

September-October 2018

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Update

The United States Army Field Artillery Branch's Newsletter

Q & A with the 53rd FA Commandant

Leaders Are Readers

Mitigating Electronic Magnetic Interference
Vulnerabilities in MLRS/HIMARS

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Purpose: Founded in 2011, the *Redleg Update* provides past and present Field Artillery leaders with a monthly update of informational highlights to assist in their individual, collective and professional training efforts, as well as report on activities occurring throughout the Field Artillery community.

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Stephen G. Smith
Brigadier General, U.S. Army
Commandant,
United States Army Field Artillery School

Stephen G. Smith

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Additionally, if you have a story of interest or wish to initiate a discussion on any topic or issue facing the Field Artillery community, contact Ms. Sharon McBride, Field Artillery Public Affairs Officer, at (580) 558-0836 or sharon.g.mcbride4.civ@mail.mil

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From the FA Commandant's desk

Q & A with the 53rd FA Commandant

Q: Was being the FA CMDT unexpected or was it something that's been on your radar?

A: Never for a second did I expect to become the FA Commandant. Having said that, I'm thrilled and humbled to serve our Army and Branch in this capacity.

Q: Now that you are the CMDT and chief of the branch; how do you feel about it?

A: Excited and energized! Like anyone else who has served this long, the Army has provided me a wealth of great Fire Support experiences through multiple deployments and training events, incredible mentorship from senior officers and NCOs, and opportunities to learn by working with talented Soldiers, Airmen, Sailors, and Marines of all ranks and branches. What a fantastic opportunity to give back to our Army.

Q: Going forward, where would you like to take the school and the branch?

A: We need to keep on our current trajectory. Increased academic and physical rigor focused on fighting and winning against a peer threat in large scale combat operations. Our Nation has a tradition of fighting large scale wars with Fires...we will remain ready to do so when called upon.

Q: I know you want to focus on the school rather than the branch exclusively; why is that?

A: Our primary and most sacred duty here at the school house is producing competent, fit, and assertive Artillery warriors for the operational force, period. To do this, we must



routinely take a hard internal look to make sure our POIs are current, our instructors are fully qualified, and that we are applying appropriate academic and physical rigor. We will continue to inform and adjust our internal efforts through routine, two way, and transparent communication with Commanders in the operational force, our CTCs, and MCTP.

Q: What challenges does the FA face from your perspective?

A: Nothing insurmountable. Focus on the basics of communicate, shoot, and move under combat conditions.

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Q: How is the school house meeting those challenges?

A: We are getting to the field more often, we are ruthlessly removing any current academic requirement that is not singularly focused on our mission to destroy our enemies in defense of our Constitution, and we are increasing our rigor during PT by implementing ACFT principles.

Q: Are you planning on any changes to the FA curriculum?

A: Yes. We pulled out 80 hours of “common core” requirements in CCC and are replacing those with pure Fire Support and Artillery specific skills. We are conducting a similar effort in BOLC-B by modifying how we teach skills currently residing in our JFO POI. I anticipate greater changes to the BOLC-B curriculum over the next six months as we drastically increase rigor for our newest officers. For example, we are developing an echelonment of Fires for BOLC-B students where they will execute Danger Close Fires.

On the warrant officer side, we have already begun implementing reforms in FA Warrant Officer Basic Course that improve our generation of FA Technicians (MOS 131A) as system of targeting systems integrators – digitally and procedurally. We’ve begun to develop significant improvements in the FA Warrant Officer Advanced Course, to integrate additional fire support and joint targeting instruction. Finally, with much-appreciated emphasis from the Combined Arms Center CG, we’ve begun to develop a Warrant Officer Intermediate Level Education, Phase 3 course for our

senior warrant officers, focused on division/JTF level and above.

