhance and progress the skill acquisition levels associated with rifleman competencies. This is where rifleman train-the-trainer, rifleman employment, and rifleman leader training and education must occur.



A student with School of Infantry-East conducts live fire training during the Combat Instructor Advanced Marksmanship Training Program. (Photo by LCpl Collette Hagen.)

These pre-established touchpoints designed to enhance leadership and MOS proficiency fall under the direction of Training and Education Command. By requiring train-the-trainer events that teach enlisted leaders how to sustain rifleman competencies and how to devise training that is relevant and challenging, Training and Education Command will provide FMF units with a ready cadre of an enhanced rifleman that can better lead junior Marine sustainment training. With limited modification to unit-level lance corporal seminars and corporals course programs, FMF units can also expound upon the capability of the MCRDs and MCTs established. Additionally, incorporating supervisor-level rifleman development training into advanced courses and senior enlisted professional military education can build cohesive training and leader education events that develop and reinforce capability at the unit level. By interleaving rifleman sustainment and enhancement training into the multiple touchpoints under Training and Education Command, the FMF would have a steady flow of school-trained NCOs and SNCOs capable of developing training that sustains and enhances the skill-acquisition levels of the Service's rifleman. The FMF will also receive senior-enlisted leaders that are primed

to mentor and coach the NCOs and SNCOs that are charged with ensuring all Marine Corps units maintain rifleman competencies and can succeed in the future operating environment.

Tension always exists between a unit's primary purpose and field training for non-GCE units, particularly those that are critical MAGTF enablers such as Supply and Maintenance Battalion. Yet, these units still exercise in austere field environments. Implementing the rifleman continuum will increase individual proficiency and enhance a unit's ability to operate in expeditionary and distributed environments by ensuring currency in rifleman competencies amongst a unit's population.

There is a significant amount of risk and uncertainty associated with the future operating environment. Like in past eras, Marines must be prepared to defend a position, navigate to an objective, participate in a patrol, and employ their service rifle. Additionally, Marines will be required to manage their signature, understand the electromagnetic spectrum, and be able to operate based on commander's intent. Marines are exposed to all these competencies during entry-level training but require further training as they progress through their service in the Marine Corps. They are not at a skill acquisition level that de-

livers the operational capability to the FMF, and they are not addressed in a cohesive or comprehensive manner following graduation from combat training. By adopting a rifleman continuum, the Service can better prepare individual Marines and non-GCE units for the future while improving survivability and increasing lethality across the force.

Notes

1. A competency is defined as a set of related skills used to successfully perform critical work in an MOS area.
2. Currently, MCT Battalion does not have the capability to sustain or evaluate *Operate in an Aquatic Environment*.
3. The five skill acquisition levels are Novice, Advanced Beginner, Competent, Proficient, and Expert. MCT Battalion currently executes a three-week POI that develops Marines to advanced beginners for the Employ the Service Rifle competency and all other competencies at the Novice level. By using SALs that contain narratives of what a Marine must demonstrate to meet a specific level, a more accurate measure of a Marine's strengths and weaknesses can be achieved to provide a focus for future development.
4. The Marine Attributes are defined as "the manifestation of competencies and traits required of all Marines to meet the challenges of the present and future operating environments" (NAVMC 1510.18D, dtd 3 Dec 2018). The attributes are physical and mental toughness; leadership; decide/act/communicate; warfighting; and exemplary character. The attributes help with the transformation by providing focused outcomes for training events.
5. Moodle is a learning management system that a Marine utilizes during training and retains access to for the rest of his/her career. This learning management system directly contributes to the transfer of knowledge and skills to the Marine through self-paced, interactive content, that can be readily accessed on a personal electronic device. This content is used to prepare for and conduct learning facilitation.
6. Headquarters Marine Corps, *MCTP 6-10A, Sustaining the Transformation* (Washington, DC: June 2016).



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The Expeditionary Communicator

Enabling C2 in any domain

by Maj Paul L. Stokes (Ret)

“The Marine Corps will be trained and equipped as a naval expeditionary force-in-readiness and prepared to operate inside actively contested maritime spaces in support of fleet operations. In crisis prevention and crisis response, the Fleet Marine Force—acting as an extension of the Fleet—will be first on the scene, first to help, first to contain a brewing crisis, and first to fight if required to do so.”

“Our desired endstate requires elite warriors with physical and mental toughness, tenacity, initiative, and aggressiveness to innovate, adapt, and win in a rapidly changing operating environment.”¹

—Gen David H. Berger,

38th Commandants Planning Guidance July 2019

The rapid pace of technological advancement coupled with the challenges of great-power competition require highly trained enlisted leaders; at the same time, emerging doctrine indicates formations at the edge of the battlespace will be small, thus minimizing the number of communications Marines deployed in support of command and control (C2) for any given mission.

This creates the demand for an expeditionary communicator that combines the most critical skills of transmissions (062x), network (063x), and data systems (067x) Marines. The solution is

This creates the demand for an expeditionary communicator ...

>Maj Stokes retired in August 2006 after 31 years of active-duty service. A former Gunnery Sergeant and Chief Warrant Officer 3, he has served in a variety of Leadership and Communications billets from the Team to Theater Levels. Maj Stokes has served as the Marine Corps Communication-Electronics School's Operations Officer, Deputy Operations Officer, and Future Operations/Plans Officer since January 2007.

to train *multi-disciplinary* communications Marines in expeditionary skillsets that enable them to operate *independently*, ensuring that commanders at all levels possess the *organic capability* to exercise C2 in any environment, across the full range of military operations and *in the smallest formation at the tactical edge*. (See Figure 1 on following page.)

To meet this challenge, from April 2020 to August 2022, the leaders of the Marine Corps Communication-Electronics School (MCCES), the largest formal school in the Marine Corps,² teamed with the Director, Information Command, Control, Communications, and Computers (Dir IC4), the FMF, and the supporting establishment to create the Expeditionary Communicator initiative.³ Formulated by the Dir IC4-chartered/MCCES-led Communication Training Advisory Group (CTAG), the purpose of this initiative is to produce a communication Marine leader who is tactically and technically proficient, self-reliant and effective in any domain and capable of operating and maneuvering across distributed operational environments.⁴

The Expeditionary Communicator Concept

Expeditionary Advanced Base Operations, Stand-in Forces, the activation of the Marine Littoral Regiments

(MLR), and other future mission sets require the restructuring of a wide range of Marine Corps formations, to include the projected 17 percent to 46 percent reduction in the size of infantry battalion communication platoons, to minimize footprint to optimize survivability/combat effectiveness. An expeditionary advanced base must be small, often consisting of only a few Marines, and have the ability to move rapidly—which means the days of carrying around the iron mountains of communication equipment and transporting the legions of operators, maintainers, and support personnel are over. Furthermore, an expeditionary advanced base must remain constantly connected to the naval, joint, and mission-partner forces in the same operating area to support maritime-domain awareness. This requires small, lightweight, multi-disciplined expeditionary communication teams that can operate independently in a complex operational environment.⁵ (See Figure 2.)

... an expeditionary advanced base must remain constantly connected to the naval, joint, and mission-partner forces ...

Expeditionary Communication Common Core Skills

To meet these mission requirements, the CTAG developed six Expeditionary Communication Common Core Skills that apply to any environment. (See Figure 3 on following page.)

- **Plan the Network:** To develop architectures capable of integrating Navy/Marine Corps/joint/combined/host nation transmission and information systems based on a thorough understanding of communications networking and data services theory, tactics, techniques, procedures, and resources—thus enabling the individual Marines’ critical-thinking



Figure 1. (Figure provided by author.)

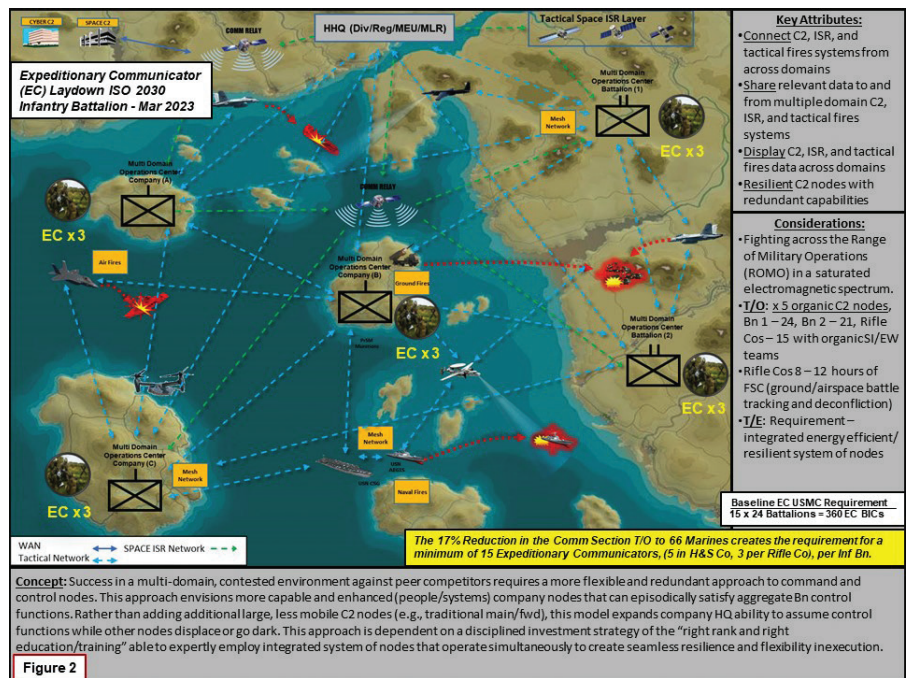


Figure 2. (Figure provided by author.)

- abilities to facilitate C2 under austere conditions.
- **Install the Network:** Conduct physical integration and installation of communication systems.
- **Secure the Network:** Secure the C2 architecture from enemy cyberspace operations.

- **Operate and Maneuver the Network:** Be able to operate and maneuver Navy/Marine Corps transmission and information systems equipment sets in all domains to include denied, degraded, intermittent, and limited-bandwidth environments.
- **Maintain the Network:** Provide

continued operation of Marine Corps transmission and information systems.

- *Assess the Network*: Identify and facilitate the collection of intelligence regarding cyberspace activity in the DOD information network, to include the electromagnetic spectrum.

Expeditionary Communicator Selection Criteria

Based on these common core skills, the CTAG identified the following selection criteria for an expeditionary communicator (EC).⁶ (See Figure 4.)

- Corporal to gunnery sergeant.⁷
- Feeder MOSs 062X, 063X & 067X.⁸
- Screened using a selection process similar to the MARSOC special operations capabilities specialist-communications (MOS 8071).⁹
- Assigned to infantry, recon, littoral combat teams, MLR, MEU.¹⁰
- Primary EC 06XX MOS awarded upon successful completion of the Expeditionary Communicator Course at MCCES.¹¹
- EC 06XX would become their primary MOS and the feeder MOS their secondary MOS.¹²
- Three-year obligation to serve in an EC 06XX billet upon successful completion of Expeditionary Communicator Course,¹³ to include a potential reenlistment option for qualified 2nd term 06XX Marines.¹⁴

- Upon promotion to staff sergeant, the EC 06XX will attend their respective chief course and then return to an EC 06XX billet, (i.e., the EC 06XX/0621 would go to the Transmission Chief Course and upon graduation would become an EC 06XX/0629).¹⁵
- Upon promotion to master sergeant, the EC 06XX would go to the Communication Chiefs Course and become a 0699.¹⁶

Using these baseline requirements and the MARSOC special operations capabilities training continuum as a point of departure, the CTAG identified the required skillsets/performance standards for an EC and—with Dir IC4 and Training & Education Command approval—these requirements were incorporated into the *06XX Communication Training and Readiness Manual*.

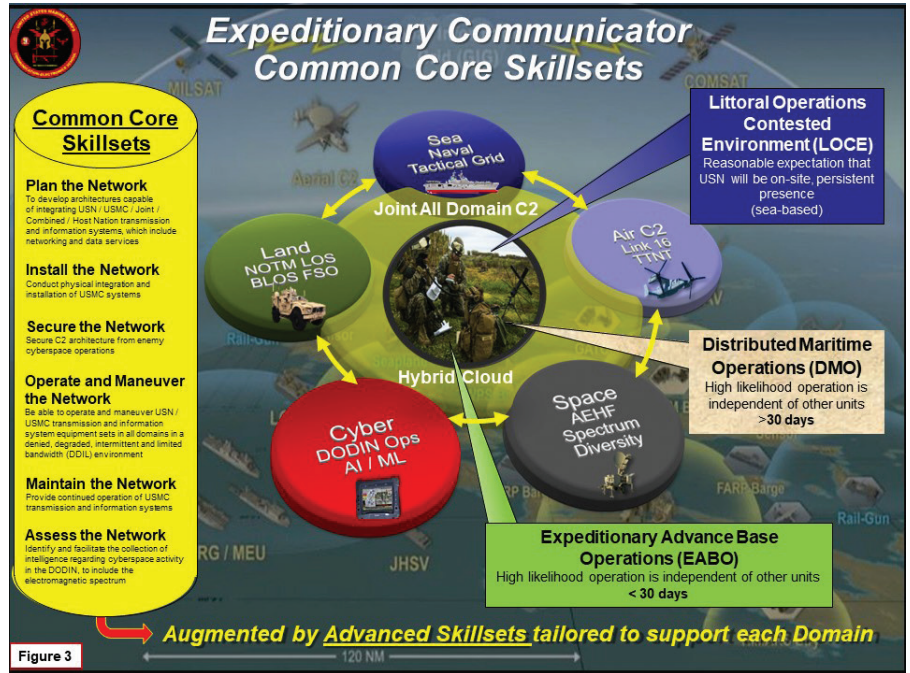


Figure 3. (Figure provided by author.)

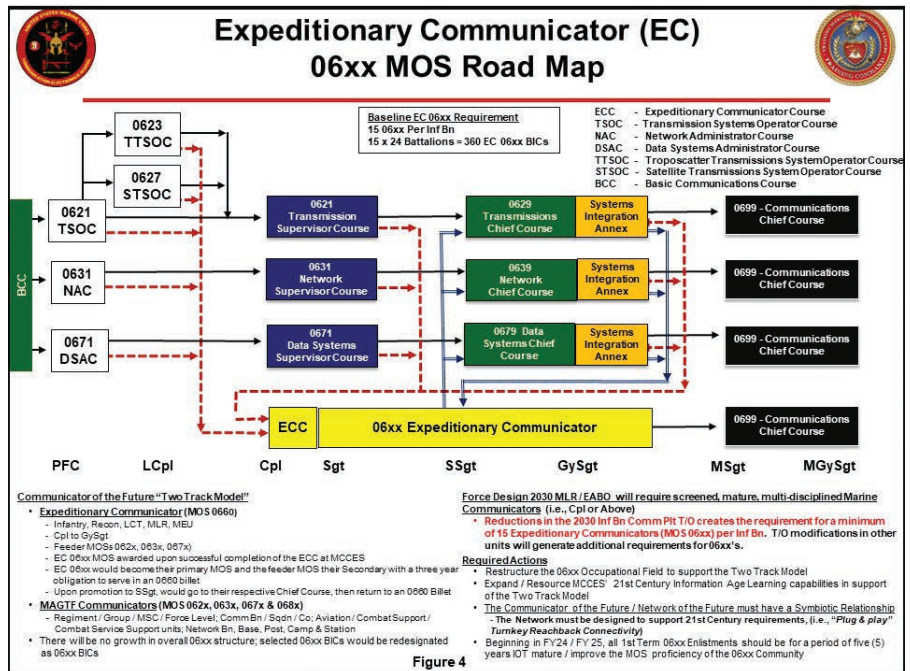


Figure 4. (Figure provided by author.)

The Expeditionary Communicator Proof of Concept Course 1-23 (EC POCC 1-23)

With these standards in mind, the MCCES Communication Training Battalion (CTB) conducted a 37-training day EC POCC 1-23 which com-

bined critical skills from the 062x transmissions, 063x network, and 067x data systems MOSs to support EC skills as multi-disciplinary independent operators. This course was conducted from 3 October 2022 to 22 November 2022, included sixteen students with multiple

06XX MOSs, and was designed to produce:

- Two to three Marine teams capable of providing everything from squad communications to a battalion-sized forward COC set up in support of operations at the tactical edge.
- Individual, tech-savvy communicators current on the latest techniques and disciplines to provide the full suite of C2 services with the support of a full reach-back network.
- Communicators with a thorough understanding of our peer competitors, denied, degraded, and contested environments, and spectrum and digital signature management.
- Highly flexible communicators with multiple skill sets to support different warfighting functions (i.e., kill chain, C2 applications, data links).
- Marines who can successfully operate in a multitude of environments and missions.

- Land, sea, shore, jungle, desert, arctic, and urban.
- Helo, vehicle, foot mobile, and small watercraft platforms.
- Marines who understand MAGTF, joint and allied-partner communication integration, and who possess inherent planning and mission-analysis skills to rapid changings in mission or environment.

EC POCC 1-23 Synopsis

The CTB instructors assigned their sixteen students to two Marine teams, replicating their likely future employment within small units. The instruction reflected their responsibilities to plan, install and secure the network, and then operate and maneuver the network in all domains, regardless of the challenges at hand. Broken antenna? Source another one. System down? Find another means. They also learned to assess and maintain the continuity of C2 services required for continuous operations and mission success with an emphasis on how to support the rapid expansion of C2 requirements from the team to battalion level. (See Figures 5 and 6.)

More specifically, the students learned about expeditionary and small-unit communications, network fundamentals, satellite systems, and tac-

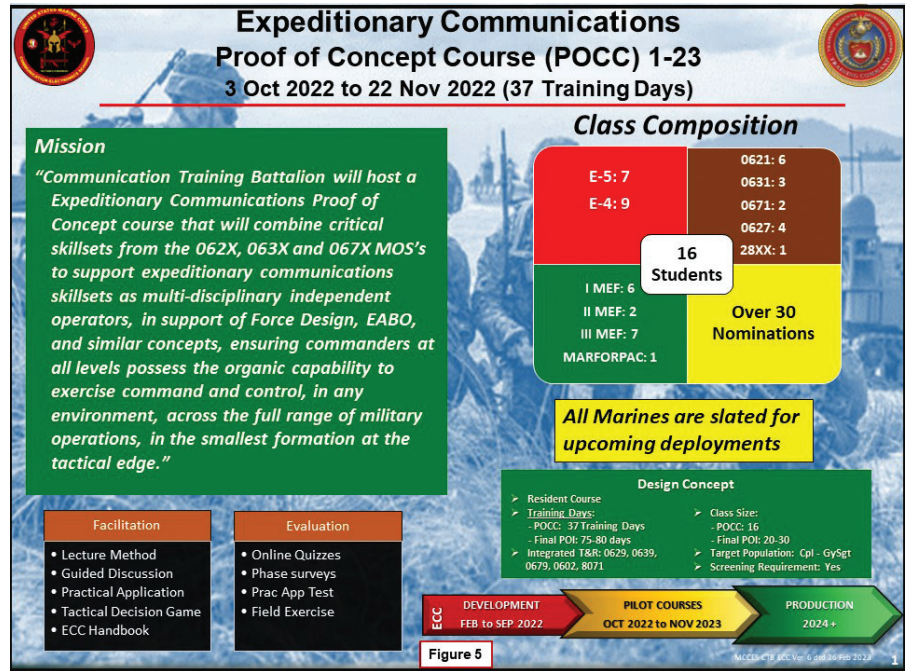


Figure 5. (Figure provided by author.)



Figure 6. (Figure provided by author.)

tical radio systems. The course, which included lectures, guided discussions, practical applications, and tactical decision games, culminated in a final, four-day field exercise. Ahead of that culminating event, students spent several days planning for those expeditionary conditions and practiced breaking out,

using and packing the equipment, and providing resilient tactical C2 services once deployed.

EC POCC 1-23 Student Feedback

The sixteen students were a hand-selected cross-section of corporals and sergeants from across the Marine Corps:

six from I MEF, two from II MEF, one from Marine Corps Forces Pacific, and seven from III MEF—the latter of which included five Marines with 3rd MLR.¹⁷ As expected, all students were highly motivated Marines who aggressively embraced the curriculum and provided valuable end of course critique comments such as:

- *“The pace of instruction was fine for the time we had on the course, but I think for us to effectively execute the EABO concept the overall course length needs to be extended so we can get more time on the gear and more reps in simulated field environments.”*¹⁸
- *“I believe doubling the course length would give adequate time to understand the concepts and get enough practical application to truly utilize them.”*¹⁹
- *“I now have a better grasp of all of the [06XX] MOSs outside of my own that I am a better-rounded Communicator.”*²⁰

The Way Ahead

Planning for the next course, EC POCC 2-23, is in progress and it is MCCES’ intent to conduct this course in two phases: Phase One “Rehearsal” (June–July 2023) and Phase Two “Full Course” (September–November 2023). This plan is the best of both worlds.

Phase One will enable CTB to prepare and allow for a dry run with equipment/facilities as well as work the EC Program of Instruction requirements. This dry run will include inviting Marines from local units to attend and use realtime feedback to validate specific class portions with the goal of keeping FMF interest high. The feedback will also be incorporated into the development and execution of the Phase Two Full Course, which will run from September to November 2023 and include 52 training days.

The limiting factor that MCCES faces is the lack of resources, (i.e., manpower, equipment, facilities, and funding) because of the current constrained environment. However, these challenges have not impeded progress, and based on the past support MCCES has received from the FMF, supporting establishment, and industry, the successful execution of EC POCC 2-23 is well within reach.

Concurrent Actions

The Center of Naval Analysis (CNA) in support of the Deputy Commandant, Manpower and Reserve Affairs, is currently conducting a study on the feasibility of “*Creating expeditionary communicators, inspired by the SOF model, either by creating a new PMOS or by converting the existing 062X MOSs to perform all comms functions at the tactical edge, enabled by automation and reachback support.*”²¹ The EC is an integral component of this study and this CNA project will

... all students were highly motivated Marines who aggressively embraced the curriculum and provided valuable end of course critique comments ...

ultimately help the Marine Corps analyze/determine the best way forward for the EC, whether it be a Primary MOS, Additional MOS, Necessary MOS, or a Skills Designator, and how would it be incorporated into tables of organization and equipment.

The Marine Warfighting Laboratory, as part of the Infantry Battalion Experiment-30 (IBX30) Phase II “811 Battalion” Experiment, plans to evaluate the feasibility of reducing the standard communications platoon of an infantry battalion from 79 Marines to 37 Marines and giving each rifle company an S-6 Section (6 Marines per company/18 Marines total). The MCWL IBX-30 team agreed to add three ECs as the company communication chiefs and one-two additional ECs (as backup or assistant company communication chief) in support of IBX-30 Phase II. This structure will be tested this calendar year, (2023), at the IBX-30 Phase II aboard MCAGCC, Twentynine Palms, CA.

The Marines of MCCES are Ready to Engage

Regardless of which course of action is selected, the fact remains that *the expeditionary communicator is an “elite warrior with the physical and mental toughness, tenacity, initiative, and aggressiveness to innovate, adapt, and win in a rapidly changing operational environment,”*²² and the Marines of the CTB, MCCES are prepared to teach these exceptional Leaders the skills they need to *seek out, close with, and destroy the enemy.*

Notes

1. Gen David H. Berger, *38th Commandant’s Planning Guidance* (Washington, DC, July 2019).
2. MCCES’ Mission is “*To train Marines in ground electronics maintenance, communications, and aviation command and control operations and maintenance in order to ensure that Marine commanders at all levels have the ability to exercise command and control across the full range of military operations.*” MCCES has 700 permanent personnel and is comprised of 11 units at 7 locations that teach 102 Programs of Instruction (POI) which produce 42 MOSs in support of the 06XX Communications, 28XX Ground Electronics Maintenance, 23XX Explosive Ordnance Disposal, 59XX Aviation Command and Control (C2) Electronics Maintenance and 72XX Aviation C2 Operations Occupational Fields and has an annual throughput of 17,000 Marines.
3. Dir IC4 Ltr 3000, IC4, Subj: Request for an Expeditionary Communications Program of Instruction dtd 30 October 2021.
4. The Communications Training Advisory Group (CTAG) is a Dir IC4 Chartered Working Group that serves as the principal advisory body to identify training and education issues of the 06 Occupational Field that impact the readiness of the FMF. CTAG focuses on supporting the FMF by developing courses of action to resolve significant training issues. The CTAG Chairman is the Commanding Officer, MCCES, and the CTAG is comprised of Marines and civilians from the communications training and education community among the operating forces and supporting establishment.
5. The CTAG identified the requirement of 15 Expeditionary Communicators per Infantry Battalion and an initial requirement for 360 Expeditionary Communicators service wide (i.e., 15 x 24 Battalions = 360 EC 06XX BICs).

6. As of 5 March 2023, the recommendation to “Create expeditionary communicators, inspired by the SOF model, either by creating a new PMOS or by converting the existing 062X MOSs to perform all comms functions at the tactical edge, enabled by automation and reach-back support” is currently being analyzed by the CNA in support of the Deputy Commandant, Manpower and Reserve Affairs. CNA Project Title: The Development of a Multiskilled Enlisted Force; CNA Document Number: DCD-2022-U-032421-Final/Date submitted to sponsor: 29 April 2022.

7. Ibid.

8. Ibid.

9. Ibid.

10. Ibid.

11. Ibid.

12. Ibid.

13. Ibid.

14. Ibid.

15. Ibid.

16. Ibid.

17. EC POCC 1-23 was comprised of 16 students: 7 sergeants and 9 corporals. Their MOSs included 6 0621 Transmission Systems Operators, 3 0631 Network Administrators, 2 0671 Data Systems Administrators, 2 0627 Satellite Transmission System Operators, and 1 28XX Ground Electronics Maintenance Marine. Of these Marines: six came from I MEF, two from II MEF, one from Marine Corps Forces Pacific, and seven from III MEF, the latter of which included five Marines with 3rd MLR. All of these Marines are slated for upcoming deployments.

18. Communication Training Battalion, Marine Corps Communication-Electronics School, Expeditionary Communications Proof of Concept Course 1-23 After Action Report dtd 15 December 2022.

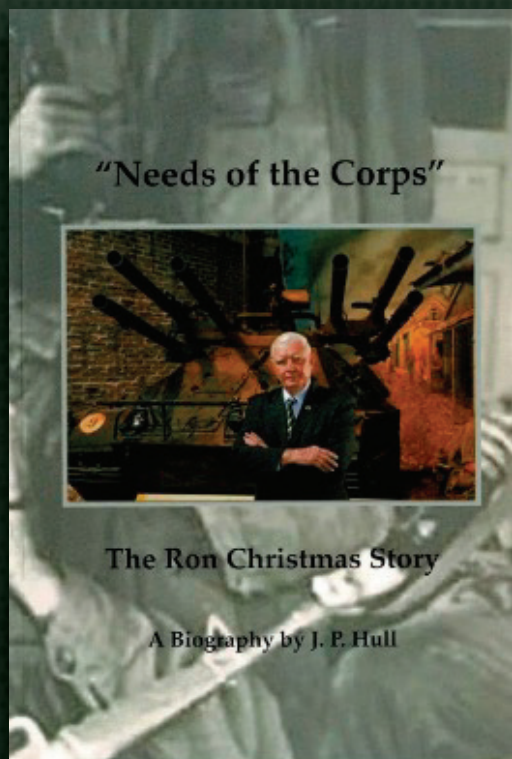
19. Ibid.

20. Ibid.

21. CNA Project Title: The Development of a Multiskilled Enlisted Force; CNA Document Number: DCD-2022-U-032421-Final/Date submitted to sponsor: 29 April 2022.

22. Ibid.

>Author’s Note: This article has been approved by the CO MCCES, Col Joseph D. Broome.



Needs of the Corps... The Ron Christmas Story

A Biography

An extraordinary story of leadership guided by physical and moral courage. Returning from Vietnam seriously wounded, Christmas struggles to recover and remain in the Corps. What follows is a remarkable three decades of active service, culminating at the rank of Lieutenant General. Continuing to serve the nation and Corps in a variety of capacities, he plays a significant role in making the National Museum of the Marine Corps a reality. An inspiring lifelong account of the selfless service of an exceptional man.

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Setting Conditions to Win Battles

The Marine Corps' enlisted education modernization and options in 2023

by SgtMaj Dan Heider & SSgt Tim Davis (Ret)

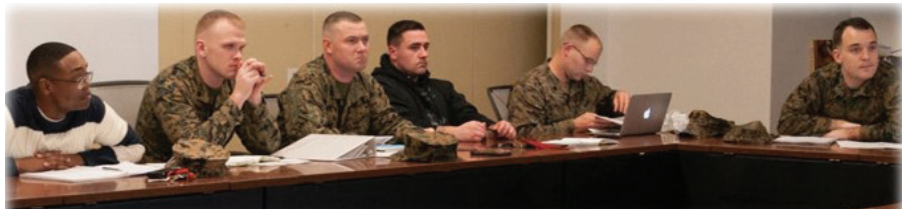
Orientation The Marine Corps continually adapts to technological advances and the individuals that make up its ranks. Considering and embracing these changes are impactful on how we develop our Marines. Leaders must remain informed about evolving practices and options in many realms. This obligation applies when considering how to approach satisfying professional military education (PME) requirements for yourself or your Marines. *MCDP 7* documents the value of learning as it relates to a warfighting institution.¹ *MCO P1400.32D, the Enlisted Promotions Manual*, outlines the requisite for enlisted Marines to attend their PME before being considered for promotion to the next grade. These factors are not the focus of this writing but rather to provide a window into the enlisted PME paths to developing and enhancing the Marine Corps' most treasured asset: the warfighter.

The *38th Commandant's Planning Guidance* highlights the evolution and desired end state for formal learning centers to transition from the industrial era of lecture-based models toward student-centered models, which develop critical thinking and emphasize curriculum and facilitate vice teach.² Student-centered classroom design promotes active and deep learning, requiring a higher level of student engagement. In these collaborative classrooms, students discuss their analysis of the curriculum concepts with their peers.

Before 2014, enlisted Marines had one option for completing professional development. Now, enlisted Marines

>SgtMaj Heider is currently serving as the Director of the Staff Noncommissioned Officer Academy Camp Lejeune. He holds a Master's in Executive Leadership, a Graduate Certificate in Strategic Leadership, and a Bachelor's in Political Science.

>>SSgt Tim Davis is currently serving as one of the Camp Lejeune College of Distance Education and Training Enlisted Seminar Regional Chief Instructors. He holds a Master's and Bachelor's of Arts in Education and is a doctoral candidate in Educational Leadership. He retired from the Marine Corps in 2017 as an Infantry Staff Sergeant and Staff Noncommissioned Officer Academy Master Faculty Advisor.



ECDEP seminars are conducted in the evening hours after the typical business day. Students are formed in groups ranging from eight-fifteen students and socratically discuss selected topics with facilitation and evaluation provided by their assigned adjunct faculty over fifteen weeks. (Photo provided by authors.)

have two options for completing their PME. The Marine Corps University provides a resident and seminar program through the Staff Noncommissioned Officer Academy (SNCOA) in each area of the globe and the College of Distance Education and Training (CDET). Both organizations have aligned outcomes and use modern instructional approaches; however, each has differences in time and execution. These outcomes are created and updated by College of Enlisted Military (CEME) subject-matter experts under guidance from the Marine Corps Senior Enlisted Academy and Marine Corps University. Understanding these differences assists unit leaders in developing the best approach for the professional development of the enlisted Marine.

Staff Noncommissioned Officer Academy

The structure of the SNCOA's resident schools focuses on educational pillars that complement and reinforce each other. Those pillars are warfighting, leadership, communication, and the profession of arms. Faculty advisors, the personnel responsible for educating the force, employ modern teaching techniques such as the Socratic Method, flipped classrooms, lectures, guided discussions, and small group sessions. They assume a mentor, coach, and leadership role to establish trust and credibility. They spend many hours with the students at physical training sessions, one-on-one counseling, or in the classroom. Their goal is to maximize and inspire

self-growth and intellectual curiosity throughout the school.

The resident courses comprise a small part of the continuous learning environment that shapes the leaders of the Corps. These courses bring together different levels of experience from various parts of the MAGTF and the Supporting Establishment. Then, participating students complete a curriculum that blends vicarious learning, professional debates, critical thinking, and insightful instruction from the faculty. The teaching and learning mechanisms invoke thought and emotion, solidifying critical concepts in the student's psyche. Moreover, the resident academy employs thought-provoking strategic and tactical decision exercises in wargaming, case studies, and battle site tours. This allows students to make decisions and discuss the consequences of those decisions, providing room to experience failure without severe penalties. The schools dive into the background and concepts of military philosophers and strategists that have shaped the institution's culture of maneuver warfare. The Marines are also exposed to Joint Military Operations and related emerging concepts, highlighting the interoperability necessity of warfighting.

