ARMY SIGNALS INTELLIGENCE TRAINING IN THE BRIGADE COMBAT TEAM PREPARING FOR LARGE-SCALE COMBAT OPERATIONS

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE
General Studies

by

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Fort Leavenworth, Kansas
2019

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
14-06-2019	Master's Thesis	AUG 2018 – JUN 2019

4. TITLE AND SUBTITLE

Army Signals Intelligence Training in the Brigade Combat Team Preparing for Large-Scale Combat Operations

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

MAJ Nicholas R. Haines, U.S. Army

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Command and General Staff College
ATTN: ATZL-SWD-GD
Fort Leavenworth, KS 66027-2301

8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

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15. SUBJECT TERMS

SIGINT, BCT, LSCO, Training

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. PHONE NUMBER** *(include area code)*
(U)	(U)	(U)	(U)	124	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

ARMY SIGNALS INTELLIGENCE TRAINING IN THE BRIGADE COMBAT TEAM PREPARING FOR LARGE-SCALE COMBAT OPERATIONS, by MAJ Nicholas R. Haines 124 pages.

The Brigade Combat Team (BCT) operates at the tactical edge conducting combat operations around the world. The purpose of this thesis is to identify SIGINT training gaps in the BCT in accordance with large-scale combat operations (LSCO) requirements. The SIGINT platoon in the Military Intelligence Company (MICO) is the only SIGINT collection asset currently in the Division. The central focus of this thesis is on Army SIGINT training in the BCT in order to support the brigade commander to make timely decisions during LSCO. This research examines the training characteristics for the SIGINT platoon in the BCT during LSCO. This thesis uses qualitative research and applies a comparative case study methodology to organizational documents, theses, monographs, historical reports, and recorded observations from practitioners in the field to help highlight the gap between current SIGINT training and requirements during LSCO. In order to illustrate training characteristics, multiple historical contexts from Operation Desert Storm and Operation Iraqi Freedom 1 help drive SIGINT training variables in order to operate in the modern operating environment. This thesis concludes with recommendations to address institutional and operational Army SIGINT training requirements in the BCT in preparation for LSCO.

ACKNOWLEDGMENTS

A special thanks to my lovely wife, Morgan, and my son Luke. Your love, support, and steadfast encouragement kept me pressing forward.

A genuine thanks and appreciation to my committee members, Candy Smith, David Pierson, and Peter Im, for their guidance, countless hours, and patience throughout this endeavor.

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ACRONYMS

ADRP	Army Doctrine Reference Publication
ATN	Army Training Network
BCT	Brigade Combat Team
BEB	Brigade Engineer Battalion
CATS	Combined Arms Training Strategy
COIN	Counterinsurgency
COMINT	Communication Intelligence
CTC	Combat Training Center
DATE	Decisive Action Training Environment
DIL	Disconnected, Intermittent, Limited-bandwidth
DIRNSA	Director, National Security Agency
ELINT	Electronic Intelligence
EMS	Electromagnetic Spectrum
EW	Electronic Warfare
FISINT	Foreign Instrumentation Signals Intelligence
FM	Field Manual
FORSCOM	Forces Command
IEWTPT	Intelligence Electronic Warfare Tactical Proficiency Trainer
INSCOM	Intelligence and Security Command
LSCO	Large-Scale Combat Operations
MDO	Multidomain Operations
METL	Mission Essential Task List
METs	Mission Essential Tasks

MI	Military Intelligence
MICO	Military Intelligence Company
SIGINT	Signals Intelligence
TRADOC	Training and Doctrine Command
USAICoE	United States Army Intelligence Center of Excellence
UTM	Unit Training Management
UTP	Unit Training Plan

CHAPTER 1

INTRODUCTION

> If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself, but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle.
>
> —Sun Tzu, *The Art of War*

The complexity of modern conflict continues to increase insecurity exponentially among people and nations. The US Army operates within this human dimension. As a result of the intense focus on counterinsurgency and stability operations in Iraq and Afghanistan, the Army is highly capable of limited contingency operations, yet the geopolitical landscape continues to shift.[1] With the past sixteen years focused on counterinsurgency, the Army has not had the luxury to prepare for the next national threat. The fiscally constrained budget reality since the Cold War presents challenges with how to address near-peer and peer threats while supporting the needs of current operations. Lieutenant General Lundy, the Commanding General of the US Army Combined Arms Center, suggested that leaders must recognize the importance of the "exponential lethality, hyperactive chaos, and accelerated operational tempo of the multi-domain battlefield when facing a peer or near-peer adversary."[2]

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[1] LTG Michael D. Lundy, "Forward," Large-Scale Combat Operations Special Edition, *Military Review* 98, no. 5 (September-October 2018): 1.

[2] Ibid.

Multidomain operations describes the joint force, whole of government approach to armed conflict.[3] The concept enables US joint forces and government partners to take advantage of personnel and training strengths to outmaneuver the adversary in all domains.[4] The *U.S. Army Multidomain Operations* concept describes how Army forces fight across all domains, the electromagnetic spectrum (EMS), and the information environment at every echelon.[5] The Army's doctrinal mission remains unchanged and consists of fighting and winning America's wars through sustained land combat missions to defeat enemy ground forces.[6] The Army's readiness deficiency and inability to overmatch the lethality of peer and near-peer competitors, including Russia, China, Iran, and North Korea, provided the foundation for the Army's modernization strategy. As the ground component of multidomain operations, the Army has a variety of challenges and requirements. These shape and drive Army-specific requirements across every warfighting function. This multidomain operations construct presents unique Intelligence warfighting function challenges and requirements.

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[3] GEN Stephen J. Townsend, "Accelerating Multi-Domain Operations: Evolution of an Idea," Modern War Institute at West Point, 23 July 2018, accessed 23 October 2018, https://mwi.usma.edu/accelerating-multi-domain-operations-evolution-idea/.

[4] GEN David G. Perkins, "Multi-Domain Battle: Joint Combined Arms Concept for the 21st Century," Association of the United States Army, 14 November 2016, accessed 7 March 2018, https://www. ausa.org/articles/multi-domain-battle-joint-combined-arms.

[5] U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-3, *The U.S. Army in Multi-Domain Operation 2028* (Washington, DC: Government Printing Directorate, 6 December 2018), 5.

[6] Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-0, *Operations* (Washington, DC: Government Printing Directorate, October 2017), 1-14.

The Army's Military Intelligence Corps is the lead entity for the Army's Intelligence warfighting function. The Army's Intelligence warfighting function must modernize across doctrine, organization, training, materiel, leadership, policy, and facilities (DOTMLPF) to provide timely intelligence to the force. Protracted counterinsurgency and limited contingency operations led decision makers to optimize the Intelligence warfighting function's training focused on these areas.[7] The Army assumed risk in the ability of the Intelligence warfighting function to effectively transition to counter potential peer threats, who were developing and expanding their capabilities. As the Army focuses on a highly lethal, fast-paced operational environment, the force must acquire the necessary skills through practical training.[8] An expansive operational environment such as large-scale combat operations (LSCO) requires all warfighting functions to be adaptable, flexible, and proactive. The Intelligence warfighting function is a prime example of the importance of such characteristics. Specifically, signals intelligence (SIGINT) within the Intelligence warfighting function is one of the Army's primary means of answering the commander's priority intelligence requirements.

[7] Department of the Army, *The United States Army Signals Intelligence (SIGINT) Strategy* (Ft. Huachuca, AZ: U.S. Army Intelligence Center of Excellence, 2018), 1.

[8] U. S. Army Intelligence Center of Excellence, *Military Intelligence Corps Training Strategy 2019-2020 Training Strategy* (Ft. Huachuca, AZ: U.S. Army Intelligence Center of Excellence, November 2018), 3.

At its core, SIGINT is the art and science of detection, collection, and exploitation of threat emissions for strategic, operational, and tactical purposes.[9] The NSA is the US government's lead organization for cryptology encompassing both SIGINT and Information Assurance activities.[10] The Director of NSA (DIRNSA) serves as the principal SIGINT advisor.[11] SIGINT operational tasking authority (SOTA) is the authoritative operational direction and direct levying of SIGINT requirements by a military commander on designed SIGINT resources.[12] SOTA is delegated from DIRNSA to the Army and includes the authority to deploy and redeploy all or part of the SIGINT resources. The Army Cryptologic Operations serves as the Army's service cryptologic component representative supporting optimized capabilities, training, and resources while the Army Tactical Control and Analysis Element provides the bridge between national and Army ground SIGINT operations. Army SIGINT cannot keep pace with the national US SIGINT enterprise as a node or component due to structure, doctrine, and training. As a result, SIGINT is no longer postured to provide the level of support brigade commanders have come to expect. The increasing gap in technical experience, leadership, and tactical training reflect a fissure in SIGINT skills necessary to support tactical

[9] Department of the Army, *The United States Army Signals Intelligence (SIGINT) Strategy*, 3.

[10] U.S. Department of Defense (DoD), Department of Defense Directive (DoDD) 5100.20, *National Security Agency/Central Security Service* (Washington, DC: Executive Services Directorate, 26 January 2010), 4.

[11] Ibid., 2.

[12] Joint Chiefs of Staff (JCS), Joint Publication (JP) 2-01, *Joint and National Intelligence Support to Military Operations* (Washington, DC: Government Printing Directorate, 2012), GL-16.

commanders.[13] Additional partners, including the cyber and electromagnetic warfare community, operate throughout the congested electromagnetic spectrum. As such, the Army must consider the future of SIGINT in conjunction with cyber and electromagnetic warfare, not in isolation, as complementary warfighting entities. By taking this holistic approach, Army commanders will be proactively enabled to make timely decisions.

As the Army transforms the preponderance of its concentration towards LSCO, the Military Intelligence community must keep pace to advise the commander effectively. Army SIGINT is now faced with the daunting challenge of transforming an organization that was trained, resourced, and equipped personnel for a different fight. Army SIGINT challenges align directly with the Chief of Staff of the Army's top priority, "Readiness."[14] At this juncture, the Army SIGINT community is not adequately prepared to support the commander's decision-making process in real-time during a LSCO type of military operation against a peer or near-peer threat. Focused training to combat the next threat is the embodiment of readiness.

The authority to design, equip, and train a unit is rooted in US law. Title 10 US Code assigns the Secretary of the Army the responsibility and authority to organize, train, equip, and sustain the Army.[15] Title 50 US Code, the Army G-3/5/7, and TRADOC establish training goals for new Soldiers. The US military joint doctrine's descriptive

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[13] Department of the Army, *The United States Army Signals Intelligence (SIGINT) Strategy*, 2.

[14] GEN Mark A. Milley, "39th Chief of Staff Initial Message to the Army," 1 September 2015, accessed 14 October 2018, https://www.army.mil/article/154803/39th_chief_of_staff_initial_message_to_the_army.

[15] Secretary of the Army, 10 U.S.C. § 3013(b) (2011).

nature addresses the foundational set of conditions necessary for success; however, it does not adequately describe how to conduct, plan, or coordinate SIGINT operations in an ever-evolving threat-based operational environment. As intended, joint doctrine provides the context and platform for the services to refine as they see fit. Field Manual (FM) 3-0, *Operations*, outlines the strategic necessity to operate across the range of military operations.[16] Army doctrine is currently limited to conceptually describing problem-solving tools and does not prescribe training. Army SIGINT doctrine is further limited to scattered excerpts, personal experience, and standing best operational and analytic practices. Commanders emphasize training based on a risk assessment and upcoming major training events. As a result, the individual Soldier is adaptable yet lacks any training beyond basic equipment familiarity and operational steps as outlined in technical manuals.

Purpose

The purpose of this thesis is to identify SIGINT training gaps in the BCT based upon the uniqueness of LSCO requirements. The Army requires a highly trained, technically astute, and tactically competent and capable SIGINT force capable of employing technical and tactical principles to assist the brigade commander in understanding, visualizing, describing, directing, leading, and assessing the LSCO environment. Optimization of SIGINT training through institutional and operational means is the primary way to achieve seamless integration and synchronization from the SIGINT sensor to the commander's desired lethal or non-lethal effects.

[16] HQDA, FM 3-0, 1-2.

Problem Statement

This thesis will highlight the current state of Army SIGINT training for the operator at the brigade level, address training applicability to LSCO, and recommend a way forward. This thesis will discuss the BCT SIGINT requirements in LSCO, determine who is responsible for oversight of these requirements, the training strategies and systems currently in place, and finally make recommendations to mitigate the training shortfalls. Sixteen years since the onset of Operation Iraqi Freedom 1, it has been nearly as long since the Army trained for high-intensity conflict or LSCO. As the Chief of Staff of the Army demonstrates the Army's ability to conduct LSCO, the Army must be adequately organized, trained, and equipped. The nature of LSCO is that the Army will initiate operations from a position of disadvantage against a peer competitor with an accelerated operational tempo while being contested across all domains. During the execution of Unified Land Operations, the Army employs a variety of sensors for the commander to maintain situational awareness. The essential perspective that Army SIGINT provides as a sensor over the other services and sensor types is persistent ground-based intelligence collection beyond the forward line of troops. Army SIGINT at the brigade level and below directly enables time-sensitive, precision lethal and non-lethal targeting against an adversary. As adversaries increase the complexity of their systems, Army SIGINT equipment will continue to evolve at the pace of technology and our acquisition process; furthermore, the instructions to operate the equipment will update accordingly. To conduct persistent ground-based intelligence collection, the Army must train SIGINT in the BCT beyond the operation of collection equipment. Training must continue to refine the fundamental skills necessary to optimize ground-based collection and capitalize on

opportunities to seize the initiative during tactical operations. By examining current Army strategies and professional publications, this thesis will highlight what is missing in tactical SIGINT training requirements focused on supporting the BCT during LSCO and the subsequent supporting training tasks.

Significance of the Study

LSCO discussions focused on a peer or near-peer adversary in a multidomain operating environment often center around materiel solutions. Army SIGINT must advance based on the needs of the customer through improvements across DOTMLPF. It is easier to develop tangible resources such as people, funding, and equipment; the challenge is to forecast intangible and non-materiel resources, such as training. "Training is the most important thing the Army does to prepare for operations, and it is the cornerstone of combat readiness. Training is the foundation for successful operations. Effective training must be commander driven, rigorous, realistic, and to the standard and under the conditions that units are expected to fight."[17] As such, the Army is charged to effectively train the force to operate successfully across the range of military operations. Army SIGINT activities must be synchronized with tactical operations to be successful.

There is a clear distinction between what national resources and other services are doing and the Army's approach to SIGINT. While there is an inherent difference in capability requirements to support land operations, the Army must close the technological gap between national and tactical SIGINT capabilities. The future Army SIGINT

[17] Headquarters, Department of the Army (HQDA), Army Doctrine Reference Publication (ADRP) 3-0, *Unified Land Operations* (Washington, DC: Government Printing Directorate, May 2012), 1-10.

professional force must be ready and capable to fight and win in an increasingly contested and complex environment. Army SIGINT must be prepared to offer commanders a fully capable, tailorable, scalable, adaptable, doctrinally sound, well-trained, well-equipped, professional SIGINT force that specifically enhances the lethality and survivability of US military forces during LSCO against a peer adversary.[18] While Army doctrine does outline the ends, the challenge is the ways and means by which the service accomplishes the ends. The trap that one can easily succumb to is conducting SIGINT solely for the sake of conducting SIGINT. As an effective way to process data and turn it into relevant and actionable intelligence, SIGINT operations should be nested with the steps of the Army's intelligence process: plan and direct, collect and process, produce, and disseminate. Army SIGINT must be prepared to support sophisticated expeditionary maneuvers, joint combined arms, and integrate within multinational operations while supporting land forces across multidomain operations. SIGINT continues to play a vital role in shaping the understanding of both the environment and specific threats. The next step to achieve the desired end state of both tactical commanders and the Army SIGINT community is through effective and appropriate training. There are extensive discussions regarding the use of SIGINT in Iraq and Afghanistan; however, limited comprehensive discussions are emphasizing how to train SIGINT for LSCO.

[18] Department of the Army, *The United States Army Signals Intelligence (SIGINT) Strategy*, 8.

Research Questions

The primary research question derived from the problem is what are the SIGINT training characteristics required to support the BCT during LSCO? Additionally, the research will address a few succinct subordinate questions. What are the SIGINT training requirements for the BCT during LSCO? What are the current SIGINT training requirements in the BCT? What are the shortfalls associated with SIGINT training in the BCT during LSCO?

Methodology

This thesis will build a doctrinal framework and apply qualitative research analysis through organizational documents, theses, monographs, historical reports, and recorded observations from practitioners in the field to help highlight and understand the disconnect between training and requirements during LSCO. Given the time and resources available, this thesis will apply deductive reasoning through qualitative research focused on existing unclassified documentation. Additionally, this thesis will also apply a case study design to answer the subordinate questions. The case study will examine two historical examples in order to provide the necessary context and establish consistent variables for LSCO. Based on what this research observes in the case studies, this thesis will deduce parallels in the division from the case studies to the BCT. Additionally, because the information available at the unclassified level was limited; this research presumed SIGINT at the operational level as described through the case studies was indicative of SIGINT at the tactical level. The case studies build an operational understanding that is applied to the tactical level. It is important to determine the BCT

requirements during LSCO and identify what SIGINT training is currently focused on in order to identify the SIGINT training gaps.

Definitions

This thesis uses the following defined terms throughout to further the discussion and define the research variables within the context of the problem statement. The Military Intelligence community in the Army commonly uses these terms. They provide the necessary specificity to the operational terms used in the discussion and resolution of the research question.

Signals Intelligence (SIGINT). SIGINT breaks down into three sub-disciplines: communication intelligence (COMINT), electronic intelligence (ELINT), and foreign instrumentation signals intelligence (FISINT).[19] The Army's component to the SIGINT enterprise currently resides within the Military Intelligence branch of the Army. The Army is responsible for manning, training, and equipping its SIGINT formations, while the National Security Agency (NSA) is responsible for the conduct of SIGINT activities, policies, and procedures for national foreign intelligence purposes.[20] Internal to the Army, there are two distinct commands where SIGINT Soldiers operate. The Intelligence and Security Command (INSCOM) generally services strategic consumers while SIGINT formations within Forces Command (FORSCOM) at the brigade level and below are focused on time-sensitive tactical SIGINT collection and reporting for tactical

[19] Headquarters, Department of the Army (HQDA), Army Doctrine Publication (ADP) 2-0, *Intelligence* (Washington, DC: Government Printing Directorate, September 2018), 4-8.