CSM Parsons has led the way in pursuing revolutionary changes to our Noncommissioned Officer Professional Development System (NCOPDS) with a rewrite of all programs of instruction (POI) for the FA Advanced and Senior Leader courses. Our intent is to develop FA NCOs to perform critical duties, train NCOs on the skills and knowledge required to certify their team/section/platoon, and prepare the NCO to lead the team/section/platoon by providing timely and accurate Fires in support of large-scale combat operations.

Q: Is there anything else I didn’t mention, that you would like to talk about?

A: Having served as an Artilleryman for 27 years, I can think of no more exciting time to be in the best branch in our Army! Our civilian and military senior leaders have made Fires modernization a top priority, Artillery force structure is growing, our maneuver commanders have more confidence and appreciation for our WfF than ever before, and we continue to demonstrate the awesome lethality of Joint surface to surface/air to surface Fires in combat and at our cornerstone training events during CTC rotations and WFXs.

Keep up the Fire! King of Battle!

BG Stephen G. Smith

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Leaders Are Readers

Why reading is the most important tool in your arsenal

By Sharon McBride, USAFAS Public Affairs Officer

Reading? Who has time to read? In a day and age where we are inundated with information, you might be thinking I really don't have time to read. I hear you. It's tough to pick up a book after a long day. Many of us (myself included) would rather zone out and watch a favorite program on Hulu.

However, as a professional in the Field Artillery you are expected to read, not just social media posts or emails, but books. Books? Yes, books, and other professional publications whether they are daily, weekly, or monthly.

"As a Redleg professional you are expected to be multi-faceted and adaptable," explains BG Stephen G. Smith, the 53rd Commandant of the U.S. Army Field Artillery School and Chief of the Field Artillery Branch. "You also must be focused and have the mental stamina that is necessary for us to win on any battlefield, on any continent and in any type of conflict. We must fight and win against a peer threat in large scale combat operations. Our Nation has a tradition of fighting large scale wars with Fires...we will remain ready to do so when called upon."

So how do we win? It starts with critical thinking, sound decision making and most importantly, unparalleled leadership skills. While this list of skills isn't all inclusive, it does exemplify how to "Engage your brain before you engage your trigger," as stated by Secretary of Defense, James 'Mad Dog' Mattis.

In a blog post from 2013, the year Mattis retired, military historian Jill Russell shared a 2003 email, with his permission, that Mattis had written and which had been widely circulated within the Marine Corps. A colleague had asked why it is important for officers to take time to read and study. ¹

Mattis wrote that "the problem with being too busy to read is that you learn by experience (or by

¹ Jena McGregor, "The avid reading habits of Trump's Secretary of Defense, James 'Mad Dog' Mattis, www.washingtonpost.com, https://www.washingtonpost.com/news/on-leadership/wp/2016/11/23/the-avid-reading-habits-of-trumps-potential-secretary-of-defense-james-mad-dog-mattis/?noredirect=on&utm_term=.6fbc1852884f (August 28, 2018)



U.S. Army photo released

your men's experience), i.e. the hard way. By reading, you learn through others' experiences, generally a better way to do business, especially in our line of work where the consequences of incompetence are so final for young men." His reading, he wrote, provides guidance and perspective. "It doesn't give me all the answers, but it lights what is often a dark path ahead."²

So do you still think you have no time for additional reading?

"If you're one of those people who claim you don't have time to read I encourage you to make time," said BG Smith. "Time never 'appears' for anything; you have to make it. As a professional of our branch you are expected to not only demonstrate the skills listed above, but to also communicate and write effectively."

Everything you read—good or bad—helps to inform your writing and therefore how you communicate. This alone is enough of a reason to keep reading.³

² McGregor, "The avid reading habits of Trump's Secretary of Defense, James 'Mad Dog' Mattis

³ Kenna Griffin, "Why You Should Read Every Day," <http://www.ProfKRG.com>, <http://www.profkrg.com/why-you-should-read-every->

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U.S. Army photo released

Nevertheless, knowing and doing are not the same; becoming an effective reader does require discipline. In his book, “The Leader’s Bookshelf,” Admiral James Stavridis provides some tools and ideas of developing a reading habit and getting the most from what you read.

