5th Squadron, 7th Cavalry Regiment, 1st Armored Brigade Combat Team, 3rd Infantry Division, electromagnetic team Soldiers support training in preparation for Exercise Combined Resolve XVII on 18 July 2022.

THE USE OF ELECTROMAGNETIC WARFARE CAPABILITIES DURING COMBINED RESOLVE XVII

by Captain Dillon Aiken

Introduction

In the summer of 2022, while deployed as part of Operation European Assure, Deter, and Reinforce, 5th Squadron, 7th Cavalry Regiment (5-7 CAV), 1st Armored Brigade Combat Team, 3rd Infantry Division (1-3 ABCT), participated in Exercise Combined Resolve XVII at the Joint Multinational Readiness Center (JMRC), Hohenfels, Germany. The squadron's use of integrated electromagnetic warfare (EW) capabilities produced several lessons learned. Key observations from the exercise included the importance of establishing habitual relationships between EW enablers and their supported units, the need for deliberate planning and execution to ensure effective use of EW capabilities, and the benefits of assigning fires assets to immediately engage targets identified by EW teams.

Task Organization and Enablers

During the exercise, 5-7 CAV was task organized with support from:

- Three armored reconnaissance troops.
- One tank troop.
- One Belgian intelligence, surveillance, target acquisition, and reconnaissance (ISTAR) company.
- One Lithuanian reconnaissance company.
- One forward support troop.
- One headquarters troop.

The squadron could employ two Raven unmanned aircraft systems (UAS) simultaneously using the systems organic to each armored reconnaissance troop and the Belgian ISTAR company. The squadron received additional support from:

- 1-3 ABCT's organic Shadow UAS.
- 7th Squadron, 17th Cavalry Regiment's organic Shadow UAS and AH-64 Apache helicopters.
- An attached Q-50 lightweight counter mortar radar.
- The Belgian ISTAR's organic ground radar system.
- Cueing from signal intelligence (SIGINT), human intelligence (HUMINT), and open-source intelligence.
- Echelons above brigade capabilities to include ground moving target indicator, full-motion video, and electronic intelligence.

While 5-7 CAV has a habitual relationship with 1-3 ABCT SIGINT that usually includes attachment of the Prophet systems, these systems were unavailable for this exercise. Instead, 1-3 ABCT attached two EW teams to the squadron for the duration of the exercise. These teams came with two Joint Light Tactical Vehicles (more commonly known as JLTVs) for mounted electronic support and two dismountable Versatile Radio Observation and Direction (VROD)/Versatile Modular Adaptive Transmission (VMAX) systems. The VROD system provides an electronic support capability, while the VMAX system provides both an electronic support and electronic attack capability.

Employment of Electromagnetic Warfare Teams

The EW teams' primary mission was to identify signals of interest for cueing other collection assets to additional collection opportunities against the opposing forces. The combined information collection effort would lead to situational understanding for the brigade combat team.

A single VROD system will produce a line of bearing that identifies the azimuth to the signal of interest. Two systems will produce a cut, which provides an approximate distance and direction sufficient to cue another collection asset. Three systems will produce a fix, which provides a high-fidelity targeting solution sufficient for a call for fire or precise cueing of another collection asset. Achieving a fix not only requires three VROD systems oriented on the same signal, but it also requires line of sight among the three systems to allow the sharing of information. The line of sight constraints within the restrictive terrain of JMRC required 5-7 CAV to collocate the two JLTV's with a single troop. This effectively limited targeting fidelity with the VROD systems to, at best, a cut.

To gain higher fidelity on the signals of interest, 5-7 CAV chose to use the EW teams as a cueing asset. Once the teams identified the location of a signal of interest, the location was passed to the squadron tactical operations center (TOC) over frequency modulation (FM) or the Joint Battle Command-Platform (JBC–P). The TOC compared the report to templated enemy locations based on S-2 analysis. If the signal of interest corresponded with a templated enemy location, such as a command and control node, the battle captain tasked another collection asset to look for an indicator or a specific information requirement at that location. Figure 1. illustrates an example of this process.

The same process applies in adverse weather conditions or when Ravens are not available. Redundancy built into the collection plan allows the use of organic, attached, and available assets to develop the situation and drive the targeting process.