The SNCOA's Physical Fitness Program challenges Marines physically and simulates decision making when tired. It also allows the students to identify their physical thresholds, which increases their ability to identify mental and physical shortfalls in their Marines. The immersive experience of the SNCOA allows Marines to interact with and self-assess against their peers. It also allows celebrating the profession of arms with traditions such as mess nights and professional dinners. This important element of the Marine Corps heritage is a way to pay homage to the warriors who built the legacy, strengthening Marines' resolve to uphold the legendary Marine fighting spirit. The environment of the academy forges relationships, enhances *esprit de corps*, and deepens the warrior spirit. Sending Marines to the enlisted academy is not only an investment in the individual Marine but also ensures the Marine Corps maintain its ability

CEME AND CDET OPTIONS FOR ENLISTED PME 2023



CEME & CDET



- All three programs run 15 weeks on the same schedule at one of seven regional areas.
- Students attend a hybrid format where a week of self-study is concluded with a Socratic seminar in the evening after working hours.

SERGEANTS SCHOOL

Small Unit Leadership Evaluation; enables students to employ all of the tangible and intangible qualities learned in the four pillars of the SSCH curriculum through peer-to-peer leadership. Students are required to make difficult and timely decisions under mental and physical duress while leading a squad of their peers.

- Five weeks in duration, occurring 5-10 times an academic year locally.

SERGEANTS SCHOOL SEMINAR

Students conduct several research and presentation projects to include two leadership-relevant topical essays. Additionally, a two-week section covering the estimate of the situation, troop-leading steps, and introduction to operation orders."

CAREER SCHOOL

Capstone Project; a culminating event designed to challenge students' critical thinking abilities as a team as they navigate the complexities the Marine Corps is currently facing in order to provide practical, timely, and relevant solutions. Completing the Capstone Project allows students to showcase their ability to think critically, creatively problem solve and effectively communicate all lessons learned throughout Career School within a team environment.

- Nine weeks in duration, occurring 4-5 times an academic year locally.

CAREER SCHOOL SEMINAR

Students prepare a defensive operation order, leadership essay, and presentation about effective counseling, coaching, or mentoring.

ADVANCED SCHOOL

Joint Operations Capstone; requires students to identify issues within the Marine Corps on three levels; individual, MOS, and operating forces, and then conduct a SWOT analysis in order to develop a COA to address these issues. The identified issues must be aligned with the Chairmen of the Joint Chiefs of Staff and SEAC's agenda.

- Nine weeks in duration, occurring four times an academic year locally.

ADVANCED SCHOOL SEMINAR

Students complete two reflective essays and a four-week module on the Marine Corps Planning Process



Resident and distance educational elements of enlisted PME. (Graphic provided by authors.)

to remain the world's premiere force-in-readiness.

CDET Enlisted Seminar Program

The SNCOA is the primary method for Marines to complete professional development and meet established requirements for consideration for promotion to the next grade for sergeant through gunnery sergeant. With the 2017 requirement for resident enlisted PME attendance, the Marine Corps decided to model a program similar to what had been in place for decades at officer PME in a hybrid seminar.³ In this format, students work towards the same program and learning outcomes targeted at the SNCOA but do so during a fifteen-week semester. The curriculum is aligned but not identical to the SNCOA, focusing on the same educational pillars. Learners work through lesson materials and complete assignments and quizzes in the days leading to a Socratic-style seminar session. Here they are evaluated by their adjunct faculty, who guides, moderates, and participates in the discussion to meet the desired educational goals and outcomes. These meetings traditionally take place in person but can also be facilitated virtually through Adobe Connect. The program has evolved to offer asynchronous seminar groups when needed, where students participate via discussion forums throughout the week in place of the synchronous meeting.

This enlisted seminar option has evolved since its inception in 2014 to support sergeants, staff sergeants, and gunnery sergeants in completing their professional development and improving as critically thinking leaders. Seminar students are not on temporary duty orders but attend their weekly seminar sessions while maintaining their responsibilities within their units. The seminar sessions are conducted after regular working hours, allowing units to execute their mission while simultaneously allowing the unit's Marines to attend to their PME. This typically happens in a garrison environment, but in some cases, the seminar program's flexibility allows Marines deployed to participate in PME. Students consistently remark on the benefit of applying



ECDEP Class 3-22 conducts a graduation ceremony aboard Marine Corps Air Station Beaufort. Adjunct faculty members can be active or retired staff noncommissioned officers who are screened, hired, and trained by CDET. (Photo provided by authors.)

what was learned in the seminar the next day at work.

The adjunct faculty members who support this program's execution are SNCOs from both the retired and active-duty ranks. They complete a screening process and receive initial and continuous training in lesson facilitation, teaching techniques, and feedback mechanisms for adult learners. Regional chief instructors and government employees regularly evaluate adjunct faculty in each of the seven global regions ensuring each program maintains a quality standard. This model facilitates sharing great pools of knowledge and experience as the adjunct faculty leading the seminar often have advanced degrees, a breadth of unique experiences, and mature insight from the various billets they have filled.

Attendance in the seminar program comes with limitations, such as the need to be available to attend for the fifteen weeks of the course consistently, a lack of a physical training component, and the requisite time management skills to balance everyday responsibilities and seminar tasks. Unique benefits of the program include earning upper and lower-level American Council on Education credits and the flexibility to contribute to your unit's mission while attending. Just as the SNCOA has an alternative version to support the needs of the SMCR, so does CDET. The Week-

end Seminar Program allows funded travel for their Marines to designated regional seminar sites monthly during drilling periods. Students complete four lessons each weekend over four months.

The Way Ahead

All enlisted students, residents, and seminars require command endorsements to attend. Commanders and senior enlisted leaders have the critical responsibility of managing this balanced approach to meet the institution's needs through the professional development of a well-educated and experienced enlisted leader. This balance maintains our historical attendance records, where two-thirds of our enlisted Marines attend the SNCOA, and one-third complete the seminar program. Like our officer PME resident schools, enlisted PME resident seats are limited, requiring the establishment of a seminar program for officers and enlisted Marines. This data shows that the brick-and-mortar option continues to be the main effort. Still, the seminar program allows many Marines to meet the educational goals of the Marine Corps while simultaneously fulfilling other obligations.

MCDP 7 identifies learning as an institutional priority and a professional expectation for all Marines.⁴ The text also encourages innovation in pursuing these goals; as we discuss the current state of enlisted PME, the follow-on

steps are already expanding the opportunities available. The Senior Enlisted Blended Seminar Program has executed its second pilot recently; this moves the fulfillment of the grade-level PME requirement to a blended style for first sergeants and master sergeants.⁵ Simultaneously, the Marine Corps Senior Enlisted Academy has been created, overseeing CEME and focusing on refining the education continuum that spans from lance corporals through master gunnery sergeants and sergeants major slated for general officer-level assignments.

The Marine Corps' ability to outmaneuver enemies and maintain its distinguished fighting spirit hinges on an established and relevant learning environment that promotes intellectual thought, innovation, and prompt decision making where leaders have opportunities to succeed and fail through trial and error without real-world repercussions. CEME and CDET share the primary purpose of

education, which is to prepare Marines for unknown conditions in complex and chaotic environments. It is critically important that leaders at all levels possess the intellectual adeptness and professional competence to carry out the tenants of maneuver warfare. As specified in *MCDP 7*, Marines must develop their minds and keep an intellectual edge over the enemy.⁶ The Marine Corps' ability to implement Force Design changes and adapt to emerging threats requires this intellectual edge. As leaders, we must continue moving forward, taking advantage of every opportunity to operate from a position of advantage. This continuous innovation requires Marines and their leadership to stay abreast of opportunities and updates regarding enlisted education.

Please contact your regional office for more information regarding the Enlisted Seminar Program. Information can be found at <https://www.usmcm.edu/CDET/enlisted>.

For more information regarding the SNCOA and CEME, please visit <https://www.usmcm.edu/CEME>.

Notes

1. Headquarters Marine Corps, *MCDP 7, Learning* (Washington, DC: February 2020).
2. Gen David H. Berger, *38th Commandant's Planning Guidance* (Washington, DC: July 2019).
3. Headquarters Marine Corps, MARADMIN 521/14, UPDATED ENL PME PROM REQ'R BY GDE AND ANNOUNCEMENT OF CMD-SPONSORED LCPL LDRSHIP ETHICS AND CAREER CRS SEMINAR (Washington, DC: October 2014).
4. *MCDP 7, Learning*.
5. Gen David H. Berger, *Training and Education 2030* (Washington, DC: January 2023).
6. *MCDP 7, Learning*.



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Maturing the Force

How one Marine Corps formal learning center is breaking paradigms

by Maj Brian Kujawski, Capt James Birmingham & Maj Caleb Miller

As a result of emerging technological and kinetic threats from near-peer adversaries, the Marine Corps is executing a significant paradigm shift to prepare for future conflicts against a growing and evolving threat. Newly adopted military technologies and operating concepts undergird this shift and will serve as a stratagem allowing the Marine Corps to persist and, when challenged, win across the continuum of conflict; however, the most crucial asset still available to wage war is the individual Marine. The Marine Corps must change its views on personnel retention and human capital, starting with the training and education of Marines at the entry level and recapitalizing that investment throughout the Marine's career. Additional means and methods must be utilized to foster change that will mature the force while not fiscally straining the Service nor artificially changing the grade of the Marine who performs the job. In support of *Force Design 2030*, maturing the force through training and education vice solely relying on grade shaping will better prepare the Marine Corps for future operating environments. Using examples from the Marine Corps Engineer School (MCES), this article demonstrates how the Service can mature the force and increase training dollar return on investment by implementing several innovative approaches: demand more of entry-level training Marines by challenging the individual to perform at higher levels, actively pursue MOS optimization where realistic, and modernize the learning environment.

I. Expect More and Train to a Higher Standard at the Entry Level

The periods of instruction (POI) from recruit training or Officer Can-

>Maj Kujawski is currently serving as the Explosive Hazards and Improvised Threat Branch Head at Marine Corps Engineer School. He previously served as the Operations Officer for 9th Engineer Support Battalion.

>>Capt Birmingham is currently serving as the Academics Officer for Marine Corp Engineer School. He previously served with 9th Engineer Support Battalion holding multiple billets.

>>>Maj Miller is currently serving as the Company Commander, Combat Engineer Instruction Company at Marine Corps Engineer School. He previously served as Operations Officer at 1st Combat Engineer Battalion.



Combat Engineer Instruction Company students emplace and cross a one rope bridge. (Photo provided by author.)

didate School through MOS school is referred to as the entry-level training pipeline and is the Marine Corps' first opportunity to shape, educate, train, and inspire Marines prior to their assignment to the FMF. The information, training, and education Marines

receive during the entry-level training pipeline are critically important and lays the intellectual and academic foundations they will carry throughout their career. This transformation will ensure that all Marines arrive to the fleet with an abundance of ancillary knowledge

allowing immediate placement within an operational unit. MCES has implemented the following to develop the basic combat engineer or utility Marine with increased capability and a higher level of training:

1. Training to a higher level by moving selected 2000-level training and readiness (T&R) events to the 1000 level.
2. Spending more time on core competencies in which students get increased sets and reps while also moving ancillary skills to managed on-the-job training.
3. Incorporating problem-solving, leadership development, and fitness into the curriculum.

In concert with these initiatives, MCES challenged the status quo and introduced updated T&R events into their basic student programs of instruction. One such example is the optimization of the Basic Combat Engineer T&R tasks by moving select 2000-level events to 1000-level events such as specialized demolitions, expedient demolitions, advanced engineer reconnaissance, and fell-standing timber. Marines must be trained at the lowest level, ensuring mastery of skills before arrival and deployment with operational units. This training ensures that advanced skills can be employed at the individual or fire-team level in support of unit requirements across the MAGTF. Another illustration of transferring noncommissioned officer (NCO)-level tasks and integrating them into entry-level training can be found in the basic water support technician POI. MCES transferred 2000-level maintenance T&R events to the basic student, recognizing that the basic water support technician Marine would require knowledge and mastery of maintenance in the future operating environment. As Marines deploy in smaller, geographically dispersed locations, the FMF will expect and require more capability within every Marine. MCES matures the force while maintaining highly effective and modernized programs of instruction, aggressively shifting from the industrial model while meeting the requirements of the 2030 force.

As expectation levels increase across all POIs during experimentation and

modernization, the level of knowledge must also increase. One method MCES utilized to increase learning and understanding was focusing on MOS core competencies. Specific to the Basic Combat Engineer POI, MCES reduced the existing 29 T&R events to 16 events, following a divest-to-invest strategy. The sixteen events focused instruction at the FLC on core competencies for First Term Alignment Program combat engineers. Divest to invest included the introduction of tasks previously taught at the NCO level as well as new tasks needed in the future operating environment. Other specified tasks will transition to FMF units that

are directly responsible for the task to their supported units and will conduct managed on-the-job training for their personnel when applicable. By following the divest-to-invest strategy, MCES was able to spend more time teaching core competencies and increase practical application, thus achieving a higher level of learning and proficiency for the individual Marine.

As stated in *Talent Management Update 2030*, "In the future, we aim to have junior enlisted Marines with the same number of reps and sets that an experienced SNCO has today. This change will require changes to talent management and training, education,



Combat Engineer Instruction Company uses virtual reality devices to train mine/IED detection. (Photo provided by author.)

and leadership development across our Corps.²¹ MCES seeks to maximize increased practical application and iterative learning opportunities to achieve this effect. Illustrated in the Basic Combat Engineer POI, students participated in field exercises at the end of each POI phase that required cumulative application of skills and problem-solving using individual skill sets in a collective environment. Additionally, the use of leadership reaction courses that are focused on MOS skills challenge the students to overcome engineer specific problems while utilizing the skills sets that were previously taught to them. During field exercises and leadership reaction courses, students are challenged with the responsibility of developing a plan and leading a small unit to accomplish tasks while having their technical skills, leadership ability, and problem-solving skills evaluated. Training Marines to solve complex problems and immersing them into leadership positions early allows the fleet to receive a more matured and better trained Marine from day one in their unit. Training Marines to perform at higher levels, investing increased sets and reps on core competencies, and including problem-solving skills, leadership development, and physical fitness into the entry-level training pipeline will certainly improve the performance of our entry-level Marines, but we must also take steps to optimize every MOS.

II. MOS Optimization in Support of Force Design 2030

The future operating environment requires units and Marines to operate in more geographically dispersed and in smaller formations. MOS optimization mitigates the operational risks of being spread out by ensuring that the Marines within the formation have expanded capability sets. MCES conducted experimentation to optimize MOSs across the engineer community, resulting in the federation of specific skills across multiple MOSs and combining other MOSs into a new MOS. Optimization increased the capabilities and expectations of individuals serving in those MOSs because of additional changes across the POIs to solidify a more competent, highly skilled, and adept

Marine to the FMF. As a part of the MOS optimization, MCES conducted a proof of principle to combine the basic refrigeration and air conditioning systems technician and the basic engineer equipment electrical systems technician into a Basic Utilities Systems Technician Course. Additionally, MCES developed a course to train Marines on drafting and surveying as an additional skill set for other MOSs vice having that capability solely with the drafting and surveying MOS.

The experimental basic utilities systems technician POI produces a Marine who can maintain every piece of Marine Corps environmental and electrical systems. Combining MOSs with similar skills and tasks resulted in significant capability improvements at the individual Marine level. The newly minted utilities system technician Marines provide the FMF and commanders with greater capability and flexibility in the operating environment. Each Marine who graduates the course can fill an 1161 or



Combat Engineer Instruction Company students conducting the Engineer Reaction Course.
(Photo provided by author.)

an 1142 role, giving small geographically dispersed units more capability. Another demonstration of MOS optimization directly impacting the capacity and ability of individuals in the force comes from the experimentation with the drafting and surveying MOS. MCES and engineer community experts recommended experimenting with terminating the individual MOS of drafting and surveying within the community and transitioning them to a secondary skills progression as part of reenlistment or force-shaping efforts. Over the past year, MCES has conducted two standalone courses: Drafting and Design as well as Construction Survey. These courses include Marines from various MOSs across the engineering community, such as heavy equipment operators, combat engineers, and utilities Marines but also included outside MOS's expeditionary airfield systems technicians. By incorporating the drafting and survey skills across multiple MOSs, the individuals

who completed the courses can bring more capability to their individual small units that typically resided at the battalion level.

The final example of MOS optimization that enhances the force's maturity is the consolidation of common tasks associated with the warrant officer population in the engineer community. In addition to producing an SME who can advise commanders, the new POI will incorporate a common phase between the engineer warrant officers (utilities officer, engineer equipment officer, and bulk fuels officer). The first iteration of the common skills phase will be conducted in the summer of 2023. This phase will focus on common maintenance tasks across the warrant officer ranks. By combining their initial training for common skills, engineer warrant officers will gain a better understanding of other occupational fields, thus making them more capable of maintaining diverse sets of equipment.

When conducting MOS modernization, it is important to note that MOS optimization is not simply merging MOSs but requires creating expanded capabilities and capacities with the individual Marines. By doing so, we can provide the FMF commanders with greater flexibility when operating in geographically dispersed small units.

III. Modernize the Learning Environment

Demanding more of our Marines as well as conducting MOS optimization simply is not enough—we must modernize the learning environment. Our Marines arrive at the entry training level pipeline with an understanding of educational technologies, research tools, videos, and online learning environments. The antiquated industrial-aged model of teaching that we have used for decades does not achieve the level of learning that our current and future force requires and is immature in the

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Combat Engineer Instruction Company students employ Nida electronics training systems.
(Photo provided by author.)

application of technological advances. Exemplifying these requirements is the adaptation of Moodle into the periods of instruction. MCES utilized Moodle to house the self-study portion of the modernized POIs across the combat engineer and utilities MOSs. Every phase or day within a specified POI has an associated Moodle tile with material corresponding to each lesson. Moodle

By combining the use of Moodle and adult learning teaching methodologies, students surpassed the performance and effectiveness measures of the older industrial-aged model and have achieved higher levels of understanding of the materials taught.

Additionally, virtual reality simulators provide a learning environment that allows students to work chronologi-

... the Marine Corps can mature the force through training and education by training to a higher standard at the entry level ...

included self-study pre-work, homework, and after-lesson management. Moodle was an excellent tool for reducing lecture time due to pre-work and increasing a student's baseline knowledge prior to arriving in the classroom or practical application. Furthermore, it enables the inclusion of adult learning methodologies by ensuring better preparedness from independent study. Moodle also facilitated greater interaction and access to course material, with students spending approximately two hours a night in the learning management system working at their own pace.

cally through a problem while performing actions within a virtual environment. Current efforts are underway to include a virtual VMR-2 mine detector in the Basic Combat Engineer POI. The Marine Corps has shown great success in using technologies to train the force, including individual simulated marksmanship training, flight simulators, and convoy simulators. The result of these systems on the fleet was a more skilled and proficient Marine. In a fiscally constrained environment, training must be accomplished in the most cost-effective methods, and acquisition and utiliza-

tion of these simulators greatly enable Marines to further their sets and reps while maintaining fiscal awareness. MCES continues to drive towards technological learning environments with the development and utilization of online videos, tablets, and internet connectivity across the campus. Actions that all aid in developing a more mature and proficient Marine by allowing more time to conduct tactical and operationally relevant reps and sets in a structured environment while significantly reducing class lectures and time spent in traditional classrooms.

The vision of the *Commandant's Planning Guidance* and the publication of *Force Design 2030* and *Talent Management 2030* has invigorated change across multiple fronts with the purpose of achieving a better return on investment for maturing the force through training and education. In conclusion and with direct support of *Force Design 2030*, the Marine Corps can mature the force through training and education by training to a higher standard at the entry level, optimizing MOSs where it makes sense in the future operating environment, and modernizing the learning environment. These methods provide a cost-effective alternative to maturing the force other than the utilization of a force-shaping models of changing the grade of a Marine performing a task. Our ultimate responsibility remains—to prepare young men and women to conduct war and defeat the Nation's enemies; we must do so in a manner that ensures they are properly prepared

Note

1. Gen David H. Berger, *Talent Management 2030* (Washington, DC: Nov 2021).





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10 April 2023

**A MESSAGE FROM THE COMMANDER
MARINE CORPS SYSTEMS COMMAND**

“With an eye to the future, and an understanding of the increased potential of our peer competitors, we are rapidly pursuing new capabilities and concepts to ensure we remain a capable naval expeditionary force in 2030 and beyond... that we remain a Marine Corps that offers a significant contribution to the joint fight and imposes massive cost on the enemy.”

This modernization challenge has never been greater as our competitors accelerate their military build-up and as technology advances at an ever-increasing pace. *Force Design 2030* continues to chart the Marine Corps’ way ahead to meet this challenge, and the acquisition community will develop, produce, and sustain the gear the Corps will need to turn *Force Design 2030* concepts into fielded capabilities. The mission is simple: equip our Marines to win on the battlefield.

A small cadre of under one hundred Marines serves as acquisition officers. These highly trained officers lead a workforce of thousands of military and civilian acquisition professionals—many of whom are Marine veterans—all of whom are passionate about supporting Marines. These are the engineers, logisticians, financial managers, program managers, and others who we rely on to translate the needs of our warfighters into technical and business language that our industry partners can design and build to. Our acquisition workforce is modernization’s center of gravity; recruiting, training, and retaining this talent is an essential part of executing *Force Design 2030*.

Our acquisition community is deeply involved in systems’ life cycles from cradle to grave—from working with Combat Development Command and the Warfighting Lab to refine requirements, to fielding to the Fleet, through sustainment with Logistics Command. Throughout, they leverage close collaboration with academia, industry, the Joint Force, and our international partners and allies. These partnerships allow us to bring the best technology the world has to offer to the hands of our Marines, giving them the unfair advantage they deserve.

Our acquisition professionals operate in a complex, highly regulated environment. Orchestrating the three processes that together field capabilities—the Joint Capabilities Integration and Development System requirements development process, the planning, programming, budgeting, and execution process, and the DOD acquisition process (*DOD 5000*)—is maneuver warfare for our acquisition Marines. Every day, they work to exploit the authorities they have within the acquisition process and execute their programs with discipline and speed. The commander’s intent is clear: deliver the most capability we can, as quickly as we can, squeezing the most warfighting advantage possible out of every dollar invested in the Marine Corps.

In this month’s issue, you will find thought-provoking articles that span the breadth of people, partnerships, and programs that make up Marine acquisition. Challenging the status quo and sharing new ideas are cornerstones of our professionalism. I encourage you all to read, discuss, and debate the ideas presented in this year’s acquisition edition of the *Gazette*. Acquisition is certainly fertile ground for scrutiny; I look forward to a lively discussion!

Semper Fidelis,

A handwritten signature in black ink, appearing to read 'D. Walsh', with a long horizontal flourish extending to the right.

David “Angus” Walsh
Brigadier General

Commander, Marine Corps Systems Command



10 April 2023

**A MESSAGE FROM THE SERGEANT MAJOR
MARINE CORPS SYSTEMS COMMAND**

Marines,

As I reflect on my first year at Marine Corps Systems Command, I can unequivocally state that observing defense acquisition up close has been a truly eye-opening and gratifying experience. During the past twelve months, I had the privilege to witness dedicated acquisition professionals equip our Marines with the most advanced ground and IT weapons systems so Marines are fully prepared to confront any adversary in all domains.

I visited China Lake in April 2021, days into my post here—to observe phase two of the end-user evaluation of the Navy/Marine Corps Expeditionary Ship Interdiction System, and was immediately surprised by the number of people there teaming up with the Marines to ensure success. I asked several people about the experience, and the most common response was they were given an opportunity to work on a project that has an immediate impact on the lives of Marines and brings a lethal capability to the Marines on the battlefield. Rapidly developing solutions is one example of the incredibly rewarding and fulfilling aspects of this command.

With *Force Design 2030* in motion, we understand that your needs are constantly evolving. That said, you—the individual Marine—are our most precious asset. The Marines and civilian professionals at MARCORSYSCOM are committed to ensuring that the systems we deliver keep pace with these changes and meet the capabilities you need, both now and in the future. We rely on your input to help us enhance our systems and ensure we equip you with the necessary tools to destroy our adversaries in any clime or place.

So, I urge you to take advantage of the opportunity to share your thoughts and feedback with us. Our Warfighter Support Division enables you to reach out to the program offices responsible for fielding your equipment directly. You can reach out to them here: <https://hcs.usmc.mil/sites/MCTSSA/innovation/Pages/Equipment-Feedback-Portal.aspx>. Let us know how we can better equip you and your fellow Marines for the challenges that lie ahead. Together, we can continue to enhance our expeditionary readiness and combat effectiveness and ensure that we remain the world's preeminent expeditionary fighting force.

Semper Fi

A handwritten signature in black ink, appearing to read "Allen Goodyear".

Allen Goodyear
Sergeant Major

Marine Corps Systems Command

Tilting the Balance Toward Speed

Fielding cutting edge capabilities

by BGen David Walsh

Never has the Demand for Faster Delivery of Capabilities Been Greater

Global competitors are developing and fielding capabilities that challenge our Nation’s competitive advantage. The advancement of near-peer adversaries, along with the tremendous pace at which technology is progressing, demands rapid modernization of our capabilities for the future operating environment. To contribute to the joint fight as a naval expeditionary force-in-readiness, we must be able to compete, deter, and facilitate escalation in an increasingly contested battlespace. Yet, despite the urgency of the geopolitical situation we face, the DOD has struggled to accelerate the fielding of cutting-edge technology to provide high-impact operational solutions for the warfighter.

There are Inherent Challenges to Acceleration

Our acquisition system (inclusive of our requirements and resourcing processes) has long been a source of tremendous frustration. It has been characterized as sluggish, rigid, inadaptible, and unresponsive. Even 37 years after the Packard Commission identified many of the issues that impede warfighting innovation, a pernicious set of underlying problems often prevent us from fielding fully capable equipment, with mature sustainment systems, in the time frame needed by our operational fleet. Too often, we take opposing sides: an exasperated fleet staunchly defending poorly defined, shifting requirements on one side versus a bureaucratic acquisition system mired in risk aversion and a cul-

“All of our analysis leads us unequivocally to the conclusion that the defense acquisition system has basic problems that must be corrected. These problems are deeply entrenched and have developed over several decades from an increasingly bureaucratic and over-regulated process. As a result, all too many of our weapons systems cost too much, take too long to develop, and, by the time they are fielded, incorporate obsolete technology.”

—1986 Packard Commission Report

>BGen Walsh is currently serving as the Commander of Marine Corps Systems Command.

ture of compliance on the other. Add in a multi-year planning, programming, budgeting, and execution (PPBE) process and a regulatory system optimized for oversight vice responsiveness, and our Marines are left wanting.

A great deal of work is being done to address the large, systemic issues. Congress has already granted additional authorities, such as the middle-tier of acquisition and the software acquisition pathway, that the DOD has incorporated in the adaptive acquisition framework and that the Marine Corps is already using. A congressional commission on PPBE reform and an Atlantic Council Commission on Defense Innovation Adoption will provide recom-

mendations that may ultimately result in additional acceleration opportunities such as more rapid requirements validation for mature capabilities, broader capability-based budget line items, and adjusting reprogramming authorities to allow additional flexibility in the year of execution. But even in the current environment, there is a way to accelerate.

We Can Go Faster by Balancing Risk, Tilting More Toward Schedule

One of the basic principles of project management is balancing the triple constraints of cost, time, and requirement

“Take calculated risks. That is quite different from being rash.”

—Gen George Patton

scope. Optimizing for one inherently creates risk or compromise in another. Recognizing the deep-rooted friction that exists in the acquisition system, we can meet the challenge of accelerating capabilities to the fleet by tilting these constraints in favor of schedule, making well-informed trades, and accepting prudent risks in the other areas.

Program managers are incentivized to reduce financial risk. Programs are regularly measured against financial execution benchmarks and under-execution could mean a loss of program funds. Of course, it goes without saying that our acquisition professionals are bound to be good stewards of the taxpayers' dollars. However, that does not necessarily mean the lowest cost or lowest financial risk. The taxpayers, and our Marines, need and want the best warfighting value for every dollar. That may mean paying a premium for more engineers to accelerate a design or moving engineers from a less critical program to accelerate a priority program. It could mean making an expensive capital investment to speed production or adopting a contract strategy that incentivizes industry to go faster, even if it increases the financial risk to the government. In a time of constrained resources, this will require close collaboration with resourcing organizations to make the necessary budgetary accommodations.

Our Marines deserve the very best, cutting-edge technology. That axiom, while appropriate and well-intentioned, often drives a dogged reluctance to accept any technical risk. This can manifest as high-end, unique requirements that may be unachievable without significant developmental efforts (i.e. time) or as a reluctance to field a system that satisfies 80 percent of requirements now as a minimum viable product with an executable plan for iterative maturation. In the acquisition community, this can take the form of extended test programs that seek to reduce uncertainty to a minuscule level, or application of strict specifications to uphold compliance, without critical thought to validate the warfighting applicability of those specifications. For the fleet, accelerated fielding may imply supply



Marines with 1st Marine Logistics Group employ an unmanned semi-autonomous drone during Project Convergence 2022, experimenting with all-Service logistics in a contested environment. (Photo by Sgt Juan Magadan.)

chain risk and reduced initial readiness as the industrial base builds to full capacity. Technical risk must be accepted thoughtfully, especially where safety and security are at stake. However, a well-informed collaboration can allow smart technical trades for the sake of getting the capability to our Marines as quickly as possible.

Enable Well-Informed, Collaborative Trades, Deferring to Users

Decisions such as these are made every day across the requirements and acquisition communities. Too often, those trades are made by well-intentioned stakeholders who may not have full visibility of second-order effects or the correct perspective to appropriately weigh considerations. The key to acceleration is to enable fully informed trades, at the right level, deferring the final vote to those that will have to live with the results of those trades—the operational Marines.

Close, transparent collaboration between designers and developers, resource managers, program managers, acquisition professionals, users, and requirements owners throughout the entire process is essential to fully inform and define the decision space for the ultimate decision authority. Tilting the

constraint equation toward schedule will require trust and a *yes, if* approach by all stakeholders.

For our acquisition corps, this will mean pushing back against the compliance culture—reducing bureaucracy, documents, and reviews by understanding what is truly essential to delivering capability and tailoring out those that are obsolete, redundant, or unnecessary. There will be resistance from those who own the processes that have been abridged. Avoid the temptation to acquiesce to this risk aversion—know where boundaries are and why, push through toward them, and when you get there, elevate your best assessment of the risks and opportunities of pushing beyond. Do not take a no from someone who cannot give you a yes. Reject the attitudes of the guardians of sacred specifications or processes. In execution, embrace experimentation and prototyping. Put early iterations in the hands of Marines to gain feedback and use all available authorities to optimize acquisition and contracting strategies to incentivize industry for speed and agility to incorporate that feedback. Do not go so far as to become a cheerleader for your program but embrace our role as the truth-tellers who can present operators with the information they need to



An artillery Marine maneuvers a Navy Marine Expeditionary Ship Interdiction System (NME-SIS) launcher which can provide Marine Stand-in Forces a proven capability to strike a naval target from more than 100 nautical miles. (Photo by Cpl Luke Cohen.)

make well-informed decisions to enable speed.

For resource managers, embrace funding strategies consistent with risk-based acquisition decisions. Help defend these strategies during the planning, programming, and budgeting processes. Advocate for greater flexibility in budget execution and partner with requirement owners and program managers to adjust resources when circumstances change.

For requirement owners and fleet users, resist the urge to demand satisfaction of all requirements in one big bang for fear of never fully achieving the desired capability in a resource-constrained, elongated traditional development program. Specify a minimum viable capability or product—the smallest product that provides usable warfighting capability—and plan for refinement of requirements and maturation of technology over time. Engage with developers early and define requirements collaboratively to ensure they're achievable within the time and resources allocated. Be prepared to consider commercial or joint solutions that may save significant time but may not meet some of the niche requirements we sometimes levy as Marines. Recognize that there will be hard decisions about

the prioritization of resources between many important programs.

Examples of these types of decisions are:

- A partner's tactical vehicle is already in production in large quantities (i.e. lower cost) and is available now, but does not meet the full fording requirement of the Marine Corps. A new development program will require tens of millions of dollars of development over several years to field a new fully compliant vehicle. Which vehicle does the Marine Corps buy?
- A commercial UAS is available now, at a low cost, but does not meet all of the cybersecurity requirements of the Marine Corps. Does the Marine Corps buy that system or invest in a secure new development?
- A new system has completed testing and meets all technical requirements. However, parts demand history is scant, and suppliers have not built robust supply chains to ensure the availability of parts. Does the Marine Corps field the system or wait until there is higher confidence that readiness can be maintained?
- A program has verified by testing that a new system operates reliably and safely throughout 90 percent of its operational envelope. Clearing

the remaining 10 percent will take an additional nine months of testing at a significant cost. Should the Marine Corps field the system with a restricted envelope, accept the risk of operating in the unknown region, or delay fielding until testing can clear the full envelope?

