

HUMAN SENSING AND THE DEEP FIGHT: CLOSING THE DIVISION DEEP SENSING GAP DURING 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
Art of War Scholars

by

FRANKLIN G. PEACHEY, MAJOR, UNITED STATES ARMY
B.S. Hons, Millersville University, Pennsylvania, 2009
M.A., Norwich University, Vermont, 2014

Fort Leavenworth, Kansas
2020

Approved for public release; distribution is unlimited. Fair use determination or copyright permission has been obtained for the inclusion of pictures, maps, graphics, and any other works incorporated into this manuscript. A work of the United States Government is not subject to copyright, however further publication or sale of copyrighted images is not permissible.

REPORT DOCUMENTATION PAGE				<i>Form Approved</i> OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 12-06-2019		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From - To) AUG 2019 – JUN 2020	
4. TITLE AND SUBTITLE Human Sensing and the Deep Fight: Closing the Division Deep Sensing Gap during Large-Scale Combat Operations				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Major Franklin Gregory Peachey				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. After nearly 20 years of focusing on counterinsurgency, the U.S. Army is returning to a focus on large-scale combat operations. In its effort to regain dominance within the land domain, the Army has identified deep sensing as a current capability gap. This study focuses on the tactical deep sensing necessary for a division to shape its deep area effectively. Since the Army transitioned to a brigade-centric force in the early 2000s, a gap has developed in a division's ability to sense within its deep area. This gap is a result of the divestiture and realignment of both technical and human sensing capabilities away from the division. However, for a division to effectively shape the fight for its brigade combat teams, it must be able to sense within its deep area. This paper will explore how a human sensing capability can contribute to closing the division deep sensing gap. This paper concludes that a human sensing capability can help narrow a division's deep sensing gap by providing the division commander with time, space, and flexibility in developing and executing operations. This contribution primarily comes from a human sensor's ability to provide an increased situational understanding of the enemy's dispositions, composition, and course of action. For this to happen, a U.S. division in a future large-scale combat operation must: have its own dedicated human sensing capabilities that can collect within the division deep area, employ its technical and human sensing capabilities in a coordinated and complementary way, and seek to leverage all human sensing capabilities within its deep area to include Special Operations Forces and inter-agency elements.					
15. SUBJECT TERMS Large-Scale Combat Operations, Deep Sensing Gap, Human Sensing, Deep Area, Deep Fight.					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT (U)	b. ABSTRACT (U)	c. THIS PAGE (U)			19b. PHONE NUMBER (include area code)
			(U)	123	

MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of Candidate: Franklin Gregory Peachey

Thesis Title: Human Sensing and the Deep Fight: Closing the Division Deep Sensing Gap during Large-Scale Combat Operations

Approved by:

_____, Thesis Committee Chair
Dirk C. Blackdeer, M.S.

_____, Member
Andrew S. Harvey, Ph.D.

_____, Member
John A. Schatzel, M.S.

Accepted this 12th day of June 2020 by:

_____, Director, Office of Degree Programs
Prisco R. Hernandez, Ph.D.

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

HUMAN SENSING AND THE DEEP FIGHT: CLOSING THE DIVISION DEEP SENSING GAP DURING LARGE-SCALE COMBAT OPERATIONS, by Major Franklin G. Peachey, 123 pages.

After nearly 20 years of focusing on counterinsurgency, the U.S. Army is returning to a focus on large-scale combat operations. In its effort to regain dominance within the land domain, the Army has identified deep sensing as a current capability gap. This study focuses on the tactical deep sensing necessary for a division to shape its deep area effectively. Since the Army transitioned to a brigade-centric force in the early 2000s, a gap has developed in a division's ability to sense within its deep area. This gap is a result of the divestiture and realignment of both technical and human sensing capabilities away from the division. However, for a division to effectively shape the fight for its brigade combat teams, it must be able to sense within its deep area. This paper will explore how a human sensing capability can contribute to closing the division deep sensing gap.

This paper concludes that a human sensing capability can help narrow a division's deep sensing gap by providing the division commander with time, space, and flexibility in developing and executing operations. This contribution primarily comes from a human sensor's ability to provide an increased situational understanding of the enemy's dispositions, composition, and course of action. For this to happen, a U.S. division in a future large-scale combat operation must: have its own dedicated human sensing capabilities that can collect within the division deep area, employ its technical and human sensing capabilities in a coordinated and complementary way, and seek to leverage all human sensing capabilities within its deep area to include Special Operations Forces and inter-agency elements.

ACKNOWLEDGMENTS

The writing of this thesis would not have been possible without the contributions of numerous people. First and foremost, I have to thank my wife, Sarah, for simultaneously being my sounding board and playing zone defense against our three children. Antonia, Natalie, and Theodore, you each, whether you remember it or not contributed many edits to this paper, one apostrophe, comma, and letter at a time.