[20] DoD, DoDD 5100.20, 24.

commanders. The latter is the Army SIGINT framework in which this thesis will focus its research and discussions.

Army Intelligence Process. The Army's intelligence process consists of four steps, plan and direct, collect and process, produce, and disseminate, as well as two continuing activities, analyze and assess.[21] The intelligence process is the sound, collaborative, and iterative method whereby the intelligence consumer interacts with the intelligence community to answer a requirement. Collectors, analysts, and consumers view the intelligence process differently based on the echelon, requirement, and operational context. This thesis will use externally facing aspects from the intelligence process as the variables to discuss SIGINT training.

Plan and Direct. Commanders drive the intelligence process through requirements. SIGINT collection is an operation; thus, the commander and staff are directly involved in planning as part of the operations process. Commanders employ organic collection assets as well as plan, coordinate, and articulate requirements to focus the unit's combat power to achieve mission success.[22]

Collect. Collection is the process of gathering data. "A successful information collection effort results in the timely collection and reporting of relevant and accurate information, which supports the production of intelligence."[23] Information collection is

[21] HQDA, ADP, 3-1.

[22] Ibid., 3-3.

[23] Ibid., 3-5.

synchronized to provide critical information at critical times. The data is stored in intelligence databases then used in intelligence production.

Disseminate. "Commanders and unified action partners must receive combat information and intelligence products in time and in an appropriate format to facilitate situational understanding and support decision making."[24] Dissemination of intelligence information is a deliberate process through command channels, staff channels, or technical channels to support operations.

Latency of Intelligence. The latency of intelligence refers to the time it takes to move or transmit data from the collection asset to the consumer. The consumer could be an intelligence analyst, a commander, or a platform delivering an effect. In LSCO, it is imperative to minimize the time in order to maintain the initiative and exploit the adversary's weaknesses.

Degraded, Intermittent, Limited-bandwidth Communication. The EMS is a busy space often with competing entities. A degraded, intermittent, limited-bandwidth communication environment refers to a less than optimal medium or transportation layer for electronic communication. This communication environment could be due to adversarial effects, environmental degradation, or friendly equipment not functioning. The adversary could employ a jamming capability degrading or even eliminating electronic communications. Additionally, the communication system capacity or processing power could fail or not be optimized for a geographic region of the world. Finally, environmental factors such as the weather and terrain can reduce the electronic

[24] HQDA, ADP, 3-6.

communication medium. A degraded, intermittent, limited-bandwidth communication environment reduces the ability to transmit digital data and information from one node to another.

Operational Tempo. Operational tempo is a measurement of the pace or speed of a military operation. Military operations that progress faster have a higher operational tempo.

Assumptions

The central focus of this thesis is on Army SIGINT training in the BCT in order to support the brigade commander to make timely decisions during LSCO. Accepting several assumptions is required to understand the context of this research. Outside the classified realm, the limited academic and professional writings that discuss the necessity for SIGINT training generate some assumptions. This thesis has six assumptions.

Assumption 1. The division is the primary unit executing LSCO. The Army will continue to use the BCT construct under the division as the primary maneuver element to execute missions during LSCO. Three types of BCTs exist in the Army: Infantry Brigade Combat Team, Stryker Brigade Combat Team, and Armor Brigade Combat Team.

Assumption 2. The formation of a BCT is in a constant state of flux and reorganization. This research looks at the SIGINT element that operates within the assigned unit formation that it supports. The SIGINT element within a BCT is resident in the Military Intelligence Company (MICO). The organization of the MICO as it relates to the SIGINT element will not change in the near future. The future integration of electronic warfare (EW) capabilities will not alter the mission or formation of the SIGINT element.

Assumption 3. As the national administration evolves, the National Security Strategy and the National Military Strategy will not shift national policies, priorities, and guidance. LSCO will remain as the guiding focus to organize, train, and equip the Army.

Assumption 4. There is sufficient time to train technical skills before deployment. The commander is responsible for everything the unit accomplishes or fails to achieve. The commander recognizes the value of enablers and is willing to dedicate time to train low-density military operational specialties.

Assumption 5. Technology will continue to advance including aspects such as remote operations, sensor sensitivity, and artificial intelligence. This research assumes that technology will not markedly change in the near term requiring significantly different SIGINT collection or analytic methods that change the nature of training.

Assumption 6. The similarities between operational and tactical SIGINT such as process, data integrity, and data storage indicate SIGINT operations are similar between echelon and across the level of war. When the operational understanding is applied to the tactical, differences and particular nuances do not matter. As such, this research assumed the operational level SIGINT as described through the case studies was indicative of SIGINT at the tactical level.

Limitations

This thesis is limited by two primary factors, time and classification. First, additional time would allow for further review of the material through new perspectives. The second limitation of this study is the details in the documentation of the Army SIGINT system are highly classified. The information available about specific attributes of tactical SIGINT at the unclassified level was limited. The similarities between

operational and tactical SIGINT such as process, data integrity, and data storage indicate SIGINT operations are similar between echelon and across the level of war. When the operational understanding is applied to the tactical level, differences and particular nuances do not matter. As such, this research assumed the operational level SIGINT as described through the case studies was indicative of SIGINT at the tactical level. Not using classified or limited distributed information affects what this research can derive from the cases. This research will generalize in the absence of available information. This limitation reduces the level of specificity in the discussion and may limit detailed Army SIGINT training recommendations. This research intends to be available to the broadest audience. As a result, this research will present all information at the unclassified level.

Additionally, this research is limited by the lack of adequate evaluation of the historical cases. The ability to identify the requirements of SIGINT training for the BCT in LSCO will be based upon historical cases in which the SIGINT technology was much different. This will limit the areas of training available for examination. Finally, the research will be limited to identifying the required SIGINT training tasks, not evaluating how well the tasks are being trained. Self-evaluated SIGINT training readiness at the BCT level as well as training proficiency levels are inherently bias due to the subjectivity of the evaluator.

Scope and Delimitations

Multidomain operations range from military engagement to limited contingency operations to LSCO. The conflict continuum ranges from peace to war and throughout the range of military operations. The range encompasses three primary categories: military engagement, security cooperation, and deterrence; crisis response and limited

contingency operations; and LSCO.[25] While aspects of SIGINT training apply across a variety of types of operations, this thesis will exclusively focus on LSCO.

This research is Army-centric, focused on training within the BCT in order to support the BCT in the context of LSCO. Research is tailored to the SIGINT element in the brigade. There are SIGINT entities throughout the Army external to the BCT that support strategic, operational, and tactical requirements including requirements of the BCT. These entities which include the Military Intelligence Brigade-Theater, Expeditionary Military Intelligence Brigade, and entities within the US Special Operations Command, will not be discussed. Additionally, this study solely focuses on the SIGINT domain inside the Army at the tactical level. There are perhaps parallel challenges that can be applied to the other services as well as throughout the Intelligence Community; however, this work will focus exclusively on SIGINT as it pertains to the BCT. This thesis does not summarize Army SIGINT history or the evolution of technology in Army SIGINT collection assets. There are numerous works available that both provide detailed accounts of the evolution of the American SIGINT enterprise as well as subdomains such as cryptography. History is used to provide context and as a tool to measure training against LSCO. In SIGINT, the source of information and methodologies of processing signals are highly protected and thus will be outside the scope of this research.

This study will not explore any classified material. This delimitation will allow for the broadest range of distribution to reach the maximum number of readers. Other

[25] Joint Chiefs of Staff (JCS), Joint Publication (JP) 3-0, *Joint Operations* (Washington, DC: Government Printing Directorate, 2017), xvi.

aspects necessary to consider in future research not addressed in this thesis are the SIGINT community's interaction with cyber and signal branches.

The research in this study will focus on answering the primary and subsequent research questions. The focus is on required SIGINT training requirements. As such, research will not extend into evaluating the efficiency or effectiveness of SIGINT training focused on preparing the SIGINT element in the BCT for LSCO.

Summary

This introductory chapter provided the necessary background to present the topic and importance of discussing Army SIGINT training. This thesis focuses on answering the primary and secondary research questions within the context of Army SIGINT training in the BCT preparing for LSCO. Additionally, this introductory chapter outlined the scope, limitations, delimitations, and assumptions necessary to focus the research. Chapter 2 will provide a literature review of existing publications of Army training, SIGINT training, various training strategies, and white papers to identify the current state of SIGINT training in the BCT. Additionally, Chapter 2 will provide the historical setting to determine the general SIGINT requirements at the brigade level. Chapter 3 will outline the qualitative research methodology, the research framework, explain the process, and highlight the lens from which the subsequent chapters will explore. Chapter 4 will analyze Army SIGINT training through the lens of the Army intelligence process within the context of the LSCO variables as highlighted in Chapter 2. Finally, Chapter 5 will conclude the discussion and propose recommendations and areas for future study.

CHAPTER 2

LITERATURE REVIEW

Introduction

The purpose of this chapter is to "provide the foundation for contributing to the knowledge base."[26] The primary research question provides the foundation by highlighting existing knowledge and contributing to the discussion. What are the SIGINT training characteristics required to support the BCT during LSCO? The subordinate questions are what are the SIGINT training requirements for the BCT during LSCO; what are the current SIGINT training requirements in the BCT; and what are the shortfalls associated with SIGINT training in the BCT during LSCO? Research for this thesis incorporated four literary components focused on answering the research question and associated subordinate questions. This chapter applies deductive reasoning through exploring the institutional ends, ways, and means of training followed by the operational application of SIGINT training in the BCT. Notable publications include Army doctrine, TRADOC publications, Army and Military Intelligence training strategies, and Combined Arms Training Strategies (CATS). Additionally, reflections from the field as published in various professional publications provide current feedback. Army doctrine provides guidelines for how the Army will both conduct SIGINT operations and support the commander's decision-making process as an input to the Army intelligence process. Strategies contained within this research include an Army, a Military Intelligence, and a

[26] Sharon B. Merriam, *Qualitative Research: A Guide to Design and Implementation*, 2nd ed (San Francisco, CA: John Wiley and Sons, 2009), 72.

SIGINT training strategy. TRADOC publications and pamphlets outlining concepts concerning the future force organization, equipment, and doctrine solutions are also considered. Additionally, the literature review has considered professional discussions for their after action reports, lessons learned, first-hand accounts, and prospective analysis. Finally, this chapter concludes with an examination of LSCO through two historical conflicts, Operation Desert Storm and Operation Iraqi Freedom 1. They provide the necessary construct to evaluate Army SIGINT during a major offensive campaign against a conventional force during large-scale ground combat operations.

Institutional Ends

Army Doctrine

Army doctrine serves as a starting point for conceptualizing, designing, planning, and conducting operations. Its primary purpose is to serve as a common professional language among service members and as a standard frame of reference for discussing operations. Army doctrine is a body of work focused on how the Army intends to operate by describing the nature and fundamentals of operations as well as addressing methods to conduct operations in order to provide mutual understanding but does not prescribe training, tasks, conditions, and standards. This thesis uses the BCT as the primary echelon for operations at the tactical level. The Army has specific doctrine tailored to the BCT found in FM 3-96, *Brigade Combat Team*. This field manual outlines the specific structure and function of the BCT including how the MICO is organized in an Infantry Brigade Combat Team, Stryker Brigade Combat Team, and an Armored Brigade Combat Team. Additionally, the Army employs a variety of doctrine specifically discussing Army training, such as within the Unified Land Operations construct in FM 3-0, *Operations*.

The Intelligence warfighting function further outlines intelligence specific training in FM 2-0, *Intelligence*, and furthers the discussion through several intelligence specific Army Doctrine Publications (ADPs), Army Doctrine Reference Publications (ADRPs), and Army Training Publications (ATPs). The non-prescriptive nature of these publications provides the guide to foster initiative and creative thinking to solve complex problems. The Army also identified that training is the cornerstone for readiness and published FM 7-0, *Train to Win in a Complex World*, to address how to conduct robust, realistic, and challenging training.[27] Finally, the Military Intelligence Corps Training Strategy 2019-2020 provides guidance on how to develop the ends, ways, and means for Military Intelligence training.[28] This document outlines how all Military Intelligence formations at all levels will execute as part of a combined arms team.[29]

Army Doctrine Reference Publication (ADRP), 7-0 *Training Units and Developing Leaders*, provides a starting point. This doctrinal publication establishes the framework leaders can use to develop a successful training strategy. The Army must prepare units and leaders to successfully navigate through a complex operational environment with a wide range of challenges.[30] As such, FM 7-0 only provides the structural framework, not the necessary in-depth training plan to execute.

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[27] Headquarters, Department of the Army (HQDA), Field Manual (FM) 7-0, *Train to Win in a Complex World* (Washington, DC: Government Printing Directorate, October 2016).

[28] U. S. Army Intelligence Center of Excellence, *Military Intelligence Corps Training Strategy 2019-2020 Training Strategy*.

[29] Ibid.

[30] HQDA, FM 7-0, iii.

TRADOC Publications

A limited number of recent white papers and Army concept publications focus explicitly on addressing measures of performance and measures of effectiveness of SIGINT training. There are numerous TRADOC publications and pamphlets outlining concepts concerning the future force organization, equipment, and doctrine solutions. It is vital that the Army implements these solutions to maintain pace with an ever-changing operational environment. While organization, equipment, and doctrine modification are necessary, there is limited documentation from TRADOC concerning a forward-leaning plan that implements the necessary technical training that SIGINT expertise requires. TRADOC Pamphlet 525-8-2, *The U.S. Army Learning Concept for Training and Education 2020-2024*, published in April 2017, provides the building blocks for Army training and education in a complex global environment.

7-100 Series Manuals

The TRADOC G2 created the 7-100 series manuals to provide an opposing force that covers the entire range of military operations and the spectrum of military and paramilitary capabilities for the Army to train against.[31] The entirety of the Training Circular (TC) 7-100 series is used for training and developing future capabilities against a credible threat. The applications for this series of TCs extend into field training, simulations, and classroom instruction except when contingency training requires

[31] Headquarters, Department of the Army (HQDA), Field Manual (FM) 7-100, *Opposing Force Doctrinal Framework and Strategy* (Washington, DC: Government Printing Directorate, May 2003), iii.

maximum fidelity to a specific country-based threat.[32] These training circulars provide a holistic and comprehensive threat for SIGINT to train against in conjunction with supported maneuver units. Threats include convention, hybrid, and irregular forces that are based on real-world events, observed threat training exercises, and current peer and near-peer threat capabilities.

The Army attempts to avoid training against and building intelligence capabilities aligned against a continually moving target. FM 7-100, *Opposing Force Doctrinal Framework and Strategy*, created a flexible opposing force baseline that outlines a realistic composite of potential adversaries the Army may encounter in real-world situations in the foreseeable future.[33] The TC 7-100 series provides the blueprints for a comprehensive opposing threat. TC 7-100, *Hybrid Threat*, summarizes for training exercises the composite strategy, operations, tactics, and organization of hybrid threats that may organize to fight US forces.[34] Specifically, TC 7-100 addresses the emerging category of threats and activities that do not fit into the traditional categories of conventional and unconventional war.[35] TC 7-100.1, *Opposing Force Operations*, describes a plausible contemporary opposing force representing a composite of varying

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[32] Headquarters, Department of the Army (HQDA), Training Circular (TC) 7-100.3, *Irregular Opposing Forces* (Washington, DC: Government Printing Directorate, January 2014), iv.

[33] HQDA, FM 7-100, Forward.

[34] Headquarters, Department of the Army (HQDA), Training Circular (TC) 7-100, *Hybrid Threat* (Washington, DC: Government Printing Directorate, November 2010), iii.

[35] HQDA, TC 7-100, v.

capabilities of actual worldwide forces used in place of any one specific threat forces.[36] TC 7-100.2, *Opposing Force Tactics*, continues the discussion of contemporary opposing forces by describing tactics that are particularly valuable in creating training environments.[37] TC 7-100.3, *Irregular Opposing Force Manual*, addresses the irregular opposing force for training exercises including insurgents, guerrillas, and criminals.[38] Finally, TC 7-100.4, *Hybrid Threat Force Structure Organization Guide*, enables the Army to train against a challenging and plausible diverse and dynamic hybrid threat consisting of conventional forces, irregular forces, and criminal elements achieving mutually benefitting effects.[39]

Institutional Ways

Military Intelligence Corps Training Strategy 2019-2020

The purpose of the Military Intelligence Corps Training Strategy 2019-2020 is to address how to achieve combat readiness in a resource-constrained environment.[40] The warfighter expects intelligence delivered despite the complexity of multidomain

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[36] Headquarters, Department of the Army (HQDA), Field Manual (FM) 7-100.1, *Opposing Force Operations* (Washington, DC: Government Printing Directorate, December 2004), xiii.

[37] Headquarters, Department of the Army (HQDA), Training Circular (TC) 7-100.2, *Opposing Force Tactics* (Washington, DC: Government Printing Directorate, December 2011), x.

[38] HQDA, TC 7-100.3, v.

[39] Headquarters, Department of the Army (HQDA), Training Circular (TC) 7-100.4, *Hybrid Threat Force Structure Guide* (Washington, DC: Government Printing Directorate, June 2015), 1-1.

[40] U. S. Army Intelligence Center of Excellence, *Military Intelligence Corps Training Strategy 2019-2020 Training Strategy*, 3.

operations with degraded connectivity.[41] The training strategy clearly articulates that the most significant challenge currently facing the Military Intelligence Corps is the support to commanders during LSCO.[42] The United States Army Intelligence Center of Excellence (USAICoE) is responsible for providing focused intelligence training, education, and doctrine for intelligence forces at echelons Corps and below.[43] The strategy continues by highlighting training implications, a training vision, institutional and operational training, and the platforms that support training including MITS, IEWTPT, Foundry, MIRC, and CTCs.[44] The combined Objective Assessment of Training Proficiency (Objective T) and MITS provide a more holistic assessment by incorporating quantifiable individual, crew, and platform proficiency into the overall readiness rate. These training platforms come from USAICoE, Department of the Army, Department of the Army G2, and INSCOM.