General Gordon Sullivan, former Chief of Staff of the Army, agrees it is essential to form a reading habit.

“Books are an important part of any U.S. Army leader’s professional development. There is never enough time to do all the reading we want to do, but I learned early in my career that I could make some time for reading. By doing so, I was able to find relaxation in the midst of challenging assignments, prepare myself to master that day’s challenge, and educate myself for the bigger problems hidden in the future.”⁴

“My point is: Read to relax, to learn, and to expand your horizons,” states General Sullivan. “You will be better for it as you will grow personally and professionally.”⁵

day, (August 28, 2018)

⁴ “American Generalship, Character is Everything: The Art of Command,” Edgar F. Puryear Jr., 2000, www.presidiopress.com, ISBN 978-0-89141-770-5

⁵ Puryear, “American Generalship”

General W. L. Creech, U.S. Air force (Ret.) is another example of a successful leader who is an avid reader. General Creech had a rapid rise to four stars and had a lasting impact on the management style and combat capabilities of the Air Force.⁶

He credits his success for having the discipline to read.

“The best intellectual growth comes from being a consummate, ever voracious reader of books of all kinds. Of course, with long duty hours and long TDYs, that’s not easy. You must develop the discipline to make yourself read a book a week, or least a book every two weeks.”

⁷

It’s a fact, those who read tend to have a more varied range of words to express how they feel and to get their point across. This increases exponentially with the volumes that are consumed, giving you a higher level of vocabulary to use in everyday life.⁸

As a young reporter I asked a more-seasoned reporter how I could improve my writing. Her response? Read good writing. She advised me to really study the sentence structure and how authors combine words. Just like a great baker chooses the freshest apples and best spices to bake a pie, a good writer or communicator chooses the best words to get their point across.

At its core, communication is about expressing yourself so that the things you think and the things you say (or write) are closely aligned. Communication is the keystone of effective leadership.

So now you know how reading can help you become an effective communicator, but how does it factor into learning how to be a critical thinker?

⁶ Puryear, “American Generalship”

⁷ Puryear, “American Generalship”

⁸ “10 Reasons Why Reading Books Will Save Your Life” Whytoread.com, <http://whytoread.com/why-to-read-10-reasons-why-reading-books-will-save-your-life/>, (August 28, 2018)

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Bill Gates and Mark Zuckerberg, who are the 2nd and 4th richest people in the world, have credited reading as key to their success. Gates, who amassed a \$92bn (£68bn) fortune largely from Microsoft which he cofounded in 1975. Gates reads for at least an hour every night and gets through books at the rate of one a week.⁹

Zuckerberg, who is an avid reader as well, has credited his reading habit into helping him become a better critical thinker.

Reading is an active mental process, which often replaces a passive activity like watching TV. People who read have higher GPAs, higher intelligence, a more diverse vocabulary, and greater general knowledge than those who don't.¹⁰ Simply, reading gives you tools in your analytical toolbox. It helps make you a better thinker.¹¹ What most people don't realize is that analytical skills are not ones that can be taught in a classroom, they are taught by actually working problems in real life.

If you worry that your analytical skills are not up to par, never fear. They can be developed with time and consistent practice. Like a muscle, the more you use it, the stronger it gets. One way to start is to read more books. This may sound a little too simple of a solution, but it really works.¹²

How does it work? Well, it helps when you read as actively as possible. Instead of passively skimming over paragraphs and grazing the pages, try to look at both sides of the story. For example, if you are reading a novel, try to see the plot from the perspective of the hero, the villain and other supporting characters. This causes your brain to think in new ways, and increase your stimulation. Thinking differently helps to expand



U.S. Army photo released

your mind, which is critical.¹³

Besides being a critical thinker, you also want your Soldiers to trust that you will make the most well-informed and correct decisions. So how does reading generate a great decision maker?

