

Communications Planning, Execution, and Assessment during STEEL KNIGHT-20

How the Blue Diamond is preparing for the next near-peer conflict
by LtCol Arun Shankar & CWO3 Emedin Rivera

The execution of STEEL KNIGHT-20 marked the completion of one of the largest Marine Corps exercises since the Cold War era. The event was led by a full division headquarters flanked by all eleven of its organic subordinate units, to include four regimental headquarters and six separate battalion headquarters. Four key events characterized the evolution: a regimental amphibious landing, a regimental air assault, a light armored vehicle wet gap crossing, and a regimental combined arms breach. However, it was the innovations in communications technology that established an overarching theme for the exercise.

Communications operations, like all military operations, are framed by three distinct actions: planning, execution, and assessment. Sadly, within communications, focus is usually only placed on execution, charging junior leaders with unnecessarily navigating chaos and resolving issues that could have otherwise been foreseen with deliberate planning and assessment. STEEL KNIGHT-20 was different. Leaders, at all levels, demanded results across all three elements of operations, and the final product appropriately reflected this

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effort. The remainder of this article expands this narrative.

Planning

The act of methodical exercise planning with all relevant stakeholders greatly benefited the execution of communications support during the exercise. Though the development of the plan certainly aligned resources and manpower against the commander's intent, it was the deliberate planning process, in and of itself, that led to a shared understanding among the team. This enhanced awareness allowed leaders in subordinate units to very easily take action in the absence of guidance and seize opportunities for decisive initiative. Unfortunately, this type of collec-

tive brainstorming from the grassroots level, with appropriate input from senior decision makers, is not commonplace in the communications community and often leads to uncoordinated, lackluster starts in exercises of this scale.

Tenets of planning. The act of planning within the Marine Corps is framed by three tenets: top down planning, integrated planning, and the single battle concept. Top down planning for the communications architecture was driven by the AC/S G-6, who provided the initial planning guidance and appropriate input at various decision points throughout the process. The guidance was nested within the Commanding General's intent, urging focus on the realities of a near-peer threat. This en-

sured the planning was in support of the overall commander's intent and not bullied into supporting special interests.

Integrated planning among the subordinate units was demanded from the very start. Unlike common, stovepiped efforts where units blindly demand a particular communications architecture in support of their exercise, all units were initially introduced to the overall, division-level concept of operations and the communications resource constraints on the first day of planning. This leveled the understanding of the playing field and helped the communications officers and chiefs design realistic concepts of communications support. The vertical and horizontal integration helped us to develop an optimal plan for the entire division, rather than just for particular units.

The *Single Battle Concept* has no better application than in the field of communications planning, and the planning for STEEL KNIGHT-20 was the model for this application. All leaders were deeply aware that "actions anywhere can lead to actions everywhere" on the network. And though this could not be prevented, the resulting outcomes of likely network changes were well known to leaders and operators at the conclusion of planning. Moreover, the network required resilience against enemy threats, and the capability to dynamically respond against hostile actions. Therefore, the network was designed to be able to withstand these perturbations with negligible disturbances to users. Branch plans were developed for more consequential network changes, such as the loss of key nodes or waveforms.

Marine Corps planning process (MCPPI). A streamlined version of the Marine Corps planning process was used to analytically step through the communications planning for the exercise. Problem framing was conducted among senior leaders to highlight the main challenges for electronic communications in a near-peer conflict. Then, one course of action was developed to address this problem with the available resources. The course of action was wargamed on paper and then again as a full communications exercise rehearsal across Camp Pendleton. Ob-

servations were documented to improve the plan. Though a formal order was not developed, the plan was transitioned to subordinates for execution through a series of briefs and feedback. Overall, we were extremely pleased with the level of attention placed against this effort by the entire G-6/S-6 team, and it paid off in spades during execution.

Execution

Division main command and control (C2). The division main command post (CP) served as the primary C2 node for the entire division's scheme of maneuver during the exercise. This node was outfitted with some of the most innovative technologies ever seen on a tactical Marine Corps network. The most groundbreaking of these was the use of wireless Secret Internet Protocol (SIPR) and Non-secret Internet Protocol (NIPR) in the tent workspaces that greatly increased the ease of mobility by exponentially decreasing setup and teardown times. The familiar garrison Marine Corps Enterprise Network NIPR was provided through a tactical NIPR wireless solution, so users were able to simply carry their laptops from their office desks to the field tents with identical experiences in both workspaces, "from office space to battlespace." Senior leaders could remain focused on activities like awards processing and fitness reports on the same computer and network they

were using in their offices. Similarly, tactical wireless SIPR was integrated into the combat operations center (COC), G-3, G-6, and Commanding General's workspaces. The solution was designed in conjunction with the National Security Agency and eventually approved by HQMC Command, Control, Communications, and Computer (C4). The team looks forward to integrating the wireless SIPR solution into both the network on the move (NOTM) and network on the move-airborne (NOTM-A) during Integrated Training Exercise 2-20.