To my committee, Mr. Blackdeer, Dr. Harvey, and Mr. Schatzel, your constant and prompt support of my effort to both write this thesis and understand the process was helpful beyond measure.

To Dr. Nowowiejski, my selection to be part of the Art of War Scholars program has been an honor and one of the most rewarding experiences of my Army career. The time and resources that the program provided me to complete this thesis was instrumental. I want to personally thank fellow scholars Greg George and Ben Chinsky for laboriously helping me wrap my head around both the structure of the literature review and the methodology. Also, I would like to thank Dr. Willbanks, who, upon Dr. Nowowiejski's recommendation, helped guide my selection and development of my Vietnam case study.

Finally, I would be remiss not to acknowledge those who were there with me at the beginning. To the Weasels of staff group 11C, specifically, Chris Gibson and Micah Stedman, your continued encouragement and useful critiques both kept me in the MMAS program and enabled my selection to the Art of War Scholars Program. You were both far more helpful than you know or will admit.

TABLE OF CONTENTS

	Page
MASTER OF MILITARY ART AND SCIENCE THESIS APPROVAL PAGE	iii
ABSTRACT.....	iv
ACKNOWLEDGMENTS	v
TABLE OF CONTENTS.....	vi
ACRONYMS.....	viii
ILLUSTRATIONS	x
TABLES	xi
PROLOGUE	1
CHAPTER 1 INTRODUCTION	3
The Problem.....	7
Large-Scale Combat and Large-Scale Ground Combat Operations	10
The Deep Area and its Importance	13
The Research Question	15
Key Definitions.....	15
Division Deep Area.....	15
LSCO	17
Large-Scale Ground Combat Operations.....	17
Sensor.....	17
Sensing.....	17
Technical Sensing	18
Human Sensing	18
Surveillance.....	18
Reconnaissance	19
Assumptions.....	19
Scope and Limitations	22
Delimitations.....	23
CHAPTER 2 LITERATURE REVIEW	25
Introduction.....	25
Gap Development	26
Technical Sensing Predominance	36
Employment of Human Sensing Capabilities	40

Division Human Sensing	41
Leveraging SOF and Inter-Agency Elements	44
Chapter Conclusion.....	46
CHAPTER 3 RESEARCH METHODOLOGY	47
Purpose of the Research.....	47
Methodology	47
Organization of the Research Process	48
Case Selection and Screening Criteria.....	49
Hypothesis	50
Data Collection	50
Data Analysis Method	52
Evaluation Criteria and Metrics	53
Validity and Limitations	55
Chapter Conclusion.....	55
CHAPTER 4 ANALYSIS	56
Introduction.....	56
Case Study #1: TF Shoemaker and Toan Thang 43	57
Context.....	57
TF Shoemaker’s Planning of Toan Thang 43	59
TF Shoemaker’s Execution of Toan Thang 43	65
Case Study #1: Analysis	70
Answering Subsidiary Question #2	74
Case Study #2: 3rd ID’s Attack to Baghdad.....	75
Context.....	76
3rd ID Planning its Attack to Baghdad	78
3rd ID’s Attack to Baghdad	80
Case Study #2: Analysis	90
Answering Subsidiary Question #3	95
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS	98
Introduction.....	98
Conclusions about Human Sensing	98
Answering the Research Question.....	102
Recommendations.....	103
Chapter Conclusion.....	104
EPILOGUE	105
BIBLIOGRAPHY	108

ACRONYMS

AO	Area of Operations
ARVN	Army of the Republic of Vietnam
BCT	Brigade Combat Team
BFSB	Battlefield Surveillance Brigade
COSVN	Central Office for South Vietnam
EAB	Echelons Above Brigade
E-MIB	Expeditionary-Military Intelligence Brigade
GMTI	Ground Movement Target Indicator
HUMINT	Human Intelligence
ISR	Intelligence, Surveillance, and Reconnaissance
LRP	Long-Range Patrol
LRSD	Long-Range Surveillance Detachment
LRSU	Long-Range Surveillance Unit
LSCO	Large-Scale Combat Operations
MACV	Military Assistance Command, Vietnam
MDO	Multi-Domain Operations
MI BN	Military Intelligence Battalion
MICO	Military Intelligence Company
ODS	Operation Desert Storm
OE	Operational Environment
OIF	Operation Iraqi Freedom
OIF-SG	Operation Iraqi Freedom-Study Group
OSINT	Open-Source Intelligence