When you read a book, you are actually gaining the knowledge, perspective and experience of someone else. This can hasten your success as you need not to repeat their mistakes while focusing on achieving a goal. Books are like a mountain of gems which contain people's successes, failures and advice. Life is too short for you to repeat the mistakes of others people in order for you attain results that someone might already have reached.¹⁴

This opinion is one that is also shared by the Secretary of Defense Mattis.

"Thanks to my reading, I have never been caught flat-footed by any situation, never at a loss for how any problem has been addressed before," Mattis wrote in a 2003 email to military historian Jill Russell.

"A real understanding of history means that we

¹³ Manning, "Analytical Thinking: Why You Need It And How to Get Better"

¹⁴ JJ Wong, "8 reasons why reading is so important," Inspiration Boost, <http://www.inspirationboost.com/8-reasons-why-reading-is-so-important> (August 28, 2018)

⁹ Griffin, "Why You Should Read Every Day"

¹⁰ Griffin, "Why You Should Read Every Day"

¹¹ "10 Reasons Why Reading Books Will Save Your Life," Whytoread.com

¹² Katrina Manning, "Analytical Thinking: Why You Need It And How to Get Better," <https://blog.udemy.com>, <https://blog.udemy.com/analytical-thinking/>, (August 29, 2018)

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face NOTHING new under the sun,” Mattis wrote. “We have been fighting on this planet for 5,000 years and we should take advantage of their experience. Winging it and filling body bags as we sort out what works reminds us of the moral dictates and the cost of incompetence in our profession.” ¹⁵

General Schwarzkopf also credits reading in having a pivotal role in his leadership.

“You either learn from history or you are doomed to repeat it. I became very interested in military history at West Point.” ¹⁶

Finally, how does a reading habit help to create unparalleled leadership skills?

Leadership skills are something that you hear a lot about in the abstract; yet you may find you’re at a loss to define what the term really means. In the broadest sense, leadership skills can be nearly anything that enables you to lead others effectively. While some skills will vary based on your industry, there are several that are universal across nearly every work en-

vironment.¹⁷ These are motivation, problem solving, professionalism, communication, technical skills, and innovation.¹⁸ Does any of this sound familiar?

Leadership skills are important for many reasons. They position you to act as an effective leader and problem-solver in so many situations. Work on honing these skills by reading and watch how they can impact your job performance and opportunities. ¹⁹

In conclusion, reading should be the most important tool in your arsenal.

“I can’t tell you the number of times I looked down at what was going on the ground or I was engaged in a fight somewhere and I knew within a couple of minutes how I was going to screw up the enemy. And I knew it because I’d done so much reading. I knew what I was going to do because I’d seen other similar situations in the reading. I knew how they’d been dealt with successfully or unsuccessfully.”²⁰

17 “What are management skills and why are they important? Career-BUILDER.com, <https://www.careerbuilder.com/advice/what-are-management-skills-and-why-are-they-important> (August 29, 2018)

18 “What are management skills and why are they important? Career-BUILDER.com

19 “What are management skills and why are they important? Career-BUILDER.com

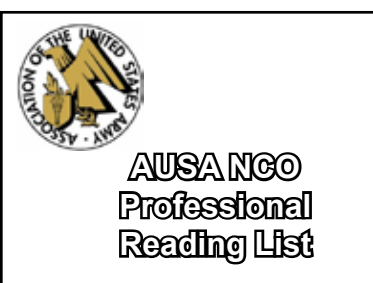
20 McGregor, “The avid reading habits of Trump’s Secretary of Defense, James ‘Mad Dog’ Mattis”

15 McGregor, “The avid reading habits of Trump’s Secretary of Defense, James ‘Mad Dog’ Mattis”

16 Puryear, “American Generalship”

What should I read?

