# The Expeditionary Communicator

## The naval C4 integration imperative
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In a Congressional hearing during spring of 2012 Gen James F. Amos told congress, "The Marine Corps is not designed to be a second land army," regardless of our success in Iraq and Afghanistan, he said the Corps "is designed to project power ashore from the sea." With the Corps' shift back to its amphibious roots, the Marine communicator faces a significant deficiency in the understanding of amphibious doctrine, blue-green system integration, and expeditionary communications. For nearly two decades, a generation of Marines have "relieved in place transfer of authority" between forward operating bases at a cyclic rate to existing infrastructure and settled into firm bases with objectives to maintain and optimize existing tactical networks. Moreover, the reliance on heavy civilian contractor support exponentially grew over this time because of a technically deficient qualified force. The expeditionary communicator skills have atrophied in this environment. The Marine communicator has an entry-level basic training curriculum focused on specific systems and very little time is spent on theories and employment concepts. System specific operator training is inefficient. In particular, training does not include theories and principles of amphibious communication.

## A Vision for the Future Force

In March 2014, Gen Amos laid out a new vision for the Corps through a document called *Expeditionary Force 21*. In the document, he recognized the need for the Marine Corps to restructure and refit to remain a force that is true to its amphibious roots. The Marine Corps' unique capability of immediate power projection coupled with credible decisive action against our Nation's foes makes our Service an indispensable tool for the President and is a peace of mind to the American people. However, the complexity, speed, and dispersed nature of current and future operations in the maritime environment will make command, control, communication, and computers (C4) a challenging arena. Our ability to gather, process, protect, and distribute actionable information to warfighting agencies at near realtime speeds will determine our effectiveness in the fight to come.

In September 2016, Gen Robert B. Neller revised *Expeditionary Force 21* and republished a new document titled the *Marine Corps Operating Concept*. In it, our 37th Commandant identified five critical tasks vital to shaping a viable, relevant, and lethal future force. The first critical task listed was "Integrate the Naval Force to Fight at and From the Sea." The inherent and unique challenges of Marines operating from the sea are consistently evident in today's force. Flag-level amphibious objective exercises like BOLD ALLIGATOR, DAWN BLITZ, and SSANG YONG all revealed comparable gaps between "fighting tonight" and the realistic lead times necessary to prepare integrated, responsive, and resilient networks suitable for a joint or combined maritime force. The bureaucratic processes required to enable networks for effective maritime operations on board naval assets does not support the "fight tonight" concept of employment. Agencies like Pacific Regional Network Operations Center, Regional Satellite Support Centers, Defense Information Systems Agency, Space and Naval Information Warfare Systems Command (NAVWARSYSCOM), United States Forces Korea, and Marine Corps Cyber Operations Group, among others, are not synchronized and all have lengthy procedural requirements that must be completed in order to enable capability to the commander of the landing force. The current status quo is not conductive to a force that prides themselves in readiness. In 2019, our 38th Commandant, Gen David H. Berger, published his guidance to the force. In it, he committed to fundamentally redesigning our Corps into a truly integrated naval force. The 06XX community is a key enabler of our force redesign.

## An Expeditionary Training Imperative

Before 11 September 2001, our deployment cycle centered training on being expeditionary. We trained to embark on a ship, communicate from the ship, go ashore, and communicate ashore in a seamless transition that was transparent to command and control (C2). Fast forward two decades later and the 06XX community of today has morphed into something that looks

closer to Army signal units than Marine units of old. Marines are expected to be naval in character and capable of conducting C4 amphibious operations in the high seas, the littorals, and ashore. However, the C4 community is simply not ready. There are zero formal learning centers that effectively address the 06XX communities' amphibious deficiency; neither the Marine Corps Communications Electronic School, Communications Training Center, nor Expeditionary Warfare Training Group Pacific/Atlantic deliver meaningful solutions. A deficiently trained force is compounded by a substantial blue-green system integration problem. The amphibious naval fleet is a cryptic collection of C4 systems that do not readily integrate with combined, joint, or organic Marine systems.