R&S	Reconnaissance and Security
SOF	Special Operation Forces
SOG	Studies and Observation Group
TF	Task Force
TITAN	Tactical Intelligence Targeting Access Node
TLS	Terrestrial Layer System
UAS	Unmanned Aerial System
ULO	Unified Land Operations

ILLUSTRATIONS

	Page
Figure 1. Division-Centric (1995) vs. BCT-Centric (2019) Deep Sensing.....	8
Figure 2. Division Resources	9
Figure 3. Contiguous Corps AO.....	14
Figure 4. Human Sensing and the Division Deep Area	16
Figure 5. 1986-2003 Proactive Division Sensing Capabilities	27
Figure 6. Plan for Future MI BN Structure as of 1993	29
Figure 7. BFSB.....	32
Figure 8. Division Task Organized for LSCO	34
Figure 9. Major Areas of Operation for the Cambodian Incursion.....	61
Figure 10. AO for Toan Thang 43.....	63
Figure 11. Task Force Shoemaker (1-5 May 1970)	68
Figure 12. V Corps Objectives	77
Figure 13. 3rd ID Running Start Concept of the Operation	80
Figure 14. LRS Team Positions Around Objective RAMS	83
Figure 15. 3rd ID's Plan for Isolating Baghdad	88

TABLES

	Page
Table 1. Historical Case Studies Evaluation Criteria and Metrics.....	53
Table 2. Summation of Evaluated Criteria for Case Study #1.....	74
Table 3. Summation of Evaluated Criteria for Case Study #2.....	95
Table 4. Aggregated Human Sensing Contributions from both Cases	99

PROLOGUE

Winter 2020: A nameless dirt road in Eastern Europe has finally frozen solid after the tracks of an American armored division churned it into a morass of knee-deep mud. In patches, however, and off to the left and right of the road as far as the eye can see, the smoldering hulks of armored and wheeled vehicles litter the landscape. Earlier that morning, as portions of the 16th Armored Division (16th AD) completed a logistical resupply to resume their movement to contact with a templated under-strength enemy motorized rifle division, mass rocket fire—including top-attack and thermobaric munitions—from an unseen enemy destroyed more than half of two combined arms battalions and numerous resupply vehicles in minutes. Brigade counter-fire radars tracked some of the incoming rockets originating from nearly 40 kilometers away.

The brigade combat team (BCT) that these battalions belonged to did everything right. They had their cavalry squadron screening as far to their front as their Paladins (self-propelled artillery) could shoot. The significant intelligence capabilities from the BCT military intelligence company (MICO) were effectively task-organized and employed in the most favorable positions possible, with their Shadow (unmanned aerial system [UAS]) attempting to look deep within the BCT area of operations (AO). However, a mixture of dense vegetation, rough terrain, bad weather, and electromagnetic interference routinely limited the quality and depth of the MICO's sensing capabilities to the close fight.

In an ominous sign, when the BCT collection manager asked division for support from their Grey Eagle (UAS), the response was that division collection faced similar challenges. Also, a high enemy air defense threat imposed a limiting range on the

division's combat aviation brigade up to the forward line of troops for reconnaissance purposes. Unfortunately, other division reconnaissance was unavailable—a squadron from what was supposed to be the corps reconnaissance and security (R&S) BCT never materialized—and the 16th AD require all of its combat effective units for the close fight. With the BCT's and division's capabilities either committed or negated, division looked to corps and above to close their deep sensing gap. The picture did not get any clearer. When the 16th AD was able to get in touch with corps sporadically, they were told most assets were committed, another unit was a higher priority, or that corps assets were also operating in a degraded capacity.

No one wanted to go down this dirt path, and the undulating terrain of forested hills, rocky outcrops, and marshy fields had been an eye-opener for those accustomed to fighting in the openness of the desert. Now, instead of seeing for miles and having an abundance of available collection assets, the division's BCTs were lucky if they knew what was beyond the next terrain feature. The corps headquarters was facing operational threats of its own, and the division was practically blind—outside of the sporadic intelligence reports that got through from corps—in its ability to project combat power beyond the close fight. As they would soon find out, the fire-strike received earlier that morning was only the start of their concerns as massed mechanized formations quickly overran individual BCT cavalry squadrons. For the 16th AD, it was only the start of a long, cold, hard winter as its BCTs routinely made contact without advanced warning. If the 16th AD was going to shape the fight for its BCTs, it needed the capability to sense deep despite dense vegetation, rough terrain, bad weather, and enemy interference.

CHAPTER 1

INTRODUCTION

Even if sensors were able to identify all enemy positions, the human and psychological dimensions of war would preserve uncertainty . . . the enemy commander's intentions remain unclear until he is forced to reveal them.