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Mitigating Electronic Magnetic Interference Vulnerabilities in MLRS/HIMARS

by SSG Kevin G. Rutherford
13M Instructor / Writer

Foreword

(U) Our adversaries train tirelessly to defeat United States tactics and aim to degrade our effectiveness. Some of the most lethal tools in the Commanders' pockets is the Multiple Launch Rocket Systems (MLRS) and High Mobility Artillery Rocket Systems (HIMARS). The family of munitions these systems deliver possess the ability to strike static targets from 300km and consistently hit within meters of the intended targets. The MLRS/HIMARS and its munitions receive guidance data from GPS-aided sources. Mission Command Systems rely on GPS data and digital reporting to provide timely information and commanders' situational awareness. Without these systems, our effectiveness will be degraded.

(U) Our adversaries might exploit these systems, detect our actions and destroy our capabilities in order to degrade our effectiveness. We must understand what methods and equipment our enemy may employ to diminish our success. Once we understand these tactics we can employ counter-measures and train against our adversaries' actions, in order to degrade their success.

Direction Finding

(U//FOUO) Russian Electronic Warfare (EW) troops possess the ability to use electronic directional finding tools to determine the location and type of equipment in use by US and allied forces. Russian EW units in conjunction with their artillery operations centers successfully target and strike their intended targets.

(U) "...example from Eastern Ukraine, a Ukrainian army unit was broadcasting a radio message when it received accurate artillery fire, sustaining multiple casualties." (Asymmetric Warfare Group, 2017).

(U//FOUO) Potential adversaries are able to detect and monitor communications equipment and may be able to determine the location of US Forces. This possibility poses an increasingly danger because Russian forces have demonstrated the ability to produce accurate indirect fire from radio signals.

(U) "As with the degraded communication environment, Cyber Meaconing Intrusion, Jamming and Intercept (MIJI) is a very real threat to U.S. formations." (Asymmetric Warfare Group, 2017). MIJI, now known as Joint Spectrum Interference Report (JSIR), has the capability to affect both tactical and strategic units. Commanders and all leaders must understand the potential significance of adversaries successfully coordinating EW with indirect fires.

Radio Jamming

(U) Radio Jamming is a method of creating "noise" to prevent radio receivers from "hearing" transmissions. Encryption alone will not prevent radio jamming. Encryption is used to hide voice or digital communication among signals.

(U//FOUO) "Brevity codes, burst transmissions, relay stations, and communications windows are all TTPs that will limit the exposure of a headquarters to enemy electronic detection." (Asymmetric Warfare Group, 2017). Understand the longer each radio transmission is, the easier the enemy will be able to locate friendly antennas. Commanders can direct the use of "Dummy Stations" to increase survivability and determine enemy capabilities. Leaders must understand that jamming of Frequency Modulation (FM/SINCGARS) or High Frequency (HF/Harris) frequencies may be possible even with encryption. However, HF signals can be more difficult to detect and can decrease the units digital signature. Understand that while using encryption Frequency Hop (FH) on SINCGARS, radio operators may change from FH to Single Channel (SC) on a predesignated frequency to attempt to "push through" the radio jamming. However, Soldiers must recognize that in doing so, the enemy can pin point their location nearly immediately. This should only be used in emergency situations, and immediate movement may be required.

(U) Units should also practice hand and arm signals while mounted during movement to commu-

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nicate. These practices will decrease the unit's digital signal, thus decreasing the chance of detection. This will place more emphasis on squad/team leaders to make decisions independently from headquarters units on immediate actions without breaking radio silence criteria.

GPS Electronic Magnetic Interference Threats

(U//FOUO) "Jamming communications adds to battlefield confusion and degrades command and control required to prepare for enemy offensive operations." (Asymmetric Warfare Group, 2017).

(U//FOUO) GPS Jamming, similar to Radio Jamming, creates signal noise to the GPS receiver. This action prevents the GPS receiver from deciphering the GPS signals from space, and therefore may result in GPS signal loss. While encryption will assist in preventing GPS data signal loss, encryption alone may not protect US assets.