The MITS is a standardized training strategy designed to help BCT commanders assess, train, and evaluate their tactical intelligence enterprise capabilities in an objective and quantifiable manner. MITS applies a four-tiered certification strategy to standardize training comprised of multiple echelons to build a ready and capable intelligence force. The four tiers are individual certification, crew certification, platform certification, and the Intelligence warfighting function certification. Training Circular (TC) 2-19.404,

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[41] U. S. Army Intelligence Center of Excellence, *Military Intelligence Corps Training Strategy 2019-2020 Training Strategy*, 3.

[42] Ibid., 4.

[43] Ibid.

[44] Ibid.

Military Intelligence Training Strategy for the Brigade Combat Team Tier 4, is the first tool published to support the MICO certification strategy to conduct individual mission essential task list (METL) tasks and skills.[45] SIGINT Tier 4 training consists of collection system familiarization, preventative maintenance checks and services, antenna construction, direction finding, time-sensitive reports, collection operations, tactical reports, and communications.[46] SIGINT Soldiers in the BCT will conduct Tier 4 training evaluations annually. TC 2-19.403, *Military Intelligence Training Strategy for the Brigade Combat Team Tier 3*, is the second tool published to support the MICO training strategy to conduct collective METL tasks and skills.[47] SIGINT Tier 3 training focuses on the collection system, site selection and establishment, as well as mounted and dismounted operations.[48] Tier 3 training discusses support to the targeting process. However, it is only in the context of all-source analysis within the staff, not integrating front-end collection in the detection phase of the targeting process. SIGINT Soldiers working as collectors in the BCT will perform an enduring set of critical intelligence collection tasks. Tier 2, platform certification, and Tier 1, Intelligence warfighting function certification, publications are in draft awaiting final publication.

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[45] Headquarters, Department of the Army (HQDA), Training Circular (TC) 2-19.404, *Military Intelligence Training Strategy for the Brigade Combat Team Tier 4* (Washington, DC: Government Printing Directorate, December 2018), iv.

[46] Ibid.

[47] Headquarters, Department of the Army (HQDA), Training Circular (TC) 2-19.403, *Military Intelligence Training Strategy for the Brigade Combat Team Tier 3* (Washington, DC: Government Printing Directorate, December 2018), 1-8.

[48] Ibid., 8-1.

Army SIGINT Strategy

Despite the INSCOM Foundry model of training, there is a significant gap in SIGINT training, particularly in the employment of SIGINT against a peer adversary in LSCO. The United States Army Signals Intelligence Strategy describes the ends, ways, and means to establish the direction required to modernize the Army SIGINT system. The SIGINT strategy provides the necessary vector to maintain supremacy throughout the electromagnetic spectrum.[49] This strategy calls for the synchronized and simultaneous pursuit of four lines of effort: organize and build the SIGINT force; train, educate, and manage the SIGINT force; equip the Army SIGINT force; and develop SIGINT doctrine.[50] Just as the Army is investing in the organizational structure, doctrine, and equipment, the same level of analysis must be placed on training. Tactical SIGINT training courses to improve the tactics, techniques, and procedures build a SIGINT force that can evolve with a dynamic threat across multiple operational environments and evolve with technology. The strategy outlines the desired training end state as a highly trained SIGINT force knowledgeable in the technical and tactical principles of SIGINT operations in support of the full range of military operations.[51]

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[49] H. Swedeen, "US Army Leaders Discuss New SIGINT Strategy," *Journal of Electronic Defense* 41, no. 9 (September 2018): 15–16.

[50] Department of the Army, *The United States Army Signals Intelligence (SIGINT) Strategy*, 4.

[51] Ibid.

The primary issue identified by this strategy is the deficiencies in the conduct of training to teach Soldiers how to employ capabilities in LSCO.[52] The majority of SIGINT Soldiers do not have sufficient training, or the experience required to employ SIGINT assets in real-world operations.[53] Upon a Soldier's initial entry, the Army utilizes Joint institutional SIGINT training which does not address Army tactical SIGINT missions or equipment.[54] Lessons learned through multiple combat training center rotations from 2012-2017 highlight the challenge in establishing and maintaining the necessary skills.[55] This is attributed to home station ad hoc training, the lack of experience using the equipment, and an inconsistency in the train-the-trainer model.[56]

Unit Training Management

The Army Training Network (ATN) provides a website-based interface for unit training management based on the doctrinal framework as outlined in AR 350-1 and FM 7-0.[57] It is the primary interface from which unit commanders can extract the institutional training requirements and evaluation criteria. Specifically, ATN is a tool available to

[52] Department of the Army, *The United States Army Signals Intelligence (SIGINT) Strategy*, 9.

[53] Ibid.

[54] Ibid.

[55] Ibid.

[56] Ibid.

[57] Sarah Schwennesen, "CATS: Building a Unit Training Plan," April 2018, accessed 31 October 2018, https://www.army.mil/article/203850/cats_building_a_unit_training_plan.

focus a commander's Unit Training Plan (UTP) and maximize proficiency.[58] The CATS further outlines every "step and process for planning, preparing, executing and assessing training, including the ability to develop training plans."[59] CATS are descriptive, task-based, and event-driven to provide unit commanders a unit training strategy to assist in the development of training plans that build or sustain unit training readiness throughout the Sustainable Readiness Model. CATS outlines tasks into specific conditions and standards with an evaluation as part of the Army's Objective T assessment matrix which includes detailed performance steps and measurement matrix. Objective T is the standard metric by which all Army units are trained and evaluated. As part of Objective T, depending on the echelon, multiple political, military, economic, social, infrastructure, information, physical, and time variables must be exercised in a static or dynamic operating environment. Currently, these variables are not in-line with any contemporary LSCO variable. By using CATS, the MICO Commander creates a focused training plan by assessing the mission requirements and associated mission essential tasks for the SIGINT element in the BCT MICO.

The CATS is the Army's approach to systematically focus near term unit training and future unit training requirements. CATS is an online-based tool that provides task-based, event-driven strategies for use in the development of unit training plans. Training events are designed to train task selection following a progressive methodology in order to build and sustain unit proficiency. Unit commanders reinforce, through effective

[58] Schwennesen, "CATS: Building a Unit Training Plan."

[59] Ibid.

training, those individual and collective skills required by the unit's METL. Unit commanders conduct collective training events in accordance with CATS. CATS helps Army units identify the type of events that may be used for specific training, tasks to be trained during unit events, the duration of training events, and the resources required to train. CATS assists Army unit leaders in the development of a training plan in accordance with the type of missions the unit was initially designed to execute. Army SIGINT collective training events as outlined in CATS are generally focused on operating equipment and participation in the intelligence cycle.

Institutional Means

The Intelligence warfighting function is one of the most challenging warfighting functions to train, conduct exercises, and assess during home station exercises.[60] The technical complexity of systems, synchronization of collection assets with information requirements and desired effects across the staff and command support relationships directly impact the ability to conduct the intelligence process.

Intelligence Electronic Warfare Tactical Proficiency Trainer (IEWTPT) provides realistic battle command training.[61] IEWTPT is the Army's program of record for critical Military Intelligence training requirements in realistic simulated operational environments. It replicates the environment in a digital construct that commanders

[60] Joshua Patton, "Developing a Live, Virtual, and Constructive Exercise Scenario to Train the Intelligence Warfighting Function," *Military Intelligence Professional Bulletin* 43, no. 4 (October-December 2017): 22.

[61] Misty Martin, "Intelligence and Electronic Warfare Tactical Proficiency Trainer (IEWTPT)," *Military Intelligence Professional Bulletin* 29, no. 3 (July-September 2003): 49.

encounter and simultaneously provides MI commanders the ability to conduct individual, crew, collective, and unit training.[62] The systems and software stimulate realistic data to train collectors and analysts by using live, virtual, and constructive capabilities.[63] The training simulates training capabilities required for Military Intelligence system sensor-specific training.[64] The training platform provides three functional groups: the technical control cell, the target signature arrays, and a constructive supporting simulation.[65] As the target signature arrays have evolved over the last decade, it now provides the stimulation required to utilize organic equipment instead of virtual training aids.[66] The synthetic electromagnetic spectrum environment trains the operator on the collection equipment as well as reporting dissemination.[67] An operator can use organic unit equipment to derive intelligence data sensitive to the battle command training construct and publish realistic reports.[68] By using IEWTPT, SIGINT collectors and analysts can synchronize data within the intelligence cycle and decision-making process to provide the commander

[62] Martin, "Intelligence and Electronic Warfare Tactical Proficiency Trainer (IEWTPT)," 49.

[63] Jared Doucet, "Enhancing DCGS-A NET/DTT through the Integration of IEWTPT," *Military Intelligence Professional Bulletin* 42, no. 4 (October-December 2016): 21.

[64] Ibid.

[65] Martin, "Intelligence and Electronic Warfare Tactical Proficiency Trainer (IEWTPT)," 49.

[66] Ibid.

[67] Ibid.

[68] Ibid.

actionable intelligence during training exercises. Despite these near-term advances, the military cannot rely solely on virtual and constructive training; it must find ways to incorporate the EMS into live training events at its combat training centers and home stations.[69]

FORSCOM identified 1st Stryker Brigade Combat Team (1SBCT) from the 4th Infantry Division to exercise the Army Operating Concept: Win in a Complex World as outlined in TRADOC PAM 525-3-1 in order to prepare for a National Training Center rotation in 2017.[70] The training exercise enabled 1SBCT to exercise multiple intelligence functions including SIGINT collection by utilizing SIGINT collection teams to obtain radio frequency intercepts and direction-finding missions using their assigned Prophet systems.[71] The Fort Carson Foundry Intelligence training program and the IEWTPT in conjunction with the Division G-2 were instrumental in creating a training environment with the depth and complexity to train SIGINT adequately.[72] This highlights the importance of leaders being directly involved in training collective tasks to learn and implement lessons before a culminating exercise. A hyper-involved conglomerate of organizations was necessary to execute and synchronize practical training. A training environment with anything less would be insufficient to train for a combat training center

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[69] Mark Dotson, Jennifer McAfee, and Francesca Ziemba, "Adapting Multifunctional Intelligence and Electronic Warfare to Support Maneuver," *Military Intelligence Professional Bulletin* 44, no. 4 (October-December 2018): 32.

[70] Patton, "Developing a Live, Virtual, and Constructive Exercise Scenario to Train the Intelligence Warfighting Function," 22.

[71] Ibid., 23.

[72] Ibid., 24.

exercise or deployment. Commanders and leaders are responsible for training. The best training practices the USAICoE Lessons Learned branch observed stem from commander's direct involvement.[73] When it is a priority for the commander, it becomes a priority for everyone else.[74]

Operational Applications

Multidomain operations and LSCO remain relatively nebulous concepts as neither is entirely fully developed, particularly with how to train. The evolution of doctrine to incorporate LSCO takes considerable time to appropriately and holistically incorporate. The most forward discussions exploring the depth and breadth of the understanding of LSCO in modern conflict is taking place in a variety of professional publications. The *Military Review* went so far as to dedicate an entire publication to the LSCO discussion. The Combined Arms Center published a seven-volume book set focused on a variety of LSCO case studies, to include information operations. Finally, within the Intelligence warfighting function, the *Military Intelligence Professional Bulletin* furthered the discussion and provided focused feedback on training.

The *Military Intelligence Professional Bulletin* provided the necessary perspectives through first-hand accounts, lessons learned, and reflections. These articles highlight aspects to training through the lens of the Military Intelligence officer authors. Themes including training in the Military Intelligence Company, the Military Intelligence

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[73] Chet Brown, "Top Ten (+1) Intelligence Training Lessons & Best Practices," *Military Intelligence Professional Bulletin* 43, no. 1 (January-March 2017): 54.

[74] Ibid.

Brigade – Theater, the Intelligence Electronic Warfare Tactical Proficiency Trainer, the Combat Training Centers, and even the 173rd combat EW intelligence platoon dominated the SIGINT training discussion.

Systematic Challenges in the Military Intelligence Company

The MICO is a highly sophisticated and unique organization in a BCT that is capable of simultaneously employing multiple intelligence disciplines to geographically dispersed locations. However, two primary challenges in a BCT MICO create friction before the organization leaves the company area. First, the brigade structure is not responsive to specific mission requirements resulting in significant training challenges and minimal support for specific needs.[75] There are 17 different military occupational specialties in the MICO that must all be trained through individual, crew, and collective tasks. Second, the complexity and volume of the equipment create a significant property management challenge that other companies throughout the BCT do not experience.[76] Each platoon within the MICO, regardless of how the MICO is task organized for a mission, has additional unique challenges. By organizational structure, SIGINT analysts are divided into two different platoons with two unique missions. There are SIGINT analysts in the information collection platoon that provides synthesized intelligence to the brigade intelligence support element. There are also SIGINT analysts in the multi-functional platoon capable of operating collection assets.

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[75] Grace Lu, "Systemic Challenges within a Brigade Combat Team Military Intelligence Company," *Military Intelligence Professional Bulletin* 43, no. 2 (April-June 2017): 20.

[76] Ibid.

SIGINT collection capabilities within each division are organic to each BCT. The BCT organizational structure places the MICO under the Brigade Engineer Battalion (BEB). The platoon sergeant is a Human Intelligence Noncommissioned Officer, the platoon leader is a junior Military Intelligence Lieutenant, the Company Commander is a Military Intelligence Captain, the BEB Battalion Commander is an Engineer Lieutenant Colonel, and the BCT Commander is a combat arms Colonel, all with little to no prior institutional SIGINT training. Additionally, the senior grade Military Intelligence officer in the BCT is a Major and is outside the chain of command. This military chain of command structure results in multiple lanes of military leadership often with competing requirements for the MICO leadership to synchronize and coordinate training.[77] Within home station training, the MICO support battalion field training exercises which makes it challenging to train the low-density skill sets within the MICO. MICO training management is challenging to employ because of the sheer number of elements throughout the BCT the unit supports.[78] MICO leadership must integrate and coordinate outside the direct chain of command and BEB footprint to include adjacent reconnaissance and maneuver battalion command teams and the Brigade S2 to overcome the company training difficulties presented by the organizational structure.[79] The MICO relationship with the Brigade S3 will be highlighted during a combat training center

[77] Lu, "Systemic Challenges within a Brigade Combat Team Military Intelligence Company," 21.

[78] Ibid.

[79] Ibid.

rotation if not adequately addressed during home station training.[80] Building relationships to further understand MICO capabilities and limitations is extremely time consuming and takes organizational energy.

Training in the MICO

The BEB is responsible for training the MICO in garrison while the brigade headquarters operationally controls the company.[81] This highlights the organizational fissure between the continuous relationship that most companies enjoy with their higher headquarters. The issue is the discrepancy between the commander conducting the evaluation and the commander employing the SIGINT enabler are different commanders with different requirements. The Decisive Action Training Environment (DATE) generates an even greater need for progressive MICO specific training to support company, battalion, and brigade level formations adequately.[82] MI Gunnery is the bottom-up concept that leaders devised to address this exact issue. MI gunnery was a progressive training summation of a METL crosswalk implemented through quarterly training progressions.[83] The result was seven tables to train. This was further codified in MI Gunnery 34-120-30, *MI Gunnery for the Training of Individual, Drill, and Collective*

[80] Lu, "Systemic Challenges within a Brigade Combat Team Military Intelligence Company," 21.

[81] Sarah Starr, "Training a Brigade Combat Team Military Intelligence Company," *Engineer* 46, no. 3 (September 2016): 42.

[82] Ibid.

[83] Ibid.

Tasks in the Military Intelligence Company of the Brigade Engineer Battalion.[84] MI gunnery execution is resource intensive initiating a mechanism for higher echelons to track and support the MICO's gunnery progression.[85] In order to be able to support maneuver battalion exercises, MI gunnery must be executed at least three months ahead of the brigade's training progression.[86] Without enough lead time, the MICO lacks the proficiency to integrate into brigade collective training events. MI gunnery provides the BCT leadership an enduring message and framework to effectively train the MICO.[87] Regardless of the execution strategy, the more thorough and well-resourced the unit conducts training progressions, the better the organization's unique tactical and technical intelligence capabilities can support brigade operations.[88]

SIGINT Training in the MICO

The end state for SIGINT training is a highly trained, technically and tactically competent SIGINT force able to apply technical and tactical principles in support of the tactical commander during LSCO.[89] The purpose of SIGINT in the tactical level of war is

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[84] Starr, "Training a Brigade Combat Team Military Intelligence Company," 42.

[85] Sarah Starr, "MI Gunnery: Training a BCT MI Company," *Military Intelligence Professional Bulletin* 42, no. 1 (January-March 2016): 20.

[86] Ibid., 15.

[87] Ibid., 20.

[88] Ibid.

[89] Jason Boslaugh and Bryan Lasater, "Army Signals Intelligence Deep Dive: Developing a Strategy for the Future," *Military Intelligence Professional Bulletin* 44, no. 4 (October-December 2018): 39.

to provide timely reporting to the commander rather than detailed analysis.[90] Tactical commanders require SIGINT Soldiers and leaders capable of understanding, anticipating, and exploiting an experienced and sophisticated threat.[91] This goes beyond leader mentorship, organizational structures such as the Army Technical Control and Analysis Element functionality, and promotion opportunities.[92] The author proposes a simple solution. Train SIGINT Soldiers, MI leadership, and the BCT staff how to employ and manage SIGINT collection assets during LSCO.[93]

Reconnaissance Training

Organic enablers in the BCT shape the enemy's decision-making cycle, create overmatch in friendly capabilities, and set conditions necessary for success in LSCO.[94] One such enabler which provides a parallel lens to study SIGINT training in the MICO is training in the cavalry squadron. The ground maneuver reconnaissance element, traditionally a reconnaissance troop or cavalry squadron, represent the combat arms community's most well trained, flexible, and dynamic sensor. The Maneuver Center of Excellence, the same organization as the Army's Infantry and Armor branches, represents and empowers the cavalry squadron. The Armor community applies a simultaneous

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[90] Boslaugh and Lasater, "Army Signals Intelligence Deep Dive: Developing a Strategy for the Future," 40.

[91] Ibid.

[92] Ibid.

[93] Ibid.