In reality, the choices are rarely that simple. There are multiple intertwined dependencies that must be considered. The key is to have the right stakeholders represented in the discussion. For senior leaders, actively encourage this collaborative approach. Reward creative problem-solving and measured risk-taking. Make time for you and your Marines to participate in this vital work. Send your best and brightest—a small cadre of acquisition Marines at Marine Corps Systems Command and Naval Air Systems Command, working closely with requirements Marines at Capabilities Development Directorate, are making tactical-level decisions with strategic impacts similar to these every day. In the spirit of talent management, invest in an acquisition corps and requirements community that you have confidence in to inform and adjudicate these trades.

“There are risks and costs to action. But they are far less than the long-range risks of comfortable inaction.”

—John F. Kennedy

While this approach will not address the larger, systemic PPBE and regulatory challenges, it does provide an avenue to move faster in the modernization of our Corps. Proactively engaging in well-informed trade-offs and risk management in favor of schedule will allow us to put new capabilities in the hands of our Marines more quickly than our traditional approach. The Nation's ability to meet the demands of the global environment and the viability of the Marine Corps as an enabler to the Joint Force count on us.



The Marine Corps Acquisition Workforce

Navigating complexity and delivering results

by Mr. Rob Cross

Defense acquisition is a complex and bureaucratic process, governed by a multitude of policies, regulations, and laws. Throughout American military history, this key capability has constituted a vital cornerstone of our Nation's defense strategy, allowing the armed forces to adapt to changing threats while maintaining military superiority over our stated adversaries.¹

In like manner, acquisition has played a pivotal role in the Marine Corps' history, providing necessary resources, technology, and equipment to enable the Marines to successfully execute their mission when duty calls. One noteworthy example of this was the Corps' adoption of the Landing Craft Vehicle Personnel or the "Higgins Boat" during the Second World War. These landing craft were used in several amphibious operations, including the Battle of Guadalcanal (1942) and the Battle of Tarawa (1943), and were essential to the success of amphibious operations during the war—ultimately helping shape today's Marine Corps.

Similar acquisition successes were seen throughout the Korean and Vietnam Wars, as well as more recent conflicts in the Middle East, and have been extensively documented by military historians like Gordon L. Rottman, Michael Green, and Eric Hammel, among others.

In the years since the *Marine Corps Gazette* began publishing its annual acquisition-themed issue, numerous such topics have been expanded upon at length, and contributors have made significant contributions to the literature in areas ranging from novel

>Mr. Cross is the Deputy Program Executive Officer for Land Systems.

software practices to key warfighting concepts. *Gazette* contributors have also devoted considerable time to addressing the challenges associated with the bureaucracy of the defense acquisition process. However, what has not yet been addressed—perhaps surprisingly—is the diverse and committed team of professionals tasked with navigating the inherently complex defense acquisition process, ensuring that Marines possess the essential equipment and systems needed to effectively combat our nation's adversaries.

While the broader acquisition enterprise encompasses individuals responsible for developing requirements and allocating funding, this article will specifically highlight the highly professionalized core acquisition workforce within the Marine Corps Systems Command (MCSC) and its affiliated Program Executive Offices (PEOs). Successful acquisition program execution necessitates meticulous coordination among personnel possessing specialized training and skill sets.

Although numerous sub-specialties exist—such as safety, cost estimating, manpower and training, testing, and cybersecurity—this article will concentrate on the five principal acquisition competencies: engineering, acquisition logistics, financial management, contracting, and program management. I must apologize in advance that the personnel showcased in this article are

exclusively from PEO Land Systems (PEO LS)—these individuals are the ones I interact with daily and whom I consider my heroes. Undoubtedly, there are heroes throughout MCSC and our sister PEOs, and I hope they can recognize themselves in these select examples.

The Few, the Proud, the Engineers

Acquisition work is fundamentally a technical endeavor, making engineers indispensable to the process. The core aspect of any acquisition program involves designing a relevant capability and managing technical risks. Although some may perceive acquisition programs as being paced by regulatory requirements set forth by the *DOD Directive 5000.01* and other governing documents, the reality is that programs are driven by the ability of industry to develop or integrate material solutions that meet Marine Corps requirements.²

Professionals in this competency employ a highly disciplined systems engineering process to ensure programs are developed as efficiently as possible. Fran Bonner, the former lead engineer for the Ground Based Air Defense program and current Integrated Air and Missile Defense coordinator at PEO LS, exemplifies the highly skilled engineers within the acquisition workforce. A telling insight into Bonner's character can be gleaned from his email signature block, which features the moniker "Wile E. Coyote, Super Genius."

Highly respected across the command, Bonner is a seasoned professional with eighteen years of experience supporting Marine Corps programs. He possesses a thorough understanding of integrated combat systems and has a



Crewmembers with 3d Assault Amphibian Battalion, 1st MarDiv, pose with their amphibious combat vehicle during a strategic mobility exercise at Camp Pendleton. (Photo by Sgt Matthew Kirk.)

track record of delivering critical gear to Marines. He has played a key role in the implementation of the Common Network Interface for Tarawa-class Amphibious Assault Ships, the Common Aviation Command and Control System, and various versions of the Marine Air Defense Integrated System. Bonner balances technical rigor and efficiency in his systems engineering approach, providing effective solutions to program managers.

Bonner's true strength, however, lies in his exceptional leadership skills. He is known as a super genius in mentoring, developing, and guiding teams of engineers from diverse backgrounds and organizations to achieve their common goals. The acquisition process requires a dedicated team of highly skilled engineers, and Bonner is just one of many who have dedicated their careers to delivering capabilities to Marines. These engineers are driven by the importance and reward of their work and can see the tangible results of their labor in the capabilities they deliver to the warfighter.

In Bonner's own words:

When it comes to serving the Marines, my passion is truly ignited. Working alongside them, getting to know their stories and struggles, and ensuring they feel seen and heard is

what drives me. The appreciation they show for this level of engagement is immeasurable, and it fuels me to want to do more. The feeling of being able to help those who sacrifice so much for our nation is truly indescribable, and it's what keeps me committed to this infinite loop of giving back. Serving the Marines is a privilege, and I cherish every opportunity to be a part of their journey.

Acquisition Logisticians: Planning for Success

The integration of a new capability into the FMF requires meticulous planning and execution during the design and development phase. This critical stage involves acquisition logisticians who play a vital role in negotiating trade-offs between capability and sustainability, directly impacting overall mission readiness. With a focus on the twelve Integrated Product Support Elements, acquisition logisticians conduct detailed analyses to ensure that the program can meet future military operations and gain concurrence from the program manager and warfighter.³ Their efforts are crucial in achieving the seamless integration of the new capability into the FMF.

As programs transition into the sustainment phase, the acquisition logisti-

cian must be ready to respond quickly to unforeseen challenges, such as system modifications, updated training, or changes to maintenance strategies. The acquisition logisticians are highly skilled individuals who can handle pressure and communicate clearly with the program office and warfighter.

Kathy McCauley is an accomplished acquisition logistician with over eighteen years of experience supporting the Marine Corps. With a passion for her job, she currently works across the PEO LS portfolio to ensure that all programs address key logistics and sustainment considerations. Her extensive experience serving in various positions of increasing authority with the Aviation Command and Control and Sensor Netting, Combat Element Systems, and Infantry Weapons programs makes her an ideal mentor for the future Acquisition Logistics workforce.

McCauley's passion for her work in acquisition logistics is grounded in her commitment to the Marines. After all, as she aptly puts it, "Marines are our center of gravity." Continuing, she notes:

As Logisticians, one of our main objectives is to build a product-support package that provide the Marine with everything they'll need to operate and maintain that system in the field," Kathy told me early this month. "Everything we do in the planning phase ties back to what the Marine needs. Our product-support package needs to support the Marine, at the last tactical mile, when bullets are flying. That's at the forefront of my mind, each day.

Defending Resources: MCSC's Financial Managers

The role of financial managers in defense acquisition cannot be overstated. Without funding, defense acquisition is impossible, making financial management (FM) professionals critical components of the acquisition process. As Del Johnson, lead FM for the Air Command Control and Sensor Netting program office, aptly puts it, "Budgetary precision and execution form the very foundation of successful acquisition and delivery, ultimately equipping our Marines with the tools necessary for mission success."

These professionals are responsible for allocating funds, managing multi-billion dollar budgets, contracts, and expenditures, and ensuring that programs are executed effectively and efficiently. The financial management professionals are experts at navigating complex financial regulations and policies associated with all phases of the Planning, Programming, Budgeting, and Execution process.⁴ This process involves planning defense spending years into the future, communicating and justifying projected spending to Congress, and translating future objectives into an executable budget for the President's budget submission to Congress.

Throughout the year, financial managers defend program budgets to Headquarters Marine Corps, the Navy, the Office of the Secretary of Defense, and Congress due to competing priorities and scarce resources. Continuing resolutions and other obstacles only add to the financial manager's challenge of executing successful programs. For program managers, there is no one more important than their lead financial manager to ensure resources are in place and executable to deliver warfighting capabilities to our Marines. The dedication to mission demonstrated by these committed individuals cannot be understated. With thirteen years of service in the Marine Corps, Johnson has been instrumental in resourcing an ACATI program and executing the funds that successfully procured and fielded the complete AAO. His expert financial knowledge, innovative ideas for resourcing various efforts, and dedication to the mission led to the successful delivery of this critical capability to the Marines. "Being the son of a Marine, and having seen firsthand the impact our gear and systems can have on saving Marine's lives, I focus on keeping our FM team engaged and try to go the extra mile to execute the program's budget as planned," recalled Johnson recently. "This is vital to ensure timely delivery of capabilities to the warfighter." In addition, Del leads a team of junior FMs, delivering financing strategies for two smaller programs that are critical enablers to *Force Design 2030*.⁵ The skill

and dedication of the FM workforce are strong, and financial managers will continue to be the driving force behind delivering sound financial strategies, defending resources, and executing program funding to deliver capabilities to our Marines.

Navigating Complex Contracts: The Role of Contracting Professionals

Contracting is the backbone of every successful acquisition program, requiring the negotiation and management of contracts with industry partners to ensure programs are executed as planned and equipment and services are delivered on time and within budget. This highly controlled competency is governed by rigorous statutory and regulatory guidance and requires a highly-trained set of individuals with a deep understanding of procurement law and regulations. Contracting professionals must be skilled negotiators capable of navigating complex contracts with industry partners to ensure that

and was willing to wage daily battles with one of our most determinedly challenging industry counterparts. Her expertise and dedication have been critical to the successful execution of the Ground/Air Task Oriented Radar program, and she serves as a role model for contracting professionals across the Marine Corps.

And yet, it is the Marine's tireless service to our country that drives McCommons. When asked what the Marines mean to her, she said, "Marines exemplify the best of our Nation. They selflessly protect our Nation and its ideals and model their core values of Honor, Courage, and Commitment."

Mastering Defense Acquisition: The Role of Program Managers

At the forefront of the acquisition process, program managers (PMs) play a vital role, bearing the responsibility and authority to achieve program objectives in development, production, and sustainment to fulfill users' operational

Continuing resolutions and other obstacles only add to the financial manager's challenge of executing successful programs.

the Marine Corps gets fair and reasonable prices for the products and services it requires.

Our contracting workforce wages pitched battles with industry counterparts on a daily basis to deliver results that benefit the Marine Corps. Contracting officers are formally warranted and bear additional responsibilities for the implications of their work, ensuring that every aspect of the contracting process is closely monitored and executed with precision.

Cindy McCommons is one of our most experienced contracting officers, having supported the Marine Corps since 2015. As the lead contracting officer for the Ground/Air Task Oriented Radar, Cindy volunteered to take on this highly challenging assignment because she fully appreciated the importance of the capability to the Marines

needs. PMs receive an acquisition program baseline outlining the cost, schedule, and performance goals Congress expects them to meet.

The program manager position represents the zenith of the profession, culminating in a career path that may originate in any competency. PMs face immense demands while navigating the daily complexities of defense acquisition programs. At the core of their role lies the delicate balance of cost, schedule, and performance. Challenges in any of these areas will inevitably impact on others. Overemphasis on technical perfection can increase schedule and cost while rigid adherence to schedule may elevate technical risk.

Even among the dedicated acquisition workforce, few are willing to embrace these demanding roles. Becoming a PM entails taking on the responsibility

of an acquisition program (or programs) and committing to a 24/7, 365-day job. The PM's authority, enshrined in *Title X U.S. Code*, persists beyond the workday, weekends, and holidays.⁶

Col Tim Hough, a distinguished PM at PEO LS, sets a high standard of excellence in his role. Currently, he serves as the leader of the Advanced Amphibious Assault Program Office, responsible for overseeing the Amphibious Combat Vehicle (ACV) and Assault Amphibious Vehicle programs. As an ACAT 1C program, the ACV program is in progress across all lifecycle phases.⁷ Col Hough adeptly manages various challenges, including sustainment issues for newly fielded vehicles, scheduling and quality concerns in full-rate production, and the technical risks associated with developing two additional mission role variants.

When asked about his commitment to the acquisition mission, Col Hough shared:

As a father of a Marine, I am driven by a deep sense of responsibility to ensure that our Nation's finest receive the best capability we can provide. Though my son may not be an amtraker, my commitment is rooted in a profound experience as a company commander, where I lost three Marines. This experience strengthened my resolve to make every day as an acquisition officer focused on providing the very best to Marines, in honor of those who made the ultimate sacrifice.

The colonel is part of the cadre of 8061 Marines who make up the uniformed portion of the Marine Corps acquisition workforce. His journey began as an amtraker in the FMF before transitioning to the acquisition MOS as a major. Like his fellow 8061 Marines, Hough realized the significant impact he could make on the institution and his peers as an acquisition expert. He devoted considerable time to MCSC's Infantry Weapons directorate, introducing new squad weapons to the FMF. Eventually, Col Hough was called upon to apply his functional amtraker expertise and technical acquisition experience to the ACV program. For the past year and a half, he has guided his team of skilled and committed professionals in

overcoming challenges, ensuring the ACV ultimately meets the needs of Marines as they confront our Nation's adversaries.

Since the Naval Act of March 1794, when Congress authorized the original six frigates of the Navy, defense acquisition has often been viewed as slow and unwieldy.⁸ And, while the acquisition process is indeed incredibly demanding, comprehensive, and often lengthy, it perhaps needs to be—to a certain extent—to create safe and effective capabilities that will serve our warfighters' needs for decades after fielding. I can assure you that, due to the sometime Herculean efforts of these highly dedicated and professional individuals, our Marines consistently go to war with the best possible gear. Many of these professionals have prior military service, and career civil servants share an exceptionally strong sense of duty.

... our Marines consistently go to war with the best possible gear.

Joining the Marine Corps acquisition workforce entails embracing long hours, substandard facilities, and inconsistent IT services. Despite the myriad challenges, those who choose to serve in the defense acquisition workforce do so with unwavering conviction in the mission's importance and the opportunity to support our Marines.

The contributions of engineering, acquisition logistics, financial management, contracting, and program management professionals have been instrumental in shaping Marine Corps history. Through their expertise and dedication, they have ensured that the Marines are equipped with the best technology and equipment to complete their missions successfully. As the Marines continue to face new and complex challenges on the battlefield, the role of the acquisitions workforce will remain critical to their success. It is only through the hard work and unwavering commitment of these profes-

sionals that the Marines can maintain their readiness and continue to defend our Nation's ideals.

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A Revolution in Marine Corps Acquisition

Sixth generation methodology
by LtCol Jay Zarra & Col Alex Ramthun

In 2020, we suggested opportunities and strategies to appropriately posture the Aviation Acquisition Officer 8059 MOS to more effectively deliver critically important capabilities in support of *Force Design 2030*.¹ Three years since the publication of that article, events like the war in Ukraine have demonstrated the Marine Corps must further revolutionize routine planning, programming, budgeting, and execution (PPBE) and wider capability acquisition culture and processes to rapidly address new challenges presented by emerging, complex peer threats, such as the People’s Republic of China.² As the Secretary of Defense states in the *2022 National Defense Strategy (NDS)*:

Business as usual at the Department is not acceptable, as over the next two decades, we face strategic challenges stemming from complex interactions between a rapidly changing global balance of military capabilities; emerging technologies; competitor doctrines that pose new threats to the U.S. homeland and to strategic stability.³

The Secretary’s urgency for change offers an opportunity now for the Marine Corps to innovate away from outdated and complacent fourth/fifth-generation approaches for capability resourcing, development, procurement, and sustainment. We must introduce a sixth-generation methodology to support a revolution in Marine Corps acquisition affairs, ultimately stimulating the successful development and fielding of capabilities beyond the *Force Design 2030*-time horizon. The sixth-generation acquisition methodology requires a transformative organizational change in three core areas: Service-wide align-

>>LtCol Zarra is a Marine Corps Aviation Acquisition Officer (MOS 8059) and serves as the Chief Test Pilot at Air Test and Evaluation Squadron Two Three (VX-23) at NAS Patuxent River, MD.

>>Col Ramthun is a Marine Corps Aviation Acquisition Officer (MOS 8059) and serves as the Military Assistant to the Assistant Secretary of the Navy for Research, Development, and Acquisition at the Pentagon.

ment to enhanced capability planning strategies and governance models, empowering program managers (PM) via mandates and authorities to drive innovation in execution, and the application of advanced human talent management practices for optimizing acquisition workforce (MOS 8059/8061) accession and career development. Introducing these structural and cultural changes

today will enable our elite force to outpace adversaries already posturing for sixth-generation warfare.

Enhanced Capability Planning Strategies and Governance Models

The *NDS* provides strategic military intent and guidance to the Services. Revisions to the *NDS* often result in posture changes for the Marine Corps



Emergent technologies and complex peer threats require a revolution in Marine Corps acquisition affairs. (Photo provided by author.)

as our organization maneuvers to align with the new DOD approach to warfare. Recent examples of this type of change include revised Marine Corps Aviation Plans and the implementation of *Force Design 2030*-related initiatives. Though operating concepts, wargames, and experiments have transformed relatively quickly to support the *NDS*, Marine Corps fourth/fifth generation PPBE processes, acquisition approaches, and governance models have remained outdated, stale, and ineffective. In fact, the Marine Corps *Force Design 2030* process map (see Figure 1.) omits rows tying in requirements generation and acquisition execution to the other key delivery processes.⁴

The legacy-era siloed approach to PPBE and acquisition creates artificial barriers to the rapid development and production of capabilities. We can mitigate and eliminate these obstructions via alignment across the Marine Corps requirements, resourcing, and acquisition communities to employ a modern, sixth-generation approach. The Marine Corps must steer away from the limited-view five-year resourcing outlook dominated by the fiscal year defense plan. The goal of the present approach is to fulfill overly complex requirements with large, exquisite, gold-plated, and costly programs of record. These enormous and cumbersome programs require extended time to resource, deliver, modernize, and sustain, with little long-run consideration to gauge future usefulness and supportability.

A longer vision and more agile capability bundling approach are required to appropriately target investments early in science and technology development, create transition points, and procure more powerful capabilities to deal with increasingly challenging antagonists. As an alternative, the Marine Corps should transition to a fifteen-year or three-fiscal-year defense plan roadmap for requirements, resourcing, and acquisition planning. This new approach enables the Marine Corps to create portfolios with capabilities of record, grounded in simplicity and scalability. Rather than creating massive and unwieldy programs of record, the agile portfolios of capabilities will offer opportunities

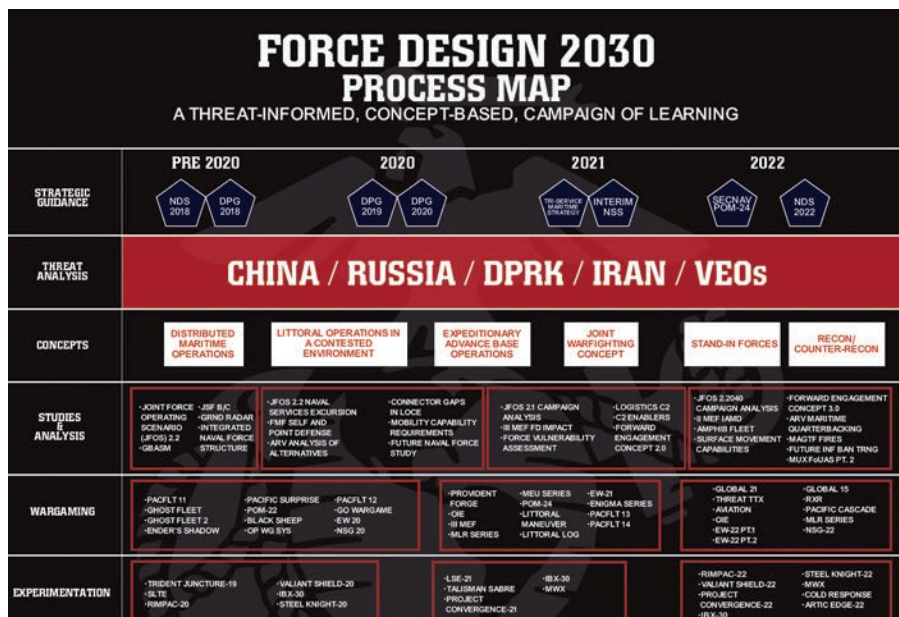


Figure 1. The Corps' Force Design 2030 Campaign of Learning requires linkages to requirements generation and acquisition. (Figure provided by author.)

for the Marine Corps to pivot faster along the fifteen-year roadmap in advance of threats through the internal reallocation of funding and priorities within each portfolio, resulting in rapid modernization of new and divestment of obsolete warfighter products.

To fully leverage this sixth-generation methodology to PPBE and acquisition, the Marine Corps must tightly align the requirements, resourcing, and acquisition communities to a new strategic capability governance model. At present, individual community stakeholders conduct planning for their particular portion of the PPBE and acquisition processes in a federated manner. Gone should be the days where each community annually plans in vacuums and later chucks the results over the fence at other stakeholders in courtroom-style meetings to direct acquisition execution. Rather, community stakeholders must conduct detailed and integrated planning continuously along the three fiscal year defense plan roadmap to deliver the capability of record solutions. Under a new governance model, senior executive stakeholders will guide the combined community planning and execution process like a Fortune 500 company's board of governors. This board room-style approach mitigates

silos, stovepipes, and individual agenda-driven friction plaguing the present paradigm. This new model is already used successfully in various parts of the DOD today, where executive steering groups guide strongly aligned warfighting requirements, resourcing, and acquisition in a coordinated manner. The new governance model will ensure PPBE and acquisition innovation survives and flourishes vice dies in individual compartments.

Empowering Program Managers

With Service-aligned, sixth-generation PPBE and acquisition approaches in place, the burden of executing the plans falls squarely on the shoulders of Marine Corps PMs. Like a quarterback in football, the PM represents the main effort in acquisition execution. Where quarterbacks lead players and manage in-game execution risk and opportunities on the football field, Marine Corps PMs lead the program office workforce and manage a year of execution cost, schedule, and performance risk and opportunities. The most successful football teams field experienced, skilled, and empowered quarterbacks to make good decisions while facing capable threats; these same attributes and capabilities are required for PMs to be successful in acquisition execution.

While Marine Corps PMs are generally both very experienced and highly skilled, they often are not empowered to take risks in execution and drive innovation within the acquisition system. The present civilian-employee acquisition workforce is dominated by the culture of process over product—a relic of the antiquated fourth-fifth-generation mindset for delivering capabilities, where both peer threats were slow and predictable, and acquisition process deviance was punished by executives with an iron fist. However, the sixth-generation conflict will feature peer threats that innovate much faster than our present acquisition system. The bureaucratic, process-first acquisition culture is not postured to out-develop and out-procure our adversaries.

Though constantly dealing with acquisition culture barriers, program managers are not interested in playing the role of “acquisition victim.” Rather, they seek to act as forces for change, driving out the overly comfortable fourth/fifth-generation mentality of the acquisition community and instilling a product-first, agile, sixth-generation culture. The pace of change can greatly increase with empowerment from executives. As the Packard Commission called for nearly 40 years ago:

We must give acquisition personnel more authority to do their jobs. We must make it possible for people to do the right thing the first time and allow them to use common sense. When this is done, layers of supervision can be eliminated, reporting can be minimized, and the DoD can get by with fewer people. Only then will productivity and quality become hallmarks of defense acquisition.⁵

Marine Corps and acquisition executives should empower PMs by demanding, mandating, and incentivizing the use of innovative methods (i.e., Middle Tier Acquisitions, Other Transaction Authorities, tailored Adaptive Acquisition Framework Pathways, etc.) in execution thus empowering PMs to conduct acquisitions—not unlike commercial industry, where the best practices of rapid experimentation, innovative development, and incremental fielding of game-changing capabilities

to outpace and outmaneuver marketplace competitors are expected and rewarded. Marine Corps PMs are capable of driving higher performance from the acquisition workforce; however, they need to be empowered to achieve this end state.

Optimized 8059/8061 Human Talent Management

The Marine Corps must move beyond the 1950s talent management approach presently applied to 8059/8061s, ensuring our best and brightest future PMs have both rich experience and elite skills to address sixth-generation warfighter needs.⁶ Though human talent management practices supporting the 8059/8061 cadre have experienced significant positive change over the last two years (i.e., optimizing structure, introducing command-equivalency selection boards, widening 8059 accession to unmanned aircraft systems operators, maintenance and logistics specialties, etc.), additional transformation is required to change culture, skills, and thinking for executing sixth-generation acquisition. The primary duties of PMs are to lead the program office workforce and manage cost, schedule, and performance risk. Mr. Jay Stefany, Acting Assistant Secretary of the Navy for Research, Development, and Acquisition, often says, “PMs are not required to be

the smartest person in the room; rather, they just need to be the smartest person in the room on their program!”⁷ The Marine Corps must recruit, develop, and retain exceptional people with the potential to become Acquisition Category I (ACAT I) O-6 Program Managers. However, in recent years, the Marine Corps has failed to yield enough talented acquisition colonels to meet Marine-specific PM structural requirements.

Would you want people lacking significant acquisition workforce experience and demonstrated performance managing program risk leading your Service’s most important program offices? No, and neither does Congress. Per statute, ACAT I PMs must have a documented minimum of eight years of acquisition workforce time (i.e., working in a program office or other acquisition non-program office role).⁸ Additionally, to be competitive for colonel PM selection, 8059/8061s must have accumulated years of fitness reports demonstrating superior management of cost, schedule, and performance risk while supporting Marine Corps acquisition programs. If you assume Marine PMs should be slated as junior time in grade O-6s, then they would need to be assessed a minimum of eight years prior to colonel promotion and be placed in important program office



The F-35 Lightning is the Marine Corps’ only fifth-generation aircraft. (Photo provided by author.)

billets as mid-level O-4s to accrue the requisite experience and demonstrate the high performance needed for O-6 acquisition command. Yet, the Marine Corps has failed to secure human talent at the year twelve-fourteen time-in-service milestone and place them in meaningful acquisition roles in preparation for the competitive selection of future PMs.

All is not lost. The Marine Corps can secure, retain, and bolster 8059/8061 human talent via a sixth-generation approach to acquisition manpower. First, we must create a highly predictive model leveraging officer personnel data for early identification of excellent accession candidates with appropriate career transition timing (targeting junior to mid-career O-4s, preferably department heads, complete to demonstrate operational forces credibility). Variables such as externally obtained advanced degrees, Naval Postgraduate School degrees, operational or developmental test background, previous program office experience, or industry or fellowship experience enable occupational field sponsors to harvest accessions from optimal populations, leading to high potential for O-6 PM selection. Second, we must annually optimize 8059/8061 structure, linking talented men and women to Service priorities and eliminating present manpower requirements failing to generate cost, schedule, and performance skills and experience for acquisition Marines. Acquisition structure must change at and support the pace of innovation. Finally, acquisition occupational field sponsors must develop and publish multiple acquisition career paths grounded in creating opportunities to meet and exceed ACAT I PM statutory qualification requirements. For example, creating multiple 8059/8061 MOS entry points based on manpower models and then follow on three-to-one tours: Three years of program office time as an integrated product team lead and deputy program manager; followed by a one-year career-enhancing B-billet in an acquisition role (i.e. industry and advanced laboratory fellowships, Eisenhower School, Assistant Secretary of the Navy for Research, Development,



The Amphibious Combat Vehicle has been developed using a streamlined acquisition process. (Photo provided by author.)

and Acquisition E-Ring staff tours, etc.) designed to innovate and transform their program management thinking. Assuming these talented acquisition professionals complete a minimum of two back-to-back, three-one tours (eight years of total acquisition time, with amazing B-Billet experiences), these Marines will exceed requirements for O-6 PM service and act as agents of sixth-generation acquisition thinking and execution in our most important program offices.

Conclusion

The Marine Corps is entering the era of sixth-generation warfare. We need a revolution in Marine Corps acquisition affairs to keep pace with adversaries and deliver warfighting capabilities beyond *Force Design 2030*. Employing an aligned sixth-generation methodology for capability acquisition enables the Marine Corps to take advantage of modern and innovative approaches during program execution. Empowering Marine PMs to apply innovative acquisition methods will enable our programs to meet aggressive cost, schedule, and performance requirements. Finally, applying sixth-generation techniques to 8059/8061 human talent accession and development will create a robust, healthy, and highly skilled community

of program management experts to lead and manage sixth-generation capabilities on behalf of the naval warfighter.

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Acquiring Competitive Advantage

What DOD should learn from corporate America

by Col Luke Watson & Col Thomas Dono

The peer-competitor environment may be new to the DOD, but it represents a normal reality for the commercial sector. As participants in the Secretary of Defense Executive Fellowship, the authors had the opportunity to work with industry executives and experience the ways in which eighteen premiere commercial organizations position themselves to remain ahead of the competition. Using observations gleaned from the corporate sector, this article offers a lens for the DOD to re-evaluate its processes and increase the potential for maintaining a competitive technological advantage; revamping the government-industry partnership is the best gambit for success.

Reevaluating the Process

Successful companies have strategies for identifying and developing the next big thing. Although we have seen many different forms, they have expressly appointed and resourced teams to accomplish this task. Making the parallel to the DOD process, most of us would point to the Joint Requirements Oversight Committee, which is fed by proposed capability requirements developed by the Joint Capabilities Integration and Development System. Proposed capability requirements are typically initiated by combatant commands, DOD Services, or technology developers such as Defense Advanced Research Projects Agency, National Laboratories, Service research laboratories, Rapid Capabilities Offices, and Strategic Capabilities Office. For this article, the authors will concede the competence of the current requirements process in addressing ca-

>Col Watson is the 1st MAW Assistant Chief of Staff for Aviation Logistics.

>>Col Dono is the Program Manager for Marine Corps Cyber Operations.

The article is based on their experiences and observations while participating in the Secretary of Defense Executive Fellowship Program and follow-on assignments at Headquarters Marine Corps and Marine Corps Systems Command, respectively.

capacity gaps (more of the same) and capability gaps that have known solutions. However, there is an opportunity for improvement in its ability to create competitive advantages through unknown solutions (new technology or innovative application) and to avoid competitive disadvantages of unknown gaps.

... revamping the government-industry partnership is the best gambit for success.

There are good reasons why the Joint Requirements Oversight Committee process and the Defense Acquisition System are deliberate with many layers of process, justification, and approval. This legacy, industrial, top-down model is very effective at justifying all expenses and maintaining small, consistent margins—and it proved effective during the grind of a Cold War arms race. However, we are in a different competitive environment now, defined by disruptive technology and asymmetric threats. The Revolutionary War hero John Paul Jones’ quote, “those who will not risk

cannot win,” is applicable here: the necessary paradigm shift will not occur without intentionally creating space to invest in high-risk/high-potential projects. Many of today’s most innovative companies, recognizing that the pursuit of efficiency could come at the cost of innovation, have intentionally bifurcated the two, creating separate innovation groups. The innovation group has different metrics that incentivize risk-taking and nurture far-fetched ideas that would otherwise be killed in infancy. In the DOD, maybe the innovation is being done by technology developers or commercially through Federal Research and Development contracts.

However, if the evaluators within the requirements and acquisitions process are still incentivized to choose known and reliable outcomes over those with the highest potential impact, we are still unlikely to steal a march on China. Several industry innovators we met admitted that they have learned, in bidding on government work, that an outside-of-the-box solution to the operational problem is frustratingly less competitive than the one that matches perfectly to all the detailed requirements put forth in a Request for Proposal (RFP). We should be concerned if even our research and development

(R&D) contracts tend to be applied to pre-determined outcomes or products instead of broad enough to capitalize on unanticipated developments or revolutionary approaches.