*Expeditionary Force 21* presents an array of concepts that help illustrate the need for the 06XX community to realign inside expeditionary concepts. The expectation that Marine communicators are going to be able to reliably standup complex satellite and terrestrial networks fully integrated into existing data networks supporting enterprise services while embarked on naval vessels has always been there. However, the reality is that the population of proficient expeditionary communicators is small in proportion to the total force. The following are some excerpts from *Expeditionary Force 21* that directly address networks and systems:

> Ability to send limited data via a terrestrial communications system or systems with a 65 nm minimum range via line of sight, retransmission, relay, or combinations of all three means.

> Providing landing forces and support craft with beyond-line-of-sight, over-the-horizon, and on-the-move C2 systems capable of operating in a satellite-degraded communications environment.[1]

Many of the C4 concepts, equipment employment, and doctrinal principles presented at a MEU are not present in many other communications units throughout the Corps. Entry- and career-level formal learning centers throughout the Marine Corps do not present practical C4 solutions for amphibious operations. The Marine Corps Communications Electronic School does not offer meaningful C4 amphibious doctrine or systems integration courses. The Communications Training Center is an equipment-centric learning center that does not apply any amphibious concepts in their curriculum. The 06XX community at Expeditionary Warfare Training Group Pacific/Atlantic over the years have been reduced to support staff that seldom trains Marines on expeditionary communications. EWTGs have no formal programs of instructions on expeditionary communications. For these reasons, Marines attached to MEUs are seldom ready to deploy as effective expeditionary communicators. The learning curve is steep for many young and mid-career Marines who are faced with a landing force operations center or a support-

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*... include requirements for a baseline understanding of amphibious communications ...*

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ing arms coordination center for the first time and do not know where to begin. Many are exposed to blue-green integration concepts for the first time during MEU/ARG composite unit training exercises just months before deployments. This usually generates command relationships that slow integration, responsiveness, and increase cultural misunderstandings.

The 06XX community would benefit from re-evaluating the process of how it prepares Marines to enable C4 from amphibious ships. Marines who have the resident skill necessary to be effective enablers onboard our amphibious fleet are scarce. Liaison Marines attached to expeditionary strike groups are uniquely conditioned to be proficient in an amphibious environment. However, more needs to be done at the Service level.

In the last version of the training and readiness manual, there was only two requirements for C4 amphibious operation competency. These prerequisites were the only formal school-house requirements published. The word amphibious comes up four times in the document. Two events are communications officer requirements and two are in the title of referenced publications. Nothing is mentioned about operator requirements in amphibious operations:
- Develop an MSE level communications plan (0603-PLAN-2001).[2]
- Develop an MSC/MAGTF communications plan (0603-PLAN-2001).[3]

The training and readiness program should include requirements for a baseline understanding of amphibious communications (indoctrination) on board amphibious ships. Our training continuum should reflect a building block approach that accounts for the inherent complexity of amphibious communications: specifically, Navy programs of record in support of Marine Corps operations and familiarization of landing force operation centers onboard amphibious ships. The EWTGs are uniquely in position to provide the type of amphibious communications training that would make the community a more expeditionary force. The EWTG N36 section is staffed and equipped with Marines poised to instruct amphibious communications. A revitalized amphibious communications program that prepares the 06XX community to be effective enablers onboard our amphibious fleet is necessary as we pivot toward a more relevant maritime force.

The need for a tailor-made training and certification package for Marines joining or deploying on MEUs must be implemented. Most Marine units have grown accustomed to static C4 nodes in permissive environments. Installation of shipboard systems and the ability to effectively transport, distribute, and deliver information while embarked on amphibious ships are skillsets necessary across the force. A basic understanding of the capabilities and limitations of ship systems are voids that need to be addressed in a training environment, not off the coast of North Korea.