(U) GPS Spoofing is an Electronic Warfare (EW) tool that deceptively provides false GPS data to receivers. This forces the GPS device to provide the user with a false reading of location. If not detected, Spoofing attacks could degrade the accuracy of indirect fires. GPS Spoofing can vary from a few meters, to hundreds of kilometers off of the true GPS location.

(U//FOUO) It is also imperative to understand that not only radio transitions are vulnerable to intrusion, jamming and interception. Digital signals, to include GPS signals, are exploitable. E.g. the Chinese based Comet-1 GPS Jammer has been rebranded from North Korea, and has a GPS jamming range of approximately 200km.

(U//FOUO) "Certain platforms are used for protection, emitting an EW signal designed to overload electronic fuses on incoming fires. Guided munitions, both direct and indirect, will either

detonate early or change course once they come in contact with one of these EW bubbles." (Asymmetric Warfare Group, 2017).

Mitigating GPS Electronic Magnetic Interference

(U) DAGRs with updated encryption keys have the ability to detect GPS jamming and spoofing. Units should use DAGRs simultaneously with other systems of navigation to ensure that the detection of EW is occurs quickly. Utilizing updated encryption keys on all crypto devices must be standard practice.

(U) Using a Terrain-Masking technique, units can mitigate the effects of jamming from a ground based jammer. Units can determine the location of the jammer by using a DAGR and the body shielding technique. Use intersection and resection of lines from two points to detect a general location of the ground based jammer. (See Figure 1.)

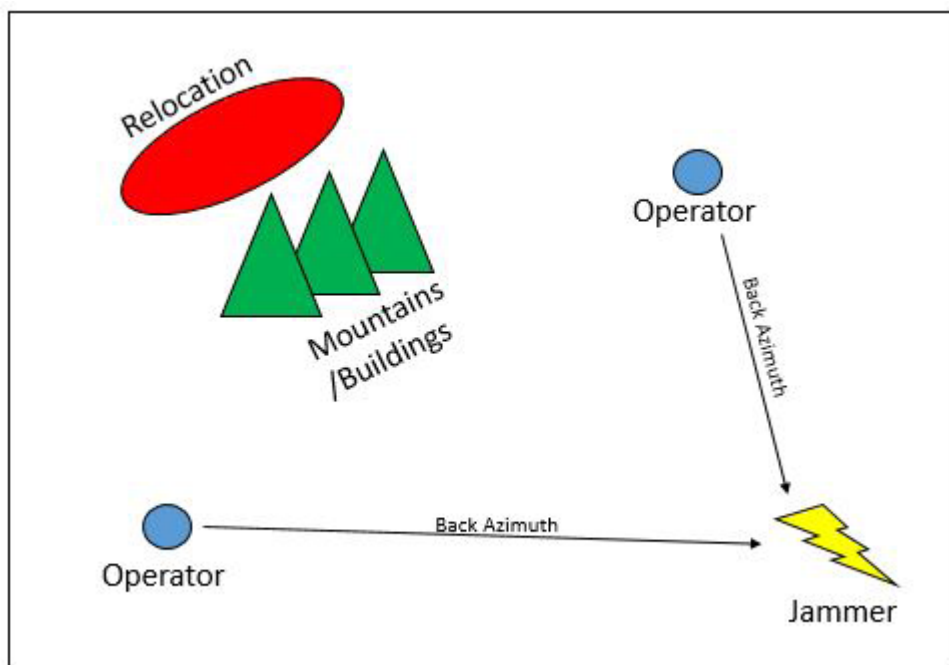


Figure 1. Example of two operators, using the body shielding technique and the back azimuth to determine jammer location. Then, selecting a relocation point.



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(U) Soldiers can then place objects such as buildings, terrain features or other vehicles between the GPS receiver and the jammer location. These objects can block the jamming signals from reaching the GPS receiver. If the location is “moving” this can indicate an airborne or mobile jammer. This type of activity must be reported to higher headquarters via GTA Card 40-01-002 and provides the information required. Units must establish TTPs to communicate these events to Commanders.