[94] Colin Marcum, "How Enablers Shape the Deep Fight for the BCT," *Infantry Magazine* 106, no. 2 (April-June 2017): 46.

institutional training and operational integration approach to reconnaissance. Institutional reconnaissance training consists of the Reconnaissance and Surveillance Leaders Course, Cavalry Leaders Course, and the Army Reconnaissance Course. Operational integration amongst the other maneuver formations, like many other enablers, ebbs and flows based on the mission requirements, commander's relationships, the commander and staff's perspective on what the enabler can provide, and past performance. The better the cavalry element is integrated with the other maneuver elements during training, the better they can collect and answer the commander's requirements in combat.

Recently, the 173rd Infantry BCT (Airborne) went a step further and integrated the SIGINT and EW formations, building a combat EW intelligence (CEWI) platoon, into their reconnaissance troop.[95] The leadership prioritized system cross training, reporting, and communication proficiency.[96] The CEWI platoon and reconnaissance troop mutually reinforced each other to plan, collect, refine, and disseminate intelligence. This team met their BCT commander's intent by locating adversary emitters, communicating across multiple spectrums, and providing the commander flexible response options to disrupt adversary communications.[97]

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[95] Doni Wong, Theodore Lipsky, Brigid Calhoun, and Pablo Cruz, "Integration of Signals Intelligence, Electronic Warfare in Reconnaissance Troop: Seeing Where the Eye Cannot See," *Armor Magazine* 131, no. 3 (Fall 2018): 13.

[96] Ibid.

[97] Ibid.

Theses and Monograph

Previous academic work in the field of SIGINT includes excerpts from World War I and World War II, internal and external of the SIGINT community, SIGINT organic to the BCT, and even using non-intelligence Soldiers to analyze intelligence information. The German military had a marked advantage by implementing SIGINT in modern warfare during World War I. Despite these lessons, both the Americans and Germans disregarded the importance of SIGINT entirely during the Ardennes Offensive during WWII. Even still, commanders do not account for SIGINT during their planning and execution. Additionally, the military does not adequately articulate requirements for the intelligence community, fails to effectively and efficiently use organic assets, and demands more national assistance. As a result, lower echelons are experiencing data overload from the sheer volume of collection assets spread across the modern battlefield.

A US Army War College strategy research project noted that since the implementation of the radio on the battlefield, armies have dedicated considerable resources to intercepting and monitoring their neighbor's broadcasts.[98] The Russians and Germans implemented SIGINT in modern warfare at scale during Tannenberg providing both sides insight into the other's intentions.[99] A thesis focused on World War II highlighted the significance of tactical signal security from both the American and

[98] Frederick E. Jackson, "Tannenberg: The First Use of Signals Intelligence in Modern Warfare" (Strategy research project, U.S. Army War College, Carlisle Barracks, PA, 9 April 2002), 15.

[99] Ibid., 18.

German side of the Ardennes Offensive.[100] Despite similar equipment, procedures, and training, the American disregard for tactical SIGINT contributed to initial German success.[101]

Another researcher concluded the need to train Army Soldiers on national SIGINT system capabilities in order to utilize national systems to answers tactical commanders' requirements.[102] The thesis goes on to articulate the need to streamline the dissemination of SIGINT data.[103] In the last twenty years since this specific writing, many of these recommendations have been addressed, but the problems continue to evolve due to the structure of the Army, the operational environment, and the political context. With a look outside the intelligence community, an individual study project from the US Army War College highlighted why SIGINT "should be an integral part of U.S. military commanders' planning and execution at all levels of the conflict continuum."[104] The author concluded that the military is a consumer of intelligence and has a responsibility to articulate their needs, or even perceived needs, to appropriately drive the

[100] Laurie G. Moe Buckhout, "Signals Security in the Ardennes Offensive 1944-1945" (Master's thesis, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 6 June 1997), 88.

[101] Ibid., 63.

[102] William P. Clappin, "Moving Signals Intelligence from National Systems to Army Warfighters at Corps and Division" (Master's thesis, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 5 June 1998), 12.

[103] Ibid., 3.

[104] Penelope S. Horgan, "Signals Intelligence Support to U.S. Military Commander: Past and Present" (Study project, U.S. Army War College, Carlisle Barracks, PA, 10 April 1991), 1.

intelligence process.[105] This remains applicable today as the Army transitions to a LSCO-centric force.

A central theme in the Army's model for intelligence collection in the BCT is the lack of capability, experience, and capacity to plan and implement organic collection assets.[106] While effectively using collection assets remains a challenge in the BCT, it generates an even higher demand for processing, exploitation, and dissemination elements. While it may appear challenging to construct a company-level intelligence support team to gather, analyze, and synthesize reports, it is even more challenging to train the technical and sensitive aspects of SIGINT.[107] Despite the Army acknowledging the need for an increased intelligence capacity at lower echelons, the limited effort thus far has focused on training non-intelligence Soldiers for a specific deployment.[108] Unfortunately, the thesis did not address the core issue, better training for the intelligence Soldiers operating at the point of collection yields a reduction in data to analyze.

These previous academic works present notable progression in the study, advancement, and importance of tactical SIGINT operations. However, there is

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[105] Horgan, "Signals Intelligence Support to U.S. Military Commander: Past and Present," 143.

[106] Aaron D. Sammons, "Transforming Doctrine and Organization to Meet the Intelligence, Surveillance, and Reconnaissance Requirements of the Brigade Combat Team Commander" (Master's thesis, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 13 June 2008), 76.

[107] Christopher C.E. McGarry, "Inverting the Army Intelligence Pyramid" (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 10 May 2011), 48.

[108] Ibid., 52.

undoubtedly a lack of analytic depth required to understand how to implement tactical SIGINT operations during the onset of LSCO successfully. Thus, there is no proven training model or even specific training characteristics for tactical SIGINT during LSCO clearly articulated in academia.

Large-Scale Combat Operations

To address the rapid shift in focus, the Army published FM 3-0, *Operations*, to drive Army culture toward increasing readiness and capabilities to prevail in LSCO. The manual describes LSCO in a broad context to establish characteristics and scale, yet the reader is unable to define or measure success and the discrete tasks that are required.[109] The 2014 U.S. Army Operating Concept, Win in a Complex World, provides a more comprehensive and accurate picture of what it means to set critical capabilities in a theater including intelligence.[110] Perhaps the most forward-looking and visionary discussions of LSCO are found within the Army University Press publications such as the *Military Review*.

The US Army Combined Arms Center authored *The US Army Large-Scale Combat Operations Book Set* through the Army University Press as a seven-volume historical case study to expand the knowledge and understanding of contemporary US Army issues. While FM 3-0 describes the broad scope of possible information related capabilities and in the information environment, these volumes specifically focus on

[109] Joseph John and Ryan Kort, "Setting the Theater: A Definition, Framework, and Rationale for Effective Resourcing at the Theater Army Level," *Military Review* 98, no. 3 (May-June 2018): 58.

[110] Ibid.

doctrine, leadership actions, and past successes and failures within the context of LSCO. It is the most notable forward leaning endeavor to comprehensively and holistically address a variety of LSCO topics. Volume seven is titled *Perceptions Are Reality* and stimulates discussion by exploring past actions, understanding successes and failures, and offering a few lessons learned. The volume discusses a collection of historical case studies of information operations in LSCO from World War II to Ukraine. The case studies illustrate how a variety of entities use information to gain a position of relative advantage during LSCO. This publication not only assists in driving the academic discussions of a variety of LSCO topics forward, but it also serves to illustrate practical applications to the current force such as LSCO variables necessary for training. The volume interweaves three thematic lessons from the historical case studies of information operations during LSCO. First, the focus is the information itself regardless of the capabilities employed to effect or procure the information.[111] Second, successful information and data collection operations should be executed as an operation: integrated, synchronized, resourced, and commander-led from inception to execution.[112] Third, information collection operations are focused on the threat and are conducted to gain a relative advantage for friendly decision makers.[113] Information operations in the 21st Century are multidomain operations. Leaders resource intelligence collection in order to

[111] Mark Vertuli, and Bradley Loudon, ed. *Perceptions are Reality: Historical Case Studies of Information Operations in Large-Scale Combat Operations* (Fort Leavenworth, KS: The Army University Press, 2018), xii.

[112] Ibid.

[113] Ibid.

develop the situation and gain sufficient information required to make timely and informed decisions.[114] The US dominance of the EMS is vital to dramatically affect the strategic, operational, and tactical direction across the range of military operations.[115]

Since Vietnam, the Army has struggled with predicting the nature of the next conflict. America, its allies, and partners currently do not maintain large standing armies, unlike potential adversaries who believe in maximizing and maintaining standing military strength.[116] Unless the Army significantly changes the strength and capacity in the generating force to adequately train, the Army will continue to assume risk with inexperienced leadership, ready equipment, and the ability to generate trained brigades within a sequential and time-consuming process.[117] An increase in the number of BCTs for LSCO would require the Army to train a high volume of tankers, scouts, infantry, and artillery Soldiers.[118] A battalion and brigade training model concentrating on combined arms maneuvers for the operating environment would enable the BCT to achieve initial proficiency.[119] However, the model does not provide time to train low density military

[114] Vertuli and Loudon, *Perceptions are Reality: Historical Case Studies of Information Operations in Large-Scale Combat Operations,* xii.

[115] Ibid., 8.

[116] Esli Pitts, "Expanding Brigade Combat Teams: Is the Training Base Adequate?" *Parameters* 47, no. 3 (Autumn, 2017): 89.

[117] Ibid., 90.

[118] Ibid.

[119] Ibid., 96.

occupational specialties necessary to operate the equipment, build cohesive teams, understand enabler capabilities and limitations, or refine tradecraft.[120]

Operation Desert Storm

In 1991, the US conducted Operation Desert Storm, a LSCO that committed the US and coalition partners against Iraqi forces to liberate Kuwait from Iraq's recent annexation. The US contingent consisted of two Army corps, one Marine Expeditionary Force, seven Army divisions, and two Marine divisions containing nearly 300,000 US Soldiers, which was more Soldier participation than either Korea or the Vietnam conflict at their peaks.[121] Operation Desert Storm was the first lethal force-on-force LSCO during the digital age and provided the necessary construct to evaluate a major offensive operation against a conventional force. By the FM 3-0 description, Operation Desert Storm is a LSCO. Operation Desert Storm, while an overwhelming decisive multi-national coalition victory, provides the context to identify research variables by incorporating modern technology with an enormous combat force. Although brief, this LSCO displayed the majority of the defining characteristics including violent competition of multiple corps land forces through multidomain operations, peer capabilities in a specific domain, and a high operational tempo with an increased speed of human interaction expressed through extreme lethality.

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[120] Pitts, "Expanding Brigade Combat Teams: Is the Training Base Adequate?" 96.

[121] Vertuli and Loudon, *Perceptions are Reality: Historical Case Studies of Information Operations in Large-Scale Combat Operations*, 107.

First, Operation Desert Storm was a coalition war fought in multiple domains to achieve limited objectives.[122] The scale and complexity of a multi-Corps ground attack increased the complexity of integrating and synchronizing across the warfighting functions.[123] General Schwarzkopf testified before the Senate Armed Forces Committee in 1990 that Iraq was the preeminent military power in the Persian Gulf region, indicating that the fourth largest military in the world was at minimum a near-peer competitor.[124] A ground offensive with mechanized warfare and concentration of firepower was necessary to defeat the Iraqi military.[125]

General Schwarzkopf faced one of the most formidable armies equipped with over 5,000 main battle tanks, 5,000 armored infantry vehicles, and 3,000 artillery pieces, alongside a highly trained Republican Guard, supported by a sizable air force with fighters, bombers, and a modern air defense command and control system. Additionally, Iraqi forces were positioned in a layered defense including entrenched infantry supported by anti-tank trenches and mine belts, as well as regular army tank and mechanized divisions, backed by operational reserves.[126] The Iraqi logistic infrastructure was also extensive and well-equipped with ample supplies. General Schwarzkopf needed to synchronize nearly 50 countries from around the world including 200,000 troops, 60

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[122] Richard Moody Swain, *Lucky War: Third Army in Desert Storm* (Ft. Leavenworth, KS: U.S. Army Command and General Staff College Press, 1997), 1.

[123] Ibid., 92.

[124] Ibid., 5.

[125] Ibid., 71.

[126] Ibid., 79.

warships, 750 aircraft, and 1,200 tanks. The goal was to destroy Iraqi capability to employ weapons of mass destruction, destroy Iraqi offensive military capability, cause the withdrawal of Iraqi forces from Kuwait, and provide for the establishment of a legitimate government in Kuwait. Thus, a LSCO with a complex problem at scale.

Operation Desert Storm began on 17 January 1991 with a massive 39-day air campaign.[127] The 100-hour ground assault portion of Operation Desert Storm began on 24 February 1991 and consisted of XVIII Airborne Corps, VII Corps, and a Marine amphibious feint.[128] The Marine amphibious feint tied Iraqi units into their coastal defenses before the main attack. The main attack consisted of VII Corps with five heavy divisions, four separate field artillery brigades, an armored cavalry regiment, and an aviation brigade.[129] VII Corps surmounted the largest armored force concentrated in a single attack in American history.[130] This massive armored thrust enveloped the Iraqi line, annihilated the Republican Guard, then continued across the northern half of Kuwait.[131] All the while, XVIII Airborne Corps protected the left flank with four additional divisions. VII Corps destroyed an estimated 1,300 Iraqi tanks, 1,200 infantry fighting vehicles and armored personnel carriers, 285 artillery pieces, 100 air defense

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[127] Richard Stewart, *War in the Persian Gulf: Operation Desert Shield and Desert Storm, August 1990-March 1991* (Washington, DC: Center of Military History, United States Army, 2010), 29.

[128] Ibid., 34.

[129] Ibid., 29.

[130] Swain, *Lucky War: Third Army in Desert Storm*, 162.

[131] Stewart, *War in the Persian Gulf: Operation Desert Shield and Desert Storm, August 1990-March 1991*, 29.

systems and captured nearly 22,000 prisoners while suffering minimal American causalities.[132] Operation Desert Storm was one of the last combat operations fought at the division and corps level, no doubt, a LSCO endeavor by nearly every definition.

A common challenge throughout Operation Desert Storm was the initial lack of understanding capabilities, limitations, goals, objectives, and end states between the joint services. Many of the various service senior leaders met each other and developed a positive and fruitful relationship in the combat zone; yet, there were still concerns about using specific assets from the joint forces.[133] Particular concerns surrounded the use of the US Marine Corps tactical fixed-wing assets. Marine aviators generally pride themselves in supporting Marine ground forces while the US Air Force stresses centralized control and decentralized execution.[134] General Boomer from the US Marine Corps and General Horner from the US Air Force quickly synchronized situational awareness, thus alleviating friction.[135] It was clear that the forcing function was, in fact, the organizational structure led by General Schwarzkopf and not by doctrine, tactical expertise, capacity, or prior engagements.[136] This shared challenge was common amongst

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[132] Stewart, *War in the Persian Gulf: Operation Desert Shield and Desert Storm, August 1990-March 1991*, 61.

[133] P. Mason Carpenter, "Joint Operations in the Gulf War: An Allison Analysis" (School of Advanced Airpower Studies, Maxwell Air Force Base, AL, 28 February 1995), 22.

[134] Ibid., 23.

[135] Ibid.

[136] Ibid., 21.

the tactical intelligence community starting with collectors through analysts to decision makers. The organizational structure solely alleviated command and control concerns.

Operation Iraqi Freedom 1

Operation Iraqi Freedom 1 was launched in March 2003, twelve years after Operation Desert Storm. The US-led coalition conducted military operations in Iraq with the immediate stated goal of removing Saddam Hussein and the Baath regime from power, destroying its ability to use weapons of mass destruction, and making them unavailable to terrorists.[137] This extremely lethal, high operational tempo, and multidomain decisive offensive operation included an air campaign and ground operations culminating with securing Baghdad.[138] The initial invasion was a quick and decisive military operation that encountered significant Iraqi resistance. US forces under V Corps included the 3rd Infantry Division, 82nd Airborne Division, 101st Airborne Division, 2nd Armored Cavalry Regiment, 3rd Armored Cavalry Regiment, 4th Infantry Division, 1 Marine Expeditionary Force, plus special operations forces, an Air Force component, and an endless host of enablers.[139] US forces fought the nearly 600

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[137] Catherine Dale, *Operation Iraqi Freedom: Strategies, Approaches, Results, and Issues for Congress* (Congressional Research Service Report for Congress, Washington, DC: Library of Congress, 2009), 2.

[138] Gregory Fontenot, Edward J. Degen, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, Office of The Chief of Staff (Army) (Washington, DC: Army Information and Data Systems, 2004), xxiii.

[139] Ibid., 441-495.

kilometers from Kuwait to Baghdad in less than 25 days with major combat operations over in less than 60 days.[140]

To defend Iraq, Saddam Hussain fielded 23 divisions, 17 regular army divisions, and 6 Republican Guard divisions consisting of approximately 350,000 troops, 2,200 tanks, 2,400 armored personnel carriers, and 4,000 pieces of artillery.[141] In addition to conventional forces, Saddam Hussain organized paramilitary and militia forces.[142] Iraq could not field sufficient naval or air forces following its destruction during Operation Desert Storm.[143]

Summary

This thesis used current publications, including doctrine, strategies, professional publications, and the unit training management online interface through ATN to determine the current focus of SIGINT training in the BCT. Then applied a historical context to determine the general SIGINT requirements at the brigade level. At the strategic level, SIGINT training is focused on the current ideals and understanding of LSCO. However, feedback from the field indicates both the force structure and training infrastructure are not congruent with the strategic aperture. The Army intelligence process, therefore, is the congruent method to deliver excellence in SIGINT collection to

[140] Fontenot, Degen, and Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, 147.

[141] Ibid., 99-100.

[142] Ibid., 99.

[143] Ibid.

the tactical consumer. As noted throughout this chapter, the context of LSCO includes multidomain operations, a highly contested information environment, peer or even dominant capabilities, and a high operational tempo with an increased speed of human interaction generating extreme lethality. Specific SIGINT training requirements to support a BCT during a modern LSCO remain predominantly in the academic arena.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this study is to discuss Army SIGINT training at the brigade level in preparation for LSCO and recommend subsequent training requirements. This requires that the research is adequately studied through the collection, analysis, and interpretation of the information available. That includes reviewing the collective body of work from doctrine, strategies, academic debates, and feedback from current practitioners in order to identify SIGINT training from the BCT perspective within the context of LSCO.