Another company we directly observed has infused risk-taking into the mainstream culture by setting it as a foundational expectation. Managers and employees routinely sat down to outline four tangible contributions (above and beyond maintaining the status quo) that they were going to accomplish—and at least one was expected to have no better than a 50 percent chance of success. These four contributions were the metrics by which they would be graded at the end of the year. While success in achieving these goals was rewarded, so was taking a calculated risk that could be learned from—even if unsuccessful. If we want an organization that innovates, we must reward those for taking risks, even when they fail. Furthermore, these conversations around *what risk to take* and *how to build on failure* are critical to training and empowering junior leaders to make bold decisions while building the trust necessary for leaders to delegate responsibility to lower levels. This highlights the fact that innovation is not only taking a risk but learning to take the right risks and to do so quickly and decisively. This corporate example stands in stark contrast to a bureaucracy that mitigates risk by pulling decisions up to higher levels, thereby sacrificing the decentralized execution that could generate momentum. If we are to field disruptive technology ahead of our rivals, we must either adapt our core process or create a parallel process that is more comfortable with risk.

Reconsider Our Potential

In addition to recalibrating our process, we should also evaluate whether we have the right set of skills to uncover unknown solutions and defend unknown gaps. To find these competitive mismatches, the DOD does need some who understand current operations and capabilities. This is a plentiful resource, but innovation will require these operational practitioners to intersect with three less available sets of information.

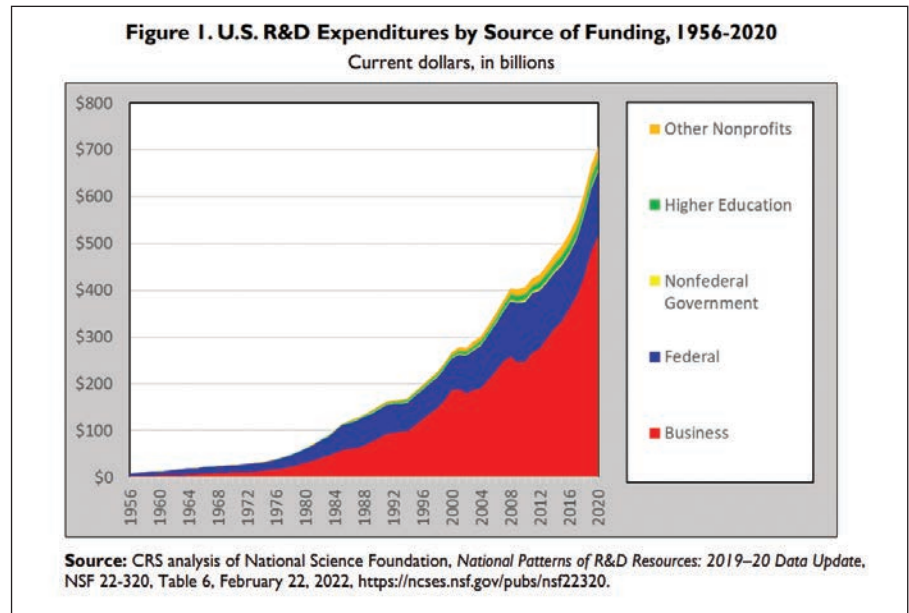


Figure 1. (Figure provided by author.)

First, scientific expertise to know what is possible (now and with continued development). Second, futurists who can visualize and articulate the competitive strategies and mismatches that new technology will bring. Third, practical insight into what industry has in work but has not been revealed. The DOD does not need to have all these skills on retainer. Creating collaborative forums with a breadth of perspective is essential to form analogous bridges where two or more disparate things or ideas are associated in a new way or for a new purpose. We scoff at solutions looking for a problem, but sometimes that is exactly how innovation happens. Our technology developers arguably have most of these skills, but is there a place in the Joint Capabilities Integration and Development Systems process where they review all proposals to find connections across disciplines, identify where existing development is already in work, or make suggestions that reveal an unanticipated way to solve a problem? Industry also has most of these skills; where do we give industry input? Until the DOD effectively answers these questions to expand its talent pool, innovation will be bounded by what we already know and understand.

Even with significant changes in our process and broadening our access to

certain skills, we should also consider the DOD's potential or capacity to find, develop, and field innovative solutions. Sixty years ago, the U.S. Government, and primarily the DOD, was the largest investor in R&D, accounting for almost 70 percent of all R&D funding in the United States (see Figure 1).¹ This meant that industry, academia, and science were all attuned to DOD-DOD applications. DOD investment was a magnet for the best talent, ideas, and concentrated work. Since that time, government investment in R&D has grown some, but by 1980, less than 50 percent of R&D funding was coming from the federal government. That also marked the start of a 40-year period where commercial investment in R&D increased by tenfold.² In short, the DOD is no longer at the top of the innovation food chain. Therefore, we should expect that most of the disruptive technology developed and fielded in the next decades will originate outside of the DOD's influence.

Our technology developers are currently our best source of intelligence on these game-changing capabilities and how the DOD could leverage them, but they have limited capacity to keep abreast of the exponential growth of commercial innovation. Realistically, even in terms of what the technology

developers are directly working on, it is no longer certain that DOD's investment will result in the best or most revolutionary product. Historically, having the biggest R&D budget drew out the best solutions, but today, the competitive field that responds to the RFP is not necessarily representative of the best that industry has to offer. We found many companies who had made strategic decisions to focus elsewhere; they have larger markets and bigger-budget customers without all the hassles and hurdles that come with a government contract. Many smaller companies, arguably more innovative by nature, do not have the infrastructure or patience to respond to an RFP. Without R&D superiority, we must ask ourselves how often our current approach of prescriptive requirements and transactional, lowest-price-technical-acceptable type contracting will put us in positions of comparative technological advantages.

Collaboration is the Solution

A sober evaluation of the potential of our current process to produce revolutionary capabilities or competitive advantage should prompt several changes. The key ingredient to improved processes and increased potential is an increased collaboration with the American commercial sector. This begins by embracing a paradigm shift from being the source of innovation (inventors) to being early adopters and the fastest systems integrators. In the 1950s, when the pace of innovation was slower and the Federal Budget was driving the Nation's R&D agenda, the DOD strategy was to invent the game-changing military application and to limit its availability for as long as possible, getting the next-generation innovation in place by the time the competition caught up. This is no longer a viable strategy. The pace of technological advancement is too fast, the longevity of exclusive possession of technology is too short, and DOD contract work is no longer the origin of most technological breakthroughs. Instead of dumping resources into countering these realities, let's leverage them! If we let the commercial sector do the inventing and shift our resources to becoming the best at find-

ing emerging technology and integrating it into our concepts of operation, we can gain a competitive advantage. We do not need to have exclusive control over a new technology; rather, we can win by becoming early adopters, doing the systems integration faster than our competitors, and staying ahead of their ability to observe-orient-decide-act (see John Boyd's OODA loop).

Second, we must be much more strategic about how we use and invest our limited R&D dollars. Specifically, we should be working toward getting the maximum benefit from the R&D

faster and could shift our resources to work on systems integration.

Third, to field cutting-edge technology, the DOD needs to develop an alternative to the traditional, transactional acquisition process, which is oriented on purchasing principal end items and is limited to whatever technology level exists at the time of proposal. If these products are using cutting-edge technology, they are almost always several generations behind by the time they are delivered. An alternative is to purchase a service where the contractor retains ownership of the problem. In this case,

The key ingredient to improved processes and increased potential is an increased collaboration with the American commercial sector.

dollars that industry is already investing in. The shortest way around the OODA loop would be to leverage existing products or technology. One chief technology officer, aware of DOD's limited budget, lamented the RFP he was reviewing, noting that the requirements documents had such specificity that they would drive a bespoke design (with corresponding high cost and long lead time) when essentially the same thing was available off-the-shelf. Sadly, there was no forum to convey this information without legal implications or a bid that did not meet specifications. Another sadly typical scenario is that users see a particular product and build out a requirements document (such as an urgent needs statement) the best they can to reflect that specific product that they believe they want. They may do a great job of describing it exactly, but in doing so, miss out on what the rest of the market (or potentially even that vendor) has to offer to address the core problem. Imagine, instead, a conversation between end users and industry where the user described the problem they had, and industry helped us understand the range of options that are available on the market today or very mature within their R&D pipeline. We would field the best solutions available much

they are motivated (either contractually or brand management-wise) to continue to develop and field technology upgrades and to do so in a way that is system integrated. Another alternative is to embrace a "lease" model where the best off-the-shelf offering at the moment is fielded, then routinely replaced with either the newest model or a step upgrade before incurring a lot of sustainment cost. This approach keeps the risk of technological development on the contractor and helps to avoid the challenge of divesting from obsolete equipment. There is an impression within government acquisitions that industry would be unwilling to participate, or that such incentive-based contracts would be cost-prohibitive. In talking strategy with corporate executives, business development types, and technology leaders, this is not the case. In fact, this is exactly the model that most leading software companies are pursuing: subscriptions that entitle users to the latest technology complete with periodic, fully integrated, upgrades. They also talk about an eagerness to compete for the next "lease" by having the freedom to "over-perform" during the current contract period. Furthermore, when the DOD is open to an off-the-shelf product, the cost to bid is significantly lower

for the company, and maintaining control of their intellectual property means government work can open up other markets. Different kinds of contractual relationships with industry are available and have much greater potential to help DOD maintain a technological edge.

Conclusion

The DOD can maintain a technological advantage over peer competitors, such as China, by adapting its processes and collaborating more with U.S. industry. Sure, the rate of China’s technological development is concerning. Yes, China is continuing to make huge R&D investments into military projects through direct military spending and by blurring the line between government and commercial projects. And yes, U.S. Federal R&D funding has not grown in the last decade. However, the good news is that American companies have invested in

R&D at a rate of four to one over that same period, and American ingenuity is alive and well. All the resources needed to develop disruptive technology or new applications of existing

A competitive technological environment is nothing new for American companies ...

technology for competitive advantage are available; they are just allocated differently than they were when we were fighting proxy wars with China in Korea or Vietnam. A competitive technological environment is nothing new for American companies; the question remains whether DOD will learn

from them and adapt its own processes to benefit from their innovation.

Notes

1. Congressional Research Service, “U.S. Research and Development Funding and Performance: Fact Sheet Updated September 13, 2022,” *Congressional Research Service*, September 13, 2022, <https://crsreports.congress.gov/product/pdf/R/R44307>.
2. Ibid.



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Let's Talk Weapon System Supply Chain Risk Strategy

Logistics as the pacing function requires a Service supply chain risk management strategy

by Maj Julie Aho & Mr. Michael Cirillo

Protecting the defense industrial base's ability to produce secure, capable warfighting capabilities for the Marine Corps is a shared responsibility. Supply Chain Risk Management (SCRM) is a critical force protection requirement not currently owned by any single deputy commandant or commander. Marine Corps weapons systems depend on low-end manufactured components that directly affect the security of our high-end weapon systems and information technology (i.e., hardware, software, and services) on which they rely. The Marine Corps depends on military-unique parts manufactured in a global economy, where the risk of counterfeit, illicit, and fraudulent parts is increasing. Without our knowledge, poorly made microelectronics, potentially exposed to manufacturing conditions vulnerable to malicious intent, can be manufactured into our weapon systems, introducing risk. The Marine Corps lacks the requisite expertise to effectively develop, design, code, test, operate, support, and defend the hardware and software in our weapons systems, which is a major gap in our acquisition process. To help leadership understand the importance of establishing a single SCRM program across the Marine Corps, this article justifies the rationale and describes SCRM best practices.

Protecting the Marine Corps' industrial base of suppliers requires a single point of accountability. While many claim interest, responsibility, or owner-

>Maj Aho works with Supply Chain Network Optimization, Headquarters Marine Corps Installations and Logistics.

>>Mr. Cirillo is the Strategic IT Initiatives Lead, Deputy to the Commander for Systems Engineering & Acquisition Logistics/Office of the Chief Engineer Marine Corps Systems Command.

ship of a component of SCRM, the Marine Corps lacks enterprise acquisition and sustainment oversight. There is no forcing function, acquisition-specific process, or policy to assist in identifying, avoiding, mitigating, or reducing supply-chain risks.

Protecting the Marine Corps' industrial base of suppliers requires a single point of accountability.

Since the 2021 release of Executive Order 14017 on Securing America's Supply Chains, DOD components and agencies have stood up and are taking proactive actions across critical material sectors of defense. In 2022, DOD initiated the development of SCRM policy and guidance to include a common framework and taxonomy, including definitions and a list of 12 risk categories and 124 sub-categories.

In November 2022, the Office of the Deputy Assistant Secretary of Defense for Logistics published a record of initial discussions among DOD, industry, and academia, which included three definitions of SCRM. Later in 2023, the Deputy Secretary of Defense, via the Office of Industrial Base Policy, will be releasing a data call to all Services to collect data on all prime contractors and first- and second-tier suppliers for specific weapon systems to guide acquisition and sustainment strategies, policies, and risk mitigation.

A recently published document signed by the Commandant of the Marine Corps that specifies lines of effort across Installations and Logistics priorities through 2030 fails to account for SCRM actions across the Service. This is likely attributed to the fact that not many leaders are familiar with or bear responsibility for SCRM. Under the direction of the Deputy Assistant Secretary of Defense for Logistics, the DOD has proposed the following definitions to inform DOD SCRM Policy.

- *Supply Chain Resilience.* The capability of supply chains to respond quickly to unexpected events, adapt to

changes, and ensure continuity of operations after a disruption. Resilience is the outcome of proactive Supply Chain Risk Management and supply chain security.

- *Supply Chain Risk Management.* A process of proactively identifying supply chain vulnerabilities to potential disruptions and implementing mitigation strategies and actions to ensure the security, integrity, and uninterrupted flow of products as risks are found, or disruptions occur.

- *Supply Chain Security.* The application of policies, procedures, processes, and technologies to ensure the security, integrity, and uninterrupted flow of products while moving through the supply chain. Examples include the ability to protect supply chains from cyber infiltrations and the introduction of counterfeit material.

No formal SCRM program exists in the Marine Corps, as evidenced by our lack of a data repository of all our suppliers and their global sub-contractor base. Analysts cannot quickly quantify risk when foreign ownership, control, or influence is detected in our programs and systems. The Deputy Commandant for Plans, Policies, and Operations currently oversees the Marine Corps program related to the Committee on Foreign Investment in the United States. Today, the Marine Corps is highly dependent on the work of other Services to detect Committee on Foreign Investment in the United States cases that put our programs at risk. One such risk area resides in the defense sector known as the Information and Communications Technology (ICT) industrial base. An ICT product is defined as a commercial end-item that stores, retrieves, manipulates, transmits, or receives information electronically in an analog or digital form. ICT products exist in every acquisition item that contains a microchip. The numbers and types of devices requiring a microchip for a digital network are increasing at an incredible rate—thus, our risk exposure is increasing with force modernization.

Consider the following vignette. The deployment of a newly formed Marine Littoral Regiment depends on the prime vendor of a new acquisition

program delivering on time and in full. A major hurricane is approaching an area that manufactures parts of a sub-assembly. The prime vendor notifies the Marine Corps of the expected disruption to assembly and delivery. Because the Marine Corps has proactively stood up and funded an SCRM program, a

plier intelligence harnessed from public domain sources. These technologies use AI to collect information on the most likely suppliers of a weapons system. AI analyzes billions of records and has the power to scan the web for part-level and site-level insights. AI mapping also provides the benefit of being able

Today, the Marine Corps is highly dependent on the work of other Services to detect Committee on Foreign Investment in the United States cases that put our programs at risk.

smart civilian analyst begins running the SCRM model and playbook for the Advanced Reconnaissance Vehicle. Because the Marine Corps prioritizes data initiatives that inform decision making, the analyst is quickly able to perform supply chain impact analysis with optimization/simulation of the prime vendor's multi-tier manufacturing supply chain of the components at risk, thanks to our Service's SCRM policy that requires Program Managers to develop SCRM playbooks in partnership with the vendors and obtain data rights to suppliers. The analyst determines that the hurricane will cost the Marine Corps \$400,000 more to have the prime vendor switch to an alternate supplier. The commander of MARCORSSYSCOM receives the analysis, which was completed in a matter of hours, and assesses the \$400,000 cost to switch suppliers as a worthy course of action to avoid a four-month delay in the fielding of the Advanced Reconnaissance Vehicle.

There are three industry-proven digital SCRM concepts applicable to the Marine Corps. They include:

- Artificial Intelligence (AI) mapping of the supplier base.
- Validated multi-tier supply chain mapping of the supplier base.
- Model-based risk profiling by location/node of internal supply chains.

The first best practice of SCRM is AI (or autonomous) mapping of the supplier base. Commercially available AI mapping encompasses years of sup-

plier intelligence harnessed from public domain sources. These technologies use AI to collect information on the most likely suppliers of a weapons system. AI analyzes billions of records and has the power to scan the web for part-level and site-level insights. AI mapping also provides the benefit of being able to automate product teardowns to get the most accurate parts and suppliers used three tiers deep in the supply chain. Industry has already mastered the analytic techniques to find such data, clean, de-duplicate, and normalize noisy data to create usable insights. While AI mapping of our suppliers is a great way to rapidly gain insights and visibility into the supply chains of our weapons systems, it also comes with a surplus of irrelevant data that is not verified. Therefore, it should not be thought of as a single-source solution to SCRM but as an insightful tool in the toolbox. Under the Office of the Under Secretary of Defense for Acquisitions and Sustainment initiative, a software-as-a-service provider is providing illuminations across weapons-system-supplier bases to provide AI mapping to MARCORSSYSCOM and other DOD Program Managers. The illuminations have provided invaluable information that includes:

- Identify foreign ownership, control, and influence.
- Quantify environmental, social, and government risks.
- Report reputational, criminal, and regulatory risks.
- Monitor financial health.
- Evaluate cyber risk.
- Quantify operational risk.

Another SCRM best practice is multi-tier supply chain mapping of the supplier base. This approach requires validating suppliers at different levels (or tiers) throughout the supply chain.

Unlike AI mapping, multi-tier mapping involves supplier-validated data—providing a more accurate picture of the supplier base. Multi-tier mapping seeks to improve the reliability of deeper-tier supplier data. Under a well-developed SCRM program, the Marine Corps would be able to align suppliers identified through multi-tier mapping with our internal digital supply chain models to quickly analyze data to determine alternate sources of supply for deployed naval expeditionary forces. Below is a graphic of what multi-tier supply chain mapping looks like.

Visibility is key to supply chain resiliency. Achieving visibility is time-consuming. Does MARCORSSYSCOM have the time to reach out to each supplier across joint programs and maintain updated data? Because this task is so daunting, SCRM programs across the DOD have been quick to rule out multi-tier supply chain mapping and opted for AI mapping instead. AI mapping is a good first step, but the goal should be to achieve multi-tier supply chain mapping of the supplier base. Industry is paving the way in developing best practices to digitally map their supply chains, and many of these commercial software vendors are ready to do business with the DOD.

The third best practice of SCRM is model-based risk profiling by location/node of the internal supply chain. This approach uses a deliberate approach through supply chain design concepts to measure and quantify supply chain risk. *Force Design 2030* calls upon the Service to ensure the sustainment of distributed forces in a contested environment. While everyone has been talking about modeling and simulation for contested logistics, few understand the purpose. The ultimate goal and purpose of digitally modeling and simulating contested logistics are to define, measure, analyze, improve, and control the continuity of the supply chain such that sustainment objectives are not inhibited. Once contested logistics scenarios (e.g., loss of a port, loss of a supply node, or loss of transport) are quantified in terms of risk, the information can be used to prioritize real-world risk mitigation actions to



Figure 1. Six dimensions of supply chain supplier risk. (Source: Exiger, Supply Chain Management Products, GSA Contract for U.S. Government.)

The ... purpose of digitally modeling and simulating contested logistics are to ... control the continuity of the supply chain such that sustainment objectives are not inhibited.

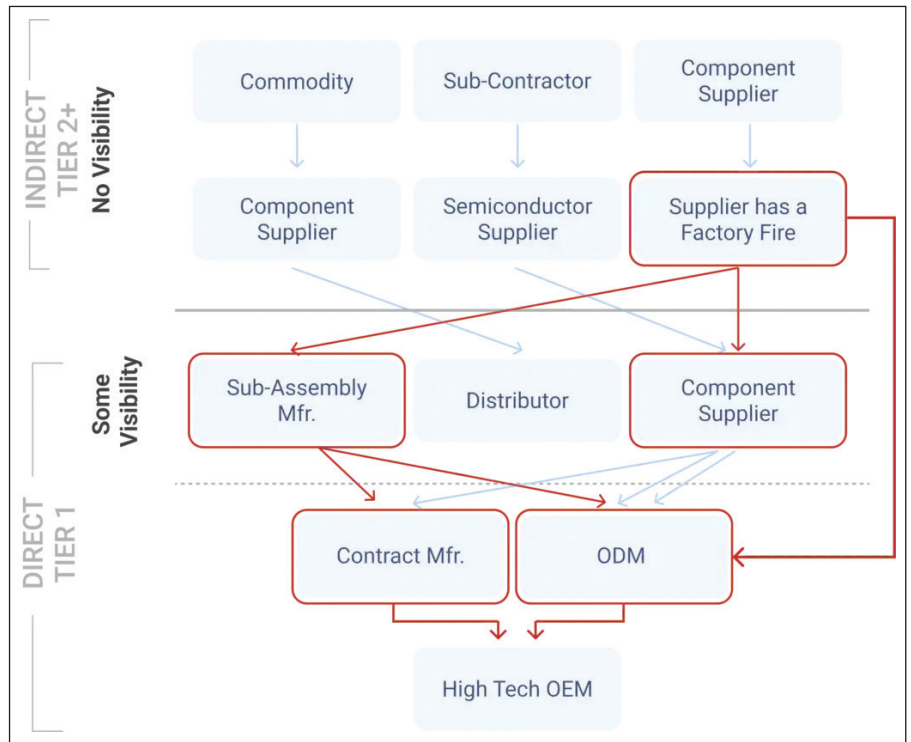


Figure 2. Multi-tier supply chain mapping. (Source: Resilinc, "Multi-Tier Mapping vs. AI Mapping: What's the Difference?")



Figure 3. Measuring risk to build a resilient supply chain. Identifying risky aspects of the Marine Corps supply chain network, understanding potential contested logistics scenarios (disruptions), and using the design process to mitigate and reduce risk is an essential part of creating a resilient supply chain. (Source: Optilogic, *Take a Proactive Approach to Risk Identification and Mitigation.*)

minimize the impact of disruptions. Instead of spinning our wheels, bleeding money, and trying to develop our own proprietary predictive analytics software for logistics, the supply chain software market is a multi-billion-dollar industry that has reinvented this problem based on lessons learned during unprecedented times of demand and supply variability.

Today, supply chain vulnerabilities across Marine Corps ground weapon systems go unnoticed because it is often unclear who is in charge of managing risk when it comes to relationships with suppliers and third-party vendors. Even if it is known that a supplier may have vulnerabilities, a problem may never be addressed as there is no designated person or team with the responsibility to manage a vendor. This problem is not unique to the DOD. Even the largest corporations have minimal teams for SCRM. However, industry is much better resourced to manage the challenges presented by supply chain failures, while the Marine Corps is not so adept at doing so and does not operate agilely. Relying on program managers to develop, implement, and manage SCRM from the ground level up is sub-optimal. Partnering with our original equipment manufacturers for data rights and supplier information is essential. The Marine Corps must



Figure 4. Foreign ownership, control or influence (FOCI) indicator chart. The National Counterintelligence Strategy states that China is increasingly asserting itself by stealing our technology and intellectual property in an effort to erode U.S. economic and military superiority and that Russia remains a significant intelligence threat to U.S. interests. (Figure provided by author.)

develop and adopt a Service SCRM strategy to manage supply chain risks. Delegating SCRM to tactical or regional commanders does not enable us to take advantage of economies of scale. Logistics modernization is progressing slowly because unilateral and uncoordinated actions across commands remain largely unknown to others. It would be difficult to ensure SCRM is adhered to if not managed through a Service strategy and centrally funded.

SCRM is a critical force protection requirement that requires attention, prioritization, and resourcing. SCRM is a large problem set that spans all Services and agencies within the federal government, intertwined between departments and the defense industrial base. Given its relevance to achieving global logistics awareness, SCRM funding ideally belongs in the Deputy Commandant for Installations and Logistics' portfolio. The Assistant Secretary of the Navy for Research, Development, and Acquisition is appointed to the Office of Primary Responsibility for four major lines of effort to align the Navy with DOD SCRM initiatives. Given the current DOD emphasis on SCRM across material sectors critical to national defense, particularly ICT products, MARCORSYSCOM (the acquisition authority for Marine Corps for ground weapon systems and information technology) is well positioned to lead SCRM. CMC/ACMC should appoint and effectively resource MARCORSYSCOM to stand up and lead a Marine Corps SCRM Program. MARCORSYSCOM, as Office of Primary Responsibility, would lead the development of an SCRM framework on behalf of DC I&L, aligned to the Navy for Research, Development, and Acquisition's efforts underway.

In summary, protecting the defense industrial base's ability to produce secure, capable warfighting capabilities for the Marine Corps is a shared responsibility. We need a single office or individual accountable for SCRM, to define the roles and responsibilities, and effectively resource goals and objectives. Until such a time when an SCRM strategy manifests, the Marine Corps will remain amateur at best when it comes to SCRM execution. Competing interests no doubt influence near and long-term objectives, but *Force Design 2030* must include a concerted approach to protect our supply chains.



Reliability

A critical imperative

by Col Tim Hough

Force Design establishes smaller, more flexible, and dynamic forces to operate in disparate and austere environments across a vast ocean to influence and/or interdict our adversary's actions. While employing smaller dislocated forces is necessary to provide the best chance to win the reconnaissance/counter-reconnaissance fight, this modernization and shift in our warfighting concepts will introduce increased distance from higher echelon headquarters and present challenges for our logistics planners. Reliance on naval supply systems afloat in support of expeditionary advanced base operations (EABO) will be limited to the constraints of cube and weight on naval shipping. Additionally, the need to limit movement in and around EABO to mask location and limit signature will create distance and time to resupply forces deployed to islands throughout the Indo-Pacific Command area of operations. As a result, the need for high reliability amongst fielded systems will be critical to ensure reduced movement in the anticipated operating environment (OE). This article will attempt to highlight what reliability is, why it is increasingly critical as a metric to support Force Design, and finally, provide recommendations on how to improve this necessary requirement during the development of systems. Force Design focuses on modernization to maintain parity with our pacing threat across a vast operating area that introduces challenges to sustainment. High reliability in our fielded systems is one of the means to meet this desired end state. To truly understand why reliability is critical, an understanding of what constitutes reliability must be understood.

Early in the acquisition process, resource sponsors are tasked with de-

>Col Hough is an 8061, Ground Acquisition Officer, and the Program Manager for Program Manager, Advanced Amphibious Assault.

veloping the requirements that will underpin how a system can and will be used. Stable requirements defined early in a program can determine the success or failure of a platform over its lifecycle. One critical aspect of developing requirements for a new platform is defining how well a system should operate to provide a cost-effective platform that can execute its intended mission. This is the foundation of reliability. Reliability is defined as “the probability of an item to perform a required function under stated conditions for a specified period of time.”¹ While there are many

parameters or functions of reliability, two important sub-calculations are the mean time between maintenance, defined as, “A basic measure of reliability for repairable fielded systems. The average time between all system maintenance actions. Maintenance actions may be for repair or preventive purposes.”² Another way to view mean time between maintenance is how much time will elapse before a Marine must fix the same part again. This will drive how long a system will be able to contribute to combat power before it must be fixed. The second parameter is the mean time between operational mission failure, which is defined as, “A measure of operational mission reliability for the system. The average time between operational mission failures which cause a loss of the system's ‘mission’ as defined by the customer.”³ Or in simple terms, how much combat power can make it



Identifying reliability requirements early in acquisition is vital to a sustainable program. Marines with 3d Assault Amphibian Battalion, 1st MarDiv reinforce water integrity testing procedures. (Photo by Cpl Alexandra Munoz.)

to the objective during any given mission. These two calculations undergird the foundation of reliability and can significantly impact the myriad design, development, production, and sustainment factors in the system's lifecycle as well as how much money it will require the Marine Corps to dedicate toward maintaining the platform over its lifecycle.

Poor reliability on a platform manifests itself negatively in various ways. Two observable areas that have tangible impacts on the Service and the execution of missions are observed in the increased total ownership costs for the platform, and reduced combat power at the edge that is vulnerable to detection, respectively. During the 2021 budget year, the DOD spent nearly \$718 billion to support national defense, of which 40 percent, or \$286 billion, was spent on operations and maintenance.⁴ For Fiscal Year 2023, the Marine Corps requested approximately \$12 billion for procurement and \$16 billion for operations and maintenance. Fielded systems with poor reliability will compete with other priority needs within the Marine Corps' already limited budget, thereby reducing its buying power to fully maximize envisioned Force Design aims due to the need to continually procure spare parts to stem the bleeding of poor readiness. Unfortunately, while viable in the short term, this approach is fiscally unsustainable to units and the Marine Corps in the long term. The preponderance of a platform's cost is in the operational support or sustainment of that platform, requiring constant fiscal investment by the Marine Corps for the length of the program's life. The longer the program is planned to be fielded, the more costs will be incurred, which is compounded by the need to continuously buy necessary parts to keep a system running. A quick example of how quickly poor reliability can add up: if the Marine Corps fielded 500 combat platforms that required replacing a \$1,000 part every four months over a 30-year system lifecycle, it would spend \$45 million on just that part alone to maintain combat readiness—assuming that part deadlined the system.

Force Design is built on the ability of forces to execute operations over a vast weapon engagement zone supported and integrated with naval forces. Given the expansive environment in which Marines will be operating as “mobile, persistent, low-signature, and economical Stand-In Forces that are integrated with naval operations,”⁵ platforms with low reliability will present a challenge with maintaining operational ambiguity to our adversary in lieu of the need to resupply via any number of connectors necessary to provide critical Class IX repair parts. Due to the limited number of surface sorties that would be available based on both limited cube of connectors and to limit movement of forces in and around the first island chain, planners will have to prioritize classes of supply for the unit occupying an expeditionary advanced base. The increased demand for spare parts to support poor-performing capabilities will restrain the FMF's ability to “maintain deception as a complement to maneuver to enhance survivability”⁶ and the amount of combat power a unit can maintain when it is critically needed. As a result, units will be forced to cannibalize parts from deadlined vehicles to maintain those that can be kept operationally relevant. According to a 2020 Government Accountability Office report on reliability, this was the very same course of action executed by maintainers on the MV-22 during Operation IRAQI FREEDOM due to poor initial reliability on the platform.⁷

Although the introduction of new platforms often is accompanied by poor reliability during its transition from its legacy relative, it does not have to be this way. There are two options for capturing high reliability before the Government awards a contract and loses leverage with industry. While these courses of action could help, it must be noted that nothing is a silver bullet in the complex world of acquisitions. Each decision must constantly be weighed against the priorities of the Service and impacts to cost and schedule. During the arc of a program's life, there are a few moments that can shape the system's reliability. Should these critical opportunities be missed, it is often difficult (depending

on the size and complexity of the system) to capture any relevant reliability in a system without extraordinary effort and money to correct any deficiencies. The first opportunity begins during a program's requirements generation or development period. This embryonic stage for a program is critical as it sets the stage for the remainder of the program. Most often, DOD programs base “requirements for weapon systems in product development almost exclusively on technical performance, with little attention to operating and support costs and readiness at the beginning of development when there is the greatest chance of affecting those costs positively.”⁸ While there is a mandatory sustainment key performance parameter, the Marine Corps should go a step further and consider adopting practices observed in the commercial market. The commercial market

considers operating and support costs to be integral to their new product development decisions. Studies have shown that by the time a product is ready for development, over 90 percent of the operating and support costs have been determined. As a result, these companies required their equipment be easy to maintain, ready when needed, and reliable at a low cost. These requirements were of equal importance to other performance characteristics.⁹

Specifically, the Service should equally weigh reliability alongside the technical performance of a platform by making reliability a key performance parameter, vice just sustainment. While this may drive increased costs during the engineering and manufacturing development phase of the program, a case could be made this upfront investment could save more critical fiscal resources over the lifecycle of the program.