(U//FOUO) Soldiers must be proficient in GPS systems such as the DAGR, Blue Force Tracker and determining their own location with a map and compass. GPS Jamming on MLRS/HIMARS effects can be minimized if soldiers are trained to detect them. GPS Spoofing can adversely affect the known self-location if units are not using the proper encryption keys. If EMI is suspected, periodically check self-location using a map and compass. This can also be accomplished by using Survey Control Points (SCP) that were identified before EMI was suspected.

(U//FOUO) Utilize different means of survey if establishing SCPs prior to entering the EMI environment is not possible. Digital Imagery Exploitation Engine Version 2 (DIEE) can be a vital solution if proper planning and coordination are applied. DIEE can allow MLRS/HIMARS units maintain accurate self-known location by using predesignated locations, brevity codes, and marked locations.

(U//FOUO) MLRS/HIMARS family of GPS Aided munitions can achieve higher apogees above the EMI bubble. This will allow the munition to gain GPS data from satellites and increase the accuracy of the munition. However, if GPS data is not being received by the launcher, unaided mode must be used. While operating in unaided mode the GMLRS single or multiple rounds in open or closed-sheaf configurations may still be used.

Training Recommendations

(U) Units should adopt TTPs that would address EMI contested environments. Primary, Alternate, Contingency and Emergency (PACE) communication plans should be briefed, rehearsed and included in unit SOPs. Incorporate Single Channel (SC) frequency as an emergency only option. The SOP should identify

hand and arm signals both mounted and unmounted in order to communicate. TTPs should also include battle drills that allows for Soldiers to communicate to Commanders the effects of EMI on each system. Breaking radio silence criteria should be strictly identified and enforced throughout training. Commanders should also institute periods of complete radio silence while coordinating with Signal Intelligence (SIGINT).

(U) Leaders at all levels should identify the power level required for FM and HF radios, and adjust as needed. The use of directional antennas should be used if practical and available. Practice radio etiquette with breaks in transmitting no longer than 3-5 seconds to avoid detection. Use digital sources (BFT or GDU) for sending routine reports rather than using lengthy voice reports. Brevity Codes should be utilized whenever possible to keep shorter transmission times. Leaders at all levels should practice operating in a communications “black out” zone. This would include, GPS, FM and HF to simulate active jamming. Unit TTPs must include for continuous operations without GPS, FM or HF. Alternatively, special tools can be utilized to conduct simulated jamming during home station training. This training must be coordinated through the electronic spectrum manager.

(U//FOUO) MLRS/HIMARS can shoot in a GPS denied environment by using Guided Multiple Launch Rocket System (GMLRS) Rockets. GMLRS can be shot accurately by firing single or multiple rounds in an open or closed sheaf configuration. However, accurate known self-location is required.

(U//FOUO) Consider, Russian artillery in Ukraine has demonstrated saturated indirect fire in over a 1000 square meters area after electronic detection of rebel forces. Increasing the distances between firing point, hide points and between launchers may increase survivability of launcher platoons. MLRS/HIMARS Commanders should evaluate local threats and consider expanding the Operational Area to allow over 1000 meters between Fire Points. This must be weighed against enemies entering the Operational Area, among other considerations. Mission Command and logistical support of units spread further apart will require additional planning.



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(U) Traditional land navigation skills should be utilized, when possible, in combination with automated equipment such as BFT or DAGR. Consider adopting alternative means of survey that does not rely on GPS, such as the DIEEE system.

(U//FOUO) “Land Navigation is a perishable skill. Failure to use and practice it will result in a deterioration of Soldiers’ abilities.” All levels of leadership and soldiers need to train to use assets to navigate that the enemy is unable to disrupt or control. (Asymmetric Warfare Group, 2007)

(U) Consistent training, and knowledge of how to overcome EMI events, will allow units persevere. Establishing unit SOPs/TTPs and conducting frequent battle drills during home station training will allow for units to excel during EMI conditions.

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