—Lieutenant General (R) H. R. McMaster, *Crack in the Foundation*

The fictitious scenario above focuses on a non-existent, though representative, U.S. 16th Armored Division participating in large-scale combat operations (LSCO) against a peer enemy in Eastern Europe. The scenario is an example of a specific type of warfare against a competent and well-equipped enemy the U.S. Army has not had to confront in nearly three decades in routinely restricted terrain that has not posed a challenge in generations. As with Task Force (TF) Smith during the Korean War, the 16th AD was not prepared to face the enemy on equal or superior terms. Its inability to sense within its deep area was one of the crucial factors inhibiting it from visualizing the battlefield, gaining an accurate situational understanding, and shaping the fight for its BCTs.

Through a four-year study published in late 2019, the Combined Arms Center (CAC) identified 17 critical capability gaps in the Army's ability to execute LSCO.¹ One area that has gained particular attention, with long-range precision fires having become

¹ Dennis M Burket, "The Evolution of the Division Formation," in *Large-Scale Combat Operations: The Division Fight* (Ft. Leavenworth, KS: U.S. Army Combined Arms Center and U.S. Army Command and General Staff College Press, 2019), 7-18, 11); Tisha Swart-Entwistle, "Lundy Retires, Becoming Senior Mentor," *Fort Leavenworth Lamp*, January 16, 2020, <https://www.ftleavenworthlamp.com/community/2020/01/16/lundy-retires-becoming-senior-mentor/>.

the Army's top modernization priority, is the Army's ability to sense deep at echelons above the brigade.² While the Army has mainly focused on sensing deep in support of potential capabilities like the strategic long-range cannon, this study instead focuses on a division's limited ability to sense tactically within its deep area. Specifically, this study assesses how this tactical sensing capability gap can be closed through the contribution of a human sensing capability. This study makes this assessment by first reviewing the development and existence of a division deep sensing gap as of late 2019. It then analyzes how human sensing has enabled division deep sensing in the past and what advantages human sensing capabilities can provide to a division during LSCO.

This study argues that, while technical sensing has advanced greatly in the last few decades, the division requires a human sensing capability to contribute to closing its deep sensing gap during LSCO. Specifically, for a division to effectively sense within its deep area, it must: have its own dedicated human sensing capabilities capable of collecting within the expected operating environment (OE), employ its technical and human sensing capabilities in a coordinated and complementary way, and actively plan and coordinate the leveraging of all human sensing capabilities within its deep area to include Special Operations Forces (SOF) and inter-agency elements.

While the key definitions section of this study defines sensing and its two aspects—technical and human—it is essential to delineate what is meant by human sensing within the context of this study: the execution of information collection by a

² Mark Pomerleau, "The Army Targets Systems to 'See' 1,000 Miles," C4ISRNET, April 2, 2019, <https://www.c4isrnet.com/c2-comms/2019/04/02/the-army-targets-systems-to-see-1000-miles/>.

human sensor in a division's deep area. Human sensors operating within a division deep area are proactive in their sensing abilities, with different sensors being more or less capable of interacting with the target of collection. Probably the most notable reference of humans as sensors derived from the development of the "Every Soldier is a Sensor" concept in the early-2000s. Central to this concept was the belief that "Soldiers are our most brilliant collectors with boots on the ground, hearing, seeing, and sensing things that technical collectors cannot."³

It is important to acknowledge that both Joint and Army doctrine do not have definitions for sensing.⁴ For this study, the act of sensing consists of a sensor—technological or human—receiving information about its OE, then passes that information along to another sensor or a decision-maker for action. These sensors can possess a proactive or reactive ability to sense the enemy and its actions. Proactive sensors can seek out information about the enemy before they attempt to achieve effects within the AO. Also, some proactive sensors have the potential to engage the enemy to gain additional information if necessary. Reactive sensors require the enemy to attempt to achieve effects within the AO before being able to gather information, such as radars that track enemy fires.

³ Stephen K. Iwicki, "CSA's Focus Area 16: Actionable Intelligence...One Year Later," *Military Intelligence Professional Bulletin* 30, no. 4 (October 2004): 43-48, 46.

⁴ U.S. Joint Chiefs of Staff (JCS), Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: U.S. Government Printing Office, 2016); Headquarters, Department of the Army (HQDA), Field Manual (FM) 1-02.1, *Operational Terms* (Washington, DC: Government Printing Office, 2019).