Another innovation directed from the division main was the extension of the PRC-117G Mobile User Objective System (MUOS) backpack satellite radio capability, down to regiments and battalions, to transmit the common operational picture (COP), tactical chat, and the Advanced Field Artillery Tactical Data System. This low signature, low probability of detection system allowed commanders to continue to C2 across the battlespace, during periods of high electronic attack threats, with almost no loss of tempo, and full connectivity to higher, adjacent, and lower commands. Instances occurred where high bandwidth satellite systems were intentionally disabled to reduce electronic signatures, and MUOS was used as a sufficient C2 platform. Every Advanced Field Artillery Tactical Data System laptop in the divi-



The combat power and command and control are challenges faced by Marines and Sailors during Exercise STEEL KNIGHT. (Photo by LCpl Julian Elliot-Drouin.)

sion had access to MUOS and did not require a wideband satellite terminal to conduct fire missions. Prior training with MUOS throughout the summer and fall seasons greatly helped operators work through the challenges of this new technology. Additionally, a top-down cultural shift, led by the Commanding General himself, demanded that commanders become familiar with how to C2 their forces with the MUOS radio capability. In fact, the Commanding General replaced the NOTM with a single MUOS radio on his own personal mobile Jump CP, citing its simplicity and reliability for his C2 requirements. Moreover, the MUOS capability has great potential in expeditionary advanced base operations in ship-to-shore communications.

Additionally, aviation and ground COPs were integrated at the direct air support center on the Common Aviation C2 System and the main COC on C2 personal computer during the exercise. Moreover, for the first time, the aviation COP was made available to regimental COCs across the battlespace through the use of the small form factor, a system built by the Marines at the direct air support center. This additional aviation picture provided commanders with a general awareness of air operations and a true COP they did not previously enjoy.

The analysis of electronic signature management was a primary objective at the division CP during the exercise, and lessons learned have influenced a broad awareness of realistic EW threats throughout the command. The threat systems management office collected data on the division forward's electronic signature to understand whether electronic emissions could predict greater operational actions. The threat systems management office also jammed various frequencies at different times to see if the communications operators could detect the attacks and shift to other waveforms without a loss of operational tempo. In other words, the radio operators were trained to be sensors of EW threats. Division staff actions against an electronic attack were also tested during the jamming sequence. Key takeaways from the study included the identification of resilient waveforms, the vulner-

ability of radio frequency identification tags on tactical vehicles and containers, the validation of advantageous terrain against enemy jamming, and the difficulty of appearing completely silent during periods of emissions control. These lessons are already influencing future training plans across the division.

The familiar "antenna farm" was placed more than one kilometer away from the division CP and extended across dual, line-of-sight links back to the CP. A secondary antenna farm was setup at Camp Pendleton and transmitted across the tactical SIPR into a laptop within the COC. The secondary antenna farm was singularly employed during periods of electromagnetic silence, where only a low signature satellite terminal emanated emissions from our local position. This antenna setup has only been exercised by 1st Marine Division, and its resilience and practicality against a near-peer threat cannot be overstated.

The bulk of the network management was facilitated at Camp Pendleton from the division network operations center (DNOC), well outside of the weapon engagement zone. The DNOC serves a role for the Blue Diamond that is similar to that of a regional hub node. Subordinate units point their links to the DNOC for services, establishing and disestablishing as needed without any focused attention from the division CP. Additionally, the DNOC provides the most cutting edge services to users, including Cisco Jabber software phones that allow users to dial into a video teleconference from any laptop on the tactical network, Internet Protocol software radios that extend radio nets into user laptops, a state-of-the-art tactical video teleconference bridge that allows unlimited video calls and a backup telephone bridge on the same calling number, and a litany of cyber security tools. In the Marine Corps, there is no tactical or garrison communications provider that is more dynamic, reliable, and responsive than this DNOC. Additionally, unlike other tactical network operations centers around the Corps, the Blue Diamond DNOC provides some level of support to every integrated training exercise, mountain

training exercise, and MAGTF war-fighting exercise in Twentynine Palms. It also serves as the elite training environment for the most proficient 06XX Marines in the Blue Diamond.

Air assault. 5th Marine Regiment conducted an air assault with the most robust communications architecture ever deployed to such an event in the Marine Corps. The NOTM-A, an airborne variant of the popular vehicular platform used in ground units, was used by the regimental commander to maintain situational awareness and provide guidance while aboard an MV-22 Osprey. Capabilities included the use of COP, Chat, and video phones. No other unit in the Marine Corps has successfully pulled tactical SIPR services through a NOTM-A, but some have been able to relay a much less capable garrison Marine Corps Enterprise-SIPR network. Admittedly, services were often spotty during flight because of satellite access but were still much improved since the last air assault evolution. A key lesson learned from the previous event led to the transfer of the NOTM-A equipment suite from the ACE to the GCE. In this model, the Marines from the GCE configure the NOTM-A to the air assault commander's desires while in garrison and then simply plug and play the equipment into the aircraft during execution. Preparation for the event is only bound by the constraints within the GCE, greatly simplifying the matter.