The purpose of this section is to develop the research framework, explain the process, and develop the lens through which the subsequent sections will use to explore the research question. This section will outline the systematic, theoretical analysis of methods applied throughout the research. The approach utilized was to collect Army doctrine, published professional discussions, and scholarly work pertaining to Army SIGINT training. Additionally, the previous section highlighted training strategies across multiple echelons. Finally, the previous chapter presented additional research utilizing the *Military Intelligence Professional Bulletin* magazine to address non-doctrinal perspectives from users concerning SIGINT training in the BCT. Several military operations were reviewed and analyzed as a lens to evaluate the training in the context of LSCO. Operation Desert Storm and Operation Iraqi Freedom 1 provide the necessary construct to evaluate Army SIGINT during a major offensive campaign against a conventional force during large-scale ground combat operations. Operation Desert Storm provides the necessary construct to evaluate a major offensive operation against a conventional force. Operation Desert Storm, while an overwhelming decisive coalition

victory, provides the context to identify research variables by incorporating modern technology with an extremely large combat force. Operation Iraqi Freedom 1 brings the context of LSCO within the scope of modern conflict. It provides an even more recent example that employs newer technology yet demonstrates the value of understanding the fundamentals. These two historical military operations provide the necessary backdrop to evaluate the impact of current Army SIGINT training to LSCO. The Army SIGINT enterprise must train the force to be adaptable and responsive to external threats by employing all available means necessary.

To that end, this chapter outlines the research methodology used to comprehensively analyze the information in the previous chapter and answer the primary research question, what are the SIGINT training characteristics required to support the BCT during LSCO? Additionally, the research will address three subordinate questions in order to answer the primary research question adequately. What are the SIGINT training requirements for the BCT during LSCO? What are the current SIGINT training requirements in the BCT? What are the shortfalls associated with SIGINT training in the BCT during LSCO?

Methodology

Choosing the appropriate research method is critical to adequately answer the research question in the context of the problem statement. Exploratory research is appropriate for studying the totality of the topic area where developed data is limited and can be a very useful stand-alone research design. Exploration often saves time and should not be overlooked. An exploratory study is a useful tool to consider when researchers lack a clear understanding of the problems they may encounter during the research

process, or there is not a clearly actionable research question. The hypotheses may be so vague that the researcher needs to discover more about the problem set and potentially generate new hypotheses before further in-depth pursuit.[144] Additionally, an exploratory study will assist in providing the researcher clarity and developing priorities. Professionals are often reluctant to approve exploratory studies because they do not provide quick solutions to immediate problems; however, over time an exploratory study can save both time and money. The two primary exploratory techniques are qualitative and quantitative research. Both techniques assist the researcher in maintaining objectivity during the research process. This thesis will use organizational documents as well as practitioner feedback and reflections as the primary sources for qualitative research.

Qualitative Research

Qualitative research is a method of purposefully sampling a collection of open-ended data, analyzing the content, and personally interpreting the findings.[145] This type of research is the most common approach to generate knowledge in the pursuit of understanding the complex array of the individual, organization, or environment.[146] It attempts to describe, decode, translate, and understand the meaning of a particular

[144] Mei Li, Ying Lin, Shuai Huang, and Craig Crossland, "The Use of Sparse Inverse Covariance Estimation for Relationship Detection and Hypothesis Generation in Strategic Management," *Strategic Management Journal* 37, no. 1 (2016): 86.

[145] John W. Creswell, *Research Design: Qualitative, Quantitative, And Mixed Methods Approaches*, 4th ed (Thousand Oaks, CA: Sage Publications, 2014), 23.

[146] Jeff S. Johnson, "Qualitative Sales Research: An Exposition of Grounded Theory," *Journal of Personal Selling & Sales Management* 35, no. 3 (2015): 262.

phenomenon.[147] This method uses structured, interpretive steps to analyze text or images. Subsequently, qualitative research focuses on understanding the complexity of the situation. It is important to note that there is still a general question to answer. Research that uses qualitative techniques may generate more questions which can assist the researcher in fully developing the research project. It is critical that the researcher plays an active role in understanding interrelated research data.[148]

There are several methods of gathering qualitative research data including face-to-face, online, and phone interviews. Additional avenues can include the use of focus groups, social media, organizational documents, and open-ended program questions.[149] Each data collection platform can provide unique utility to the researcher depending on the context of the research. Given the time and resources available, this thesis will achieve the most significant level of understanding toward the primary research question by applying qualitative research focused on using existing unclassified documentation.

John Creswell discussed five traditions of qualitative research: bibliography, phenomenology, grounded theory, ethnography, and case study.[150] This thesis will employ the case study tradition. Creswell noted that a case study is "developing an in-

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[147] John Van Maanen, "Reclaiming Qualitative Methods for Organizational Research: A Preface," *Administrative Science Quarterly* 24, no. 4 (1979): 520.

[148] Johnson, "Qualitative Sales Research: An Exposition of Grounded Theory," 262.

[149] Alexandra Howson and Wendy Turell, "7 FAQs Research for Results," *Medical Meetings* 40, no. 4 (2013): 28.

[150] John W. Creswell, *Qualitative Inquiry and Research Design: Choosing Among Five Traditions* (Thousand Oaks, CA: Sage Publications, 1998), 65.

depth analysis of a single case or multiple cases."[151] Additionally, Stake noted that a case study investigates the topic within a real-life context.[152] The case study tradition can be further refined to a comparative case study in which the research will analyze information from multiple cases.[153]

Case Study Research Design

This thesis uses the case study qualitative research design. When using a case study design, researchers are encouraged to collect detailed information using a variety of data collection procedures while cases are bounded by time and activity.[154] This is advantageous to exploring and understanding an in-depth analysis of a program, event, activity, or process.[155] The research is bounded by the context of modern LSCO with the specific activity of SIGINT training. A case study is particularly suitable for investigating a not well-understood situation as a result of particular circumstances.[156] This thesis will apply two cases to make comparisons, propose generalizations, and define requirements.

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[151] Creswell, *Qualitative Inquiry and Research Design: Choosing Among Five Traditions,* 65.

[152] Robert E. Stake, *The Art of Case Study Research* (Thousand Oaks, CA: Sage, 1995), 18.

[153] Creswell, *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*, 65.

[154] Stake, *The Art of Case Study Research*, 18.

[155] Creswell, *Research Design: Qualitative, Quantitative, And Mixed Methods Approaches*, 14.

[156] Paul D. Leedy and Jeanne E. Ormrod, *Practical Research Planning and Design* (Upper Saddle River, NJ: Pierson Education, Inc, 2010), 137.

Case Study Historic Context

This research applies the conceptual framework to actual historical events. The result of analyzing the information through multiple historical events provided the necessary contextual variables to evaluate training requirements to prepare for LSCO. Throughout modern history, major combat operations have been infrequent. However, the study of past experiences can provide a lens into how to prepare successfully for major combat operations in the future. The case studies used in this research to evaluate the effectiveness include Operation Desert Storm and Operation Iraqi Freedom 1. Operation Desert Storm provides the necessary construct to evaluate a major offensive operation against a conventional force. Operation Desert Storm, while an overwhelming decisive multi-national coalition victory, provides the context to identify research variables by incorporating modern technology with an extremely large combat force. Operation Iraqi Freedom 1 brings the context of LSCO within the scope of modern conflict. It provides an even more recent example that employs newer technology yet demonstrates the value of understanding the fundamentals. Additionally, it provides the first aperture to examine ground tactical SIGINT during major combat operations. History allows the research to identify failures, lessons learned, tactical requirements, and consistent variables for the context of this research. The historic context highlights brigade level SIGINT requirements associated with LSCO. This framework will provide the necessary evaluation to highlight the variables necessary for current SIGINT training in preparation for modern LSCO.

Strength and Weakness of Research Methodology

Qualitative research is designed to identify the process and meaning of events.[157] Qualitative research has an array of advantages that might provide a researcher with the necessary insight into a topic. This method provides the depth and details to adequately analyze issues, attitudes, behaviors, and complexities through a descriptive narrative. It provides a holistic understanding of shared perceptions, motivations, and underlying causes behind certain decisions that lead to the current state. Therefore, it assists the researcher in identifying what matters.

This thesis is only a link in a long chain of discussions across the continual evolution of Army SIGINT. Qualitative research provides an opportunity for further research as to why the Army or the greater SIGINT enterprise may have made a particular decision in a specific situation. This greater depth can help explain both positive and negative aspects to the evolution. Additionally, obstacles and hindrances are also easily detected throughout the research process. A researcher can capture near real-time social perception and uncover information on social discourse and attitudes by using the power of social media platforms.[158] Qualitative research permits a more discovery-oriented approach allowing the researcher to remain flexible and make adjustments as

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[157] Donald Cooper and Pamela Schindler, *Business Research Methods*, 12th ed. (New York: McGraw-Hill Irwin, 2014), 146.

[158] Alan Branthwaite and Simon Patterson, "The Power of Qualitative Research in the Era of Social Media," *Qualitative Market Research: An International Journal* 14, no. 4 (2011): 430.

new information emerges.[159] This is particularly important in an area that relies heavily on technology. Thus, qualitative research can assist the researcher in anticipating future changes.

Each research method has distinctive shortcomings that a researcher might want to consider before beginning the research project. Such limiting factors could create outliers or skew data in a way that would ultimately invalidate possible findings. In deciphering qualitative research, data analysis must be done; however, with a plethora of abstract data, the actual extraction of results can be time-consuming to fully explore the meaning of responses or the underlying perception based on the respondent's feedback. This time equates to increased costs, thereby increasing the overall cost of the research project. Another prominent disadvantage of qualitative research is that the research data may have a small sample size; thus, research findings might be unique to the document authors, specific situations, or mission specific in the study and cannot be generalized across the entire range of military operations. It takes time to collect data within a new problem set sufficiently. While SIGINT and LSCO are not new for the Army, implementing both within the context of multidomain operations and modern technology is relatively novel. Finally, analysis can easily be influenced by a researcher's personal biases or perspective on the topic, as the researcher interprets results through the lens of their research findings.

The focus of qualitative research is to understand the behavior further while quantitative research describes and explains an event. During qualitative research, the

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[159] Robert E. Stake, *Qualitative Research: Studying How Things Work* (New York: The Guildford Press, 2010), 135.

researcher is the primary source of analysis, human analysis. Regardless of the type of research methodology used, this thesis will have to overcome the constraints of classification for the benefit of all Army professionals, as there are fundamental aspects that should define the collective understanding of Army SIGINT.

Evaluation Criteria

With limited unclassified information readily available, this thesis will focus on using published works to help determine the feasibility, suitability, relevance, and credibility of sources and avoid the human sampling aspects of qualitative research. SIGINT training characteristics must incorporate the LSCO variables as noted through the historical case studies, doctrine, strategy, and feedback from practitioners. The publications discussed in Chapter 2 characterize multiple variables of robust, lethal, and competing land forces engaging in LSCO including multidomain operations, a highly contested information environment, peer or even dominant capabilities in a specific domain, and a high operational tempo with an increased speed of human interaction and extreme lethality. LSCO occurs in the form of major operations and campaigns with the objective to defeat the enemy's armed forces and military capabilities in support of US national objectives.[160] On the low end of the scale, LSCO could involve a division while on the high end is potentially as large as a Field Army with multiple Corps. The information environment of future LSCO engagements will be contested at best.[161]

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[160] HQDA, FM 3-0, 1-1.

[161] Vertuli and Loudon, *Perceptions are Reality: Historical Case Studies of Information Operations in Large-Scale Combat Operations*, 17.

Information supremacy will be marked by windows of opportunity, which mandates systematic redundancy.[162]

Most recently, consider the Army's primary pacing threat, Russia.[163] Russia brought Estonia to its knees in 2007, Lithuania in 2008, then Georgia in 2009. These were the necessary military deception, propaganda, and social media real-world training events the Russian military needed before the successful annexation of Crimea in 2014. Despite the relatively small size of the Russian military involved in the operation, they were relatively unopposed and maintained freedom of maneuver throughout the EMS and across the Internet. The US Army must be able to find, fix, and finish the adversary operating in this modern operational environment.

Thus, LSCO training variables identified for this research are: minimal latency of intelligence; a disconnected, intermittent, or limited-bandwidth communication environment; and maintaining a high operational tempo while covering a large distance quickly. Within the targeting process (decide, detect, deliver, assess) a distinct advantage in LSCO is to minimize the latency between the detect and deliver stages. LSCO also transpires in a congested, contested, and complex communication environment at the point of collection. Soldiers operating modern SIGINT collection equipment must be able to conduct operations that minimize the latency of intelligence in a disconnected, intermittent, or limited-bandwidth communication environment while maintaining a high

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[162] Vertuli and Loudon, *Perceptions are Reality: Historical Case Studies of Information Operations in Large-Scale Combat Operations*, 17.

[163] J. D. Leipold, "Milley: Russia No.1 Threat to US," 9 November 2015, accessed 1 October 2018, https://www.army.mil/article/158386/milley_russia_no1_threat_to_us.

operational tempo over a large distance. As a result, this research will consider SIGINT training variables derived from the external aspects of the intelligence process within the context of LSCO: plan and direct, collect, and disseminate. This research will not consider the process step of the Army intelligence process, because it is an internal procedure and will be executed in a similar method regardless of the range of military operations or operational environment. That is not to suggest the time required to process data may not have a direct impact on the LSCO variables.

The first variable, plan and direct, requires an intricate relationship between the SIGINT collector and the decision maker, staff, and analysts that is paramount to support the maneuver element appropriately. The second variable, collection, includes attributes such as the knowledge of wave propagation theory, site selection, and equipment operation that will assist the collector in sensor emplacement. The final variable is dissemination which involves moving, storing, managing, and knowledge of technical data as well as publishing reports while ensuring the decision maker, staff, and analysts receive salient information.

The attributes of intelligence excellence (anticipatory, timely, accurate, usable, complete, relevant, objective, and available) provide the standards against which intelligence products should be evaluated.[164] Nested accordingly, accuracy and usability best describe quality SIGINT collection. Distance and direction to the target are important parameters to describe the accuracy of the target. The usability of the content collected is based on the consumer's requirements. This research will examine the

[164] Joint Chiefs of Staff (JCS), Joint Publication (JP) 2-0, *Joint Intelligence* (Washington, DC: Government Printing Directorate, 2013), II-6.

SIGINT training variables through the lens of the Army intelligence process within the context of the LSCO variables.

Summary

Through a qualitative research study using the case study methodology, this thesis will maximize time and resources available to provide the sufficient analytic depth required to answer the primary research question. Specifically, this thesis uses current doctrine and training strategies to define SIGINT training variables for BCT operations while conducting LSCO. Next, a historical context is applied to determine the general SIGINT requirements at the brigade level. CATS was used to identify the current requirements for SIGINT training in the BCT. Additional publications provided insight including feedback from current practitioners. This chapter outlines the conceptual framework and methodologies that will drive the findings and generate recommendations. The subsequent chapters apply the methodologies to what is and is not already known to generate insightful findings and analyze results. Understanding specific training complexities within the context of LSCO provides the intended insights necessary to continue to generate and expand the conversation at the lowest level to the broadest audience. The historic context applied to the qualitative research methodology assisted the research in highlighting current Army SIGINT training against recent LSCO. The following chapters are not intended to provide conclusive solutions, decisive answers, or a synthesized glide path to the multitude of challenges discussed within this chapter surrounding SIGINT training. The focus is to provide leaders with a refined understanding to make informed decisions and continually refine necessary adjustments to training Army SIGINT professionals.

CHAPTER 4

ANALYSIS

> For decades, the United States has enjoyed uncontested or dominant superiority in every operating domain. We could generally deploy our forces when we wanted, assemble them where we wanted, and operate how we wanted. Today, every domain is contested—air, land, sea, space, and cyberspace.
>
> —Jim Mattis, Secretary of Defense,
> *Summary of the 2018 National Defense Strategy*

Introduction

The topic of training generally initiates spirited discussions. Numerous opinions, diverse perspectives, and abundant debates exist on such an important subject. This is because training requires dedicated time and resources. Training is one thing commanders have control of and can direct, a vehicle for which to prepare for war. The purpose of this research is to review the collective body of work from doctrine, strategies, academic debates, and feedback from current practitioners in order to identify SIGINT training from the BCT perspective, in the context of LSCO. The purpose of this chapter is to discuss the findings of SIGINT training in the BCT that are focused on LSCO based on qualitative research and a case study approach. This chapter will examine two historical military operations to further refine and define variables to study LSCO, BCT requirements, and SIGINT training requirements. Throughout modern history, major combat operations have been infrequent. However, past experiences can provide a lens on how to prepare for major combat operations. Excerpts from the Operation Desert Storm and Operation Iraqi Freedom 1 provide a baseline of understanding for intelligence in LSCO. Generalized intelligence characteristics are common throughout the intelligence

disciplines, including SIGINT. Thus, this research deduces that SIGINT characteristics mirror the broader intelligence characteristics within the context of LSCO. Additionally, the structure and capabilities of the intelligence units within Forces Command continue to migrate down throughout the organization. As such, this research takes important historic operational-level observations and generalizes them to the modern tactical level to deduce parallels for the BCT during LSCO.

The problem statement of this thesis focuses on illuminating the key tactical SIGINT training requirements supporting the BCT during LSCO. Training must continue to refine the fundamental skills necessary to optimize ground-based collection during tactical operations. The primary research question derived from the problem is, what are the SIGINT training characteristics required to support the BCT during LSCO? The subordinate questions are: what are the SIGINT training requirements for the BCT during LSCO; what are the current SIGINT training requirements in the BCT; and what are the shortfalls associated with SIGINT training in the BCT during LSCO? These questions are best examined through two case studies.

To appreciate where the Army stands today and determine how it must progress, the institution must embrace lessons from the past. Two previous conflicts, Operation Desert Storm and Operation Iraqi Freedom 1, provide the necessary variables to study which are highly relevant to future LSCO endeavors. It is imperative to study the achievements and shortcomings of such paramount historic combat operations.