Human sensors can be government forces—covert or conventional—or something in between. It is crucial to make a distinction between human intelligence (HUMINT) derived from human sensing and HUMINT operations that consist of activities to include source operations and interrogations. Joint doctrine defines HUMINT as “a category of intelligence derived from information collected and provided by human sources.”⁵ It further defines a source as “a person, thing, or activity from which information is obtained.”⁶ Human sensing focuses on the activity of human sensors gathering information within a division’s deep area to develop actionable HUMINT for division operations. The focus of information collection is delineated by the mission variables and outlined within a commander’s critical information requirements.⁷

This research is significant to the military profession based on the Army’s assessment that the division is “central to the conduct of LSCO” and the Army’s ability to prevail in the next conflict against a near-peer threat.⁸ To realistically fulfill this role, divisions must effectively execute tactical operations within the operational approach developed by higher echelons. A division’s ability to sense throughout its AO is crucial to focus its limited resources (means) through effective deep operations (ways) to achieve

⁵ JCS, JP 1-01, 105.

⁶ Ibid., 219.

⁷ The mission variables include mission, enemy, terrain and weather, troops and support available, time available, and civil considerations. Headquarters, Department of the Army (HQDA), Army Doctrinal Publication (ADP) 6-0, *Mission Command: Command and Control of Army Forces* (Washington, DC: Government Printing Office, 2019), 3-6.

⁸ Headquarters, Department of the Army (HQDA), Army Doctrinal Publication ADP 3-0, *Operations* (Washington, DC: Government Printing Office, 2019), 1-6.

a defined military end-state (ends).⁹ Without the ability to persistently and effectively sense within its deep area, a division is less ready and less capable of executing its central role within LSCO.

The Problem

How can a U.S. Army division close its deep sensing gap to better ensure land dominance during a large-scale combat operation against a near-peer or peer threat across a diverse set of OEs? Currently, Army divisions are limited in their ability to proactively sense within their deep areas due to a lack of sensing capabilities, either assigned or in direct support. For the last few years, a division's only assigned ability to proactively sense within its deep area—without having to commit further aviation or subordinate ground assets—has been its Grey Eagle UAS designed to operate within an uncontested air domain. This lack of assigned sensing capabilities is in stark contrast to the proactive sensing capabilities that have historically been available to an Army division for employment during LSCO (see figure 1).

⁹ U.S. Joint Chiefs of Staff (JCS), Joint Publication (JP) 5-0, *Joint Planning* (Washington, DC: Government Printing Office, 2017), IV-16.

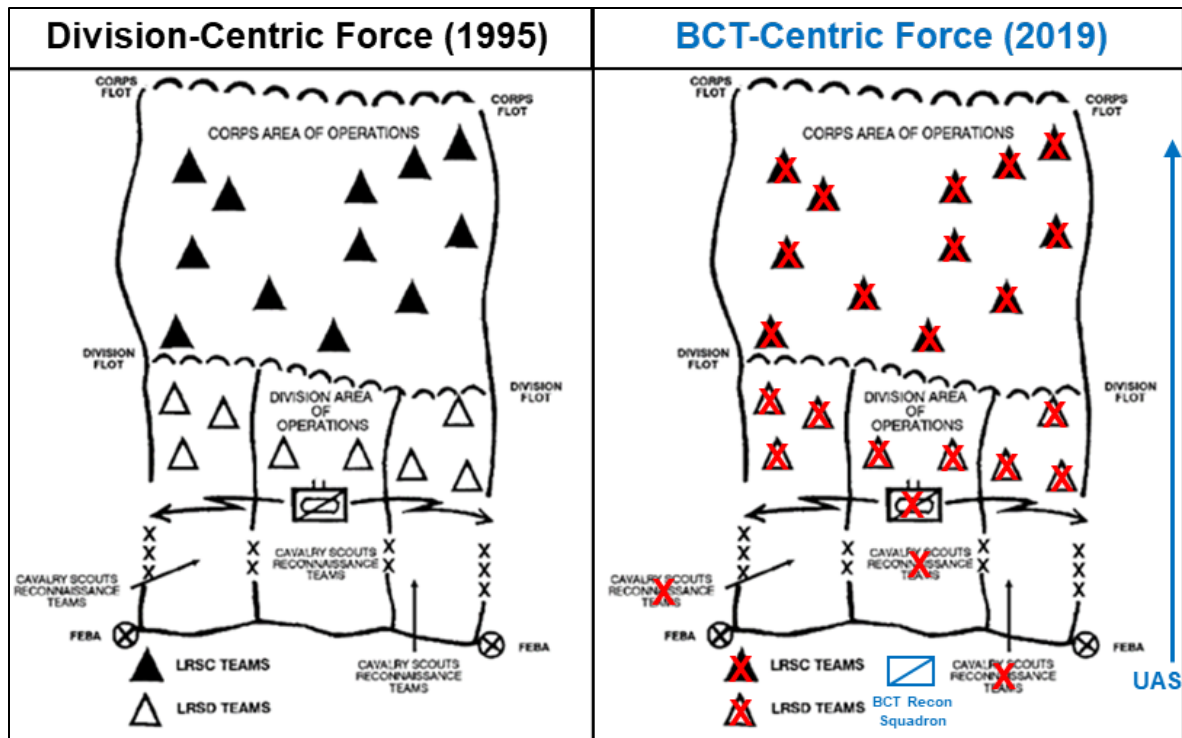


Figure 1. Division-Centric (1995) vs. BCT-Centric (2019) Deep Sensing

Source: Headquarters, Department of the Army, Field Manual 7-93, *Long-Range Surveillance Unit Operations* (Washington, DC: Government Printing Office, 1995), 2-10. Modified by the author.