A second opportunity to capture improved reliability is during source selection to award a contract. This is the last real moment where the Government has an opportunity to drive toward improved performance without having to negotiate with industry following the award of the contract. During source selection, a body of experts from the program office will evaluate each of



Reliability enables deployment and employment of equipment in multiple environments. A U.S. airman guides an amphibious combat vehicle aboard a C-17 during a strategic mobility exercise. (Photo by Sgt Matthew Kirk.)

the companies' proposals to award a contract. As part of this evaluation, the source selection team will use the requirements developed for the capability to evaluate how well each system performed. The use of requirements during source selection is not new. Most programs weigh each system's ability to meet the requirement as a factor when considering which vendor to award a contract to, but as observed in requirements generation, typically, requirements tied to performance take top billing. This article proposes using reliability as a basis to be considered for evaluation, thus shifting the burden onto industry to meet the standard. If the vendor does not meet the established threshold prior to the evaluation, they can be disqualified from the source selection and, ultimately, a chance at winning the contract. Risks inherent to this approach include none of the offerors being able to meet the requirement, thereby negatively impacting the schedule and experiencing significant sunk costs. Depending on the complexity of the system or the maturity of the technology, this risk must be considered. But if you have a mature platform with mature technology, a sound business case could be made to use reliability as a metric to enter source

selection to lower overall costs for the life of the program. Post contract award, when leverage shifts to the contractor via a sole source contract environment, a performance-based logistics contract can be awarded to establish contractor maintenance and reliability standards. This approach will create time until the Marine Corps has all critical elements in place to ensure a smooth transition from a legacy platform to the new capability supported by organic maintenance while maintaining relevant readiness. While this can be costly, maintaining relevant readiness to ensure the building of proficiency and maintaining combat power to support the Marine Corps' operations can be achieved.

Force Design is rapidly pushing the Marine Corps to rethink how it envisions the future to meet the rise of our pacing threat. This acceleration is acutely focused on the modernization of the enterprise's equipment to meet the challenge of advances in technology by China in the Indo-Pacific Command area of operations. While the Marine Corps has always maintained a keen ability to innovate, it must not overlook how critical the reliability of our systems will be toward supporting its future concepts. Reliability standards with necessary weighting developed

early on in a program will set the path the program and the Marine Corps will walk in terms of financial and readiness costs. While many of the systems fielded will be critical to Force Design, there are many in their infancy. During this juvenile stage, novel approaches with contracting to capture higher rates of operational execution must be considered against schedule and cost. Ignoring the need for higher reliability will jeopardize Marines, making it a critical imperative.

Notes

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Advanced Manufacturing

Uses and challenges in the Acquisition Cycle

by Maj Matthew Audette, Mr. Robert Davies, Dr. Kristin Holzworth,
Mr. Doug McCue, Mr. Juan Saucedo & Mr. Mike Miller

The Marine Corps’ advanced manufacturing programs of record are focused on enabling advanced manufacturing (AM) at the lowest tactical levels. The use cases and end states were previously discussed in the March 2022 *Gazette* article, “Additive Manufacturing: Fix them where they fight,” by Maj DeLeal. This article can be considered a successor that focuses on the adoption of advanced manufacturing into the acquisition process to create more sustainable equipment for our Marines.

Advanced manufacturing does not have one set definition across industry, academia, or even the DOD. The Marine Corps uses AM as an umbrella term covering both additive and subtractive manufacturing methods.

The Advanced Manufacturing Systems (AMS) Team has three programs of record that will place advanced manufacturing capabilities at all Marine Corps ground units. The Shop Equipment Machine Shop is our expeditionary subtractive manufacturing capability and is currently in sustainment. Two active programs are fielding additive manufacturing capabilities. The Expeditionary Fabrication system is initially operationally capable with four assets fielded and another seventeen scheduled in the next four years. This program is aimed at intermediate-level maintenance units and is designed to be used by 2161 machinists. The system consists of a 20’ expanding ISO container containing five 3D printers, a laser cutter, a high-end scanner, and the computers and software suites to support operations. The first technical refresh for the Expeditionary Fabrication is scheduled for fiscal year (FY) 25,

>Maj Audette is a 1302 at Marine Corps Systems Command. He is the Team Lead for the Advanced Manufacturing Systems Team.

>>Mr. Davies is the Fabrication Equipment Project Officer for the Advanced Manufacturing Systems Team who is responsible for the team’s programs of record.

>>>Dr. Holzworth is the Chief Scientist for the Advanced Manufacturing Operations Cell that supports the Advanced Manufacturing Systems Team’s digital repository and prototype efforts.

>>>>Mr. McCue is an Additive Manufacturing Analyst for the Advanced Manufacturing Operation Cell that supports the Advanced Manufacturing Systems Team’s Advanced Manufacturing Candidate Software and Cyber Security efforts.

>>>>Mr. Saucedo is a logistician for the Advanced Manufacturing Operation Cell that supports the Advanced Manufacturing Systems Team’s Defense Logistics Agency, cataloging, and supply chain efforts.

>>>>>Mr. Miller is an Additive Manufacturing Analyst for the Advanced Manufacturing Operation Cell that supports the Advanced Manufacturing Systems Team’s training and education efforts and construction scale additive manufacturing portfolio.

and AMS is on track to include an expeditionary metal printing capability. Beginning in the summer of FY23, we will start fielding the Tactical Fabrication Kit (TACFAB) to Marine Corps ground units. The TACFAB is an operational-level maintenance capability consisting of two commercial-off-the-shelf printers, a laptop, and software, all stored in man-portable pelican cases. The TACFAB is aimed not at one MOS community within the Marine Corps but all MOSs and units intending to allow AM “incidental operators” of any MOS the ability to affect readiness issues and solve problems at the tactical level. The fielding plan for the TACFAB has every ground unit not receiving an Expeditionary Fabrication receiving a TACFAB over the next three years.

Directly enabling these hardware programs is the digital thread. The key enabling technology of advanced manufacturing is the ability to locally access authoritative technical data. Without this foundation, the machine and the parts it produces are only as good as the local users. A digital thread will allow the Marine Corps to source designs from fleet Marines and vet them through program offices for approval. The Marine Corps’ current digital repository is web-based, Common Access Card-enabled, and built from commercial off-the-shelf software, giving us the growth space to achieve our end goals. It is constantly developing and adding new capabilities. The end state for this digital thread is a program of record style repository called the Digital Manufacturing Data Vault (DMDV).

This last year Marine Corps Systems Command wrapped an eighteen-month prototype effort for the DMDV to explore use cases and identify key capabilities such as offline access, interfacing with other Marine Corps logistics IT systems, and cybersecurity. We envision the final DMDV as creating a bridge between the engineer or program manager and fleet users, creating a feedback loop of concepts, design, and rework creating a better product that will affect readiness. The DMDV at the same time will facilitate intellectual property management within a cyber-secure environment and manage the royalty model for paying for parts. Together, this will ultimately create that Digital Class IX block.

These efforts within AMS reside at the long end of a data chain that originates at all other Marine Corps Systems Command and Program Executive Office Land Systems programs. The AMS team serves as a group of on-call subject-matter experts for programs to leverage. The team has been developing a toolbox with options for program offices to leverage to identify, collect, and manage data to sustain our equipment. Marine Corps programs of record are currently leveraging advanced manufacturing to address diminishing sources of supply, facilitating the design and rapid prototyping of new end items, and quick-turn solutions to readiness issues either through prototyping or as an end-item solution. These quick-win style uses of advanced manufacturing are reactive rather than proactive. While they assist in making our equipment more resilient, these use cases only represent the first steps in using advanced manufacturing within acquisitions.

Populating the digital repository with the technical data to feed our hardware programs of record is critical to allowing Marines in expeditionary environments the ability to fabricate repair parts. To date, most of the hundreds of items in the digital repository have landed there through a fleet Marine crowd-sourced approach of identifying and designing parts.

The first approach AMS facilitates is a Naval Advanced Manufacturing Part Identification Exercise. The



II MEF, 2nd MLG, and the Marine Innovation Unit host an advanced additive manufacturing course at Stewart Air National Guard Base, Newburgh, NY. (Photo by LCpl Sixto Castro.)

concept originated in the Naval Sea Systems Command AM team and has spread throughout the Department of the Navy. A Naval Advanced Manufacturing Part Identification Exercise consists of a sprint-style event in which a program office's engineers and logisticians, AM subject-matter experts, and, when possible, fleet users gather and conduct a walkaround of a piece of equipment. The users and program

Web Federal Logistics Information System—and output a list of most likely printable candidates on a scale of *technical* feasibility and *economic* feasibility. These tools allow for a highly targeted approach for program offices to leverage AM by focusing efforts on the most fabricable parts or those with the highest returns on investment. These decision tools can help identify AM use cases based on both Marine Corps organic

The team has been developing a toolbox with options for program offices to leverage to identify, collect, and manage data to sustain our equipment.

office identify problem areas and pain points. At the same time, the AM SMEs offer feasibility assessments and then begin developing the technical data for fabricating and subsequently approving for use of AM parts. This brute-force method is the fastest and most accessible to program offices.

A more sophisticated approach in development is the use of AM candidacy software. These automated tools ingest data of all types—3D computer-aided design models, 2D drawings, technical manuals, and logistics data from the

AM capabilities and capabilities found in the DOD and U.S. industrial base.

Once AM candidates have been identified and printed, the program offices face barriers to approving them for use. The primary barrier around a program adopting a part for use is the question, “is this part good enough to use?” AM lacks industry-accepted standards like those found in castings and forgings; while those are coming one day, we currently do not have them. Without such data, we are forced to accept risks with using AM parts or comparing them to

the original equipment manufacturers' (OEM) parts' performance. This presents another lack-of-data problem in that program offices typically do not have access to data at a granular enough level that states, "bracket X on truck Y fails when subjected to load Z," but rather, the entire system is tested as a whole. Such detailed information was not of use in the past, so it was never purchased. Without these industry standards around printed parts and data around specific components, AMS is proposing that partnering with the OEM in a cooperative research agreement would offer advantages to both parties. While the Marine Corps does not have access to such granular data, OEMs may. At the very least, they have the requirements the system was tested to. While purchasing from an OEM, a native computer-aided design model or standard 3D object file is always useful. Based on our experience, the AMS team argues that the most useful IP to have access to is any test or analysis data the OEM developed when determining the design for a part that will meet our requirements. When assessing a 3D printed part for acceptability developing a model of a part is typically the fastest step in the process. Commonly, when a part is being 3D printed, there is a geometry change to account for a design shortfall, a different material being used to make the part or to leverage some advantage that AM offers. In these cases, a computer-aided design model purchased from an OEM will be of little use. The next few months are typically spent determining how the printed part compares to the OEM part. This evaluation process could be greatly shortened if the OEM were brought into this process through a cooperative research agreement. A cooperative research agreement between program offices, OEMs, and AM teams at government labs would be a viable, low-cost approach to developing more resilient and responsive equipment.

Another barrier to adoption is the lack of cataloging options for parts. How do we differentiate an OEM part from an AM part? Within AM parts, how do we differentiate a printed-in-metal, as-good-as-OEM part from a

limp-home, spare-tire solution? In an Expeditionary Advanced Based Operations environment where a 5-mile part in hand is infinitely more valuable than a 5,000-mile part in a warehouse thousands of miles away, we need both in our portfolio but a need to differentiate them. We need the ability to leverage AM to repair gear now while broadcasting the demand for OEM items to prevent gutting our supply chains. To remedy this issue, the AMS team has a pilot project to catalog AM parts of as many different natures as possible. Once complete, this will provide a play-book for program offices to use when assessing parts for use. The appropriate supply and maintenance policies must be updated when these findings are complete.

While every effort so far has discussed the development of technical data in-house, the Marine Corps will need to acquire some data from OEMs to get the full potential of AM. This is a complicated topic because intellectual property is expensive, and businesses are loathed to relinquish their proverbial

... the Marine Corps will need to acquire some data from OEMs ...

"keys to the kingdom" to the government. Different approaches utilized by program offices might make these more tenable. For example, the software candidacy tools, as mentioned earlier, can be used to identify the most useful IP to procure. So, while we cannot afford to purchase everything, we can ensure our dollar goes further. Another method of leveraging OEM IP is a "royalty," which is when the Marine Corps successfully prints a part while the OEM is adequately compensated. For industry to adopt such a royalty model, the onus is on the government to develop and demonstrate to industry that we can accurately track successful prints and be good stewards of IP by not leaving it on printers. Currently,

this "royalty model" is not technically implementable because the Marine Corps lacks the tools to demonstrate those key capabilities to industry. However, as part of a pilot program with the DMDV, such a capability was demonstrated and subsequently put into the initial capabilities document for the AM digital repository. Within the FYDP, the Marine Corps will be capable of implementing such a model.

Finally, at the earliest points in the acquisition cycle, when generating requirements, critical systems should have requirements that a certain percentage of a materiel solution must be fabricable locally using organic Marine Corps equipment. Typically, AM does not support the economies of scale that traditional manufacturing methods offer. For initial production from the OEM, the items do not need to be 3D printed, but instead having the OEM provide the data allowing us to make one-off items in austere environments would meet our desired end state. The above-mentioned software tools would offer the ability to assess an OEM's ability to satisfy this requirement.

In conclusion, the advanced manufacturing programs of record are directly enabled by the adoption of the technology within Marine Corps program offices. While there are certain challenges and unknowns, the AMS team has identified these problems and has solutions in development for them. As the processes surrounding advanced manufacturing matures the AMS Team will continue to assist our programs of record in adopting the technology to meet the warfighter's needs.



Big Impacts Using Small Methods

Sustaining operational readiness by repairing electronics

by LtCol Ross Hrynewych, Mr. Jorge Ruiz,

CWO3 Romualdo Colón-Adorno & CWO3 Dustin Sawyer

While aboard the USS *Pearl Harbor* (LSD 52) during an 11th MEU deployment in 2021, Sgt Joshua V. Pineda, a ground electronics telecommunications and information technology systems maintainer, affected 49 circuit card repairs totaling \$161,674.81 of repair part cost-avoidances on mainly Navy equipment. Ground electronic maintenance Marines, like Sgt Pineda, can use their technical understanding of electronics theory and test equipment to seamlessly integrate into the greater naval mission due to a little (pun intended) Naval Maintenance Program called Miniature/Microminiature Electronic Repair (2M).

Marine Corps Systems Command (MARCORSYSCOM), Program Manager Supply and Maintenance Systems (SMS), in collaboration with the Naval Undersea Warfare Center, provides training, equipment, piece-part replacement components, and technical support to our Marines in support of the 2M Maintenance Program. Over the past Future Years Defense Program, our Marines affected 7,878 2M repairs for a total value of \$15.2M of repair part replacement cost-avoidances. These cost-avoidances directly benefit the MEF's operations, maintenance, and sustainment and secondary repairable (SecRep) budgets while extending equipment life cycles. In the case of the 11th MEU, ground electronic maintenance Marines conducted 49 2M repairs onboard a surface vessel while underway conducting distributed maritime operations. Our Marines pos-



Cpl Garcia, with 2d Maintenance Battalion, Electronics Maintenance Company, inspects electronic components with the Circuit Card Assembly Test Station aboard Camp Lejeune, NC. Marines have averted \$15.2 million in replacement part costs over the past five years by organically repairing circuit cards. (Marine Corps photo by Matt Gonzalez.)

sess the training, tools, and technical abilities to sustain capabilities, both whenever and wherever, in support of Naval campaigns.

2M maintenance is considered intermediate maintenance, a sub-classification of field-level maintenance. Our Marines perform 2M repairs at over 50

>LtCol Hrynewych is a 2802 and serves as the senior Ground Electronics Maintenance Officer within U. S. Marine Corps Forces, Pacific.

>>Mr. Ruiz serves as the Project Officer for the Circuit Card Assembly Test Station at Marine Corps Systems Command.

>>>CWO3 Colón-Adorno is a 2805 and serves as the Ground Electronics Maintenance Officer at U. S. Marine Corps Forces, Command.

>>>>CWO3 Sawyer is a 2805 and serves as the Executive Officer of the Electronics Maintenance Company, 1st Maintenance Battalion.

units across the Marine Corps, including maintenance battalions, Marine aviation logistics squadrons, Marine wing communications squadrons, communication battalions and companies, artillery regiments, intelligence and radio battalions, MEU combat logistics battalions, Combat Logistics Company 33, Combat Logistics Battalions-7, and at the Marine Corps Communications and Electronics School. The equipment used for 2M is not large or heavy. It consists of a test station that is the size of a bread box, a variable heat soldering kit with tools that fit on a workbench, a microscope, and an inventory of spare microelectronic parts. To initiate repairs, Marines conduct standardized inspections and tests with a Circuit Card Assembly Test Station (CCATS), which has probes that must be manually placed on electric components. Once in place, the CCATS injects a very small amount of electrical current, electronically stimulating the component so the CCATS can measure, store, digitize, and analyze its electrical properties. Marines compare suspected faulty component digitalized “electronic signatures” against the known good signatures that are in the CCATS’ computer database. Marines use this information to diagnose and repair faulted electronic circuit card assemblies.

When Marines capture, digitize, store, and validate electronic signatures of each component on a circuit card using CCATS, it is referred to as a “Gold Disk.” Creating a Gold Disk requires a Technical Data Package that includes three pieces of information: a circuit wiring schematic, a component map of the circuit card, and a detailed listing of the piece-part components of the circuit card. Wiring schematics detail how the parts are connected to each other, the map shows the locations of the small components on the printed circuit board, and the part listing details the electrical and physical form factors of the parts—so the technician knows which part to order when replacing it. In 2021, MARCORSYSCOM, Portfolio Manager Logistics Combat Element Systems, PM SMS fielded the next generation of CCATS—which provided Marines a better capability



MARCORSYSCOM participates in the Navy's 2M Maintenance Program. (Graphic provided by Mike Bruzan, Naval Undersea Warfare Center.)

to inspect, test, capture, digitize, and store electronic signatures for comparative testing.

The ability to keep equipment operational is largely dependent on how the government develops the equipment’s life-cycle sustainment plan. For items containing embedded microelectronics, considerations should be weighed when choosing manufacturer warranties over organic maintenance. Warranties are



A close-up view of a multi-layer circuit card with labeled surface-mounted components. This type of information is a critical component of a technical data package. (Photo provided by Phillip Comer.)

effective when the manufacturers are responsive; however, global supply chain and intra-theater distribution challenges can pose devastating effects on the readiness of our operating forces. Once the warranty periods end, the Marine Corps may be ill-prepared to assume a viable sustainment strategy unless organic maintenance preparatory actions are in place. In comparison, when our equipment fails overseas, an organic maintenance strategy may offer increased viability, ensuring equipment availability “in any clime and place.” A sustainable life-cycle plan must be responsive to both garrison and deployed environments where access to robust spare part inventories and supply shipping networks are not guaranteed.

To be effective, equipment life-cycle sustainment plans should include considerations for technical data packages, as embedded microelectronics have proliferated within mission-essential equipment. Acquiring or developing technical data will contribute to setting the necessary conditions for what the *Tentative Manual for Expeditionary Advanced Base Operations* requires. The littoral force needs the

*ability to persist by positioning ... required maintenance capabilities as close to the point of need as feasible. Although stand-in forces may be able to evacuate equipment via multimodal means to higher maintenance activities for repair, the time and distance required for evacuation reduces the responsiveness of the maintenance system and risks reducing littoral force capability. ... The ability of Fleet Support Representatives (FSRs) to perform frequent or extensive maintenance as part of the stand-in force may be unrealistic. Planners must consider the requirement for uniformed personnel to acquire the knowledge, skill, abilities, and specialized tools that would be required to replicate FSR-capabilities, or they must consider increased sustainment and force protection requirements related to an increased role of FSRs supporting stand-in forces.*¹

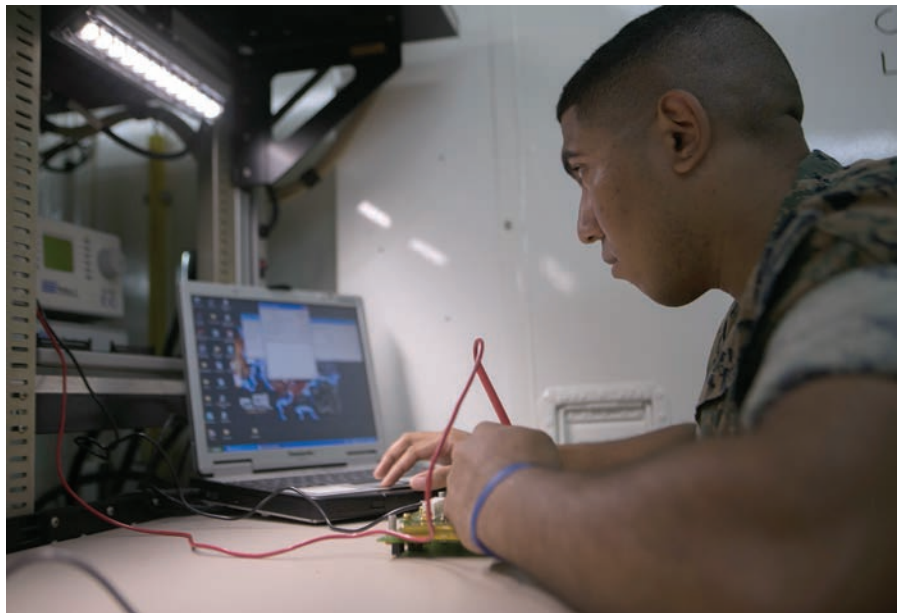
There is a time and place for the original equipment manufacturer warranty and FSR support. Still, Marine forces need the ability to sustain capabilities while operating in forward-deployed

and contested logistics areas where access to distribution and transportation is limited or denied. To do this, Marines must possess organic intermediate maintenance capabilities to sustain combat readiness.

To address some of these issues, the 2800 Occupational Field's Ground Electronics Maintenance Advisory Group, a chartered body under the auspice of the Deputy Commandant for Information, initiated a 2M Working Group (2MWG) to advocate, identify, and pursue 2M repair routine development actions across the Marine Corps. Working group members communicate and synergize efforts with the Marine Corps' FMFs, Supporting Establishment, Naval Undersea Warfare Center, and external academia and industry on 2M repair initiatives. The 2MWG advocates for targeted funding to procure or develop technical data. One 2MWG use case involves MARCORSSYSCOM's development of a Technical Data Package for a ground system that the Marines currently repair today. The initial Return on Investment (ROI) estimate for this use case is expected to exceed \$27M over the next five years for repair part budgets.

To realize the full benefit of 2M, additional investments are necessary to create tactical and operational advantages to sustain combat power in dispersed and contested maritime environments. One such investment is introducing a robotic automated testing station for electronic maintenance. In accordance with *DODI 5000.94, Use of Robotic Systems for Manufacturing and Sustainment in the DOD*, robotics are required in forward-deployed or mobile maintenance operations to increase productivity and capacity; to improve quality, health, and safety; or to reduce environmental impact.

The introduction of automated robotic testers will increase the speed at which inspections and testing of circuit card assemblies occur. Robotic automated circuit-card testers possess an enclosed workspace where robotic testing probes, carriage motors, and optical cameras interact to touch the electrical connections of the circuit card under test at pre-programmed coordi-



LCpl Lowry inspects and tests a suspected faulty circuit card. (Photo by LCpl Tyler Ngiraswei.)

nates, testing the electrical properties of each component. Programmed sequences (or test routines) and diagnostic fault reports can be analyzed and shared between maintenance activities to further enable Naval Logistic Integration and mutual support throughout the distributed maritime environment.

Targeted investments in 2M create efficiencies across the Marine Corps ...

Marines are making a big difference in sustaining readiness while averting costs using 2M. To improve sustainment for today's electronic-laden battlefield, the Marines need technical data for new and in-service fielded equipment. Robotic automated test equipment for circuit card maintenance will enable improved maintenance *"as close to the point of need as feasible."* Targeted investments in technical data and robotic automated test equipment offer a greater organic sustainment capability within the FMF at a fraction of the cost of traditional faulty part replacements,

FSRs, or manufacturer warranties across equipment's life cycles. Targeted investments in 2M create efficiencies across the Marine Corps and yield cost savings within several program execution budgets. Expanded 2M implementation, when considered as part of force design efforts, serves to sustain Marine forces operating in forward-deployed and contested areas where access to distribution and transportation is limited or denied. Continued investment and expansion of 2M enables the naval force to restore critical warfighting equipment as far forward as possible with a significant return on investments.

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Using Front-End Analysis to Modernize Training and Increase Effectiveness

Resourcing the main effort

by Dr. JoAnn C. Patton, Mr. Scott McMiller & Mr. Neil Williamson

“The purpose of all training is to develop forces that can win in combat. Training is the key to combat effectiveness and therefore is the main effort of a peacetime military.”

—MCDP 1

“Marines develop a variety of competencies to better understand and respond to complex enemy or adversary systems. Learning environments that simulate these complex systems develop Marines’ professional competence and encourage adaptation, as well as the ability to outthink enemies and/or adversaries in changing situations.”

—MCDP 7

If training is the main effort of the Marine Corps, why is so little invested to ensure that Marines are being trained on the right tasks, at the right time, with the right training devices to accomplish their mission?

Most of us can attest to hours wasted on training materials and training devices that are only tangentially related to our jobs. However, when your job is to serve as America’s force-in-readiness, this wasted time could significantly impact our Nation’s ability to respond in the event of conflict.

According to *Force Design 2030*, “The warfighting impact of all other future capabilities is directly tied to the level of commitment we make to training modernization.”

However, we continue to make training design and device decisions based on subjective criteria, opinions, or available funding. If the intention is to modernize the way we train, it is critical that we follow sound, proven processes to make informed training decisions.

Figure 1 shows the adaptive acquisition pathways used to acquire most of the tactical systems and equipment in the Marine Corps. Typically, during the acquisition of a tactical system, the system is analyzed to determine the training requirements associated with

>Dr. Patton is the Lead Instructional Systems Specialist at PM TRASYS. She has a PhD in Human Factors Psychology. Dr. Patton has been conducting front-end analysis for DOD for more than twenty years.

>>Mr. McMiller is an Instructional Systems Specialist at PM TRASYS. He has a Master’s degree in Instructional Design and Technology. He is a retired Air Force Senior Master Sergeant.

>>>Mr. Williamson is an Instructional Systems Specialist for Navy Surface Warfare Center-Panama City Division currently supporting PM TRASYS. He has a degree in Workforce Education and Development.

fielding that system (including training devices and courseware). This requirements analysis is completed following Milestone B (or other similar decision points depending on the pathway used). Everything that will ultimately be used to train future operators and maintainers will be completed prior to the Ready for Training date during the Production and Deployment phase.

Unfortunately, when the system being acquired is a training system and enters the acquisition process at Milestone B, there is no time to conduct the analyses that can help define the requirements of that system. To ensure the right product is provided to the fleet, that analysis must precede the generation of any documentation that triggers the acquisition process.

Front End Analysis (FEA) is an umbrella term that encompasses different sequential analyses that are conducted to help identify training requirements. In the past, *OPNAV 1500.76C* required all Navy and Marine Corps aviation programs to conduct an FEA to identify the training environment—every aspect of training requirements associated with tactical systems.

The new guidance, however, from *OPNAV 1500.76D* applies to *all* acquisition programs. In the past, much of the Marine Corps ground community

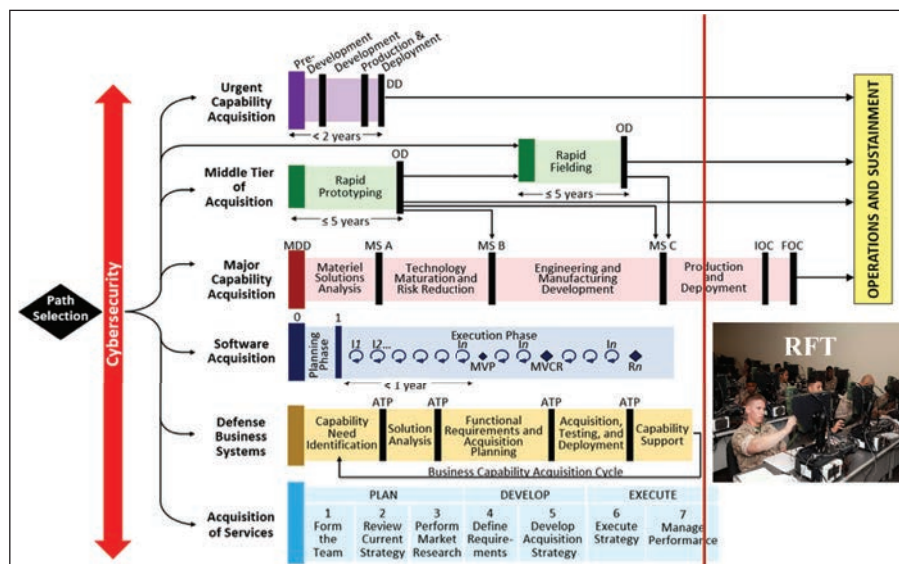


Figure 1. Ready for Training aligned with Adaptive Acquisition Framework. (Figure provided by author.)

sition process. While there are different opinions on how to conduct the actual analysis, this article describes analyses that have been successfully used to determine if a training device is required within a training pipeline. Before designing any training device, the first step is to identify the jobs/tasks performed by the end user. A *task analysis* is used to identify the tasks required to operate and maintain a tactical system or the tasks required to successfully per-

of the devices, a full task analysis was not conducted. During a task analysis, subject-matter experts decompose their jobs into their tasks, subtasks, etc. They further describe tasks in terms of a series of task attributes (see Appendix 1 on page 95 for a list of the attributes and how they impact training decisions). Collectively, these attributes inform decision makers with respect to many aspects of the training environment. Conducting a proper task analysis ensures training and/or training systems reflect *requirements* as opposed to an individual's or group's *desires*.

Following a task analysis, a *Training System Requirements Analysis (TSRA)* can be conducted to determine if a training device is required to train the tasks identified in the task analysis. Additional task details as well as attributes are collected during a TSRA. The data collected from subject-matter experts during a TSRA is used to inform the need for a training device as well as some of the required design characteristics of that device.

Finally, in terms of defining training requirements, a *Training Decision Coordinating Paper (TDCP)* identifies training device alternatives as well as their associated acquisition and sustainment costs. A TDCP is perhaps the most informative report for stakeholders. In addition to allowing the stakeholders to

has based training device acquisition on user surveys or other subjective data. During the Global War on Terror, Operation IRAQI FREEDOM, and Operation ENDURING FREEDOM, several training systems were acquired based on urgent/universal needs statements. Unfortunately, these training systems did not go through a thorough analysis process prior to production and fielding and lacked measurable value to the FMF.

In June 2021, MCO 3550.14 was signed requiring that FEAs be conducted early in the requirements tran-

form a job. Conducting a task analysis on a tactical system is relatively simple using technical manuals and other deliverables provided by the equipment manufacturer. However, many of the training devices developed and fielded for the Marine Corps during the Global War on Terror, Operation IRAQI FREEDOM, and Operation ENDURING FREEDOM were procured to practice cognitive skills such as commander and battle staff decision making in support of maneuvers. While experts were certainly used to shape the overall goals

compare the short-term and long-term costs of any proposed training device alternatives, the TDCP clearly delineates the pros and cons associated with potential training devices. This allows stakeholders to make well-informed tradeoff decisions between those alternatives.

The requirements generated by the TSRA and training options generated by the TDCP ensure that stakeholders make decisions based on objective data vice opinion. They ensure the end user fully understands the capabilities provided by the training solution and understands how the use of those sys-

tems fulfills training and readiness completion reporting.

PM TRASYS is in the process of conducting the first FEA for a new training system that will be designed to train senior battle staff. In the upcoming months, senior battle staff members will be asked to support these analyses by participating in workshops to decompose training and readiness events and assign attributes. Since the Marine Corps ground community is now committed to conducting these analyses, future training device decisions should result in effective training that:

- Is training the correct training and readiness events or tasks?
- Has the correct design characteristics to ensure effective training?
- Is collecting the correct performance measures?
- Is providing adequate performance feedback?

For a complete list of task attributes collected during task analysis and TSRA, please contact any of the three authors: Joann.patton62@gmail.com, scott.mcmiller@usmc.mil, and neil.b.williamson.civ@us.navy.mil.