### Enduring Frustrations at Sea, the Littoral, and Ashore

The trends are consistent. The lack of comprehensive C4 standardize amphibious training packages and poor blue-green system integration is obvious. The effectiveness and reliability of C4 during amphibious operations has been reliably inconsistent for many years. The following excerpts from past MEU deployments date back to 2011 but were sadly still relevant as recent as 2018:

> The lack of Marines cross-trained and capable of extending C2 across three ships, forward planners and MSE assets placed ashore threatened the accomplishment of MEU METLs. Organizing, training and equipping communication support teams to fulfill mission requirements was a priority during the first part of PTP. This delayed the training of other components of the MAGTF while critical skill sets were developed. The shortened PTP hindered integration and training of the MSEs negatively impacting training opportunities on combat operations center (COC) and the Command Post of the Future (CPOF) communications suite utilization.[4]

> One problem was supplying sufficient C2 manpower to make full use of the LPD C2 suite. On the Green Bay, the disaggregated ACE had to rely on the BLT's communications personnel for support. While the Green Bay possessed increased C2 capability, the older LSD (USS Comstock) lacked the capability for the Marines to effectively pass data without making use of Navy communication assets from time to time.[5]

> The 13th MEU communications section (S-6) had integration with the Navy aboard ship as its main priority during the PTP. With communications, no two Navy amphibious ships are structured the same and the MEU needed to understand its capabilities and limitations aboard ship. The MEU S-6 emphasized his dependence on the Navy while the MEU was on ship. He recommended any MEU S-6 visit and coordinate with his Navy counterpart as a first action.[6]

The *Marine Corps Operating Concept* reinforces the urgency for fundamental change in our training, task organization, and system integration. Nowhere is this more relevant than the way the Corps integrates with the amphibious naval fleet. Most units predominantly embark onboard amphibious ships weeks before an exercise and spend the first week trying to find the landing force operations center and mess decks. The learning curve is massive for the average communicator. Although MEUs fair a bit better, six or seven months of integration is still not enough:

> The Marine Corps is currently not organized, trained, and equipped to meet the demands of a future operating environment characterized by complex terrain, technology proliferation, information warfare, the need to shield and exploit signatures, and an increasingly non-permissive maritime domain.[7]

### The Systems Integration Imperative

If the MAGTF is going to be an enduring, viable, and responsive maritime force at any level, it must develop C4 integration tactics, techniques, and procedures onboard amphibious ships that are more intensive and enduring than

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MEU composite unit training exercises or other integration exercises of short durations. A MAGTF that expects to come from the sea must create enduring and habitual practices at every level of the blue-green team that result in tangible enduring solutions to the landing force here and now.

Technical objective liaison teams that represent the interest of the MEFs should be staffed at the MEB/MEF level. They should imbed with ARGs and expeditionary strike groups with the prime objective to solve the inherent blue-green complexities of system integration on board amphibious ships. Moreover, the teams should focus on

enduring relationships between the Navy and Marine Corps Team in order to facilitate collaboration and efficiency that could never be achieved in a two-week visit or even a six-month deployment. For instance:

> Communications and hence command and control were most difficult while on ship. Navy officers were surprised when I told them, 'When I get off this ship, I will have good communications.' We need to make our on-ship communications equal to those ashore.[8]

Achieving a well-qualified technical force is just as important as solving the challenges of blue-green system integration. Moreover, the transition of C4 nodes from ship-to-shore must be a prime essential task to our commanders.

I MEF's DAWN BLITZ provided many lessons learned and was an overall success in 2015. However, a critical MEB command element capability was not completely flushed out during the exercise. The joint task force enabler detachment's ability to conduct a MEB command post exercise from ship-to-shore and validate C4 requirements for manning, organizing and training was not flexed. The logistical, wideband, and technical control challenges of transitioning a MEB command element ashore are still highly conceptual and are not clearly defined requirements in standard operating procedures or doctrine. The need to fully vet a truly amphibious MEB joint task force enabler capability cannot be replaced with transitioning the staff into the MEF Operations Centers or other controlled C4 facilities and exercise staff functions without validating the challenges of moving (ship-to-shore) key enablers and putting online a fully operationally capable tactical C4 node.

There are inherent integration problems with Navy and Marine Corps systems. The addition of a combined maritime force adds a layer of complexity that is yet to be clearly understood or articulated. The solution to partner interoperability must begin with joint force interoperability. C4 naval integration must serve as the principal and foundational objective for all other force integration.

*Over the horizon and line-of-sight C2 must be improved for the landing force.* (Photo by Cpl Nathan Reyes.)