Despite this limited sensing capability, divisions are expected to employ long-range fires along with maneuver assets in their deep area to shape the fight for their subordinate elements. The current state of sensing capabilities within a division is far less than what the Army division had assigned when it executed large-scale ground combat operations in the past. Whether planning for large-scale ground combat operations against Soviet forces or conducting operations during Operation Desert Storm (ODS) and the 2003 invasion of Iraq, divisions had many dedicated human sensors, in addition to assigned and joint force technical sensors, available to collect both proactively and reactively within their deep areas (see figure 2).

other than a terrible sandstorm during the 3rd Infantry Division's (3rd ID) attack toward Baghdad. A future large-scale combat operation may not be in such a conducive OE or against such a drastically overmatched enemy. Since 2003, however, the Army has divested its divisions of many of these sensors while fighting an asymmetrical war with sensor enhanced modular BCTs.¹⁰ A more detailed look at the sensing gap as of 2019 and how it developed is covered within the literature review of this study. To better understand the deep fight and the importance of closing the division deep sensing gap, however, it is best to start with how the Army conceptually views the execution of future major operations.

Large-Scale Combat and Large-Scale Ground Combat Operations

The CAC is the proponent for the development of the Army's Multi-Domain Operations (MDO) concept. As the Army has made the conceptual switch from fighting and training for counterinsurgency to LSCO, it has published a significant amount of literature discussing this concept. Its current doctrine outlining the MDO concept is its Training and Doctrine Command (TRADOC) Pamphlet (TP) 525-3-1, *The U.S. Army in Multi-Domain Operations 2028*. This concept forms the foundation for the role the Army envisions playing during LSCO, specifically, prevailing against an adversary through the execution of large-scale ground combat operations.¹¹

¹⁰ U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-8, *U.S. Army Concept: Multi-Domain Combined Arms Operations at Echelons Above Brigade 2025-2045* (Washington, DC: Government Printing Office, 2018), 6.

¹¹ U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-3-1, *The U.S. Army in Multi-Domain Operations 2028* (Washington, DC: Government Printing Office, 2018), 24.

From this foundational concept, the Army developed its Echelons Above Brigade (EAB) Concept, published in TP 525-3-8, U.S. *Army Concept: Multi-Domain Combined Arms Operations at Echelons Above Brigade 2025-2045*. This concept outlines how the Army transitioned from a force centered on divisions to an Army focused on BCT modularity. It then outlines how the Army must once again reemphasize the importance of echelon-above-brigade formations to compete in large-scale ground combat operations.¹² In addition, the EAB Concept identifies the critical importance of the deep fight at the corps and division levels, detailing how corps must integrate operational fires to shape the deep fight and create “windows of superiority” for divisions to engage in their deep areas to degrade an enemy’s tactical systems and formations.¹³ Divisions are expected to return to operating as “a fighting formation that employs subordinate units instead of only functioning as their stationary headquarters.”¹⁴ In the last few years, the Army has begun to publish doctrine aligned with this concept that details how an Army formation will execute operations within LSCO.

In 2017 and 2019, the Army published FM 3-0, *Operations*, and Army Doctrinal Publication (ADP) 3-0, *Operations*. While both FM and ADP 3-0 emphasize the importance of Army preparedness across the range of military operations, they provide significant emphasis on renewing the Army’s focus on executing large-scale ground combat operations. This new doctrine provides an operating concept through Unified

¹² TRADOC, TRADOC Pamphlet 525-3-8, 6.

¹³ Ibid., 43.

¹⁴ Burket, “The Evolution of the Division Formation,” 12.

Land Operations (ULO) for leaders to achieve unified action during the simultaneous execution of offensive, defensive, and stability operations. While the operations doctrine is current, FM 3-94, *Theater Army, Corps, and Division Operations* is out of sync with the EAB Concept as it was last published in 2014. That lack of synchronization is representative of the current division force structure and its lack of readiness to execute its role within the EAB Concept—to shape the deep fight for its BCTs.