Quote to Ponder:

“In no other profession are the penalties for employing untrained personnel so appalling or so irrevocable as in the military.”
—General of the Army Douglas MacArthur, *Annual Report of the Chief of Staff, U.S. Army, 1933*



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Appendix 1: Task Attributes Collected During Task Analysis and TSRA

Attribute	Defining Question	Rating Level	Description	How do We Use This Data?
Condition		Free form text entry	The conditions under which the performer typically performs the task.	The conditions provide data regarding the elements that must be present to perform the task (e.g., tools, software applications, other tactical systems, etc.)
Standards by which task performance is graded		Free form text entry	The standards by which task performance is assessed as successful or unsuccessful.	The standards are used to determine the performance measures to collect and evaluate during training and or performance of the task.
Initiating Cue	How do you know when it's time to perform this task. Specifically, what stimulus in the environment lets you know this task needs to be performed?	Free form text entry	The stimulus in the environment lets the task performer know this task needs to be performed.	
Importance (criticality of performing task correctly)	How important is it that the task be performed correctly?	1. Low importance	The consequence of poor task performance is minor. The job or mission is <i>not</i> affected significantly.	Task importance is one factor in determining training priority (formal school vs. OJT).
		2. Moderate Importance	The consequence of poor task performance <i>may</i> hamper mission accomplishment.	
		3. Important	The consequence of poor task performance <i>will</i> hamper mission accomplishment.	
		4. Very Important	The consequence of poor task performance will <i>almost</i> certainly result in mission failure.	
Learning Difficulty?	How many times do you need to practice the task to become proficient?	1. 1–2 times	The task requires little or no practice to become proficient.	Learning difficulty helps determine how much practice is required to master a task. It is also used to compute skill decay.
		2. 3–5 times	The task can be learned with relative ease and gets substantially easier with practice.	
		3. 6–9 times	The task requires considerable concentrated effort to learn but can be mastered through practice.	
		4. 10 or more times	The task requires sustained concentration to learn, requires critical decision making, and many concurrent activities. The ability to perform the task improves with practice but does not get substantially easier.	
Performance Difficulty	How difficult is it to perform this task?	1. Not difficult	Task requires little conscious effort to perform and is always performed the same way.	Performance difficulty is a factor in training priority. It is also used to determine if a task needs to be taught in "chunks."
		2. Somewhat difficult	Task requires some concentration and challenge to perform but is performed the same way each time.	
		3. Difficult, same	The task requires concentration, is challenging to perform, and involves many subtasks, but is performed the same way each time.	
		4. Difficult, different	The task requires concentration, is challenging to perform, involves many subtasks, and is performed differently from situation to situation.	

Attribute	Defining Question	Rating Level	Description	How do We Use This Data?
Safety Hazard Severity	From a safety standpoint, if the task is performed incorrectly, how severe is the consequence?	1. Minor	A failure that is not serious enough to cause injury, property damage, or system damage. Will result in unscheduled maintenance or repair.	Safety hazard severity is used to determine the degree of mastery required of a given skill.
		2. Marginal	A failure that may cause minor injury, minor property damage, or minor system damage. Will result in delay or loss of availability or mission degradation.	
		3. Critical	A failure that may cause severe injury, major property damage, or minor system damage. Will result in delay or mission loss.	
		4. Catastrophic	A failure that may cause death or system loss.	
Team Involvement	What is the level of team interaction required to perform the task?	1. None	This is an individual task.	Team involvement drives the level of interaction required between the student and "others." With a training device, it implies the need for "someone else" with whom the student must interact and the nature of that interaction.
		2. Inform/acknowledge	Make others aware of status, environment. Acknowledge receipt of information.	
		3. Coordinate	Team members work on separate tasks, but the tasks have a high degree of interdependence and there is a high degree of shared knowledge.	
		4. Cooperate	Team members work on shared tasks with significant consultation. There is a high demand for personal contact.	
Frequency of Performance	How often is the task performed?	1. Rarely	The task is performed less than once a year.	Frequency is a factor in training priority and skill decay. Tasks that are frequently performed do not necessarily require formal training and will not necessarily require frequent skill refresher.
		2. Infrequently	The task is performed between one and four times a year.	
		3. Frequently	The task is performed between one and four times a month.	
		4. Very Frequently	The task is performed between one and four times a week.	
Task Delay Tolerance	How much time can elapse between the trigger (when the need for task performance becomes evident) and when performance begins?	1. Time is not critical	When the task is started is not critical.	Task delay tolerance helps determine the degree of mastery required of the student and whether job performance aids can be used during task performance. It also helps determine the level of mastery to which a student should be trained.
		2. Some	The time issue is not critical (within the hour).	
		3. Very little	A short delay between the trigger and response is acceptable (minutes count, not seconds).	
		4. No tolerance	There is very little tolerance between the trigger (stimulus) and response (seconds count).	
		2. Medium	The position or size of controls and displays is important to the task.	

Attribute	Defining Question	Rating Level	Description	How do We Use This Data?
		3. High	The position and size of keys, buttons, switches, knobs and displays is very important to the performance of the task. The ability to identify and distinguish between these items is an integral part of the task.	
Training Priority	Training priority is based on the Difficulty, Importance, and Frequency (DIF) Model.	Computed automatically		It provides an assessment of the relative training emphasis that each task should receive. Level 1 and 2 tasks need significant training emphasis, Level 3 tasks also require high levels of task performance proficiency, but are of lesser significance, and Level 4 tasks have a lesser amount of training priority.
Skill Decay	Skill Decay Analysis identifies tasks that are susceptible to decay (i.e., prone to degradation) if not adequately practiced.	Computed automatically		This information helps determine the tasks that will require follow-on practice to ensure those skills do not degrade.
Tactile Fidelity	How important is it to replicate the feel of the interface?	1. Low	The sensation of the intensity and quality of the physical response is present but can be approximated.	Tactile fidelity helps determine the importance of replicating the feel of system interfaces.
		2. Medium	The sensation of the intensity and quality of the physical response is important, but less than complete precision is acceptable.	
		3. High	The precise quality and intensity of the physical response of the hardware provides essential information for performance of the task; variable resistance in a clutch lever, for example.	
Appearance Fidelity	How important is to replicate the shape, color, and brightness of the system and its controls?	1. Low	Appearance is an aspect of the task, but exact replication is unnecessary. An on/off light, for example, need not duplicate the color of the operational equipment.	Appearance fidelity helps determine the importance of replicating the appearance of system interfaces in terms of texture, color, and brightness.
		2. Medium	The appearance of panels, controls and displays is important. Presentation may be approximate. A variation in the shade of yellow, for example.	
		3. High	The exact color, surface texture, brightness, and shape of panels, controls, and displays are very important to the performance of the task. These qualities provide information, which is essential to task performance. Red versus yellow indicator lights; screen brightness, for example.	

Attribute	Defining Question	Rating Level	Description	How do We Use This Data?
Format Fidelity	How important is it to replicate the format of the data displayed or the actions taken?	1. Low	Information is formatted but format does not provide essential information.	Format fidelity helps determine the importance of replicating the appearance of system interfaces in terms of texture, color, and brightness.
		2. Medium	Format provides essential task information, but may be approximate. Multi purpose display formats; non sequential steps for example.	
		3. High	The format of the data provides information essential to task performance: format must be exact. Fixed message formats; warning screens and messages; sequence of steps is important for task performance; clarity of voice reception, for example.	
Content Fidelity	How important is it to replicate the information displayed or heard to the performance of the task? e.g., frequency, bearing, level, audio components, etc.	1. Low	Content provides primary information for task performance, but precision may be approximate.	Content fidelity helps determine the importance of replicating the information displayed or heard.
		2. Medium	Content provides primary information but less than exact precision is acceptable.	
		3. High	Content provides the primary information for task performance. Precision is critical to successful task performance.	
Response Fidelity	How important is it to replicate the rate at which data changes, the response time of the display, or motion/movement as a result of task performance?	1. Low	Data changes and display responses are essential to task performance, but a wide tolerance is acceptable.	Response fidelity helps determine the importance of replicating the responses to student actions in terms of display, motion, etc.
		2. Medium	Data changes and display responses are essential to task performance, but some departure from operational system response is acceptable.	
		3. High	The rate at which data is updated (i.e., realtime) and the response time of the display to data inputs provides essential information for task performance. Response must exactly replicate operational system.	
Sound Fidelity	How important is it to replicate the background noise, conversation and vibration?	1. Low	Variations in the intensity and quality of background noise, provides some critical information and affect task performance indirectly. Gross duplication acceptable.	Sound fidelity helps determine the importance of replicating the background noise in the environment.

Attribute	Defining Question	Rating Level	Description	How do We Use This Data?
		2. Medium	Variations in intensity and quality of background noise, provides critical information or directly inhibits task performance. Exact duplication is not required.	
		3. High	Variations in intensity and quality of background noise, provides critical information or directly inhibits task performance. Exact replication is required.	
Motion Fidelity	How important is it to replicate the incidental movement of the system, equipment or platform?	1. Low	Movement of the platform affects task performance. Gross replication is acceptable.	Motion fidelity helps determine the importance of replicating the motion of the platform.
		2. Medium	Movement of the platform provides critical information or feedback for task performance. Exact replication is not required.	
		3. High	Movement of the platform provides critical information or feedback for task performance. Exact replication is required.	






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Harnessing Data to Revolutionize Marine Corps Maintenance

Condition-Based Maintenance Plus

by Maj Adam T. Deitrich

Conditions-Based Maintenance-Plus (CBM+) is a maintenance strategy that seeks to collect, transmit, analyze, and act on maintenance data from platforms such as vehicles, aircraft, or generators using electronic data logging devices and artificial intelligence/machine learning (AI/ML) software. This strategy has been adopted and matured by commercial industries since the 1980s. Central to the process is predicting maintenance failures before they occur through near realtime monitoring of system conditions and performance. Commandant of the Marine Corps *White Letter 2-20, "Achieving Condition Based Maintenance,"* served as a call to action for Marines to move away from our current maintenance posture and toward a predictive model. After the letter's release, Deputy Commandant, Installations and Logistics initiated a pilot program that provided technology and conceptual roadmaps for the widespread implementation of CBM+. At the direction of Combat Development and Integration Command, Marine Corps Systems Command (MARCORSYSCOM) is adopting the Deputy Commandant, Installations and Logistics minimum viable product as an agile acquisition effort. It will seek to implement the pilot at scale as part of the commands' *Force Design 2030* procurement efforts. This article will explain the four lines of effort (LOE) in the Marine Corps CBM+ strategy, material solutions being devel-

>Maj Deitrich is a 0402/8862 serving as the Project Officer for the Condition-Based Maintenance Plus program at MARCORSYSCOM. He has a Master of Business Administration with a concentration in Material Logistics Management from the Naval Postgraduate School.

oped, and reveal initial fielding plans for FMF units. The four LOEs include *at-platform data collection, data transmission and storage, data transformation and predictive analysis,* and *supply chain optimization and Global Combat Support System-Marine Corps (GCSS-MC) partnering.* The article will conclude by discussing barriers to implementation and opportunities for further research.

At-Platform Data Collection (LOE 1)

At-platform data collection includes techniques, hardware, and software for compiling data from condition monitoring elements, including near realtime telematics from on-platform sensors, on-the-spot fluid sampling and composition analysis, and the quantification of environmental operating conditions (e.g., weather, moisture, and temperature).

In the short term, the CBM+ program office will achieve data collection through two methods. The first device implemented at the tactical level is an inexpensive commercial off-the-shelf data logger installed on over 300 Joint Light Tactical Vehicles, Logistic Vehicle System Replacements, and Medium Tactical Vehicle Replacements. This

data logger connects directly to the vehicle's controller area network (CAN) bus. The device logs the vehicle's internal communication and extracts the data via a wireless access point installed in the unit's motor pool. The data is initially stored on a mid-tier server in the motor pool before being sent to the cloud-based top-tier server. Dispatchers and maintenance personnel have immediate access to crude fault code data from participating vehicles via a CBM+ kiosk in their dispatching office. This initiative will scale to over 800 vehicles in fiscal year (FY) 2023.

The second technology in testing by SYSCOM during the next two years is a mobile trip tool (MTT). This handheld device has specialized conditions monitoring and trip reporting applications. Units participating in this portion of the CBM+ pilot program will be issued MTTs for Joint Light Tactical Vehicles, Medium Tactical Vehicle Replacements, and Logistic Vehicle System Replacements. MTTs are electronically docked in the dispatching office. When a Marine has dispatched a vehicle, they will be issued an MTT. The MTT will serve as their trip ticket, and all pre- and post-operation checks

will be done on the device. The MTT will also be plugged into the truck and serve as the data logger during the evolution. When the Marine returns the vehicle, they will also return the MTT to the dispatcher. Once the device is docked, the data from the trip uploads to CBM+ servers.

Data Transmission and Storage (LOE 2)

Data transmission and storage focuses on the ability to transmit data via multiple modalities with design specifications supporting onboard storage and computing, wireless transmit/receive capabilities, and Internet of Things technologies. Centralize data in an authoritative cloud repository, accessible by the joint community for multiple use cases.

The important near-term initiative regarding LOE 2 is establishing a Marine Corps Enterprise Network (MCEN) connected Systems Integration Lab (SIL). During the first few years of the CBM+ pilot, the Pennsylvania State University (PSU) Advanced Research Laboratory acted as the SIL. As data flowed from unit-level servers to the cloud, data scientists at PSU would format and store it in usable forms for AI/ML algorithms. As a research institution, PSU cannot provide these services as the program increases in scale. Moreover, the PSU SIL is not MCEN connected. During FY23, MARCORSYSCOM will supervise the transition of this SIL responsibility from PSU to Naval Surface Warfare Center Crane, IN. Naval Surface Warfare Center Crane has been tasked with transitioning data flow onto MCEN.

The CBM+ program will also migrate cloud services from PSU’s environment to the Department of the Navy’s Jupiter platform inside the DOD Advanced Analytics environment. Advanced Analytics/Jupiter is a cloud and AI/ML tools provider for DOD customers. Anyone with a common access card can request an account. The environment is approved to host data up to and including cyber security impact level six. The Department of the Navy has funded the use of Jupiter for all members through FY28.

Data Transformation and Predictive Analysis (LOE 3)

The data transformation and predictive analysis LOE concentrates on the analysis of collected data to identify patterns to predict anomalies and failures at system and component levels. Drive realtime, autonomous decision support that is appropriately packaged and prioritized for select echelons of maintenance, repair, and inspection.

The CBM+ team has selected a vendor to build AI/ML algorithms and data visualizations directly on Advanced Analytics/Jupiter. The Marine Corps will own all data, models, and visualizations. In the first two years, models will focus exclusively on GCSS-MC electronic record jacket information and CAN bus data from deployed data loggers.

Historical GCSS-MC AI/ML models will focus on trend analysis and life cycle costs. These models will support decision making at all levels of the en-

terprise. The models will allow users to discern the cost to repair individual vehicles over their life and the cost to sustain entire platforms over their life cycle. These models will also help to project repair part requirements, inventory planning, and project future demand for parts and components.

Models using CAN bus data will determine equipment condition, plan equipment usage, determine preemptive maintenance schedules, and extrapolate remaining useful life. This is done by analyzing equipment fault codes and component anomalies. The overall goal is to predict and prevent catastrophic failures before they occur and make data-driven decisions on equipment usage, maintenance schedules, and strategic investments.

The CBM+ team has toured commercial industry distribution and logistics centers to understand the return on investment these services can provide. Using this model-based approach, some

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The advertisement features a central graphic with a blue sky background and a white grid of hexagonal nodes. Each node contains an image of a piece of equipment and a label. The nodes are interconnected by lines representing data flow, with binary code (0s and 1s) overlaid on the lines. The equipment and labels include:

- Cross Domain:** A CUBIC XD device.
- Radio over IP:** A radio antenna.
- Medium / Large Kits:** A rack of server equipment.
- Small Dismounted Kits:** A small server rack.
- Small Mounted Kits:** A server rack mounted on a vehicle.
- Observer Team:** A group of soldiers in a field.
- Dismounted Mobile:** A soldier with a laptop.
- Mounted Mobile:** A soldier in a vehicle.
- Company Command Post:** A soldier with a laptop.
- Brigade/Battalion Command Post:** A large vehicle.
- Small / Medium Kits:** A server rack.

At the bottom of the graphic is the CUBIC logo and the website cubic.com.

Fortune 500 companies are achieving vehicle-to-mechanic ratios of one mechanic for every 85 vehicles. For reference, the Marine Corps ratio is approximately one mechanic for every eleven vehicles.

Supply Chain Optimization and GCSS-MC Partnering (LOE 4)

Supply chain optimization and GCSS-MC partnering aims to inventory management and test increased part availability in response to aggregated predictive insights from technology and operational demonstrations and partner with GCSS-MC to create a closed loop between the two systems.

While work towards this LOE will likely not start until 2025 or later, the model insights produced by the CBM+ SIL can potentially revolutionize supply support across the entire DOD. After achieving fidelity in the initial maintenance models, the CBM+ team will work to develop additional models in Jupiter that can assist SASSY management units in determining stocking objectives and re-order points for secondary repairable and consumable maintenance parts. Moreover, the team will work to help deploying units make data-driven decisions on physical and digital class IX blocks. Achieving this LOE will help leaders optimize supply support in every clime and place.

While the CBM+ program does work with GCSS-MC to conduct data and record jacket pulls, the team has requested funding starting in FY25 to increase and improve the relationship. The end state of this initiative is to have a closed loop between the systems. A CBM+ model detects an impending failure and automatically prompts GCSS-MC to open a service request. Parts are automatically ordered based on the models’ advice. When the item is received and the vehicle repaired, GCSS-MC automatically informs the CBM+ database that the vehicle has returned to operational status.

Initial Fielding Plans

CBM+ technology is currently deployed to five commands across three MEFs. Those units include the Equipment Support Detachment at Twen-

tynine Palms, Combat Logistics Battalion-7, Combat Logistics Battalion-8, 2d Transportation Battalion, and 3rd Marine Littoral Regiment. In the summer of 2023, the program will expand data logger, kiosk, and wireless access point implementation to two battalions at both 1st and 2d MLGs. By the beginning of 2024, the program will deploy MTTs to two III MEF units for testing and evaluation. By the spring of 2024, all participating commands will have accounts in the Marine Corps CBM+ analytics virtual environment and be trained to use it.

In FY24, CBM+ technology will be fielded to up to four commands at III MEF to support *Force Design 2030* efforts. Units participating in the CBM+ program will assist Deputy Commandant, Installations and Logistics and Combat Development and Integration Command in generating requirements, policies, and best practices for CBM+ implementation. MARCORSYSCOM is also in the process of contracting a technology roadmap and returns on investment study to develop a long-term material solution strategy, identify and eliminate technology gaps, and discern if CBM+ is a worthy long-term investment. This study will be published by September 2024.

Barriers to Entry and Opportunities for Further Research

Cybersecurity continues to be the most significant barrier to entry for all aspects of the CBM+ program. Achieving authority to operate is a heavy administrative burden for any program. Trying to connect systems to the MCEN or getting software applications approved can take months or years, and at the end of the process, the answer could be “no.” If the DOD does not figure out how to streamline these processes while still protecting our data, we will put ourselves at risk of being outpaced by our competitors.

Funding is also a significant barrier to entry for CBM+. The 2023 National Defense Authorization Act directed Services to initiate or continue pilots to collect and synthesize telemetric vehicle data; the CBM+ budget was reduced by approximately 40 percent

in the same year. This caused significant reductions in the quantity of data loggers and MTTs the program procured. It also prevented expanding to III MEF during FY23 due to the substantial shipping and travel costs associated with implementing the program outside the continental United States.

In future years the program will expand to include fluid analysis, corrosion control, and reliability-centered maintenance data. While material and policy solutions are being developed to address these other pillars of CBM+, significant research is still required to understand how to harness their data to optimize maintenance and operational decisions. Moreover, research must be conducted to establish enterprise-wide reliability-centered maintenance analysis protocols that ensure platforms are measuring and collecting data on the things that give the greatest return on investment.

Conclusion

The CBM+ program is working to revolutionize Marine Corps maintenance and supply support by transforming data into valuable user insights. The team has identified the four lines of effort to facilitate full operational capability by 2030. In the short term, the program will focus on CAN bus sensors and historical GCSS-MC data to build models that predict failure, life cycle costs, and remaining useful life. However, these initiatives comprise only two of the five pillars of CBM+. Further research is required to understand how the program can expand to include fluid analysis, corrosion prevention, and reliability-centered maintenance analysis. CBM+ technology is being tested by five Marine Corps commands with plans to expand to nine by the end of FY23. The program’s most significant concerns are centered around cybersecurity and funding. If these issues are not addressed by the Service, the program and others like it could be at risk of failure.





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Logistics Digital Transformation

Enhancing product lifecycle management in the Marine Corps

by Mr. Tim Brimhall, Mr. John Estep & Mr. Greg Kellenberger

“We cannot continue to rely on the processes and procedures of yesterday and expect them to meet the challenges and threats of tomorrow.”

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

The Logistics Digital Transformation (LDT) team assigned to Program Manager, Logistics Integrated Information Solutions Marine Corps, provides information technology innovation to the Marine Corps logistics community at ever-increasing speed through digital transformation efforts. The LDT team is implementing industry product lifecycle data standards, leveraging modern digital technologies, and adopting adaptive software development practices to create new or modified logistics processes. The emphasis is on relentlessly challenging the status quo where it is no longer viable or valuable from a modern information technology perspective and delivering incremental value to the warfighter as rapidly as possible.

What is Digital Transformation?

Digital transformation is the process of using data in a digital form and infor-

>Mr. Brimhall is the Team Lead, Digital Transformation and Product Manager, Data Environment and Integration. He works with the Logistics Integrated Information Systems-Marine Corps Program Office and with Marine Corps Systems Command.

>>Mr. Estep is the Product Owner, Technical Data Management Platform and the Product Manager, Data Environment and Integration. He works with the Logistics Digital Transformation Team and the Logistics Integrated Information Systems-Marine Corps Program Office, Marine Corps Systems Command.

>>>Mr. Kellenberger is the Lifecycle Logistician, Product Manager, Data Environment and Integration and works with Logistics Integrated Information Systems-Marine Corps Program Office.

mation technologies to create new—or modify existing—business processes, culture, and customer experiences to meet changing business and market requirements. This reimagining of business in the digital age is digital transformation. The four pillars of digital transformation are people, processes, data, and technology.

It Starts with People

Digital transformation does not start with data or technology—it begins with people. People are paramount to transformation because all the data and technology in the world are only useful if it is helpful to the Marine performing the mission. This customer-focused approach gives the team and participants a more holistic view of the complex nature of DOD logistics and provides the transparency required to build trust. The LDT team engages with key stakeholders through product councils, which evaluate existing pain points to identify opportunities for better effectiveness and efficiency

through process improvement. The product council sets the direction of the technical data management (TDM) products, allocates resources, and provides insights into how the product performs. The TDM platform is a streamlined product data management platform for delivering current/accurate ground weapons systems and equipment information. The platform consolidates the data, information, and processes from several legacy logistics systems to improve data quality, integrity, and transparency while shortening process times.

It is Founded on Standardized Data

Digital transformation begins with people, but achieving it relies on accurate, transparent, and reliable data. Consolidating data from multiple legacy systems and then conforming it toward a common data standard is the key. To accomplish this, the LDT team implemented the Society of Automotive Engineers, Government Electronics, and Information Technol-

ogy Association standard for logistics product data. The DOD adopted this industry standard in April 2014 and set specific criteria for conducting product support analysis. Standardization creates a common language that enables seamless communication, integration, and interoperability with industry suppliers, the DOD, government agencies, the Department of the Navy, and other sister Services. The initial release of TDM-CATALYST has exposed a small percentage of these standardized data elements, with future releases revealing even more, leading the Marine Corps to ever-greater process automation.

It Incorporates Modern Technology and Software Development Practices into the Solution

The third element of the LDT paradigm is the team's technology and agile software development lifecycle. Utilizing cloud services, a low-code business process model, and modern database platforms coupled with a development,

as conditions change or user feedback dictates by utilizing continuous integration/continuous delivery. Incremental delivery improves efficiencies and aligns the finished product with end-user needs while allowing room for quick failures if project progress is not meeting the mission.

Process Transformation and Installation and Logistics 2030

Logistics digital transformation provides significant process improvement and automation opportunities to the Marine Corps logistics community and enables the vision of the *Installation and Logistics 2030 Plan*. An example of current LDT efforts is the automated update of component lists for Marine Corps equipment. The Stock List 3 (SL-3) documents inventoried and required components and accessories for individual weapon systems and other military equipment. It is an essential product for periodic inventories for accountability and equipment readiness. The data elements within the 1,469 Marine

the size and complexity of the equipment and inventory document being created. Once an SL-3 publication is released, updates are provided through naval messages requiring a Marine on the ground to perform pen and ink changes to the publication. The result is SL-3 information is out-of-sync with the actual bill of materials, which produces inconsistent, inaccurate, and untimely inventory findings. This inaccurate information leads to erroneous supply and maintenance actions causing delays in the repair, which decreases readiness and increases costs by ordering and stocking out-of-date repair parts.

The Solution

The LDT team will implement a solution to allow Marines in the fleet to directly access bill of materials information instead of abstracting it into a publication. The solution will leverage the TDM-CATALYST capability as the authoritative data source for managing the weapon system configuration BOM. TDM will refine the capability by automating realtime extractable SL-3 inventory listings directly from the system, including piece-part relationships and part images, to quickly identify items for inventory purposes. The revised process will ensure SL-3 extract is synchronized and available for download from TDM based on the initial weapon system baseline at fielding. Additional approved baseline configuration changes that occur during the lifecycle of the weapon system will automatically update the current SL-3 extract, which will include all additions, changes, and deletions for any data elements within the SL-3 format. Configuration management is maintained through the change promulgation log in TDM-CATALYST, with automated notifications occurring instantaneously to all Marines at every level of the chain of command based on their TDM-CATALYST in-system subscription or their unit table of equipment subscriptions. The automated SL-3 update capability is planned for deployment in FY23.

Future Considerations

Logistics digital transformation is

A major conceptual flaw with SL-3s is how they are created and distributed as traditional publications. Producing publications requires several manual tasks ...

security, and operations tool chain, the team performs short-timed, incremental delivery of capability—typically less than two weeks. This incremental approach to software development delivers the logistics community a usable portion of capability while providing feedback to the team for future development. Teaming Marine users with software developers helps ensure that these products meet the mission and are useful in their intended environments. Our innovative approach represents a departure from traditional software development projects. These antiquated approaches can take months to years to complete—only to find the original requirements were not met, were ill-defined, or had changed since starting the project. Instead, we can rapidly pivot

Corps SL-3 documents come from the bill of material information managed by Marine Corps program management offices using the TDM-CATALYST application.

The Problem

A major conceptual flaw with SL-3s is how they are created and distributed as traditional publications. Producing publications requires several manual tasks—including gathering information; drafting, formatting, reviewing and after approving the document—and then distributing the final product. Discussions with individual program management offices indicate that the current timeline to generate and distribute an SL-3 publication can range from three to twelve months, depending on

an ongoing process of continuously seeking out automation, technology, and process improvements to improve effectiveness and to serve the Marine in the field better. Introducing TDM's robust IT capability brings us closer to bridging the gap between the weapon system data and logistics functions performed in realtime.

A capability currently being explored is the development of the automatic creation of supply requisitions after an SL-3 inventory. Suppose inventories can be conducted on a mobile device or laptop. In that case, as items are found to be either missing or unserviceable, they can be automatically added to a data file to be either manually exported or transmitted across the network to the ordering system. Performing these functions simultaneously and sequentially will increase efficiencies and improve data quality by removing the manual inputs

between the two systems. It would also reduce audit findings regarding equipment being on hand or ordered.

Summary

SL-3 automation is only one of several opportunities the LDT team is exploring. We continue to explore opportunities identified through our continuous engagement with the logistics community to deliver products that improve processes at all chain of command levels. Automating tasks through synchronizing people, data, processes, and technology produces the results needed to keep pace with the Nation's adversaries. Achieving the strategic goals identified in the *Installations and Logistics 2030* plan requires a different approach that uses data and automation to accelerate its implementation. We cannot rely on past processes and procedures to solve future problems

and must be adaptive to change to meet logistics information requirements at the speed of relevance.

Program Manager, Logistics Integrated Information Solutions Marine Corps will bring Marine Corps Logistics Product Data into the 21st century with an intuitive application design that facilitates user interactions, provides high-quality data, and effective business process automation. PMLI2S-MC will continue identifying opportunities to transform logistics processes to ensure Marine Corps Logistics Information Technology warfighters the technical advantage over our Nation's adversaries.



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Project Tripoli

Shaping the future of Marine Corps training

by Mr. Ron Inmon & Mr. Carlos Cuevas

The 38th Commandant Planning Guidance states that we should train the way we expect and intend to fight. The 38th Commandant Planning Guidance further states that modernizing and finding better ways to train the FMF is one of the Marine Corps' top five priorities. Currently, training and, specifically, training devices were designed to meet a specific need for training. The forward-thinking into the future was lacking, and the ability to make an integrated, robust training environment that was connected and seamless was a far-off thought. Modern warfare and the ability to train the future generations of the Marine Corps needs to be updated and upgraded to provide a seamless interoperable training environment.

The Marine Corps, as part of the Joint Force, must be capable of competing with, deterring, and defeating a pacing threat in a contested multi-domain operational environment, requiring the Service to conduct integrated all-domain training across the warfighting functions. Training and Education Command's Project Tripoli, as defined in *Training and Education 2030*, creates a training environment capable of supporting a scalable, all-domain immersive training that meets the needs of today's force and supports the development and advancement of concepts in support of future requirements. Project Tripoli is envisioned to accomplish this mission by:

- Providing a distributed and deployable, live, virtual, and constructive training environment (LVC-TE) representing the current and future battlefield and threat.
- Providing modern simulators and simulations meeting the training objectives of *Force Design 2030* and

>Mr. Inmon is the Live, Virtual Constructive Training Environment Project Team Lead at Program Manager Training Systems. He has a Bachelor of Science in Information Technology and a Master of Science in Information Systems Management.

>>Mr. Cuevas is the Live, Virtual Constructive Training Environment Project Team Lead at Program Manager Training Systems. He has Bachelor of Science in Sociology and an Master of Business Administration.

“Training must be focused on winning in combat in the most challenging conditions and operating environments—from the thin air and high altitudes of the mountains to the sweltering heat of triple canopy jungles and including the sprawling self-organized chaos of dense urban terrain.”

—38th Commandant Planning Guidance

Training and Education 2030.

- Blending live, virtual, and constructive training into a single, multi-domain environment.
- Integrating instrumented range capabilities.
- Providing tools and repositories for rapid generation of training events and after-action analysis.
- Providing multi-echelon, joint, and multi-national training objectives.
- Integrating experimental warfighting concepts and applying wargaming results into a training environment.

What is Project Tripoli and how does it benefit the Marine Corps? *Training and Education 2030* outlines a vision for what Project Tripoli will accomplish:

Project Tripoli and the LVC-TE it creates will provide the means to conduct fully integrated training at all echelons, in all domains, connected

across disparate locations. In its fully mature state, the LVC-TE will create the system interoperability we need to fully integrate with joint and international LVC capabilities. The primary objective is to increase combat readiness at every echelon of command, while also allowing for experimentation with emerging concepts and technologies. The following vignette highlights the benefits of this rapidly evolving capability:

Picture an MLR Command Element in Hawaii directing live and virtual (piloted from linked simulators) F-35 Joint Strike Fighters located in Cherry Point, NC, receiving targeting data for virtual enemy ships from a live expeditionary advance base on San Clemente Island, CA, transmitting targeting data to an expeditionary strike group or executing a computer-generated naval strike missile attack,

all with a shared and complete operational picture among all participants.

Project Tripoli will modernize the training environments and simulators that provide a consistent and persistent connection that allows multiple locations and multiple training capabilities to be connected and interoperable. This will require a significant investment in infrastructure and technologies. Currently, efforts are underway to analyze the best methods to establish the LVC-TE network. LVC-TE will need to use an evolutionary approach to meet the current and future requirements. This approach will call for lots of experimentation with some expected failures along the way to provide the best training capabilities for the modern Marines. The first instantiation of LVC-TE will be this summer during SERVICE LEVEL TRAINING Exercise 4-23. Leveraging currently existing infrastructure, LVC-TE will connect multiple sites across the Marine Corps where geographically disbursed units will be able to train in the same exercise. This effort will mostly use capabilities that exist in constructive simulations as a pilot program. Lessons learned will be applied as the capability is expanded rapidly over time.

In FY24, the new Force-on-Force Training System-Next (FoFTS-Next) will be deployed at Twentynine Palms to support SERVICE LEVEL TRAINING Exercise 2-24. Project Tripoli will connect the live-training domain with the virtual and constructive environments and will be the cornerstone of the LVC training. FoFTS-Next is the next-generation force-on-force training system that will equip training units with the tools necessary to conduct realistic and challenging force-on-force training. FoFTS-Next will accommodate rapid changes and process the tremendous amounts of sensor data needed for force-on-force training, unmanned aerial systems, cyber, electronic warfare, and loitering munition capabilities in order to facilitate readiness. FoFTS-Next is a high-fidelity training system that has a higher accuracy for individual Marines engagements, providing the ability to instrument vehicles and weapons platforms currently unsupported



Training the Marine Littoral Regiment across all capabilities and domains requires a modernized integrated live, virtual, constructive training environment. (Photo by Sgt Israel Chincio.)

by the legacy force-on-force training system.