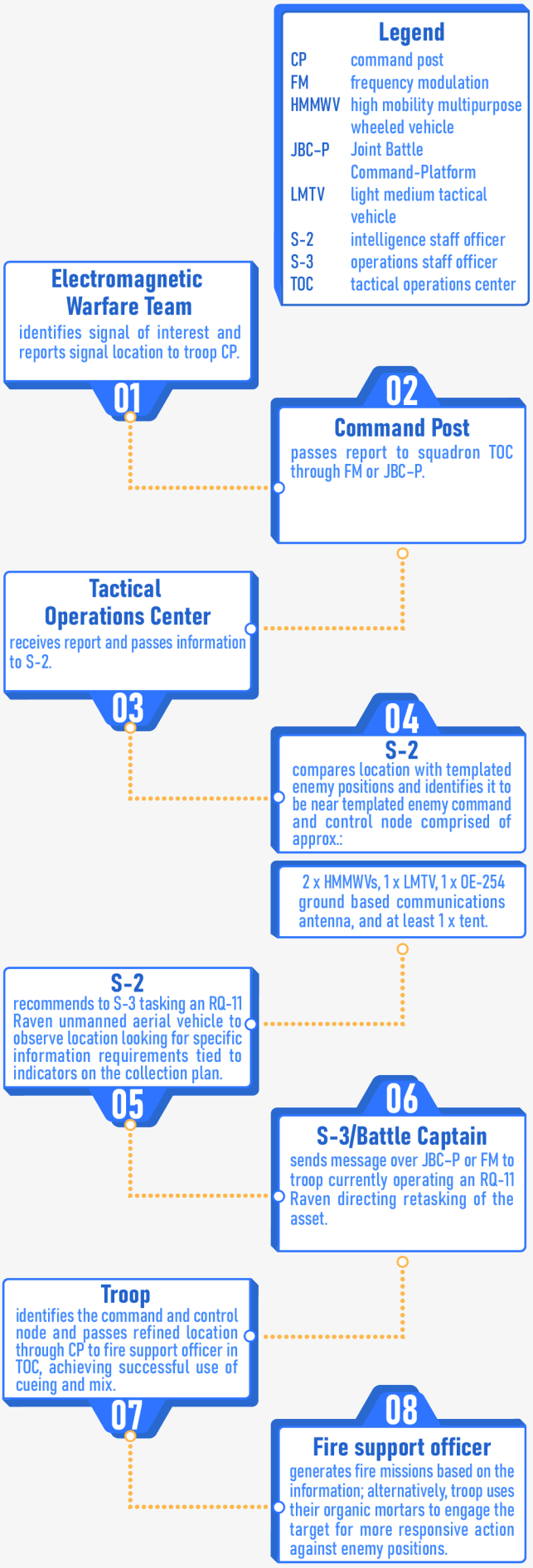

Figure 1. Electronic Warfare Team Employment

Recommendations

While EW was a significant enabler for 5-7 CAV during Exercise Combined Resolve XVII, there are several ways to improve the effectiveness of EW, thereby generating options for the commander to achieve a relative advantage on the battlefield. Recommendations going forward include:

Leverage Resource Materials. Leverage resources like *The Electronic Warfare Smartbook*[1] during initial exercise preparation to understand planning considerations and best practices for EW capabilities. Figure 2, adapted from FM 3-12, *Cyberspace Operations and Electromagnetic Warfare,* provides an overview of tasks that EW can accomplish. While 5-7 CAV exhibited a baseline understanding of EW from having a full-time EW noncommissioned officer in the squadron, there was not a deliberate process to plan for and integrate EW effects into operations before the exercise beyond its inclusion in the information collection matrix and the information collection synchronization matrix.

Integrate EW Personnel into the Military Decision-Making Process (MDMP). *The Electronic Warfare Smartbook* recommends including EW personnel early in the MDMP to gain an understanding of both electronic support and electronic attack capabilities. EW personnel can assist in generating specific information requirements and indicators for information collection related to the threat electronic order of battle. EW personnel help to generate an understanding of enemy composition and disposition. The smartbook also discusses ways that EW can support each warfighting function during the MDMP and operations process. The consolidation of EW personnel at the brigade level made it challenging for 5-7 CAV to incorporate them into the MDMP, but prior coordination would have made it possible.

Define Metrics. During the assessment phase of the operations process, consider using metrics, such as those developed by the National Training Center and used for evaluation of rotational training units. Again, *The Electronic Warfare Smartbook* provides relevant examples of metrics for EW.

Integrate Mission Teams. To increase the responsiveness of targeting operations, consider assigning a field artillery platoon with the responsibility to engage targets identified by EW cueing. The platoon could begin to clear friendly air and ground forces upon identification of a signal of interest and be prepared to immediately engage upon target identification.

Habitual integration of EW teams with their supported units is essential to success. While the squadron integrated an EW noncommissioned officer and a VMAX/VROD system into both the platoon live fire exercise (LFX) and troop combined arms live fire exercise (CALFEX), this was not sufficient to develop relationships of mutual trust and understanding among all EW enablers and the troops. At the brigade level, the EW officer must prioritize the incorporation of supporting EW enablers into all feasible training events with the supported unit. This integration should include both mounted and dismounted maneuvers to ensure that the operational tempo can be maintained. Coordination is especially important when mixing wheeled and tracked vehicles as platforms.