The Army also provides doctrinal guidance in the conducting of deep operations, while also detailing the role, purpose, and functionality of supporting R&S elements. Army Techniques Publication (ATP) 3-94.2, *Deep Operations* outlines the Army's ULO tenet of depth and describes how it extends operations in time, space, or purpose to affect an enemy's ability to employ uncommitted forces.¹⁵ It is important to understand the emphasis the Army places on a division's ability to conduct deep operations, as the success of these operations depends, to a large degree, on a division's ability to sense across the depth of its AO. FM 3-98, *Reconnaissance and Security Operations* outlines how a corps and division commander, deprived of dedicated reconnaissance elements, will employ an R&S BCT or, if unavailable, will task internal elements with conducting R&S tasks throughout the depth of their AO.¹⁶ The assessed effectiveness of employing

¹⁵ Headquarters, Department of the Army (HQDA), Army Techniques Publication (ATP) 3-94.2, *Deep Operations* (Washington, DC: Government Printing Office, 2016), 1-1.

¹⁶ Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-98, *Reconnaissance and Security Operations* (Washington, DC: Government Printing Office, 2015), 1-7.

these potential mitigation measures to assist in minimizing a division's deep sensing gap is further reviewed in Chapter 2.

The Deep Area and its Importance

With the conceptual and doctrinal underpinning of LSCO established, it is important to focus on a division's deep area and its importance in a large-scale ground combat operation. A corps headquarters defines a division's AO based on mission requirements and the need to protect the force.¹⁷ With an established AO, division commanders define their deep areas based on the limit of their subordinates' boundary and that of the corps'.¹⁸ While it is difficult to identify a specific measurement to characterize a division's deep area, the range of a subordinate BCT's fires capability, as well as its own, generally play a significant role in defining close and deep areas (see figure 3). Also, it is in the division's interest to project its deep area as far from the BCTs' as possible to shape the fight as far in advance as the division's capabilities allow.

¹⁷ Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-94, *Theater Army, Corps, and Division Operations* (Washington, DC: Government Printing Office, 2014), 7-6.

¹⁸ HQDA, ATP 3-94.2, 1-2.

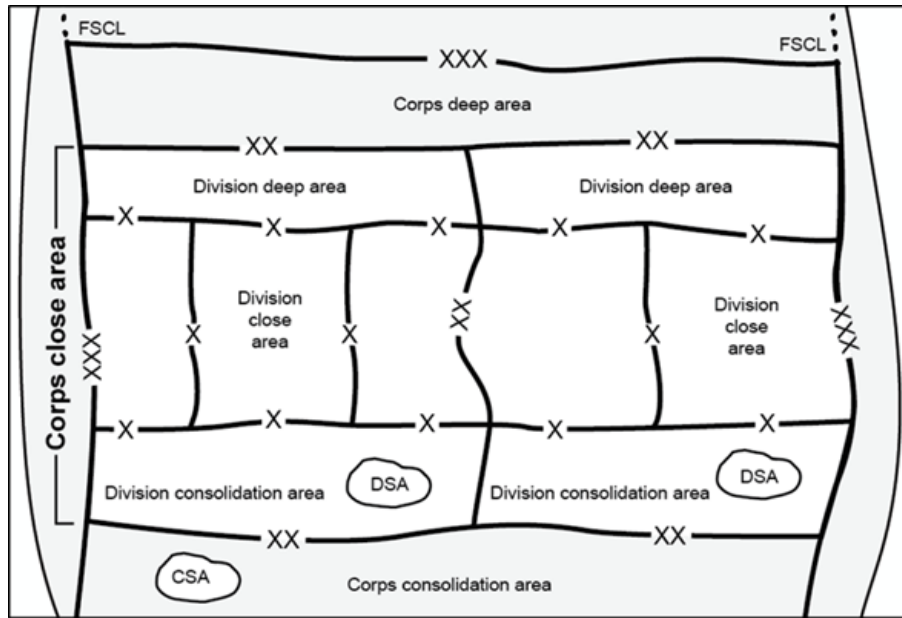


Figure 3. Contiguous Corps AO

Source: Headquarters, Department of the Army, Field Manual 3-0, *Operations* (Washington, DC: Government Printing Office, 2017), 1-32.

It is within the division's deep area that it seeks to shape the close fight for its subordinate BCTs by executing combined arms operations against uncommitted enemy forces or high-value capabilities.¹⁹ The nature of deep operations can consist of the employment of a range of military options, including lethal and non-lethal fires, to more complex operations requiring the synchronization of numerous capabilities across warfighting functions, like a deep raid. However, one consistent requirement, regardless of the option chosen, is the need for reliable division sensing within its deep area.

¹⁹ HQDA, ATP 3-94.2, 1-4.