Operation Desert Storm

In the post-Cold War era, Operation Desert Storm illustrates the importance of amassed combat power and increased lethality through precision by minimizing the

latency of intelligence while operating in a disconnected, intermittent, or limited-bandwidth communication environment. Operation Desert Storm presented the first opportunity to validate the Army's post-Vietnam organizational structure and tactical collection systems in combat.[165] The SIGINT support to tactical commanders was a vast improvement due to the proximity of the collector to the commander, improving the knowledge and understanding in the employment of SIGINT assets. The tactical SIGINT organizational structure validated Division and Corps SIGINT collection and represented an investment in the future.[166] In Operation Desert Storm, the SIGINT operator used the collection equipment as a means to access both the voice and data of the adversary's communications. The success stemmed from versatility with a strong foundation of teamwork and a technically skilled workforce.

The intelligence organization organic to the division during Operation Desert Storm was known as the Military Intelligence Battalion (MI BN) Combat Electronic Warfare Intelligence (CEWI). This organizational structure internal to the division consisted of two Lieutenant Colonels, the division G2 and the MI BN (CEWI) battalion commander. While the division G2 was a staff officer that could focus on employing the capabilities, the battalion commander had command responsibilities and authorities including the responsibility for training. This organization and organizational structure was developed as a result of the Intelligence and Organization Stationing Study following

[165] John J. Bird, "Analysis of Intelligence Support to the 1991 Persian Gulf War: Enduring Lessons" (Strategy research project, U.S. Army War College, Carlisle Barracks, PA, 3 May 2004), 7.

[166] Ibid.

the Vietnam conflict to reduce excessive intelligence compartmentalization in order to make tactical intelligence more responsive to the combat commander.[167] As a result, commanders at the brigade level received intelligence collectors as part of their task organization to answer their specific intelligence requirements more timely. This organization provided commanders a dedicated intelligence collection apparatus composed of several intelligence disciplines including imagery intelligence, human intelligence, measurement and signature intelligence, counterintelligence, and SIGINT.[168] The SIGINT collection assets in the MI BN (CEWI) could conduct COMINT and ELINT operations.[169] The Collection and Jamming Company provided COMINT collection, direction finding, and communication jamming while the Electronic Warfare Company provided COMINT and ELINT interception and direction finding capabilities.[170] Multiple Command Post Exercises, the Battle Command Training Program, and Combat Training Center rotations showcased the MI BN (CEWI) increasing the commander's expectations.[171] Unfortunately, on the ground in the Persian Gulf, this Soviet-focused organization left the tactical commander's expectations mostly unmet. Operational

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[167] John C. Hamond, "CEWI: Vision for the Future?," *Military Review* 70 (June 1990): 58.

[168] Robert J. Taylor, "Heavy Division Organic Signals Intelligence (SIGINT): Added Value or Added Baggage" (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 13 December 1996), 2.

[169] Ibid., 3.

[170] Ibid., 18-19.

[171] Ibid., 22.

constraints, the Iraqi use of wired communication systems, SIGINT equipment limitations, and a lack of SIGINT capabilities throughout the staff were the primary contributors.[172] Because SIGINT did not deliver and gain the commander's attention, there was a limited push for enabler training upon their return to their home station following the conflict.

Immediately before Operation Desert Storm, SIGINT collection training was limited to institutional training at Ft. Huachuca, home station training, field exercises, and CTC rotations. Training for collectors focused nearly exclusively on operating the collection equipment such as the TRAILBLAZER.[173] The very elements that were emphasized throughout the various command nodes were the same aspects not emphasized to the collectors, which became the root cause of many of the tactical SIGINT collection issues. SIGINT collectors training on crew drills is insufficient and left the intelligence structure not adequately prepared to operate in combat.[174] The intelligence architecture, including communication and reporting systems, was not realistically developed to account for operational conditions in the Persian Gulf.[175] As a result, the tactical intelligence cycle was left idle.

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[172] Taylor, "Heavy Division Organic Signals Intelligence (SIGINT): Added Value or Added Baggage," 23.

[173] Richard J. Quirk III, "Intelligence for the Division: A G2 Perspective" (Study project, U.S. Army War College, Carlisle Barracks, PA, 25 June 1992), 69.

[174] Ibid., 92.

[175] Ibid., 93.

During the onset of Operation Desert Storm, SIGINT collectors operated in an EMS environment in which they were able to collect Iraqi communications deep within Iraq.[176] The environment was sparse, but Iraqi forces were communicating. The primary challenge for SIGINT during Operation Desert Storm was the conduit to get reports to the scouts, brigades, and even the Commanding General.[177] The geographic considerations of where the SIGINT collection assets were located became increasingly challenging. In one account, the 2d Armored Cavalry Regiment positioned tactical SIGINT collection assets farther forward than any other collection assets in VII Corps, yet they failed to collect and report Iraqi communications.[178] Additionally, senior leaders were often in continuous motion throughout the theater. Operational intelligence that SIGINT was able to collect provided critical intelligence to decision makers. The MI BN (CEWI) was always on the move and had difficulty collecting, processing, and reporting intelligence.[179] Without a robust communication architecture, proximity was vital to ensure minimal latency in intelligence reporting.[180] Additionally, ground-based SIGINT systems were not capable of operating while on the move, reducing their value and implementation.

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[176] Quirk III, "Intelligence for the Division: A G2 Perspective," 211.

[177] Ibid., 244.

[178] Daniel F. Baker, "Deep Attack: A Military Intelligence Task Force in Desert Storm," *Military Intelligence* 17, no. 4 (October-December 1991): 39.

[179] Taylor, "Heavy Division Organic Signals Intelligence (SIGINT): Added Value or Added Baggage," 25.

[180] Swain, *Lucky War: Third Army in Desert Storm*, 145.

Intelligence training before Operation Desert Storm, recounted by the 24th Infantry Division G2, focused predominantly on training the skills of the battalion and brigade S2s and their sections building a division-wide intelligence system.[181] This concept included assigning roles to functional brigade and battalion S2s to be experts of their respective enemy capabilities.[182] Additionally, the Division G2, COL Quirk, recounted the importance his Commanding General placed on maps as a foundational source of intelligence, not SIGINT.[183] The importance of this integrated teamwork cannot be overstated, yet there was no such parallel emphasis placed on the relationship between an intelligence collector and the commander or the staff. Integrated teamwork would not have solved all the SIGINT issues encountered during Operation Desert Storm such as the Iraqi use of wired communication network or the limitations of SIGINT collection equipment. However, it would have improved the understanding of SIGINT capabilities throughout the staff. The staff and subordinate commanders did not understand the full range of SIGINT capabilities and limitations; subsequently, ineffectively positioned SIGINT sensor teams for collecting enemy signals

Through the lens of plan and direct, collect, and disseminate, the intelligence apparatus missed the mark, thus highlighting training inadequacies prior to Operation Desert Storm. As a component of intelligence, SIGINT collection operations also did not provide the desired situational awareness or targeting fidelity to turn intelligence rapidly.

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[181] Quirk, “Intelligence for the Division: A G2 Perspective,” 13.

[182] Ibid., 28.

[183] Ibid., 46.

As such, SIGINT training before Operation Desert Storm likewise missed the mark. SIGINT training was effective at creating collection subject matter experts with the technical and tactical knowledge to operate the equipment. Collectors were trained and understood the technical aspects of their tradecraft. This research hypothesizes that pre-deployment training failed to understand and exploit relationship building outside the intelligence nucleus with maneuver partners, the primary consumer of the SIGINT collection. The proximity of SIGINT collectors to maneuver elements during combat operations possibly facilitated in improving the understanding of collection asset capabilities and limitations. There was little to no emphasis on shared planning and directing. Thus, it would have taken several interactions for SIGINT to understand the maneuver requirements and provide any tactical value. SIGINT training was ineffective at this time in preparing collectors to keep up with the operational tempo, communicating long distances back to a central analytical node or directly to a commander, or providing target fidelity necessary for lethal targeting. The National Training Center was the pinnacle of training at this time. While SIGINT did not play a significant role in supporting the brigades during the rotation, the SIGINT teams were occasionally able to map out enemy defenses by intercepting the opposing force engineer unit's communications. Generally, there was an inability to disseminate relevant tactical SIGINT intelligence during training because the teams did not have anything to report. As such, the accuracy and usability of tactical SIGINT collection were limited during Operation Desert Storm. Many of these intelligence challenges identified at the operational level shortly after Operation Desert Storm remain common challenges throughout the intelligence discipline today.

Operation Iraqi Freedom 1

Operation Iraqi Freedom 1 brings the context of LSCO within the scope of modern conflict. It provides an even more recent example of a conflict that employs newer technology yet demonstrates the value of understanding the fundamentals. Additionally, it provides an aperture to examine ground tactical SIGINT during major combat operations. Throughout Operation Iraqi Freedom 1, the SIGINT operator continued to use the collection equipment as a means to access both the voice and data of the adversary's communications.

In after action reports, most brigade and below unit commanders claimed they planned every assault as a movement to contact and they anticipated enemy composition, disposition, and strength based on their personal analysis. [184] This is not the optimal or desired way to engage with the enemy. The intelligence system only provided a starting point of uniformed forces and paramilitary formations.[185] There was little common operational understanding between echelons.[186] The digital divide between the military intelligence and national intelligence systems reinforces that tactical SIGINT must operate in a disrupted communication architecture. The challenge at the tactical level was the time required to collect the right signals, transport and analyze the data, and disseminate the intelligence reports. During Operation Iraqi Freedom 1, the intelligence system was able to provide the situational awareness to inform commanders when to

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[184] Fontenot, Degen, and Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, 423.

[185] Ibid.

[186] Ibid., 284.

expect contact reliably. At the operational level, Operation Iraqi Freedom 1 reiterates that there is a definite advantage to the force that can operate in a disconnected, intermittent, or limited-bandwidth communication environment while covering a considerable distance quickly.

The Intelligence Battlefield Operating System was optimized to support echelons at the corps and higher. Unfortunately, to be effective in the operating environment with a dynamic threat, the brigade and below units required the capability to sense and analyze threats. The Intelligence Battlefield Operating System could not maintain the tempo and distance coupled with an inadequate communications architecture that outpaced capabilities.[187] Additionally, technical, procedural, and training issues contributed to the system not adequately supporting the digital common operating picture at the brigade level.[188] The Intelligence Battlefield Operating System failed to provide the intelligence granularity required due to the speed of the tactical operations that merely outpaced the ability to collect, process, and disseminate intelligence within the commander's decision making cycle.[189] Even intelligence designed and generally adequate for sensor to shooter targeting was not effective in supporting full spectrum requirements. Historic issues such

[187] Daniel Corey and David Tohn, "Operation Iraqi Freedom Study Group: Intelligence Battlefield Operation System Initial Observations" (Ft. Leavenworth, KS: Center for Army Lessons Learned, 19 June 2003), 7, accessed 14 January 2019, https://www.call2.army.mil/products/on-point/asp.

[188] Ibid.

[189] Ibid., 8.

as inadequate communication architecture, sufficient collectors, and a refined understanding of what the collectors provided continued to plague tactical formations.[190]

In the decade following Operation Desert Storm, the Army reorganized training to meet future challenges and lead the way for the joint team.[191] This was supported by a doctrinal update from AirLand Battle to Full Spectrum Operations. A wide distribution of lessons learned from battlefield reflections from Somalia, Haiti, Rwanda, the Balkans, Bosnia, and Kosovo were institutionalized into CTC training unit rotations for the contemporary operational environment.[192] Additional live environment training exercises including Victory Strike in Poland and Lucky Warrior in Kuwait enabled the staff to practice planning, preparing, and executing deep fires and maneuver.[193] Much of the exercises focused on team building and refining standing operating procedures that contributed to the commanders and staff's ability to understand and overcome challenges they would soon confront.[194] The Army did field and train collection operators on new SIGINT equipment such as the AN/MLQ-40V Voice Collection System (PROPHET).[195] The accelerated fielding timeline of this particular system required a balance between delivering the best equipment capabilities to the SIGINT operators at the risk of

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[190] Fontenot. Degen, and Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, xxix.

[191] Ibid., xxiv.

[192] Ibid., 15.

[193] Ibid., 53.

[194] Ibid.

[195] Ibid., 59.

incomplete training and integration into unit standing operating procedures and staff planning processes.[196] Thus, the culminating maneuver-centric training events immediately before Operation Iraqi Freedom 1 did not incorporate the full complement of the intelligence process with the lack of real-world collection. Unit and Soldier training that was conducted in theater focused on individual and collective training including live fires, urban combat training, and operating in a chemically contaminated environment in order to hone combat skills.[197] While this type of training in the battalions and brigades built the necessary fire and maneuver skills and critical esprit de corps necessary for the impending LSCO, training did not reinforce understanding enabler capabilities and limitations or refine reporting mechanisms to drive the Army intelligence process because full capabilities had not been realized or valued.

At the strategic level, Major General Alexander transformed the US Army Intelligence and Security Command (INSCOM) into an organization responsible for bringing national intelligence capabilities to assist the tactical commander's problems.[198] A twice-daily video teleconference improved synergy, integration, and ensured the national intelligence community was pushing data out and down to the customers in the theater.[199] This top-down refinement was widely successful, but there was no parallel

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[196] Fontenot. Degen, and Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, 59.

[197] Ibid., 58.

[198] Ibid., 66.

[199] Ibid.

bottom-up refinement at the lowest tactical level. This meant that tactical echelons did not share in the success of this synchronizing forcing mechanism.

The "Intelligence Officer's Battlebook" created from Operation Iraqi Freedom 1 lessons learned established vital takeaways that apply to any intelligence discipline professional; namely, to consider what the organization needs, already has, and how to communicate.[200] Simply stated, implement the Army intelligence process. These generalized operational level lessons transcend echelon and remain applicable today to the tactical level as SIGINT collection supports a BCT conduct LSCO. To work effectively as a team, each entity must know and understand their counterpart, train extensively together, understand everyone's role in the organization, and how to interact.[201] Intelligence is complex work and requires everyone to establish excellent communication early, conduct mutual training events using means and methods that will be used during the conflict, and stay synchronized through aggressively understanding capabilities.[202]

Through the lens of plan and direct, collect, and disseminate, observed operational level intelligence suggests SIGINT training prior to Operation Iraqi Freedom 1 demonstrated limited improved accuracy and usability to the brigade commander. Doctrine, organization, and equipment modernization predominantly focused on echelons

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[200] U.S. Army Intelligence Center, *Intelligence Officer's Battlebook* (Ft. Huachuca, AZ: United States Army Intelligence Center, 26 June 2003), 14-15.

[201] Ibid., 18.

[202] Ibid., 19.

above the division. What was modernized internal to the division was rarely synchronized through training prior to operational deployment.

BCT Requirements During LSCO

Historical case studies provided the necessary variables critical to identify how nations engage in LSCO. Operation Desert Storm and Operation Iraqi Freedom 1 clearly depict operational-level organizations must be able to conduct multidomain operations within a highly contested operational environment against a high operational tempo peer with equivalent or even dominant extremely lethal capabilities while maneuver elements cover a considerable distance quickly. While not a perfect fit, parallels exist, and lessons learned from Operation Desert Storm and Operation Iraqi Freedom 1 apply to the BCT in a modern LSCO. There is limited open-source evidence of brigade-level SIGINT during Operation Desert Storm and Operation Iraqi Freedom 1. Instead, this unclassified discussion focuses on division level and higher intelligence. The similarities between operational and tactical SIGINT such as data collection and processing, data integrity, data storage, and data transmission indicate SIGINT operations are similar between echelon and throughout the levels of war. The overall operation and organization of SIGINT architecture at both levels indicate that their structure is similar enough to apply operational understanding to the tactical discussion because they face the same challenges and shortfalls. This research hypothesizes that the same operational level variables apply at the tactical level. The premise of this research is that SIGINT issues at the division level and higher during Operation Desert Storm and Operation Iraqi Freedom 1 also existed at the brigade level. This set of LSCO operational environment conditions

translates into training requirements that should be codified through institutional and BCT operational training requirements.

Disconnected, Intermittent, or Limited-Bandwidth Communication Environment

First, enablers in the BCT must be trained to operate in a disconnected, intermittent, or limited-bandwidth communication environment. SIGINT training must take into consideration operating in a contested communication environment from the point of collection to the analysis cell to the end customer. Multidomain operations against a near-peer competitor require SIGINT Soldiers to be able to operate modern collection equipment in disconnected, intermittent, or limited-bandwidth communication environments. The transport layer is the conduit to transmit information from the sensor to the shooter or the sensor to the decision maker. The lack of a redundant intelligence communication network at the tactical level highlights SIGINT training opportunities for receiving and pushing intelligence between tactical units and their higher headquarters.

Minimize Latency of Intelligence

Second, enablers in the BCT must train to minimize the latency of intelligence. This reference to latency refers to the time it takes to move data from the collection asset to the consumer. This consumer could be a decision maker, an intelligence analyst, or an asset delivering an effect. In LSCO, it is imperative to minimize the time in order to maintain the initiative and exploit the adversary's weaknesses. This element is highly dependent on the ability to operate under the conditions of the first element. The speed of intelligence is an essential characteristic in LSCO as it enables the ability to concentrate massive combat power at the decisive point in an operation. For instance, the sensor to

shooter link is one aspect of information transmission that provides the commander the speed and flexibility to respond to the adversary in an evolving operational environment rather than merely fighting the plan. In order to synchronize and achieve the desired effect, the BCT must be capable of quickly disseminating information from the sensor to the customer. SIGINT training must clearly articulate and practice data transmission in order to maintain the initiative and deliver timely and accurate precision intelligence.

The details of how information transmits from the sensor to the consumer are critical to understand during LSCO.[203] The most resounding feedback of SIGINT collection to answer the commander's requirement is from reflections of BCT commanders. Following the 2d BCT, 1st Infantry Division Decisive Action Training Environment rotation at the NTC in 2013, the BCT Commander expressed the importance of effective two-way communication specifically with the SIGINT collection assets in an NTC after action report. The BCT Commander incorporated the SIGINT collection assets in the combined arms rehearsal and ISR rehearsal, yet the reporting and dissemination plan was not clearly understood.[204] The staff and subordinate commanders did not understand the full range of SIGINT capabilities and limitations, and SIGINT sensor teams were placed in a valley making the SIGINT team ineffective at collecting enemy signals.[205] In an after action report, the BCT Commander clearly articulated the

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[203] Carl Fischer, *Training for Decisive Action: Stories of Mission Command. Collected Insights from Commanders and Leaders on their Experience at the National Training Center* (Ft. Leavenworth, KS: US Army Combined Arms Center, Combat Studies Institute, 2014), 8.