III MEF's Ssang Yong 2018 also revealed valuable lessons, most notably that system and network interoperability in combine operations does not support effective C2. The Combine Enterprise Regional Information Exchange Systems (CENTRIXS) Korea network onboard was not fully interoperable, which limited access to coalition C2 tools and impacted the responsiveness of the landing force. During the conduct of the exercise, it was evident that Navy and Marine Corps systems did not have the compatible versions of software or hardware needed to enable situational awareness, chat, and other collaboration tools. Moreover, the domain trusts necessary to enable single sign-on to information technology resources did not exist between participating commands. NAVWARSYSCOM's "Authority to Operate" directive and baseline ship restrictions aboard USS *Bonhomme Richard* and USS *Wasp* prohibited necessary modifications that would have facilitated deployed Marine domains aboard. The landing force was supplemented with Navy systems that allowed connections to CENTRIXS-K outside landing force operation centers. This solution was limited to a small number of users and was not ideal for collaboration. These—amongst a host of other systems integration issues—revealed that the

blue-green team not only has to work better jointly but that coalition partners are far behind with systems that can integrate with Navy and Marine systems. In order to have combined collaborative information environments, we have to develop systems that integrate at the lowest common denominator.

The C4 community requires a fundamental shift in the way we enable C2. Marines must transition from a mindset of prolonged stationary comfort to an expeditionary one. What does a force conceived for the sea need to effectively C2 today? It needs to improve employment of over-the-horizon and line-of-sight systems in order to expand options and capabilities to the landing force. It needs to understand networked platforms and applications that expedite continuity of operations not delay it. It needs to improve its information processing capabilities and compatible C2 services in order to enhance amphibious operations, not detract from them. Most importantly, it needs to truly integrate blue-green systems by reducing like capabilities and streamlining collaborative systems.

The challenges encountered aboard amphibious ships today are unique to the ship. Specifically, *blue in support of green* systems that are managed by Navy personnel but operated by Ma-

rines. Enabling a commander's critical exchange information requirements are dependent on three domains: the transport (*connect*), network (*distribute*), and services domains (*deliver*). All three domains are not efficiently integrated onboard amphibious ships today. Every domain requires significant coordination to enable seamless ship-to-shore C2. The prevailing assumption is that the Navy provides the embarked force infrastructure to support Marine networks and domains. In reality, the entire system is Navy owned, accredited, and governed. It provides Marines little flexibility to support critical and unique *information exchanges requirements*. The afloat MAGTF C4 required capabilities letter produced by HQMC Combat Development & Integration identifies capabilities urgently needed onboard L-Class ships. However, if the fight is tonight, much urgent work is needed; we should adhere to the *Marine Corps Operating Concept*.

## Transport

According to the MOC:

> Our ability to successfully execute the concept will depend greatly on the extent to which we have; overcome the enduring obstacles to leveraging and sustaining 'commercial-off-the-shelf systems'-because affordable '70%' solutions now are better than outdated solutions 10 years from now.[9]

The transport domain composed of space, terrestrial, and optical/wired transmission systems connect all information exchanges.

Embarked landing forces require the capability to connect point-to-point and point-to-multipoint nodes via line-of-sight, retransmission, relay, and beyond-line-of-sight systems. These capabilities must reliably enable C2 to the landing force whether ships are underway, in the littorals, or ashore. Ships are uniquely dependent on the electronic magnetic spectrum. The electromagnetic spectrum is the only transport available to ships. Therefore, compatible dynamic waveforms are critical for resilient electronic magnetic spectrum operations onboard naval vessels.

High performance waveform, advance networking wideband waveform,

single channel ground air radio waveform, integrated waveform, net centric waveform, among other commonly used waveforms used by Marines, must be interoperable with blue systems. Today, they are not.

The enhanced man pack UHF terminal antenna is a prime beyond line-of-sight narrowband satellite communications voice/data capability used by the landing force. Unfortunately, it is not compatible with the ships channelization system. The demand assigned multiple access system on Navy platforms does not support integrated waveform today. IW is a key capability used by fast moving ashore nodes. This limitation restricts a large percentage of Marine Corps narrowband satellite communications users' ship-to-shore interoperability and must be prioritized for integration.