The Marine Corps' portfolio of simulations was originally designed as isolated, single-purpose employment concepts. Current requirements have changed as newer methods of training have evolved. Today's warfighter requires an integrated and interoperable system of systems focused on training readiness and learning outcomes. The present materiel solution was built on different operability and technical standards and is incapable of providing a federated system designed to support scalable training events. These scalable training events range from entry-level training, initial and advanced military occupational specialty training, unit-level training, and Service-level training to professional military education across all operational domains. The current solutions do not support integration with the Joint Force.

Training and Education Command, in conjunction with the Program Manager Training Systems, is conducting an exhaustive analysis of the current simulators in the fleet and assessing the usability of these simulators. Modernization efforts are underway to divest of legacy simulators that either are no longer being used due to the outdated capability being surpassed by current

technology or the requirement for massive investment in the system to close interoperability gaps. New and improved simulators will be aggressively pursuing new technologies that fit the learning styles of Marines today. Technologies that are being pursued use alternate reality and virtual reality capabilities. Common feedback from the fleet is that scheduling the use of current simulations takes time and doesn't always fit into unit training plans. The current simulators take time to prepare and usually require the unit to go to a facility and schedule time to use the simulators. By utilizing mixed reality devices, legacy simulators can be made smaller and deployable. Mixed reality simulators reduce the cost to build and provide more capability than can be currently procured. Increasing quantities and quality of more modern simulators means more Marines can be trained quicker and more efficiently. Modern deployable simulators allow Marines to get more of the correct reps and sets which ultimately increases readiness.

Additionally, range modernization efforts are underway to upgrade existing ranges to meet the demands of new training requirements. Modernization efforts will require a huge investment in infrastructure, range operations, and range-control systems. Additional in-

vestment will be a need for range safety tools to effectively manage and de-conflict multiple, simultaneous training events and exercises. Leveraging industry capabilities, the future ranges will be interconnected to include a critical seamless exchange of data across all domains. Training demands require near realtime data exchanges across multiple domains. The new infrastructure needs to have the capacity to pass information with low latency so that actions and reactions are almost instantaneous and not several minutes to several hours.

As the culture of the Marine Corps shifts back to the roots of a more Littoral mindset, training tools, and capabilities need to be more of a joint nature. The Marine Corps will be adopting the Joint LVC infrastructure. This capability provides the Marines with all the constructive simulations necessary to train in the multi-domain environment as well as position the Marine Corps to be the first Service that will be compli-

ant across the joint spectrum for training. Joint LVC puts the Marine Corps in a position to begin training now and provides a suite of tools that are ready out of the box.

To keep up with the rapid changes, the Marine Corps will need to adopt more modern approaches to acquisition to get these capabilities into the hands of Marines quicker. For the acquisition community, this means taking the approach of moving away from the stove-piped, proprietary solutions that exist today. The Marine Corps acquisition community needs to adopt the agile mindset as much as practicable. We need to look at communizing software and hardware products that enable us to push training devices to the fleet quicker and more efficiently. Program Manager Training Systems is looking at adopting an agile structure to be better equipped to react to the changes necessary to keep pace. Acquisition of new capabilities can no longer take five

years from conception to fielding and needs to shorten that window down to months. Utilizing new authorities granted by Congress allows for more rapid execution, another area where cultural norms will be disrupted and make us more agile.

The *38th Commandant Planning Guidance*, *Force Design 2030*, and *Training and Education 2030* all outline a need to modernize how Marines train and better equip Marines for the next actions. To achieve the vision of Project Tripoli, fast and rapid changes will need to be made, cultural norms about how to train Marines will need to change, and flexibility, policy, and innovation will need to be adopted mindsets. Project Tripoli will prepare the future force that can achieve intellectual overmatch against all adversaries in all domains.



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Know Thy Enemy

Lessons learned from the Chinese Civil War and the Sino-Vietnamese War

by 2ndLt David T. Tung

The onset of the 21st century ushered in the rise of China as a major world power. China has evolved into a multi-faceted geopolitical threat, projecting military power in the South China Sea while pushing the Belt and Road Initiative—its economically predatory global infrastructure development plan.¹ Xi Jinping’s intent is for China to supplant the United States as the global hegemon. With the freedoms of international trade and navigation becoming increasingly limited by China’s expanding sphere of influence, the Marine Corps finds itself reorienting towards the Indo-Pacific region to face this emergent threat with *Force Design 2030*.² Since a potential military confrontation between the United States and China looms large, an examination of the history and tactics of China’s People’s Liberation Army (PLA) can provide insights into how Chinese leaders think and operate. The value of understanding our future adversaries cannot be understated; as Sun Tzu writes in *The Art of War*, “Know thy enemy and know yourself; in a hundred battles, you will never be defeated.”³

This article analyzes the strategic and operational contexts of two battles in modern Chinese military history, the Battle of Jinzhou (1948) during the Chinese Civil War and the Battle of Lào Cai (1979) during the Sino-Vietnamese War. These pivotal battles serve as microcosms of the larger wars they represent, helping us better understand some of the lesser-known periods in the history of the PLA. Furthermore, these two battles teach us important lessons on decentralized command and the spectrum of attrition and maneuver warfare; both of these timeless themes are salient features of *MCDP 1* and play an integral role in *Force Design 2030*.

>2ndLt Tung is a student at *The Basic School*.

The Chinese Civil War (1927–1949)

The post-World War II phase of the Chinese Civil War saw Mao Zedong lead the PLA against Generalissimo Chiang Kai-Shek of the Kuomintang and his Nationalists. Despite outnumbering the Communists, possessing superior weaponry, and having the support of the United States, the Nationalists were ultimately defeated by the PLA in 1949, leading to the formation of the People’s Republic of China.⁴ *MCDP 1* states,

The value of understanding our future adversaries cannot be understated ...

“To best cope with the uncertainty, disorder, and fluidity of combat, command and control must be decentralized.”⁵ Chiang Kai-Shek’s inflexibility and mistrust of his subordinates led to his adoption of a highly centralized command structure. In contrast to this, Mao’s emphasis on decentralizing command was crucial in establishing a warfighting doctrine that enabled his commanders to generate the tempo of operations necessary to lead the PLA to victory. The Battle of Jinzhou was a turning point of the war; casualties inflicted upon the Kuomintang were so severe that after that battle, Communist forces outnumbered Nationalist

forces for the first time. After routing the Kuomintang at Jinzhou, a decisive Communist victory was inevitable.⁶

The Battle of Jinzhou (1948)

On 12 September, PLA forces commanded by Gen Lin Biao marched toward Jinzhou, a city both sides saw as integral to the control of Northeast China. Less than twenty miles east of Jinzhou stretched a narrow route through the city of Tashan; this served as the only access point between Jinzhou and the Nationalist base at Huludao. Understanding this, Lin Biao sent part of his force to Tashan to prevent the Nationalists from reinforcing Jinzhou. While Mao trusted Lin Biao to make his own decisions, Chiang Kai-Shek sent multiple waves of personal representatives to the front lines over the course of the fight at Tashan, sowing confusion and muddling the Nationalist chain of command. This led to a breakdown of command and control and ultimately prevented the Nationalists from penetrating the PLA blockade at Tashan. The failures at Tashan contributed to Chiang’s growing unpopularity; one commander, Lei Weichou, was even openly insubordinate.⁷

On 14 October, the PLA began its assault on Jinzhou. Throughout the attack, the Nationalists’ communications infrastructure began to deteriorate due to the same command and control issues that plagued their forces at Tashan. The PLA was known to frequently employ flanking attacks and guerrilla tactics, a style of fighting the Communists had previously implemented to great success against the Imperial Japanese during World War II. This emphasis on maneuver warfare necessitated the use of a heavily decentralized command structure. At Jinzhou, the PLA blasted holes through buildings to create new

angles from which to conduct flanking attacks. Lin directed his subordinate commanders to keep their forces as dispersed as possible so that the city could be swiftly seized; he would have been unable to achieve this effect if control of the PLA was not highly decentralized. These tactics allowed the PLA to act efficiently; after 31 hours of fighting, the Communists had taken the entire city.⁸ After the PLA consolidated at Jinzhou, Chiang Kai-Shek made a stop at Tashan to verbally berate his officers. His pride would lead him to order an immediate counterattack on Jinzhou against insurmountable odds; Nationalist forces were easily routed and subsequently forced out of Northeast China.

The Battle of Jinzhou and its immediate aftermath had swung the momentum of the war in the favor of the Communists.⁹ Chiang's micro-management directly led to repeated defeats and his micromanagement of governance indirectly hindered his war effort; rampant corruption throughout Chiang's government alienated American support as well as the support of his countrymen. Chiang tried to structure a unified fighting force by consolidating authority. However, Mao was able to establish unity of purpose by fostering an organizational culture that was built on trust and emphasized decentralized command.¹⁰

The Sino-Vietnamese War (1979)

The relationship between the Soviet Union (USSR) and the PRC soured in the 1950s, prompting China to begin turning away from the Soviet bloc and towards the West. This was followed by Mao Zedong's death in 1976, which gave way to changes in leadership and the rise of Deng Xiaoping, who proceeded to enact sweeping economic reforms in China and open up trade with the West.¹¹ In 1978, the Soviet Union signed a Treaty of Friendship and Cooperation with Vietnam as a sign of solidarity against China.¹² When the Vietnamese invaded Cambodia a month later, they ousted the Chinese-backed Khmer Rouge, further agitating Chinese-Vietnamese relations.¹³ China feared the USSR was now capable of encircling the Chinese Southern border



A communicator with 3d Marine Littoral Regiment tests equipment as part of a MAGTF Stand-in Force, focusing on the pacing threat in a contested and distributed maritime environment.
(Photo by Sgt Patrick King.)

by deploying troops into Indochina, so in February of 1979, Deng announced that China would conduct a limited attack on Vietnam. The Chinese declared that the invasion was intended as a punitive action for Vietnamese aggression in Indochina; to dissuade the USSR from interfering with this invasion, China rallied one and a half million troops along the China-Russia border on emergency war alert.¹⁴

The Battle of Lào Cai (1979)

Outside of several border skirmishes it fought against India in the 1960s, the PLA had not seen major combat since the Korean War. The Chinese military had also been slow to modernize; while investing in the military became one of the targets of Deng Xiaoping's reforms, the PLA in 1979 still lacked the combat experience and armament of the Vietnamese. Still, the Chinese forces greatly outnumbered the Vietnamese military; these factors prompted the PLA to return to the attrition warfare tactics they had utilized during the Korean War. The city of Lào Cai would give the Chinese access to a rail line that ran to Hanoi and was thus identified as a crucial city to seize. On the day of the invasion, the PLA advanced toward Lào Cai from the North,

the East, and the West, hoping to encircle the city and overwhelm it with alternating waves of fire and massive shoulder-to-shoulder frontal assaults. The Vietnamese, on the other hand, employed various forms of maneuver warfare through its use of extensive tunnel networks, surprise attacks, and booby traps; these tactics weakened the Chinese advance but were ultimately unable to hold out against the PLA's massing of dense frontal attacks.¹⁵ The PLA captured Lào Cai by the third day of the invasion, but not without heavy losses. The war ended after three weeks and six days when Chinese troops withdrew from Vietnamese territory, looting and destroying infrastructure along the way. Over the course of the invasion, Chinese forces were able to deal significant blows to Northern Vietnam's economic centers; however, Vietnam inflicted heavy casualties on the PLA and was able to maintain a presence of troops in Cambodia, causing both sides to claim victory.

Throughout the Sino-Vietnamese War, the USSR provided the Vietnamese with indirect support but stopped short of directly intervening because leaders in Moscow were unprepared to wage full-scale war with China solely to protect Vietnam.¹⁶ Though the success

of the Chinese invasion is subject to debate, Deng Xiaoping was able to orchestrate an invasion of Vietnam without provoking retaliation from the Soviet Union, a major world power that had sworn itself to defend Vietnam. Echoes of the geopolitical context that preceded the Sino-Vietnamese war resonate in today's growing tension between China and Taiwan.

Closing Thoughts

We learn from these case studies that decentralized command and the spectrum of attrition and maneuver warfare can dramatically shape the battlespace, regardless of the time period, advances

Toshi Yoshihara and James R. Holmes write in their book, "Red Star over the Pacific: China's Rise and the Challenge to U.S. Maritime Strategy," that "The jury remains out on how, and to what ends, Beijing will apply its burgeoning naval might ... Sun Tzu, Mao Zedong, Deng Xiaoping, and Liu Huaqing will exert influence on Chinese calculations. As Beijing embarks on its pursuit of command of the sea 'with Chinese characteristics,' to borrow the common formula used by Chinese thinkers, it will clearly consult far more sources than Mahan, and some of these indigenous sources may carry more weight than any Western theo-

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We learn from these case studies that decentralized command and the spectrum of attrition and maneuver warfare can dramatically shape the battlespace ...

in military technology, or participants involved. Mao's understanding of the principles of both maneuver and attrition warfare is demonstrated throughout his writings; in 1934, he wrote: "In every battle, concentrate an absolutely superior force (two, three, four, and sometimes even five or six times the enemy's strength), encircle the enemy forces completely, strive to wipe them out thoroughly and do not let any escape from the net."¹⁷ The PLA's history has shown that they understand the utility of maneuver warfare and will not shy away from the large expenditure of human lives required for attrition warfare. In addition to this, the Chinese military's modernization efforts have accelerated in recent decades; they are now capable of leveraging both the size of the population and the state-of-the-art military technology at their disposal. *Force Design 2030* highlights how recent advancements in precision long-range weapons will necessitate quick movement across seaward and landward portions of complex littorals; this can only be achieved by a force that is designed and trained to be highly dispersed, maneuverable, and decentralized.¹⁸

rist."¹⁹ Lessons we can learn from the past about the nature of war and the nature of our enemy will prove invaluable in future conflicts.

Notes

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Primacy of Coalition Warfare

First hand experiences
by LtCol Tom Williams (Ret)

Whenever I hear someone call themselves an expert or claim to know the formula for success, I am immediately suspicious. Success is often disguised as hard work, and in truth, there is no magic formula. However, successful tactics, techniques, and procedures employed in past conflicts are a good place to start. Every conflict, crisis, or war is unique, as are the military lessons I have learned from my participation in two tours in Vietnam, 1969–70, 1972–73, and the First Gulf War, 1990–91, also known as DESERT SHIELD and DESERT STORM. The purpose of this article is to make a comparison between both conflicts and to explain from my perspective the major differences. It is not my intent to glorify war, but once we, as nations of the free world, have exhausted all diplomatic options and have committed ourselves to a conflict, we must fight to win without additional risk to life, operational costs, and human resources as we mistakenly did in Vietnam. With the benefit of hindsight, useful and real benefits arise from my participation in both Vietnam and the Gulf War. Therefore, I have a clear understanding of the true cost and carnage of war, and I have formed strong opinions regarding our successes and failures during these conflicts. During the Vietnam War, there was no serious consideration given to destroying the will and capacity of the enemy to fight as we did in the Gulf War. The body-count measurement of success was not valid, nor was it a winning strategy, especially when the enemy was so resilient and willing to throw more human resources into the

>LtCol Williams is a retired Infantry Officer who deployed twice to Vietnam. In 1969–70, he was an Infantry and a Recon Platoon Commander. On his second tour, during the 1972 Easter Offensive, as a Vietnamese speaker, he was embedded with the Vietnamese Air Force at Hue City, flying 190 missions. During the First Gulf War, he was the Operations Officer for the I-MEF mobile command post. Currently, he lives on a 75-acre farm in southeast Queensland, Australia.

conflict. There has been much written about the Vietnam War, and there have been many who have expressed their reasoning for why we were there. As a young inexperienced company-grade

officer at the time, I did as I was ordered. *An order isn't an invitation to debate*, and I went to war.

Initially, after World War II, America wrongly supported the First French



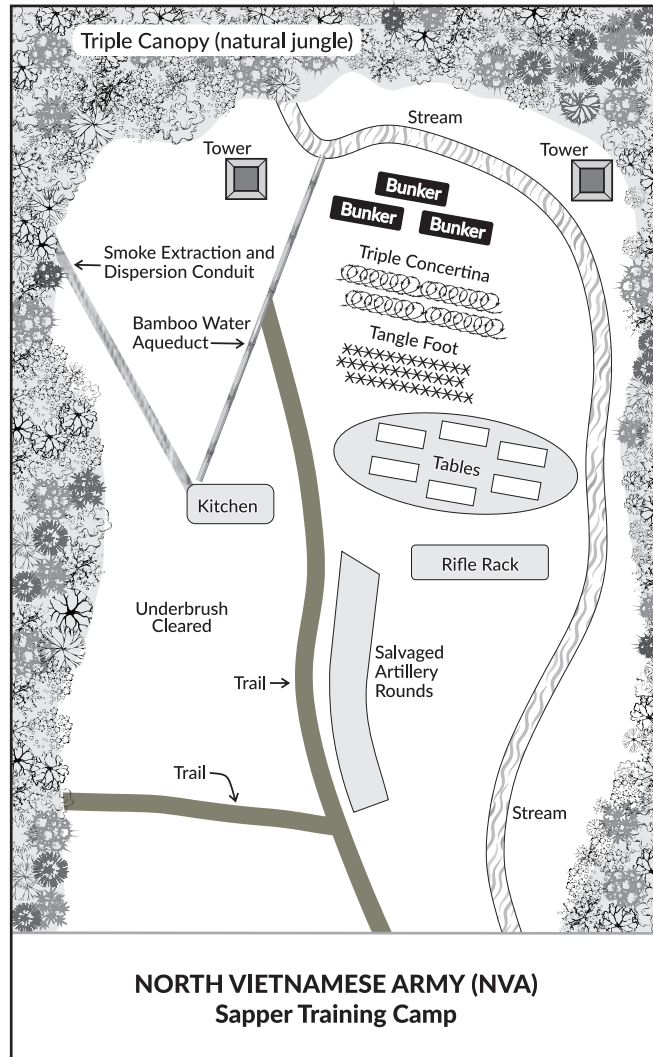
The author discovers a 1,000 pound North Vietnamese Army rice cache among other in the notorious "Arizona Territory" west of Da Nang in the central I Corps zone. (Photo by author.)

Indochina War in Vietnam while the French were rebuilding their colonial empire. Following the defeat of the French by the Viet Minh at Dien Bien Phu, America then backed a corrupt South Vietnamese regime against the Communists. This was the “Second Indochina War,” it was our Vietnam War. It was also a war in which America failed to bring the enemy to its knees, lost the support of the American people, and was finally forced, by public opinion, to withdraw.

In the Gulf War, the world community of nations had a unifying purpose and a credible threat to world peace, the invasion and occupation of Kuwait by Iraq. The purpose became the unifying factor, which was the glue that held the Coalition together. Therefore, it was unanimously agreed that Kuwait must be liberated from the ruthless and murderous Iraqi occupying forces numbering approximately five hundred thousand.

Another lesson learned was the necessity for national, international, and regional support. If it were not for Watergate, Nixon would have had that necessary support, in contrast to the Gulf War, whereby the UN made its voice heard, as the founders of the UN originally intended. Every opportunity was made to resolve the crisis politically but to no avail. In the absence of Iraqi compliance, the decision was made to engage the Iraqi threat with military force.

As a precursor to military intervention, real estate, militarily known as an intermediate staging base, was needed near Kuwait to assemble friendly forces. Saudi Arabia was concerned that Iraq would continue south from Kuwait and subsequently occupy their oil industry on the east coast, the King of Saudi Arabia, King Fahd, requested the United States to protect The Kingdom against

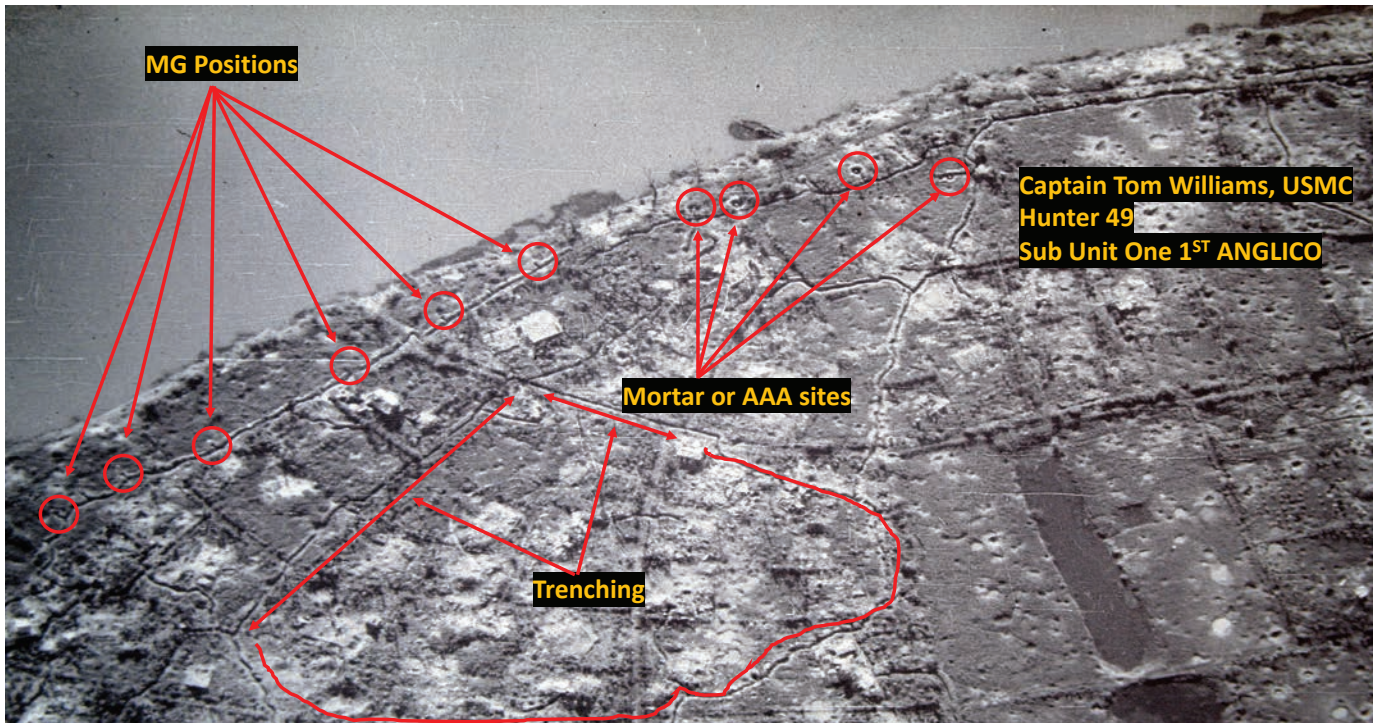


Sketch of an North Vietnamese Army sapper training camp in Vietnam. (Image provided by author.)

any such attack. Therefore, Saudi Arabia was used as our intermediate staging base to assemble, plan, prepare, train, and ultimately launch the Coalition force to liberate Kuwait. In Vietnam, we had South Vietnam as our intermediate staging base; however, for political reasons, we allowed the enemy to operate from sanctuaries in Cambodia, North Vietnam, and Laos; additionally, we never effectively isolated the battlefield, nor did we take the war to North Vietnam until it was too late under Nixon. We had the air power, but it was not focused on eliminating the will of the enemy nor was it employed to eliminate essential support facilities as we did in the Gulf War. The next lesson learned highlighted the logisti-

cal need in providing enough time to assemble, organize, and train a credible coalition force. From August 1990 to January 1991, forces from Europe, the Middle East, and the United States flowed into locations throughout Saudi Arabia and adjacent Arabian Gulf countries. From my perspective at the time, this was a surprise. I can only assume that the Iraqi dictator, Saddam Hussein, thought that he had the high ground and that the deployment was only a huge bluff. Although the Maritime Prepositioning Force concept was frequently exercised in peacetime training, the Gulf War was the first time it was employed for a real-world contingency. Leading the way for the deployment and build-up of Marine forces was the 7th MEB from Twentynine Palms, CA. Its mission was to establish a secure operating area and logistics support facility in the port of Al Jubail, Saudi Arabia, and to achieve the quick response required. The Marine Corps employed the strategic option called the Maritime Prepositioning Force. This allowed the 7th MEB from California,

assisted by a Navy support element, to rendezvous with equipment and supplies stored aboard forward-deployed Maritime Prepositioned Ships. The employment of the Marine Prepositioning Force concept was a real game changer for the rapid deployment of combat forces on short notice. Never in recent history had so many Marines been deployed so rapidly with the equipment and supplies to sustain them for 30 days. Not since World War II had there been such a large coalition of forces assembled in response to such an international calling. It was necessary to build a unique and exceptionally strong coalition of multinational, task-organized military force with many contributing nations providing air, ground,



Aerial photo taken by the author while flying an aerial observer mission over the Quang Tri Citadel during the 1972 Easter Offensive. (Photo by author.)

and sea forces—a Coalition air-ground task force.

Because of security considerations, it is difficult to be open, transparent, and inclusive when developing the war plan, but it is necessary. Therefore, a vigilant vetting process is essential to ensure there is no enemy on the inside without compromising the deep trust and relationships at all subordinate lev-

chain of command from the President through the Secretary of Defense directly to combatant commanders. Prior to the Gulf War, desert warfare training of the U.S. forces was a recurring training requirement for U.S. Services. Each U.S. Service component had its respective desert training areas. It is also significant to note that every second year a major staff exercise (Internal Look), a

region of the world. Americans often bring more to the table militarily and are often the leaders for multinational responses to international conflicts, however, they should guard against driving the situation by participating and listening more to dialogue during deliberations. In conclusion, I cannot over-emphasize the necessity to use military intelligence to drive the planning process and stress the importance of preparing the battlefield, another significant difference in our successful approach to winning the Gulf War that was a significant failure in the Vietnam War. The most noteworthy aspects of preparation of the battlefield during the Gulf War included the identification and destruction of the enemy center of gravity.

“Don’t allow yourself to be drawn into a fight with someone who has more reason to be in the fight than you.”

els across the joint and combined forces. My aphorism for achieving the necessary trust and confidence in a joint and combined environment is continuous coordination, synchronization, and collaboration to achieve common synergy for the accomplishment of the mission.

The most unifying influence for U.S. forces was the Goldwater-Nichols Defense Reorganization Act of 1986, which streamlined the U.S. military

command post exercise was conducted at the U.S. Central Command Headquarters, MacDill Air Force Base, near Tampa, FL. At the time of the Iraqi occupation, this exercise was just reaching a conclusion. Therefore, much of the exercise discussion came to fruition in the form of reality on the ground in the Middle East with the U.S. Central Command as the responsible headquarters for responding to a crisis in this

Personal Insight

Any consideration for the involvement of U.S. forces in future wars should always consider: how will we account for funding the war? What are our national security interests? Do the American people support our involvement? What is our mission and what is the desired end state? What is the strat-

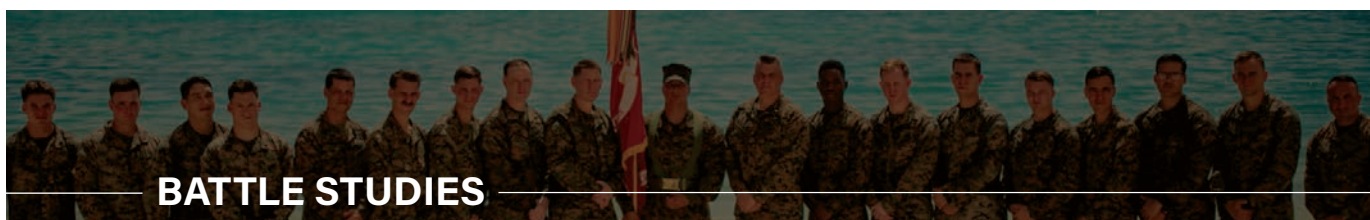


An Iraqi defensive sand table of Kuwait City. The author took this photo on the last day of offensive operations during the 1990–91 First Gulf War. (Photo provided by author.)

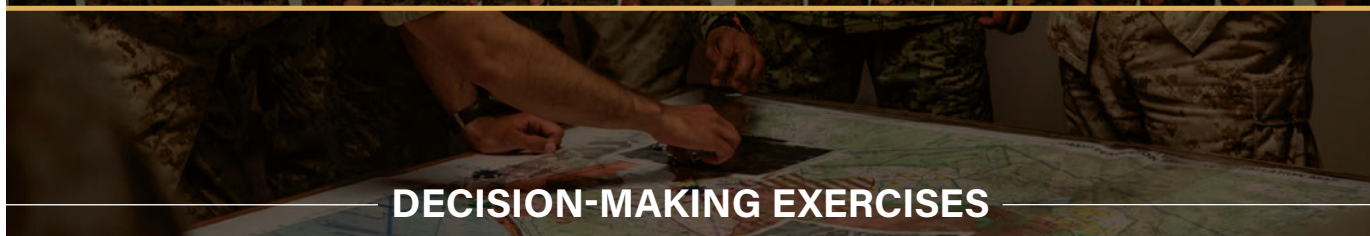
egy for winning the war? And how do we plan to restore the region to peace after the war? *Without clear answers to these questions, the United States should not be involved in any war.* Furthermore, we should never allow ourselves to be drawn into another country's civil war.

Don't allow yourself to be drawn into a fight with someone who has more reason to be in the fight than you.

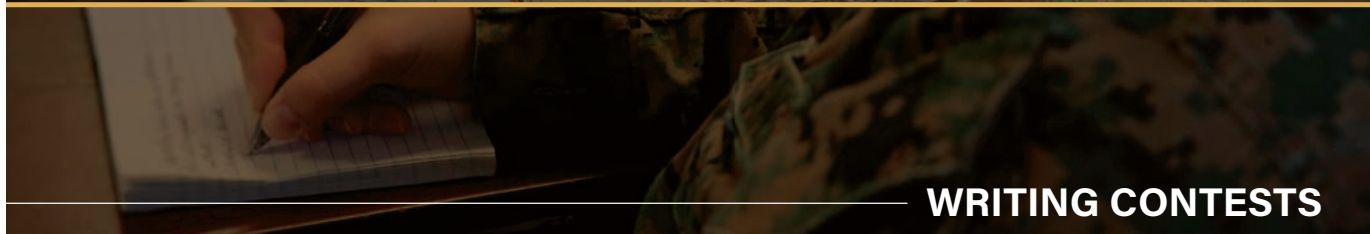
Failure to learn from these mistakes will ensure their repetition!



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Not Invented Here

The fast track to combat rifle excellence

by Mr. Andy Stanford

The average Marine evinces above-average expertise at rifle marksmanship when compared with members of the world's other large fighting forces. The Corps may even be the best "army" on the planet in this department. However, this is not the same as saying Marine Corps rifle training represents the current state of the art.

Ironically, if predictably, private sector programs—free from the fetters of bureaucracy and institutional inertia—have generally outpaced government efforts when it comes to teaching combat shooting and developing related doctrine. Special mission units from all Services (e.g., MARSOC, Army Special Forces, Navy SEALs, and Air Force Pararescue) have sent personnel to civilian schools and base much of their in-house combat small arms curricula on concepts, drills, and exercises initially developed in the private sector.

Private Sector Perspective

The late, great John D. "Jeff" Cooper—a former Marine lieutenant colonel who served in World War II and Korea—pioneered modern combat firearms training in the 1970s at Gunsite ranch in Arizona. A fair number of Marines have attended courses there in the past, on Uncle Sugar's dime, and some of Cooper's doctrine filtered back to the Corps. For example, he coined the terms "controlled pair" and "hammer pair" as used in Marine Corps combat marksmanship training.

Techniques and training developed by the private-sector firearms instructors who followed in his footsteps comprise the current state of the art worldwide. Today, scores of full-time trainers and schools ply their trade across the United States and overseas. Whether or not they have a military or police

>Mr. Stanford is a former Department of Defense Analyst, the winner of the 1994 National Tactical Invitational at Gunsite, a graduate of more than three dozen private sector shooting schools, and the author of several books on related topics. Since 1990, he has taught combat small arms courses across the United States, Europe, and Central America.

background, most teach curricula that include material far in advance of that covered in typical public-sector lesson plans.

Yes, I understand that training large numbers of men and women to a common standard is different than teaching small classes or individuals. In addition to working as a full-time trainer through my own company (Options for Personal Security), I once served as an adjunct firearms instructor at a police academy where our primary "product" was a basically qualified officer who could pass the state-mandated handgun course. In this capacity, I experienced firsthand a government bureaucracy teaching combat-shooting skills to large classes of recruits with widely varying degrees of aptitude. The curriculum in question could've been much more effective at producing real-world gunfighters had it more closely reflected the latest training methods. The Corps' rifle program is in a similar position today.