[204] Ibid.

[205] Ibid.

maneuver unit's lack of understanding in employing SIGINT assets and their lack of understanding in dissemination which resulted in only ten percent of the SIGINT reports arrived at the BCT main command post.[206] Rehearsals are only a tool but are essential to understanding the placement of front-end systems and identification of a communication plan for data transmission. The leadership and enablers must build mutual trust to successfully execute all the tasks the BCT Commander visualizes which takes time.

Operational Tempo

Finally, enablers in the BCT must train to maintain a high operational tempo. In LSCO, the BCT must have the capacity to maneuver a considerable distance quickly. "Commanders must anticipate that the high tempo of large-scale combat operations will create gaps and seams that create both opportunities and risks as enemy formations disintegrate or displace."[207] Subsequently, SIGINT collectors should train in a way to build the capacity to support maneuver elements while on the move covering a large distance quickly. This enables the collective team to exploit opportunities that reinforce success and achieve the commander's intent and desired end state.

SIGINT Support During LSCO

The general intent of SIGINT collection is independent of the operational context. The focus of SIGINT collection and analysis is tied directly to answering the

[206] Fischer, *Training for Decisive Action,* 8.

[207] HQDA, FM 3-0, 1-4.

commanders and staff's questions in order to "reduce the inherent uncertainty of war."[208] SIGINT collection in the BCT must be able to quickly answer the commander's requirements, develop and refine the broader situational understanding, and rapidly disseminate reports while covering a considerable distance during LSCO. Plan and direct, collect, and disseminate aspects of the Army intelligence process are the prime characteristics of how Army intelligence enablers interact with and support maneuver elements. In Operation Desert Storm and Operation Iraqi Freedom 1, the SIGINT operator used the equipment as the means to access the voice and metadata of the adversary's communications. The modern SIGINT collector's role in the BCT shares these technical aspects of operating the collection equipment.

SIGINT support to the brigade during LSCO as seen through Operation Desert Storm and Operation Iraqi Freedom 1 is two-fold: inform decision makers and support other disciplines. These requirements are not fundamentally different; however, the context in which they are executed differs significantly. In LSCO, both aspects must be executed quickly for the BCT to maintain the initiative and achieve the desired effects. SIGINT support during LSCO can also inform decision makers by providing early warning and indications to the commander, staff, and analysts that answer the BCT Commander's priority intelligence requirements. Additionally, SIGINT collection can enable targeting such as cyber and EW effects to disrupt, degrade, deny, destroy, or manipulate an adversary's communication network. Training must include synchronizing

[208] Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-55, *Information Collection* (Washington, DC: Government Printing Directorate, April 2012), 1-1.

planning and direction with the supporting maneuver element, collecting, and disseminating the precise information the consumer needs as quickly as possible and in a way that is easily understood and used during LSCO.

Current SIGINT Training Requirements

The current Army training strategy is focused on successfully navigating through a complex LSCO operational environment within a wide range of challenges. Subsequently, the current SIGINT strategy is clearly articulated as LSCO focused and incorporates components of the LSCO SIGINT training variables identified throughout this research. However, the institutional guiding documents including CATS, METL, Objective T, and MITS including tasks, conditions, and standards are not centrally focused on either COIN or LSCO. This gives the SIGINT community in each BCT the necessary latitude to design training specific to the assigned mission. This latitude to adjust training focus is not inherently wrong. Unfortunately, it does not provide the forcing function to drive the Army intelligence process within the context of the LSCO variables necessary to prepare for SIGINT collection in the BCT during LSCO. The nature of Army training as described through CATS does support the concept of collectors being able to quickly answer the commander's requirements, rapidly disseminate reports, and enable targeting effects while covering a considerable distance. However, CATS does not adequately evaluate training through the lens or context of these variables. The Mission Essential Tasks and supporting collective tasks to intelligence organizations both internal to the BCT as well as external including the Military Intelligence Brigades – Theater and Expeditionary Military Intelligence Brigades does not evaluate rapid dissemination of reports and the timeline to answer a

commander's requirements. For SIGINT specifically, the Mission Essential Tasks and supporting collective tasks predominantly focus on operating the AN/MLQ-44A(V)2 Prophet System from a fixed site, while on the move, and sensitive tactical reporting. The other Mission Essential Tasks and supporting collective tasks are internal SIGINT team processes and management.

Current SIGINT training requirements also are not a sufficient forcing mechanism to ensure SIGINT collection teams are able to support the commander. The broad mandate to conduct SIGINT collection operations and operate assigned equipment is largely insufficient. Current SIGINT training standards are not focused on LSCO training variables and instead rely upon commanders to provide that forcing function. Tactical commanders must understand that current training provides latitude regarding the conditions of SIGINT training and they must clearly articulate those conditions to their SIGINT elements to mitigate this potential risk to operating in a LSCO environment. Additionally, SIGINT assets may be required to operate in a variety of different conditions, including stability or security operations in a consolidation area. If training is properly integrated with the unit and commander's priorities, then it is not necessary to force it into the SIGINT training requirements. Generally, enabler training is not a BCT commander's top priority, it is the ability to mass combat power at the decisive point. Without enabler training emphasis, maneuver elements will struggle to achieve this objective while operating in the modern operational environment.

IEWTPT and Foundry 3.0 provide individual and crew training through language emersion, simulation, and live environment training. Simulation training is cost effective and does not require extensive resources; however, there is no substitute to live training

with the supported customer. The simulation environment is a step in the right direction and provides training opportunities that were unavailable prior to Operation Desert Storm and Operation Iraqi Freedom 1. Live environment SIGINT collection operations should take place in conjunction with tactical unit collective training to enable critical planning and direction as well as dissemination training opportunities that are vital during LSCO.

The final component of current SIGINT training requirements for a SIGINT collector is language training. The SIGINT Soldiers assigned to the BCT under the current organizational structure to conduct SIGINT collection are Cryptographic Linguists - military occupational specialist 35P. These Soldiers are assigned to the SIGINT collection teams to operate the equipment. As such, they are often consumed by multiple week language training. This language training is required to maintain language proficiency and is essential when exploiting voice communications intercepts. Language continuation training simply takes time with an opportunity cost of training integration with the maneuver unit staff and commanders. This is a necessary skill set and component of training that contributed to some successes in Operation Desert Storm and Operation Iraqi Freedom 1 and will continue to provide value in a future LSCO.

SIGINT Training Requirements For LSCO

Exclusively focusing within the COMINT domain of SIGINT, the training requirements for language, report writing, direction finding, analysis, and the necessity to cross-talk with all-source analysts are generally the same regardless of the operational context in which the data is collected – limited contingency operations such as COIN or LSCO. However, LSCO can only be successful with training that requires the continual and rapid flow of information from the collection sensor to the consumer. Within the

DOTMLPF-P construct, it is evident that the Army addressed the complexity of advanced communication systems used by near-peer adversaries by fielding collection equipment that is sufficient to answer the BCT commander's requirements.

More importantly, to achieve LSCO focused SIGINT training, consider the institutional and operational components of the external aspects of the Army intelligence process: plan and direct, collect, and disseminate. Commanders will continuously demand detailed information. SIGINT collection assets in the BCT must be trained within the context of LSCO and enabled through institutional elements that further the ability to plan and direct, collect, and disseminate. When SIGINT training is properly integrated with maneuver unit training priorities, as specified by the commander, then it will have a LSCO focus and not require separate emphasis or direction by the SIGINT training standards. LSCO necessitates this interdisciplinary training between collectors and consumers of intelligence in order to minimize the latency of intelligence in a disconnected, intermittent, or limited-bandwidth communication environment while maintaining a high operational tempo over a considerable distance.

Plan and Direct

The first step in the intelligence process is to plan and direct. Commanders drive the intelligence process from requirements and assessing collection to generating intelligence knowledge. SIGINT collection is an operation and must be resourced, integrated, and synchronized. Thus, the MICO and BEB commander representing the collection unit as well as the BCT staff are directly involved in SIGINT planning as part of the operations process. SIGINT collection teams can plan and direct their training during home station field training exercises. For a collector, information collection must

be synchronized with maneuver elements to operate and provide critical information at the appropriate time. So, the challenge is when the teams deploy and conduct operations as part of a military campaign. Commanders employ their organic collection assets to focus the unit's combat power to achieve mission success. The leadership in the BCT, at best, has limited experience planning and directing SIGINT collection while the SIGINT collection teams have never executed a plan directly conceived by the BCT staff. If the collection teams did not train prior with maneuver or fires units, then it is challenging to proactively concentrate combat power at the decisive point.

Before Operation Desert Storm, intelligence collection elements and maneuver units trained together. Internal to divisions, Military Intelligence companies within MI BN (CEWI) units had habitual relationships with brigades and supported the brigades during key training events and CTC rotations. As a result, there was an understanding of intelligence collection, and it was integrated into the operational planning process. However, prior to Operation Iraqi Freedom 1, intelligence collection elements and maneuver units did not consistently mutually train doctrinal requirements together allowing the importance of planning and directing to atrophy.

During a recent NTC rotation, the MICO Commander echoed the SIGINT collection team's challenges in reporting intelligence to the BCT promptly. Enablers such as SIGINT collection teams are often task organized within the BCT. Despite a published task, purpose, and collection guidance, the supported unit quickly negated the BCT Commander's intent.[209] The underlying issue was the lack of understanding on the part of

[209] Fischer, *Training for Decisive Action*, 63.

maneuver commanders on how to employ SIGINT collectors. This knowledge gap in understanding how to properly plan and direct SIGINT collection operations resulted in numerous exercise failures. Throughout the training exercise, the lack of coordination and working together, understanding of SIGINT capabilities and limitations, and an inability to disseminate information the BCT decision makers despite an adequate communication plan led to the inability to answer the BCT Commander's priority intelligence requirements.[210] The execution of a BCT offensive plan incorporates combat multipliers such as SIGINT to produce more significant destruction of the enemy at every level while preserving the BCT's combat power.[211]

Collect

The second step in the intelligence process is to collect. Collection is merely the process of gathering data. A successful information collection effort is only possible with timely and accurate collection. This step directly supports the production of intelligence. To be at the right place at the right time requires a SIGINT collection team to train tradecraft and fieldcraft with the supported unit. Tradecraft and fieldcraft include the technical knowledge and application of wave propagation theory, site selection, site security, and land management. Both will assist the collector in sensor emplacement, maximizing collection opportunities. Asset positioning is crucial. This highlights the importance of integrated training on collection practices. In order to maximize SIGINT collection opportunities, the SIGINT collection systems must be positioned at the proper

[210] Ibid., 64.

[211] Ibid., 10.

distance away from the target to provide reliable direction finding while close enough to collect the signal and process the voice and metadata.

LSCO is not a static engagement. While difficult, it is imperative that ground-based SIGINT collection is trained to operate throughout the EMS while on the move during LSCO. During Operation Desert Storm, maneuver forces had to stop for ground-based SIGINT teams to collect. This was an equipment issue; however, the EA-60A Quick Fix helicopter, which was also in use at the time, collected on the move by design. Modernization throughout DOTMLPF-P across all intelligence collection platforms has mitigated many of these equipment shortfalls. Additionally, maneuver forces covered a considerable distance quickly during Operation Iraqi Freedom 1 rendering SIGINT efforts and effects desynchronized because SIGINT and maneuver were not trained together in this capacity. During Operation Desert Storm, intelligence collection was challenging for tactical SIGINT collectors because the commanders and staff did not understand the system's capabilities and limitations. As such, commanders did not push these collection assets to the border early to gain early access to enemy operational and technical data due to their unfamiliarity with operating with collection assets.[212] As a result, the SIGINT collection was not conducted before ground operations.

Disseminate

The final applied step in the Army intelligence process that includes an external component is to disseminate the intelligence. Dissemination including moving data in a degraded, intermittent, and limited-bandwidth operational environment, data

[212] Quirk, “Intelligence for the Division: A G2 Perspective,” 301.

management, and knowledge of technical data. The Army's Military Intelligence community relies heavily on a stable communications infrastructure and an ever-increasing demand for more bandwidth. In fact, the intelligence communication architecture is perhaps the lifeblood of the intelligence community. Intelligence only has value if it is communicated to the consumer. The best intelligence is useless if the commander does not receive, understand, or believe the intelligence.[213] The ability to share critical intelligence reports including the details, evidence, and assessments to decision makers and analysts is paramount. Upon the foundation of integrated training, the tactical SIGINT reports must reach their customers quickly. Otherwise, it just adds to the confusion and chaos of warfare.

Current SIGINT Training Structure

This research will apply a deductive scope to view training requirements for SIGINT. Commanders own the training within their organization. To understand the training structure of the SIGINT platoon, one must first understand the organizational structure. The SIGINT platoon is located in the MICO under the BEB within each BCT. The senior SIGINT Noncommissioned Officer is a Staff Sergeant. The platoon leader is a junior Military Intelligence Lieutenant, the Company Commander is a Military Intelligence Captain, the BEB Battalion Commander is an Engineer branch Lieutenant Colonel, and the BCT Commander is a combat arms Colonel, all with little to no prior institutional formal SIGINT training. External to the military chain of command is the senior grade Military Intelligence officer in the BCT, a Major. This military chain of

[213] U.S. Army Intelligence Center, *Intelligence Officer's Battlebook*, 24.

command structure with leadership not well versed in SIGINT collection operations generates competing and often conflicting training requirements for the MICO leadership to synchronize, coordinate, and deconflict. Within home station training, the MICO task organizes to support battalion field training exercises which makes it challenging to train the low-density skill sets such as SIGINT within the MICO. To overcome the company training difficulties presented by the organizational structure, MICO leadership and SIGINT Soldiers throughout the BCT must build mutual understanding of collection capabilities and limitations to include adjacent reconnaissance and maneuver battalion command teams, the BCT S2, and the BCT S3. Building the knowledge of employing SIGINT throughout the staff and commanders as well as the capacity to rapidly disseminate and integrate SIGINT is time-consuming and takes organizational energy, yet it is not addressed throughout unit training management.

The foundational doctrine, FM 3-0 and FM 2-0, are LSCO focused in terms of scale and scope. These detailed foundational doctrine documents provide the terminology, operational perspective, and establish broad academic boundaries necessary to enable more specific prescriptive documents. FM 7-0 provides broad training guidance, but nothing that can be extracted for specific SIGINT training requirements in any military operation. The SIGINT strategy is conceptually focused on LSCO and provides the ends, ways, and means to transition towards a LSCO. SIGINT METL in the BEB is only focused on the general concept of collection and lacks the specificity necessary to train and evaluate SIGINT collection in support of LSCO. Objective-T is focused on operating individual and crew weapon systems. Objective-T plus MITS provides a more holistic assessment by incorporating quantifiable individual, crew, and

platform proficiency into the overall readiness rate. Foundry 3.0 provides the foundation for a training environment with the depth and complexity to train aspects of SIGINT collection adequately. IEWTPT provides the digital construct to enable the systems and software stimulants within a realistic simulated operational environment to train individual, crew, collective, and unit training. Collectively, Objective-T, MITS, IEWTPT, and Foundry 3.0 provide the current institutional, systematic training structure for SIGINT training. This structure is scalable and tailorable to accommodate any mission training requirement.

Shortfalls of SIGINT Training Gaps

The Army continues to adjust DOTMLPF-P methodologies to fight and win in a complex world.[214] While the structure of the tactical SIGINT collection element is different from that of Operation Desert Storm and Operation Iraqi Freedom 1, the challenges and lessons remain the same. The doctrinal requirements exist and are tailored to the LSCO arena. The recently published SIGINT strategy, Objective-T, METL, Foundry, and IEWTPT all contain LSCO tailored aspects of SIGINT. However, the primary component that is lacking is the institutional and operational mechanism encouraging the integration of SIGINT collection teams with the supported maneuver unit through collective training exercises. The Army's implementation of the current SIGINT training architecture, at best, trains and develops SIGINT Soldiers to operate their assigned equipment and enables language proficiency. Consideration should be

[214] James A. Kolky and Michael J. Trujillo, "Maneuver and Intelligence: Bridging the Gap for Unified Land Operations," *Armor Magazine* 128, no. 2 (Spring 2017): 68.

given to returning to the foundational Army intelligence process as the guide, metric, and training aid to focus SIGINT training to support BCT during LSCO.

The first shortfall is an apparent lack of knowledge and understanding of SIGINT collection capabilities, limitations, tradecraft, fieldcraft, and best practices. This degrades the ability for the BCT commander and staff to plan and direct SIGINT collection. Additionally, it directly affects the ability to collect signals in the right place at the right time. The second shortfall is the inability to disseminate and quickly integrate time-sensitive tactical SIGINT reports to enable situational understanding and effects while operating in a degraded, intermittent, limited-bandwidth communications environment.

The commander, unit standard operating procedures, and the requirements of the deployment or upcoming training rotations drive unit training within the BCT. There is a clear gap in institutional training mechanisms to hone the skills required for SIGINT in the BCT to support the commander and the staff. Focused training on plan and direct, collect, and disseminate are necessary to improve the accuracy and usability of SIGINT during LSCO in order to minimize the latency of intelligence and operate in a degraded, intermittent, limited-bandwidth communication environment at a high operational tempo.

Summary

The EMS is often described as a congested, contested, and complex operational environment. The ability of the Army to sense, understand, decide, and act faster than the adversary creates a decisive advantage, one that is particularly important in LSCO. The Army continued to refine the practical application of new technology supporting institutional doctrine and operational tactics with degrees of success during Operation Desert Storm and Operation Iraqi Freedom 1. The focus of most training events is

directly tied to the area requiring improvement or the intended result. To prepare for LSCO, the primary focus should be on the training aspects concurrent with SIGINT requirements during LSCO. SIGINT training requirements associated with LSCO as identified in the cases are to plan and direct, collect, and disseminate SIGINT while minimizing the latency of intelligence in a disconnected, intermittent, or limited-bandwidth communication environment while maintaining a high operational tempo over a large distance.