The Digital Wideband Transmission System is the current onboard solution for connecting nodes via wideband line-of-sight. However, it cannot relay signals to aerial platforms, and it is not compatible with ashore Marine systems. More capable omni-directional self-healing systems are available and can be installed today. These systems would significantly improve and rapidly deliver voice, video, and data services to and from disadvantage ashore nodes.

Super high frequency system integration has not been validated between blue-green systems. However, the Marine Corps' very small aperture terminal family of systems can connect to shipboard Navy multi-band terminal via modem to modem connections by utilizing X or Ka-band. Installation of master reference terminals would enable more efficient and survivable time division multiple access that would further enhance integration of the force. Blue-green super high frequency interoperability would enable dynamic homing options to L-Class ships from and to Marine nodes ashore, reducing the dependency on fix Gateway sites.

Extremely high frequency terminals connect critical services to afloat and ashore nodes using some of the most protected waveforms in DOD. Capabilities like "cross-link" and low data rate provide the commander global reach via low probability of interception-detection, and anti-scintillation communications links. Although these systems are blue-green compatible, the relationships needed to establish enduring connections as standard operating procedure do not exist. Today, the Marine Corps secure mobile anti-jam reliable tactical terminal can connect to the shipboard Navy multi-band terminal. However, it is never leveraged as an operational capability.

## Networks

As stated in the MOC:

> Designed and protected our C2 and ISR [intelligence, surveillance, and reconnaissance] networks as a multi-source information sharing architecture that reliably serves disparate MAGTF elements—because distributing actionable information keeps operations in chaotic environments from becoming chaotic operations.[10]

The network domain composed of switches, routers, and boundary control devices distribute all information exchanges.

The Navy does not allow the embarked force to operate with organic Internet protocol space. Instead, Navy Internet protocol space is assigned to Marines while embarked, preventing seamless transition of C2 nodes from ship-to-shore. The local area network aboard a ship can be configured to support both Marine Corps enterprise networks and Navy enterprise domains simultaneously while maintaining cybersecurity standards. Naval vessels should reflect architectures identical to a small joint base, allowing multiple service enclaves distribution paths over shared infrastructure. On-board security stacks could facilitate inter-enclave connectivity while maintaining segmentation and security. Shared network infrastructure would enable a joint force on-demand access unclassified, classified and coalition networks. This flexible network capability would permit responsive distribution of information to mission dependent C2 requirements.

Deployed Marine forces and Navy ships utilize significantly different architectures in enabling wide area network connectivity. Network technologies like black-core routing and virtual routing forwarding are utilized both services; however, they are not interoperable. Ground units have long benefited from Defense Information Systems Network–Tactical Edge a global enterprise network allowing network connectivity of multiple enclaves. Defense Information Systems Network–Tactical Edge enables wide area network connectivity between tactical communications sites and enterprise entry points, enable the Fleet Marine Force flexible transport site options. Naval network architectures are proprietary networks that enable wide area network connectivity between deployed ships and ashore services. These significant variables in architectures hinder Marine and Naval communicators from enabling information exchange internally to the ship and external to enterprise entry points. Alignment of afloat and ashore network architectures is vital to FMF and Naval C2.

## Services

According to the Marine Corps Strategy for Assured C2:

> The Marine Corps cannot meet the demands of the future warfighter with separate network designed for 'garrison' and 'deployed' operations. The need for greater mobility and rapid deployment render our current C2 construct grossly inadequate.[11]

The services domain composed of directory services, unified communications, information assurance, and C2 applications deliver the commander's critical information.

The Deployed Marine Corps Enterprise Network (DMCEN) concept of employment provides a highly responsive network enabling staffs to respond to contingencies in compressed timelines. DMCEN delivers local services to forward deployed units regardless whether they are disconnected or disadvantage from the enterprise. Although the concept has been tested repeatedly, deployments of Marine Corps enterprise network services aboard naval vessels continues to be problematic. Programmatic and accreditation issues between Headquarters Marine Corps

and NAVWARSYSCOM prevent the embarkation of DMCEN onto naval vessels without significant coordination and special arrangements. Although technically feasible today, FMF units require top down momentum in order to generate configurations for Consolidated Afloat Network & Enterprise Services that would allow for the deployment of MCEN services aboard naval vessels as a standard baseline and not a custom solution.