Combined arms breach. The combined arms breach was conducted by 7th Marines, and the local S-6 section left no stone unturned in its innovative efforts during this highly complex event. Significant achievements included the use of Link-16 radios and high bandwidth Kymeta antennas. The Link-16 self-healing waveform is not dependent upon satellites, but instead relies upon ground and aerial repeaters to transmit voice and data. Additionally, its digital interoperability in joint and coalition communities, as well as our own ACE, makes it a prime capability for future conflicts. 7th Marines confirmed the value of this capability in the GCE and provided feedback to Marine Corps Combat Development

During previous air assaults I was only able to command, but not control from an air platform. NOTM-A is closing the gap to allow for command AND control from an air platform. When the capabilities of the MV-22 are coupled with the NOTM-A, communications and real time intelligence are becoming less of a limitation on operational reach.

—Col Rob Weiler, CO, 5th Marine Regiment

For the first time in my career, I did not lose SA when I left my COC. I was able to maintain and increase it while on-the-move throughout the battlespace.

—Col Matt Good, CO, 7th Marines

Command in hopes of a future equipment fielding. The Kymeta antennas were used on tactical vehicles to provide legitimate bandwidth to key leaders while away from the main CP. Unlike the existing NOTM, the Kymeta antennas provided bandwidth and reliability that allowed the Commanding Officer, 7th Marines a complete suite of communications systems on an MRZR jump vehicle. Streaming video teleconference capabilities and the full use of SIPR capabilities were commonplace in this configuration.

Assessment

Planning and execution have little value without the insertion of regular assessment actions. Assessment measures execution against the objectives of the original plan and informs the commander if plans should be altered. This should be evaluated in a COC or some other node where execution is controlled through the issuance of orders and feedback. Similarly, within the communications field, this is best done by evaluating the control of the network at a control center.

Communications control evaluation. The division communications control center was graciously assessed by the 3d MAW G-6 network engineering officer during the exercise. She spent several hours understanding our initial plan and then studying our control processes. Her goal was to determine if we were meeting our planned objectives and if

those objectives were in line with the overall commander's intent.

Feedback from this assessment was fantastic. Rather than simply focusing on highly technical improvements, the assessor maintained a mature, holistic view of our actions, highlighting shortfalls in processes that could be easily improved. She commended our overall execution of the communications plan but warned us of overextending ourselves beyond our capacity and resources. The rudder was helpful and led to a smoother execution during the second half of the exercise.

Conclusion

Innovations within the communications community, across the entire Blue Diamond, were hailed at all levels of command at the conclusion of the exercise. Commanders were generally pleased with their communications support and enjoyed the friction caused by the active enemy jamming during key periods of execution. Leaders within the division staff commended the integration of the G-6 staff during both planning and execution, allowing communications initiatives to be part of a complete staff effort, rather than a stovepiped annoyance.

An adversary force should participate in the exercise next year. This would greatly increase uncertainty and truly test the resilience and flexibility of the communications network. The benefits we enjoyed from relying on a predeter-

mined exercise script for enemy jamming sequences and emissions control periods would not exist in a contest against an adversary. Furthermore, such a scenario will likely sponsor much more innovation and lessons learned than our typical canned exercises.

Additionally, our team continues to study and experiment with solutions that progress the network toward a "one user environment" in both garrison and field circumstances. We have already met this demand with the maturity of our wireless network capability that provides garrison Marine Corps Enterprise-NIPR connectivity, allowing every user in 1st Marine Division to use his office computer in the field, on a wireless network, with the exact same NIPR capabilities offered in garrison. We hope to eventually have software phones on NIPR and SIPR laptops that allow users to have a permanently assigned phone number, regardless of location. Moreover, we are working toward extending our more flexible tactical SIPR network to key leaders in garrison, rather than the rigid Marine Corps Enterprise-SIPR network, so that they can easily transfer to a field environment without any interruption to their user experience.

The culture of the communications community within the Blue Diamond encourages and rewards Marines of all ranks to develop and share innovative ideas. This spirit is led by the vocal sponsorship of the Commanding General and permeates its way throughout the ranks. This environment makes communicators proud to be a member of their technical profession and also proud to be Marines within the 1st Marine Division. The execution of STEEL KNIGHT-20 capitalized on this circumstance and allowed the communications community to advance capabilities far beyond previous standards. We are proud to serve among this team of warfighters.

>Authors' Note: We would like to thank all the officers, chiefs, and their Marines who made the exercise a success. There is no better group of communicators in our Corps.