The current SIGINT training requirements are to operate the collection equipment and process data and not focused on LSCO training variables. When properly integrated with the unit and commander's priorities, it is not necessary to force LSCO variables into the SIGINT training requirements. However, tactical commanders must understand that current training provides latitude regarding the conditions of SIGINT training and they must clearly articulate those conditions to their SIGINT elements to mitigate this potential risk to operating in a LSCO environment. Generally, enabler training is not a BCT commander's top priority, it is the ability to mass combat power at the decisive point. Without enabler training emphasis, maneuver elements will struggle to achieve this objective while operating in the modern operational environment.

The resulting training shortfalls are exemplified by the lack of knowledge in employing SIGINT and the inability to rapidly disseminate and integrate SIGINT. There is an apparent lack of SIGINT collection knowledge and understanding of organic SIGINT capabilities across the BCT staff. COIN-based personal experiences continue to taint collection opportunities. SIGINT collection during COIN was effective by employing static collection sites whereas LSCO requires collection while on the move.

The vague understanding of SIGINT collection capabilities and requirements diminishes or even eliminates the value of SIGINT operations in the BCT.

As near-peer adversaries continue to develop and refine their multidomain capabilities, the Army must subsequently continue to improve its intelligence collection in order to be effective in the future operational environment. Intelligence drives maneuver and must support the targeting process through detection, target identification, geolocation, and rapid dissemination of critical information.[215] Despite advances in material and systems solutions, LSCO combat operations are dynamic and require an increased and committed integration between intelligence collection assets and maneuver forces.[216] The Army intelligence process provides the necessary and persistent aperture, coupled with the LSCO variables, to prepare the SIGINT element in the BCT for LSCO.

This thesis clearly emphasized SIGINT training areas that are indirectly tied to the execution of SIGINT collection in the BCT yet directly correlated with supporting the BCT during the execution of LSCO. The Army must adapt to the changing complexities of the LSCO operating environment or it will yield its competitive advantage.

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[215] Jack D. Kem, *Deep Maneuver: Historical Case Studies of Maneuver in Large-Scale Combat Operations* (Fort Leavenworth, KS: The Army University Press, 2018), 227.

[216] Ibid., 228.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

> The nature of war is enduring yet the character of war changes over time.
> —Clausewitz, *On War*

Conclusion

This thesis intends to answer the primary research question; what are the SIGINT training characteristics required to support the BCT during LSCO? In order to answer this question, it was imperative to address three subordinate questions; what are the SIGINT training requirements for the BCT during LSCO; what are the current SIGINT training requirements in the BCT what are the shortfalls associated with SIGINT training in the BCT during LSCO? This chapter will suggest a few future training recommendations in order to address both institutional and operational aspects of SIGINT training in the BCT focused on LSCO.

This thesis concludes that the Army Military Intelligence Corps should consider SIGINT training requirements for the BCT during LSCO using the Army intelligence process. In application, SIGINT training must focus on enabling the BCT to minimize the latency of intelligence in a disconnected, intermittent, or limited-bandwidth communication environment while maintaining a high operational tempo over a considerable distance. The current SIGINT training requirements in the BCT are focused on individual, crew, and collective tasks and skills necessary to operate the equipment not further refining those aspects that would increase the advantage over the adversary. The primary shortfalls associated with SIGINT training in the BCT during LSCO are

exemplified by the lack of knowledge in employing SIGINT and the inability to rapidly disseminate and integrate sensitive tactical SIGINT in the BCT.

The less than ideal tactical SIGINT collection in support of ground operations during Operations Desert Storm and Operation Iraqi Freedom 1 suggest three competing conclusions. First, the Army intelligence process as it relates to SIGINT collection is not trained as per the training requirements and therefore cannot be implemented effectively during a conflict. Second, SIGINT collection is not properly resourced for LSCO environment. Third, the Army intelligence process is irrelevant in LSCO. While each intelligence discipline struggles with different aspects of training, the Army intelligence process has repetitively proven efficacious, thus it should be considered as a leading component to SIGINT training in the BCT in preparation for LSCO.

As a contemporary model that exhibits aspects of future LSCO engagements, consider Russia's activities in Ukraine during 2014. The Ukraine crisis of 2014 is the most recent example of a world power employing tactical SIGINT capabilities during the invasion of a sovereign country. During the Ukraine crisis of 2014, Russia employed soft power techniques to degrade Ukraine's ability to influence the information space, denied Ukraine technical capabilities, and defended the Russian narrative through information warfare. Russia demonstrated a remarkable ability and willingness to disrupt democratic institutions, undermine social cohesion, and sow confusion, doubt, and distrust among Western allies and their publics. Through digital and analog SIGINT capabilities compounded through social media platforms, Russia accelerated the pace of their information warfare advancement. This discussion increases the requirement and applicability of tactical SIGINT in the modern LSCO operational environment.

Future Training Recommendations

The nature of LSCO is that the Army will initiate operations from a position of disadvantage against a peer competitor with an accelerated operational tempo while being contested across all domains. LSCO characteristics including violent competition of multiple corps land forces through multidomain operations, peer capabilities in a specific domain, and a high operational tempo with an increased speed of human interaction expressed through extreme lethality. Thus, this thesis proposes future training for LSCO should be executed within the context of variables minimizing the latency of intelligence in a disconnected, intermittent, or limited-bandwidth communication environment, while maintaining a high operational tempo that covers a considerable distance quickly. Additionally, SIGINT collection operations must be fully synchronized with these tactical maneuver plans in order to maximize opportunities to answer the commander's priority intelligence requirements. Observations from Operation Desert Storm and Operation Iraqi Freedom 1 suggest future SIGINT training should focus on those SIGINT training characteristics that increase the combat power, lethality, and maneuverability of the BCT while engaged in LSCO: plan and direct, collect, and disseminate. Future training opportunities exist both internal and external of the Army intelligence community. There is a component of training in which SIGINT collectors must train independent of their supported maneuver element in order to refine subject matter expertise on collection equipment.

This thesis recommends maintaining the current strategy with a subsidized multi-pronged approach to focus SIGINT training on LSCO through both Military Intelligence branch internal aspects, but even more importantly, external aspects that must be

considered in order to improve planning and directing, collection, and dissemination. External components include training the BEB Commander and partnering with Military Intelligence Brigades. All the SIGINT assets in the BCT fall under the organic task organization of the BEB Commander and the organizational structure must support training ownership. Ownership includes looking external for expertise in other formations. The Military Intelligence Brigades have the experience as well as the command influence that used to exist with the MI BN (CEWI) Battalion Commander in the division during Operation Desert Storm and Operation Iraqi Freedom 1 to support training. Additionally, conducting SIGINT training at CTCs that are integrated with the maneuver plan is imperative. Conducting integrated training at CTCs with an EMS environment that is concurrent with the scenario will provide an opportunity for the SIGINT teams to showcase their value on the battlefield alongside their supported maneuver units. This live EMS operational environment will institutionally and iteratively train the BCT staff to plan for SIGINT operations and enable SIGINT teams to train dissemination practices. Based on the ability to plan and direct, collect, and disseminate, consider the following recommendations:

Recommendation 1: Educate the BEB Commander

The pinnacle of the organization's ability to plan and direct, collect, and disseminate is the BEB Commander. The current organizational structure within the BEB supports this training ownership. Unfortunately, there is a lack of knowledge and understanding of SIGINT collection capabilities, limitations, tradecraft, fieldcraft, and best practices of organic SIGINT capabilities during LSCO across the BCT and BEB staff. COIN-based personal experiences continue to diminish or even eliminate the value

of SIGINT operations in the BCT because of a lack of understanding precise capabilities and limitations. Additionally, the transformation from the BSTB to the BEB introduced a strong emphasis on training engineer tasks due to the makeup of BEB leadership. Senior leaders in the BEB are predominantly from the Engineer branch. They are less familiar with non-engineer assets and capabilities and are particularly unfamiliar with how to train Military Intelligence collection capabilities as well as build the architecture to support collection, data transport, and dissemination. In a LSCO engagement, engineer assets are imperative, but the ability to plan and direct organic Military Intelligence collection assets to drive offensive, defensive, and stability operations is paramount. Leaders throughout the chain of command require familiarity on the integration of intelligence collection disciplines. There must be a clear understanding of the commander's requirements that are in line with SIGINT capabilities. All the MICO assets fall under the organic task organization of the BEB Commander. This requires more than a simple briefing during an officer's Intermediate Level Education, Pre-Command Course, or even a capability brief by the senior SIGINT Soldier in the BCT. This research suggests an institutional approach across all warfighting functions that educates commanders and staff on employing enablers.

Increasing capability, capacity, and understanding of SIGINT across the staff through capabilities briefs, institutional training through the Maneuver Center of Excellence at the Maneuver Captain Career Course, the Command and General Staff College, and the Army War College is a necessary start. Leaders should understand the importance of the EMS and how the intelligence community is working to provide understanding throughout this arena. Military Intelligence officers receive extensive

training on maneuver doctrine and practices while in institutional professional military education training. Maneuver officers should participate in a comparable level of institutional education on Military Intelligence collection assets such as SIGINT. Additionally, those in command of an organization with SIGINT collection assets should also know how to educate the team.

The BEB commander is an engineer officer and responsible for the preponderance of the enablers within the BCT. The organizational structure in a BCT responsibility for SIGINT training does not include a Military Intelligence officer outside the MICO. As the commander is responsible for training, then based on the current organizational structure of the MICO in the BEB, the Maneuver Support Center of Excellence shares an institutional support role in SIGINT training with USAICoE as the proponent for SIGINT collection training in the BCT. As such, the BEB commander should receive additional pre-command training on the capabilities, limitations, strengths, weakness, and challenges of SIGINT collection assets from USAICoE. Perhaps a Military Intelligence Company capabilities class taught at the Maneuver Center of Excellence and the Maneuver Support Center of Excellence. Additionally, the Maneuver Support Center of Excellence shares some responsibility for ensuring tactical SIGINT training internal to the BCT is conducted.

Recommendation 2: Partner with Military Intelligence Brigades

In conjunction with training the BEB commander for an improved commander's training guidance, focus, direction, and resourcing, consider partnering training opportunities with the local Military Intelligence Brigade. Based on home station proximity, expertise in either an Expeditionary Military Intelligence Brigade or Theater

Military Intelligence Brigade could assist training SIGINT collection. The BCTs can leverage the experience of these units conducting tactical SIGINT collection training in support of a Corps and Army Service Component Command level exercises and operations. Additionally, these Military Intelligence battalion and brigade commanders can help SIGINT training prepare for individual, crew, and collective certification requirements. Reaching up to the division or corps senior intelligence officer often proves unsuccessful due to the lack of command authority, not due to the lack of expert staff officers to support training. Most MICOs have the opportunity to leverage an Expeditionary Military Intelligence Brigade or Theater Military Intelligence Brigade for training resources, support, expertise, and best practices.

Recommendation 3: Integrated SIGINT Training into Maneuver Training

In order to maximize opportunities to train collection practices as well as dissemination of SIGINT, consider consistently integrating SIGINT training with maneuver unit training. This is particularly important at CTCs, a training environment where units determine the nature of their CTC training. This research identified that BCTs generally do not integrate SIGINT training with the BCT maneuver training. SIGINT collectors need to conduct integrated and iterative training with their customer what operating with the demands and reality of an EMS environment that is synchronized with the training scenario. There are three CTCs: the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana; the National Training Center (NTC) at Fort Irwin, California; and the Joint Multinational Readiness Center (JMRC) at Hohenfels, Germany. The Army units rotate through these CTCs to sharpen their collective tasks at the brigade and below echelon through complex, challenging, and realistic training. These collective

training events include combined arms maneuver with a whole host of enablers. Using master scenario events list injects is a primitive way to train enablers. CTCs represent a prime opportunity to train SIGINT to prepare for LSCO. The training environment should adhere to the LSCO variables as indicative of a peer or near-peer adversary.

Additional Future Research

The overall conceptual framework that formed the basis of US Army warfighting doctrine following the Vietnam conflict iteratively transformed from the mid-1970s to the mid-2000s. The catalysts necessitating change included the current threat, technological advancements, and political realities. Following the Vietnam conflict, Active Defense doctrine formed the initial framework focused on weapon systems and attrition warfare. Active Defense was replaced by AirLand Battle. AirLand Battle placed a greater emphasis on coordination between land forces conducting maneuvers and air forces attacking the enemy force's rear-echelon. Full Spectrum Operations replaced AirLand Battle including dominance in the physical space, throughout the electromagnetic spectrum, and information space. Finally, Unified Land Operations replaced Full Spectrum Operations emphasizing the simultaneity of offense, defense, and stability operations. Future research focused on training could consider the evolution of SIGINT training in conjunction with the progression of operational doctrine from Active Defense through Unified Land Operations.

Army SIGINT is just one participant operating within the electromagnetic spectrum at the tactical edge. Army SIGINT, cyber, and EW operate in the same physical and logical space. Sometimes they operate independently; sometimes they are dependent on each other to achieve mutual success. As a result, SIGINT training should also

consider these other entities from a collective training perspective. These components are complementary; however, they sometimes have competing priorities. The electromagnetic spectrum is crowded with a wide range of commercial and military communication systems, weapons, even GPS. In the modern battlefield, there are numerous military components operating a myriad of electronic devices in the same space, often generating desynchronized or even opposing effects.[217] As this space becomes more technologically sophisticated, coordination between SIGINT and EW military forces becomes increasingly essential.[218] Both disciplines operate within the same EMS. As such, Army SIGINT must have a clearly defined role as well as be able to operate with other disciplines.

Additional future research should focus on exploring areas where SIGINT, cyberspace, and EW can train together in order to support the BCT commander during LSCO. It is vital that SIGINT, cyberspace, and EW capabilities integrate at the point of collection to simultaneously provide situational awareness and enable the commander to deliver effects in support of the scheme of maneuver. These small windows of opportunity create a relative advantage exploiting the adversary's decision-making cycle. These three complimentary capabilities enable the BCT commander to evaluate the effectiveness and seize the initiative. Additionally, training integration of SIGINT,

[217] Zsolt Haig, "Convergence Between Signals Intelligence and Electronic Warfare Support Measures," *Land Forces Academy Review* 19, no. 3 (October 2014): 334.

[218] Ibid., 328.

cyberspace, and EW collapses discipline specific isolation enabling commanders to create multiple dilemmas for the adversary in multidomain operations.

Future research may consider the impact of Military Intelligence leader development on SIGINT. While not examined through this research, there may be an underlying issue with the Military Intelligence leadership's knowledge of employing SIGINT. The integration of tactical SIGINT with maneuver units extends to the officer corps. Military Intelligence officers participate in a variety of specialized training to hone their skills across an array of intelligence disciplines. SIGINT training should not exclusively apply to Soldiers operating SIGINT equipment. A SIGINT platoon in the BCT has a platoon leader and a company commander, both of whom should have at least baseline knowledge of SIGINT operations and planning considerations. At a minimum, officers should be familiar with the intelligence architecture of their specific unit based on equipment, mission, and the operational environment. For a Military Intelligence officer, there are several career opportunities to understand how to employ SIGINT collection assets that should be stressed. SIGINT subject matter expert technical skillsets are perishable, and the Army does not stress the importance throughout a Military Intelligence officer's career. Officer SIGINT training programs such as the Signals Intelligence/Electronic Warfare training and more extensive Junior Officer Cryptologic Career Program (JOCCP) already exist, but their importance is not stressed. Leader development will build an institutional platform for SIGINT teams to build mutual trust and a shared understanding of capabilities and limitations with supported maneuver units. The SIGINT team is currently grade plate deficient, and officer leader development will help bridge the gap.

Future research could examine the advent of a tactical SIGINT collection training course. This research did not examine the ability of Soldiers to operate their equipment, yet that could contribute to the inability of the BCT to rapidly disseminate and integrate SIGINT. The Army leverages joint institutional SIGINT training during a Soldier's initial entry training into the Army. This training does not address the Army's tactical ground SIGINT mission or assigned equipment. There is currently no institutional training to cover the operation of the collection systems. The exclusive equipment training is primarily conducted in conjunction with new equipment fielding. Additionally, there is no institutional training in the conduct of SIGINT operations against peer and near-peer adversaries. Future research may consider the creation of a tactical SIGINT course. The course must include the operation of SIGINT equipment, tactics, techniques, and procedures associated with collecting against peer and near-peer threats, within a realistic training environment incorporating the LSCO variables. This will enable SIGINT Soldiers to focus on training subject matter expertise and employment of the equipment. Reconnaissance courses, including the Reconnaissance and Surveillance Leaders Course, Cavalry Leaders Course, and the Army Reconnaissance Course, provide existing successful models in which to construct a tactical SIGINT collection training course. A tactical SIGINT training course will promote honing tradecraft skills and create subject matter experts capable of operating in a congested, contested, and complex operational environment.

Summary

War has been a human endeavor since humans have inhabited the earth. Rigid structures are inadequate to meet the demands of the complexity of the current

operational environment. In today's digital age, intelligence collection assets must be able to adapt to the ever-changing characteristics of war. While equipment may offset some distinctions between COIN and LSCO, scalable and tailorable training backed by institutional and operational knowledge is the way forward.

The importance of training fundamentals cannot be overstated. Despite the operational environment or context of warfare, Army SIGINT professionals operating in the BCT must be trained. Army SIGINT requires a disciplined institutional and operational training program to maintain combat readiness. The current institutional LSCO focused SIGINT training is moving in the right direction, just not yet optimized.

The performance of tactical SIGINT operations in the BCT during LSCO ultimately rests on the training, education, and experience of the Soldiers. Technology is simply a tool that enables. A properly organized and trained unit applying doctrinally sound principles accomplishes the mission. Any potential way ahead to the issues outlined throughout this thesis require both institutional and organizational adjustments within tactical formations and centers of excellence. Setting the stage for more doctrinally capable SIGINT collection in the BCT for LSCO requires buy-in from the maneuver, maneuver support, and intelligence centers of excellence. In order to be ready for LSCO, the Army must close the gap and create conditions to apply intellectual solutions to the BCT's application of combat power during LSCO.

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