A digitally integrated joint force requires a large portfolio of C2 applications in order to execute operations. Navy and Marine programs of record require complex configurations and coordination in order to enable interoperability. Program of Record C2 application utilize custom, unfamiliar, Internet Protocol ports. To fully integrate the systems capabilities, firewalls and other security devices must be specifically configured on a per mission basis in order to enable information exchange. Change requests are required per respective network operating center, which neither efficient nor effective; troubleshooting of blocked ports is tedious and exacerbated by complex distribution networks. Due to highly customized features, C2 applications also utilizes a variety of message formats. Twenty-plus years of grounds based operations has resulted in Marine Corps C2 systems being more interoperable with Army systems then Navy systems. Standardization and documentation of IP ports and data messages will enable whitelisting of traffic and enable interoperability between systems. Other C2 services like unified communications, chat, and collaboration services should be engineered in combination with Joint Task Force or Combatant Command systems, one-off solutions that do not replicate or communicate with ashore command structure impairs the expeditionary communicators abilities. Blue-green system integration must be prioritized at every level of the decision cycle; the efficiency and lethally of the maritime force depends on it.

## Conclusion

The Corps is relevant for its creed as much as its capabilities. The ethos its

> *To improve our ability to fight at and from the sea, we must: Collaborate with Navy counterparts to establish austere, scalable, and agile EABs.*

warriors practice is valued as much as the equipment they carry. Its commitment to a selfless and fearless culture keeps the force relevant. However, the Corps must fiercely align limited resources toward making Marines the undisputed force of choice for power projection from the sea. Proper training and system integration will uniquely enable the force. A middleweight and highly specialized force that delivers the combatant commander valuable decision space and viable options in compress timelines. The Marine Corps C4 training pipeline must become "bluer" with deliberate objectives to improve blue-green system and culture integration. All MAGTFs must become bluer at all levels by active system and culture integration of units like expeditionary strike groups and MEBs. Service-level agencies like Marine Corps' CD&I and Navy's NAVWARSYSCOM must also assimilate systems acquisition and program management efforts that enable a truly integrated naval force. The challenges that have plagued blue-green integration are decades old. Today, agencies must target technical engineering integration solutions as much as the latent bureaucratic dissonance of dispersed agencies producing stove-piped solutions for a naval force expected to fight as a team:

> Lying offshore, ready to act, the presence of ships and Marines sometimes means much more than just having air power or ship's fire, when it comes to deterring a crisis. And the ships and Marines may not have to do anything but lie offshore. It is hard to lie offshore with a C-141 or C-130 full of airborne troops.[13]

When Maj Earl "Pete" Ellis wrote "Advanced Base Operations in Micronesia" (1921), not one amphibious ship existed in Navy or Marine Corps inventories. Sailors and Marines did not have a clear plan on how to conduct amphibious operations. Since then, the Navy-Marine Corps Team has exponentially matured this capability to a globally reaching credible deterrent against our Nation's foes. The advent of technological advances must enhance what Ellis began and not detract from the scope of what is possible from a fully integrated amphibious naval force.

### Notes

1. Headquarters Marine Corps, *Expeditionary Force 21*, (Washington, DC: March 2014).

2. Department of the Navy, *NAVMC 3500.56D, Communications*, (Washington, DC: November 2019).

3. Ibid

4. Marine Corps Center for Lessons Learned, "26th MEU Operations Lessons and Observations from the 26th MEU Deployment, August 2010–May 2011," (Quantico, VA: 2011).

5. MCCLL, "13th MEU: Lessons and Observations from 13th MEU Deployment, February-September 2011," (Quantico, VA: 2011).

6. Ibid.

7. Headquarters Marine Corps, *Marine Corps Operating Concept*, (Washington, DC: September 2016).

8. "13th MEU Lessons and Observations."

9. MOC.

10. Ibid.

11. Department of the Navy, *Marine Corps Strategy for Assured C2*, (Washington, DC: HQMC, March 2017).

12. MOC.

13. Headquarters Marine Corps, *Expeditionary Force 21: Marine Expeditionary Brigade Concept of Operations,* (Washington, DC: July 2014).