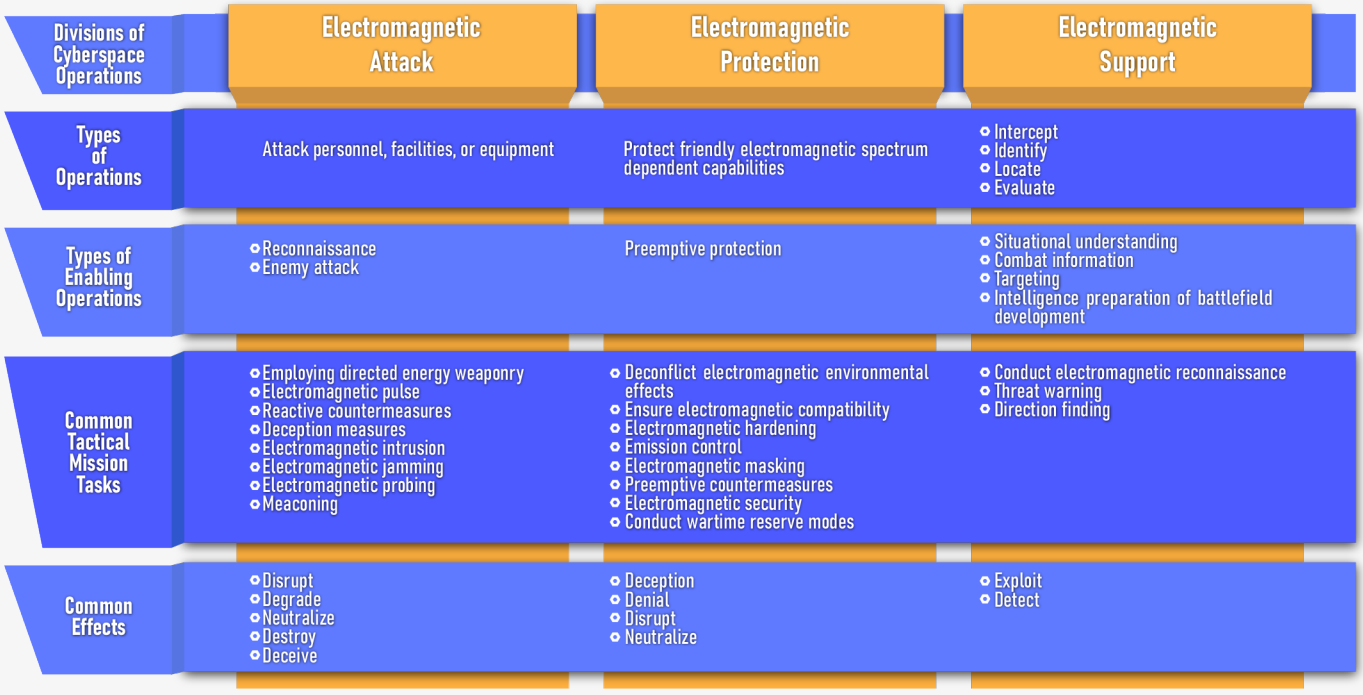

Figure 2. Electromagnetic Warfare Taxonomy[2]

Additionally, EW teams can build mutual trust and understanding by demonstrating the capabilities of their systems. The supported unit has a responsibility to cultivate this trust and understanding by requiring EW support during exercises. The supported unit should plan to have live electromagnetic emissions present during training events. This creates opportunity for signal identification by the EW team, which allows the supported unit to take additional action. During platoon LFX and CALFEX, 5-7 CAV attempted to replicate this through "white card effects" that showed what the VROD screen would look like if it were observing a signal of interest. This is good, but observing a live emission would be significantly better.

Conclusion

5-7 CAV exhibited a willingness to embrace EW capabilities during Exercise Combined Resolve XVII to improve signals acquisition for an integrated collection strategy. The squadron benefitted from this integration through improved cueing of reconnaissance troops and better planning fidelity based on an enhanced understanding of the opposing force's locations. A deeper dive into resource materials and changes driven from lessons learned will further expand the squadron's capabilities. Full integration of EW capabilities with the array of other collection assets available to the squadron will help create a robust intelligence picture. This allows the commander greater flexibility and assurance during both planning and decision making.

Endnotes

1. Department of the Army, Center for Army Lessons Learned Handbook No. 16-15, *The Electronic Warfare Smartbook* (Fort Leavenworth, KS: Center for Army Lessons Learned, May 2016), https://www.army.mil/call (common access card login required).

2. Graphic adaptation from Department of the Army, Field Manual 3-12, *Cyberspace Operations and Electromagnetic Warfare* (Washington, DC: U.S. Government Publishing Office, 24 August 2021), 2-8.

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5th Squadron, 7th Cavalry Regiment, 1st Armored Brigade Combat Team, 3rd Infantry Division, electromagnetic team in a mounted configuration conducts support for Combined Resolve XVII at the Joint Multinational Readiness Center, Hohenfels, Germany, on 18 July 2022.