Marine combat rifle training has evolved in fits and starts over the last quarter century, while the aforementioned private-sector efforts have consistently improved by leaps and bounds. Make no mistake: the Marine Corps is still playing catch-up when it comes to combat rifle marksmanship training. No surprise since the Corps started late. If you need evidence, look no further than private-sector courses and combat competition from the 1980s.

The "Orange" Gunsite curriculum, Vietnam veteran Clint Smith's initial

Urban Rifle classes, and the Soldier of Fortune International Three-Gun Championships (with Match Director Michael Horne) are examples of relatively early civilian combat rifle shooting. These evinced a progressive approach lacking in the Corps' rifle training doctrine at the time, with a few notable exceptions such as the requalification-only "C" course in the 1960s and Maj Richard Jeppesen's (Marine Corps retired) developmental Basic and Transition Rifle Courses of the late 1980s. That said, there now seems to be significant momentum in the right direction at last because of the Marksmanship Program Management Section at the Weapon's Training Battalion, Quantico.

The Swiss Way

Theoretically, it should be possible to accelerate recent improvements and implement long overdue changes sooner than later. However, fast-tracking Marine Corps combat rifle training doctrine will require a much more aggressive approach to curriculum development. The Swiss Army—no strangers to precision rifle marksmanship—provides one possible answer. The following description of their methodology is from a briefing ("Directives in Training") given to the British army by the Swiss in 2007, under the subject heading "The Swiss Way."

Open-Source Development

1. Publish quickly and often.

2. More developers equals fewer bugs.
3. Other developers are our greatest resource.
4. Steal good ideas.
5. Perfection equals nothing to remove.
6. Use resources in unexpected ways.

Given the large number of combat small arms trainers in the United States today, items 3 and 4 above represent a great opportunity for the Corps. Private sector instructors and schools have combat rifle training expertise that far exceeds anything that existed in the past.

But of course, it is not that simple, as addressed in another example from the Swiss Army briefing, which defines the role that people play in making any progress. The upshot is that all human societies and organizations—including the Marine Corps—are complex adaptive systems, and interactions of the human factors below ultimately determine the outcome of any endeavor.

5 Elements of Complex Adaptive Systems

1. Conformity enforcers.
2. Diversity generators.
3. Internal judges.
4. Resource shifters.
5. Intergroup tournaments.

In the past, the specifics of Marine Corps rifle marksmanship training have usually been defined by the first group, conformity enforcers, with the occasional diversity generator advocating some noteworthy change. The Corps' internal judges have generally ruled in favor of the former. To overcome this institutional inertia, Marines responsible for the rifle training curriculum, at all levels, must empty their cups of current assumptions to make room for new knowledge. A wealth of suitable ideas from sources like those below represents low-hanging fruit ready to be picked right now.

Subject-Matter Experts

Below are listed a dozen private-sector instructors, each selected for his potential contribution to Marine Corps combat marksmanship training. Note that the majority of those below are military combat veterans, and even those whose expertise derives primar-



The Advanced Marksmanship Training Program utilizes Marine Corps Base Camp Lejeune facilities to increase Marines' proficiency as riflemen. (Photo by LCpl Collette Hagen.)

ily from competition have served as full-time civilian armed professionals. I have specifically omitted pioneering individuals such as Massad Ayoob, who specializes in self-defense for private citizens, schools such as Gunsite and Thunder Ranch whose curricula are now on the conservative end of the spectrum, and trainers who focus purely on competition. In no particular order:

Travis Haley, Haley Strategic Partners: Haley served as a Force Recon Marine, then a contractor in Iraq and Afghanistan. With psychologists, kinesiologists, and other sports doctors on staff, he addresses several aspects of human performance not covered in most other programs. His courses stress the ability to shoot under disruptive conditions such as environmental extremes.

Mike Seeklander, Shooting Performance: A DESERT STORM veteran Marine and world champion practical shooting competitor, after 9/11 Seeklander worked as the lead firearms instructor for the Federal Air Marshalls. He teaches rifle and handgun skills courses around the country and offers an extensive library of written and video courses covering key topics from his curriculum.

Paul Howe, Combat Shooting and Tactics: This Army special forces veteran fought in the battle in Mogadishu

as a member of "The Unit." Howe's combat rifle courses teach time-tested marksmanship fundamentals at a high level of execution. (See the CSAT website for his performance standards.)

Kyle Lamb, Viking Tactical: Another Mogadishu veteran of the Army's top special forces unit, Lamb offers rifle courses that include firing from inside vehicles and around barricades, plus significant practice at shooting from the non-dominant shoulder, with an emphasis on both accuracy and speed—the latter precisely quantified by electronic shot timer.

Pat McNamara, TMACS: Yet a third Army veteran of "The Unit," McNamara's curriculum features progressive drills that can be physically demanding at times. The author of the book *Tactical Application of Practical Shooting*, he is a highly innovative instructor whose performance-based training emphasizes escaping what he calls "the flat range mentality."

Craig "Southarc" Douglas, Shivworks: This Army Ranger veteran and retired police lieutenant specializes in extreme close-quarters combat. Douglas is a master at teaching the techniques required to prevail in a contact distance fight. For reality-based training at the near end of the range spectrum, he is the current duty expert.



Weapons and Field Training Battalion conducts the Advanced Marksmanship Training Course at Edson Range, Camp Pendleton, to give Marines a more practical understanding of their weapons. (Photo by Cpl Anthony D. Pio.)

Greg Hamilton, Insights Training: Ex-Army-Ranger Hamilton also served as a special forces reservist and a contractor in Iraq. A seasoned tactician, he always provides a solid combat rationale for everything he teaches. Students leave his courses knowing not only what to do, but when, where, how, and why as well.

John Holschen, Heiho Consulting: Holschen, a career Army special forces team sergeant who also worked as a contractor in Iraq, taught alongside Greg Hamilton at Insights before striking out on his own. He is not only a master tactician and gifted instructor but also highly experienced in military training curriculum development.

Tactical Response: Company founder James Yeager was a former cop who served as a security contractor in Iraq. He recently died of ALS, but his innovative curriculum lives on in the courses taught by Tactical Response, covering fighting with firearms in 360-degree environments, as opposed to shooting skills alone.

Bennie Cooley: A former member of a full-time, civilian sector tactical team, Cooley is also a highly successful, top-ranking competitor in both three-gun and long-range precision rifle matches. (For pure three-gun competition coach-

ing, other champion shooters such as former Marine Barry Dueck would also fill the bill.)

Bill Rogers, Rogers Shooting School: Rogers got his start at the FBI but quickly realized that the Bureau's firearms training left much to be desired. His Ellijay, GA, school teaches shooting at reaction speed on an innovative computer-controlled, pneumatically activated, steel target system. He has trained literally thousands of U.S. military special operations personnel since opening his school in the 1970s.

SureFire Institute: Founded by former Navy SEALs, SureFire Institute pioneered low-light force-on-force training and tactics. Plankholder Dave Maynard tested these concepts in combat as a government contractor overseas and teaches his system to bona fide law enforcement, military, and intelligence personnel.

Taken in total, the above expertise, adapted to the needs of the Marine Corps, could quickly turbocharge Marine Corps combat rifle training. Per the Swiss Army curriculum development model described previously, the Corps should contract each of the above instructors to teach classes to key Marine training personnel, then shamelessly steal as many good ideas

as apply—teaching methods, shooting techniques, drills and exercises, target systems, etc. Likewise, invite them to participate in the annual Marine Corps combat rifle symposium. The resulting whole would greatly exceed the sum of its parts. The effects of any potential changes should be evaluated via live-fire testing with a comprehensive set of diverse, combat-relevant shooting problems that test practical marksmanship and weapons handling skills over the entire spectrum of likely engagement conditions.

Parting Shots

In 1990, after giving my first-ever briefing on Marine combat rifle training to noncommissioned officers at the School of Infantry Camp Pendleton, a salty gunnery sergeant walked up to me and confidently declared, "You can say whatever you want, but you ain't gonna change the KD course." On one hand, the program of instruction at recruit depots and The Basic School support this assertion. On the other hand, the Corps *has* instituted annual combat rifle training that it never dreamed of before. The most likely future scenario is that the Marine Corps rifle curriculum will inevitably evolve as Marines gain more experience with task-specific training.

Institutional issues still conspire against the complete abandonment of a National-Match-type course, which has historically set the tenor for the entire effort. (See *Marine Combat Rifle Marksmanship Training: The Good, the Bad, and the Underlying Issues*, [MCG, Jul16], for my thoughts on this matter.) Nonetheless, the fact remains that adopting ideas from top private sector instructors could greatly improve Marine Corps rifle training, and quickly too. Again, the Corps would do well to invite a representative sample to their annual Combat Marksmanship Symposium. The time is long overdue to provide cutting-edge, task-specific training required to make every Marine a truly competent on-demand combat marksman.



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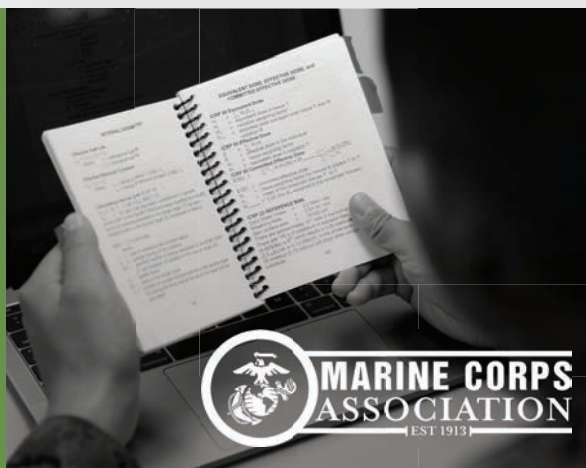
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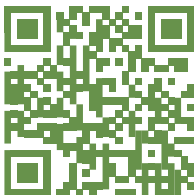
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It's Never Been Just a Shooting Game

How participation in marksmanship competition enhances individual and unit lethality

by Capt Philip "Vroom" Williams

Since the inception of the Marine Corps Shooting Team in 1901, the Marine Corps has recognized the increase in combat readiness that came from participation in marksmanship competitions. The Marine Corps recognized that competition produces the advancement, innovation, and discipline needed to succeed in combat operations. Competition is an integral component of combat readiness, the Marine Corps instituted the Competition in Arms Program (CIAP). Through this program, Marines are empowered and encouraged to participate in marksmanship competitions, establish unit teams for intramural marksmanship competitions, and send their best shooters to regional Marine Corps Marksmanship Competitions (MCMCs). The top ten percent of competitors from all regional MCMCs are invited to the Marine Corps Championships by the Marine Corps Shooting Team and have the potential to augment the Marine Corps Shooting Team during the summer competition season. The skills these competitors learn through competition make these Marines and their units more lethal: "As an annual testbed of marksmanship concepts, participation in the CIAP inspires innovation, providing the setting to continually advance Marine marksmanship lethality."¹ Participating in shooting competitions will quantifiably increase the lethality of individual Marines and promote Service-level marksmanship advancement.

By participating in shooting competitions, individual Marines will become more lethal with their issued weapons.

>Capt Williams is a CH-53E Pilot currently serving as the Marine Corps Shooting Team Officer-in-Charge.

Members of the Marine Corps Shooting Team provide advanced marksmanship instruction at MCMCs. The periods of instruction are based on the experience team members have gained through advanced marksmanship competitions. These periods of instruction during the MCMCs make sure that every Marine who participates will go back to his unit as a more lethal warfighter. Marines who participate in MCMCs during Fiscal Year 2023 received three

of ARQ participants across the FMF scored expert, 48.15 percent scored sharpshooter, 25.21 percent scored marksman, and .78 percent failed to qualify. Of the Marine competitors who participated in ARQ at MCMCs during the 2023 MCMC season, 46.26 percent qualified expert. This is almost double the number of experts compared to the FMF. Sharpshooters were similar to the FMF at 45.98 percent. Only 7.47 percent of competitors scored marksman, which was less than one-third the number of marksmen in the FMF. Marines who participated in the CIAP scored significantly higher on ARQ compared to Marines who did not compete.

As a Service, the Marine Corps has leveraged the benefits and byproducts of

As a Service, the Marine Corps has leveraged the benefits and byproducts of marksmanship competition in some of the newest Service-level marksmanship training and evaluation.

days of instruction with service rifles and service pistols on advanced marksmanship skills and techniques including engaging moving targets and night marksmanship. The competitors then put these skills they have learned to the test in individual and team competitions as well as the annual rifle qualification (ARQ). The Marine Corps Shooting Team compared the ARQ scores of MCMC participants to the ARQ scores of the rest of the FMF. The numbers were staggering. In 2022, 25.87 percent

marksmanship competition in some of the newest Service-level marksmanship training and evaluation. The Marine Corps has come to understand that marksmanship lethality must factor speed along with accuracy. Therefore, infantry marksmanship training better reflects this reality in the Infantry Marksmanship Assessment (IMA) and the Advanced Marksmanship Training Program (AMTP). AMTP incorporates drills, standards, and equipment setup, which have their roots in competition



SSgt Germano, an instructor with the Marksmanship Program Management Section, Weapons Training Battalion, Quantico, prepares to conduct a transition drill during the Marine Corps Marksmanship Competition. (Photo by SSgt Christian Cachola.)

shooting. The scoring method for the final test of AMTP, the IMA, is also directly derived from competition as a ratio of score divided by time, also known as the hit factor or lethality factor. Each Marine is competing with himself/herself to meet the demanding marksmanship standards. In the IMA, there is no maximum score because it is a function of time as well as a point value for hits. This means that there are no limits to how far Marines can push themselves competitively except for their own discipline and drive. Furthermore, the AMTP forces students to perform on demand and without preparation. This aspect sets the conditions for students to take their training seriously because it is the only thing that they will have to fall back on. Shooting competitions and combat both force this same on-demand performance. Due to the competitive aspects of the IMA and the demand in the AMTP for on-demand performance by training incorruptible gun-handling skills, AMTP participants in Infantry Marine Course possess “dramatically higher weapons handling and employment skills than have been achieved in the past.”²

Marksmanship competition needs to be an integral part of unit training. However, due to the operation tempo

and a lack of available time, many unit leaders are reticent to prioritize participating in competitive marksmanship. The stacked requirements of unit training progression through the *Training and Readiness Manual* coupled with

Marksmanship competition is more than a game ...

the day-to-day operations of an infantry battalion leave little time to prioritize formal training for the purpose of individual marksmanship skill through competition. The word competition gives the connotation of a simple game that does not affect unit readiness or lethality or does not appear to have a return on investment when viewed through that lens. However, the benefits of training marksmanship through competition cannot be overstated. This does not mean that every range needs to be set up as a match, but there are other ways to incorporate competition into marksmanship training. For example, a unit could use one range per month

for the purpose of individual advanced marksmanship training and competition. Another option available through the CIAP is to issue weapons and ammunition to Marines to attend a local civilian match. Range planners can create an intramural match for units to yield a culture of competition excellence. Additionally, sending highly skilled combat marksmanship coaches or combat marksmanship trainers to participate in MCMCs will pay dividends in improving any unit’s marksmanship program by equipping these combat marksmanship coaches or combat marksmanship trainers with advanced marksmanship knowledge to train their Marines.

The primary venue for sustained high performance is found in competition. As Pete Carroll, the coach of the Seattle Seahawks states, “[w]e’re in a relentless pursuit of finding a competitive edge in everything we’re doing.”³ Shooting competitively creates that edge in terms of individual lethality. Marksmanship competition has been shown to significantly increase an individual Marine’s shooting ability. The recent Service-level marksmanship training advances of the IMA and AMTP leverage these benefits. Units, regardless of specific mission, need to prioritize shooting competitions to keep up with the Marine Corps’ modernization efforts and Force Design. Marksmanship competition is more than a game—it is an integral part of the Marine Corps ethos of *every Marine a rifleman*.

Notes

1. Headquarters Marine Corps, *2018 Marine Corps Rifle Marksmanship Lethality Capabilities-Based Assessment* (Quantico, VA: November 2018).
2. Headquarters Marine Corps, *Training and Education 2030* (Washington, DC: January 2023).
3. Michael Gervais and Pete Carol, *Compete to Create* (Newark: Audible, 2020).



Exploiting Success

by Mr. Joseph Miranda & Dr. Christopher Cummins

MCDP 1-3 states, “The successful leader exploits any advantage aggressively and ruthlessly not once but repeatedly until the opportunity arises for a finishing stroke. We must always be on the lookout for such opportunities—whether we create them ourselves or they arise in the flow of action.”

A major historical example of exploitation comes from the German campaign in the West, 10 May to 25 June 1940. Historically, the Germans were up against considerable Allied forces when the campaign commenced. Among other things, the French and British fielded more tanks than the Wehrmacht. In addition, France’s Rhine frontier was defended by the Maginot Line, a modern fortification system. The Allies would add to their order of battle the Belgian and Dutch armed forces upon the Germans invading these countries during the campaign. Yet, in the span of six weeks, the Germans gained a stunning strategic victory, with France, Belgium and the Netherlands surrendering while the British Expeditionary Force was forced off the continent.

A major reason for the German victory was their high command developed a plan under the supervision of Gen Erich von Manstein to exploit the advantages of a concentrated armored force (Panzergruppe Kleist, named after its commander). The Allies believed the rough terrain of the Ardennes region of southern Belgium was unsuitable for large-scale armored operations and thus did not defend the region. The Germans

>Mr. Miranda is a prolific board wargame designer. He is a former Army Officer and has been a featured speaker at numerous modeling and simulations conferences.

>>Dr. Cummins, PhD, MBA, is the publisher of Strategy & Tactics Press and CEO of Decision Games. He has led a team in publishing over 400 board wargames and 600 magazine issues over the past 35 years. He is a former Army psychologist and continues to practice part-time specializing in assessing, testing, and treating individuals with stress disorders.

took advantage of the Allied assumption for Kleist to drive through the Ardennes and then for the Panzers to exploit through to the English Channel. This exploitation maneuver cut the line of communications to the Allied armies in Belgium from those in France and allowed the Germans to defeat the Allied forces in detail. Following the evacuation of British forces from the port of Dunkirk, the Germans launched a second major offensive to capture Paris and forced a French capitulation.

Exploitation was down to the tactical level. Panzer commanders such as Heinz Guderian and Erwin Rommel took advantage of situations as they arose, notably to seize and then break out of bridgeheads on the Meuse River in the first days of the campaign. These commanders did so often without consulting higher headquarters, acting on their own initiative to take advantage of situations as they presented themselves. The result was the Allies, hampered by slower reaction times, could not keep up with the pace of German operations. In today’s terms, the Germans had a faster OODA loop (observe, orient, decide, act), leading to the disorientation of the Allies

and gaining the decision at various stages of the campaign.

MCDP 1-3 adds, “Like the chess grandmaster, we must think ahead to our next move and the one beyond it: How am I going to use this advantage to create another one?” And, “Once we have created leverage, how do we take advantage of it? A decisive result or victory rarely stems from the initial action, no matter how successful. More often, victories are the result of aggressively exploiting some relative advantage until one becomes decisive and the action turns into a rout.”

Let us look at how exploitation is a major factor in Decision Games’ *Manstein’s War*.

Exploitation in 1940

The central game system of *Manstein’s War* is based on *command markers*. Players draw command markers randomly, and these generate control for various forces—usually those under specific army groups. The Germans have an additional marker for Panzergruppe Kleist, an army echelon formation controlling several Panzer (armored) corps. This game system models a wide range of not just command

control factors but also fog of war and doctrinal factors. As with the original campaign, much in the game is up in the air. The player who can better exploit opportunities will gain the edge.

Manstein's War gives players the big picture. Maneuver units are mainly army echelon, with mechanized forces shown as corps. Since players do not know ahead of time which command markers will be picked and in which order, the player must be alert for opportunities. For example, the Germans pick Army Group A and use it to force open a gap in the Allied lines. They then pick Panzergruppe Kleist and drive its Panzer Corps through the gap, with spearheads cutting off Allied forces from their lines of communications.

There is an element of chaos in the game system, but there are ways players can anticipate the situation and bring in some order. One is by



employing special command markers such as *Rommel* and *De Gaulle*. These are one time use markers to allow for up front leaders who took the initiative to seize opportunities as they appeared. On 17 May, Gen De Gaulle launched an armored counterattack with his 4th *Division cuirassée* (armored division) at Montcornet. The attack gave the Germans some concern, though owing to a lack of reserves De Gaulle could not exploit it.

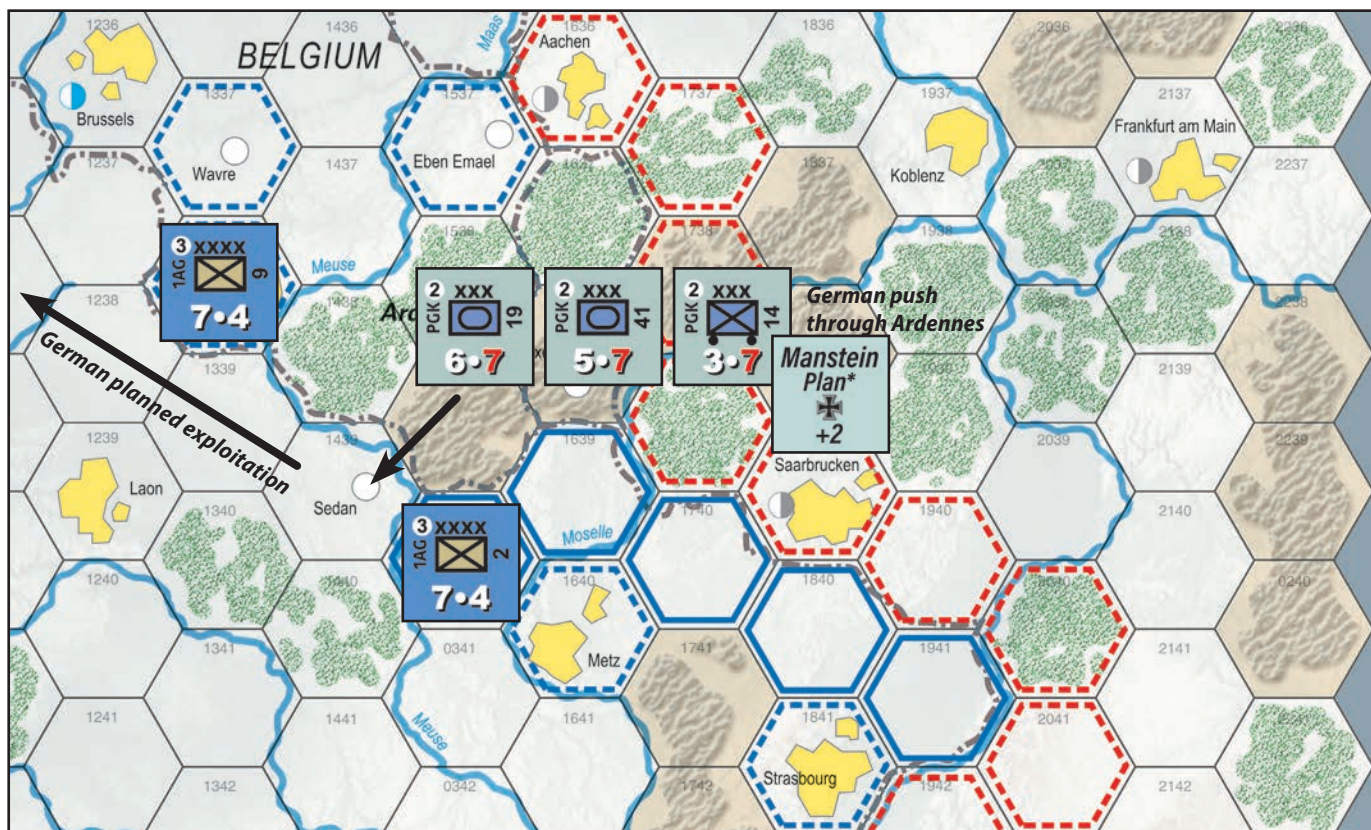
On the German side of the game, the *Manstein Plan* marker provides an attack bonus for Panzer units. Critically, it allows for enhanced operational capability in the Ardennes sector where the Germans broke through the Allied defenses and drove to the English Channel coast.

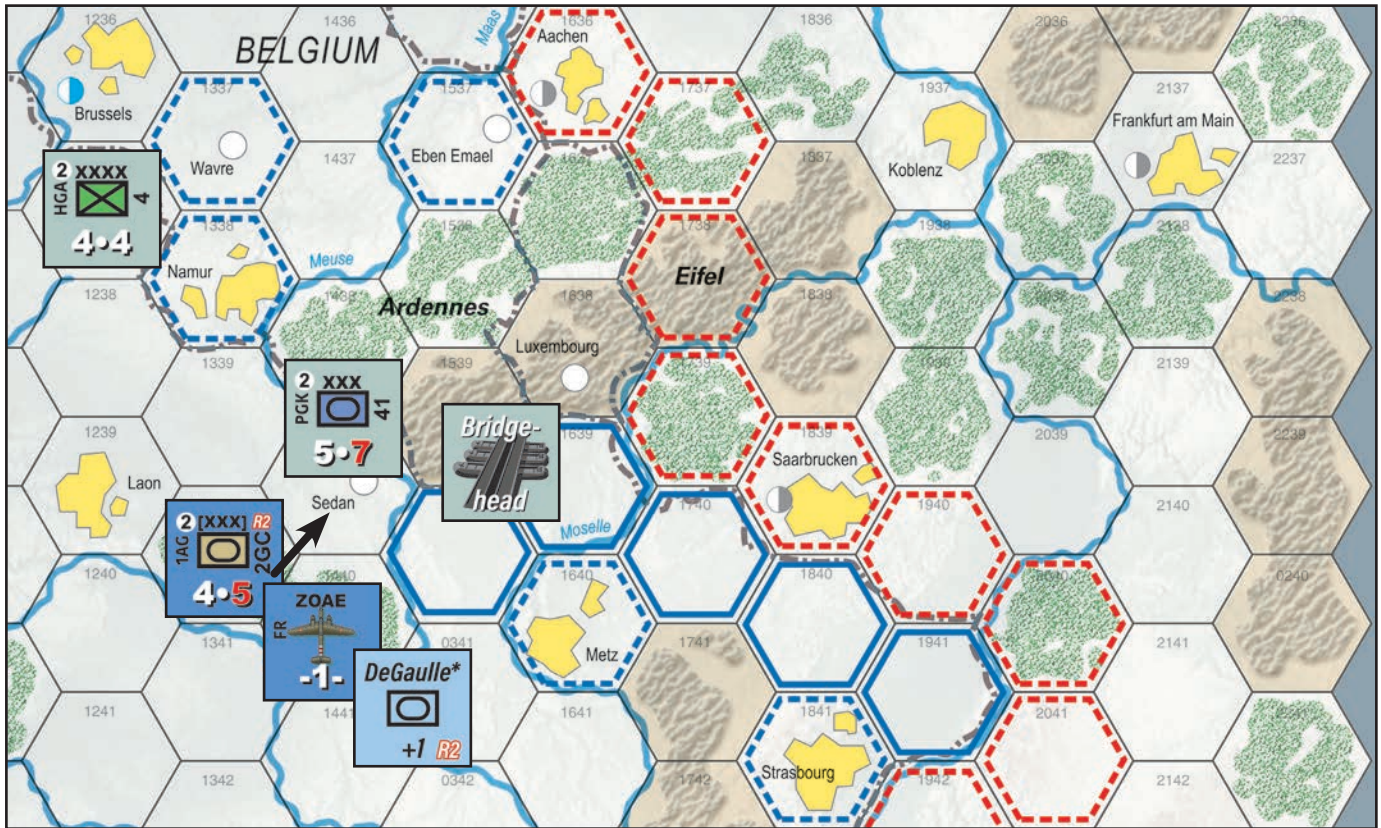
MCDP 1-3 notes, “The reserve is an important tool for exploiting

success. The reserve is a part of the commander’s combat power initially withheld from action in order to influence future action.” And, “[Another] way to exploit advantage is through pursuit. A pursuit is an offensive tactic designed to catch or cut off a hostile force that has lost cohesion and is attempting to escape in order to destroy it.”

Reserves are a critical component to player strategy. It is here where the Germans have something of an advantage. Airpower is a major reserve asset players can commit across the front. The Luftwaffe has a considerable edge in numbers against the Allies air forces. Also, the Germans can airlift an airborne corps in the Allied rear to seize critical objectives or to enhance a ground attack via vertical envelopment. The German order of battle includes several special forces units to use in connection

Breakthrough on the Meuse. German Panzergruppe Kleist, operating under the Manstein Plan, move through the Ardennes. They attack against a weak point in the French defenses at Sedan which they will exploit to drive into the Allied lines of communications.





Counterattack at Sedan: German 41st Panzer Corps has established a bridgehead across the Meuse River at Sedan. Allies use the De Gaulle marker to launch a counterattack with an armored group, supported by an airstrike. By retaking Sedan, the French can drive into the rear of German Fourth Army at Namur. French air support provides reserve combat power.

with conventional assaults to destroy enemy fortifications (for example the German glider-borne commando assault against the Belgian fort at Eben Emael on 19 May destroying this linchpin to Belgian defenses). Thus, the player can add weight attacks at decisive points.

Pursuit is a vital part of operations in *Manstein's War*. Units can lose strength because of combat, depicted by replacing full strength units with game pieces of progressively weaker combat power. Multiple attacks will lead to the destruction of enemy forces on the run.

On the operational level, the Germans have a *Fall Rot* (Plan Red) command marker they can add to the command pool once they have consolidated their conquest of Belgium. Fall Rot provides an additional general offensive involving two army groups and additional

Luftwaffe support. This marker models the impetus from the Wehrmacht's victories in the first stage of the campaign which the Germans exploited to complete the conquest of France.

Overall in *Manstein's War*, both sides deploy forces with about equivalent combat power. However, the Germans have the advantage when it comes to factors of maneuvers, reserves, and exploitation. Still, the Allies can gain their own advantages by clever play. It is up to both commanders to exploit the situation to gain victory in the West in 1940.



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YOU'VE READ IT, NOW PLAY IT!

MANSTEIN'S WAR

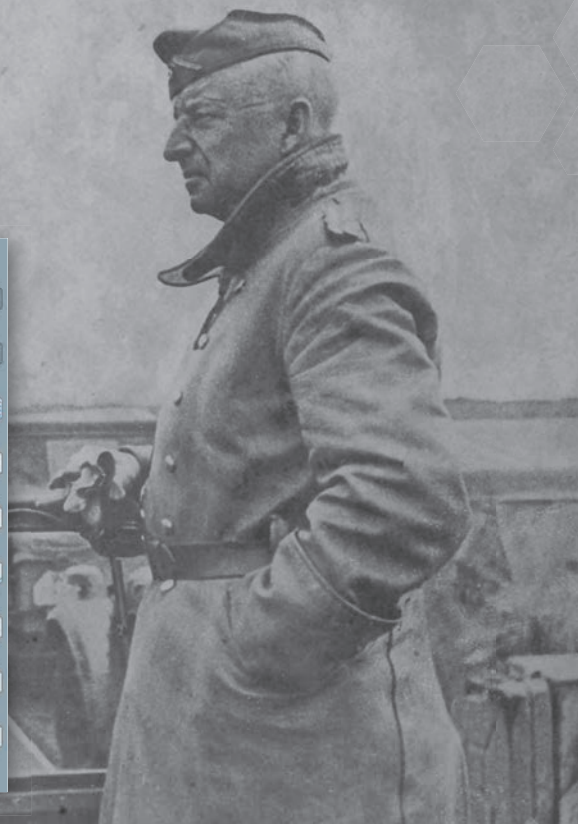


DECISION IN THE WEST 1940

Map: 22x34-inch
Counters: 176 5/8-inch
Players: 2 (Germany vs. Western Allies)

Counter Level: Armies—Corps
Hex Scale: 24 miles (39 km)
Turn Scale: 1 week
Game Length: 8 turns

Manstein's War: Decision in the West 1940 is a wargame of the German offensive in Western Europe in May–June 1940 in which the Wehrmacht seized a stunning victory over Allied forces in the Low Countries and France. The game uses a variant of the *Boots* system to model command, control, and logistics on an operational scale. Both players can fight a campaign of mobility and decisive battles. Each player uses command markers to activate their forces, which are divided into sub-commands (army groups and similar echelons). Each player has special markers which provide additional operational capabilities. Can you turn the tide of history in that decisive spring of 1940? 🌟



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— Press release dated April 6, 2023



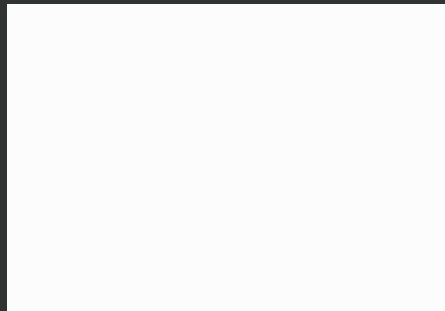
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