The Research Question

As the Army implements mitigation strategies to compensate for the gap in a division's deep sensing ability and looks toward restructuring units to compete in the next large-scale combat operation, it is important to address the following research question: How can a human capability contribute to the closing of the division deep sensing gap during LSCO? This primary research question prompts several subsidiary questions. First, what is the division's sensor gap in its deep area during LSCO? Second, how has human sensing enabled division deep sensing in the past? Third, what advantages can human sensing capabilities in the division deep area provide during LSCO?

Answers to each of these questions shape and focus the research toward a specific gap in the existing literature about closing the division deep sensing gap, specifically, the employment of human sensing capabilities in the division deep area during LSCO. Conclusions from this research will define the role a human sensing capability can have in closing the division deep sensing gap and validate the need for a division to have its own human sensing capabilities, balanced with and complementary to division technical sensing capabilities, while also seeking to leverage all human sensing capabilities within its deep area. With the problem and its significance outlined and the questions for research identified, it is important to define terms that are key to this study.

Key Definitions

Division Deep Area

According to ATP 3-94.2, *Deep Operations*, the division deep area is the area that “extends beyond subordinate unit boundaries out to the higher commander’s designated

AO,”²⁰ and according to ADP 3-0, *Operations*, is “where the commander sets conditions for future success in close combat.”²¹ For a division, this generally means that a division deep area would start from the limits of where its BCTs can have effects from their organic fires capabilities, and then extend out toward a limit set by its corps headquarters. A rough estimate of depth for this study starts at 10-15 kilometers beyond the forward line of troops out to 40-50 kilometers (see figure 4).

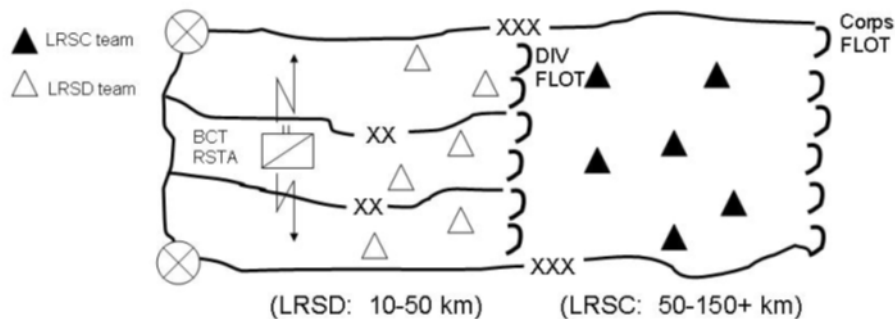


Figure 4. Human Sensing and the Division Deep Area

Source: Michael M. Larsen, “Organizational Structure of Deep Ground Reconnaissance for Future Divisions and Corps” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2006), 8.

²⁰ HQDA, ATP 3-94.2, 1-2.

²¹ HQDA, ADP 3-0, Glossary-3.

LSCO

According to ADP 3-0, *Operations*, LSCO are “extensive joint combat operations in terms of scope and size of forces committed, conducted as a campaign aimed at achieving operational and strategic objectives.”²²

Large-Scale Ground Combat Operations

According to ADP 3-0, *Operations*, large-scale ground combat operations are “sustained combat operations involving multiple corps and divisions.”²³ These operations are the Army’s specific contribution through ULO to the U.S. military’s execution of LSCO.

Sensor

Doctrine does not define what a sensor is or can be but uses the term interchangeably to describe both technical and human collection capabilities. For this research, the term “sensor” is interchangeable with “collection asset” or “capability” and is the means to execute the activity of sensing effectively. It is important to note that not all sensors are equal in their abilities to sense different aspects of the OE or the enemy.

Sensing

Doctrine does not define sensing but does discuss sensing as an activity conducted by both humans and through technical means. For this research, “sensing” is the ability for any asset to collect within its OE.

²² HQDA, ADP 3-0, Glossary-6.

²³ Ibid.

Technical Sensing

Doctrine does not define technical sensing, but for this research, the term refers to data collection conducted by a non-human capability. This capability may be physically located outside of the division deep area that is the focus of its collection effort. As currently structured, divisions are largely dependent on the external technical sensing provided by the joint force.

Human Sensing

Doctrine does not define human sensing, but for this research, the term refers to information collection conducted by a human capability physically operating in the division deep area. For clarity, the way this study employs this term is different from how it is often used commercially—to describe a technology capable of detecting human presence. Also, while human sensing produces HUMINT, it focuses on a human sensor's interaction within its OE, not on engaging in source or interrogation operations, which is the prevalent use of the term.²⁴

Surveillance

According to FM 3-55, *Information Collection*, surveillance is “the systematic observation of aerospace, surface, or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means.”²⁵ This term outlines a tactic that

²⁴ Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-55, *Information Collection* (Washington, DC: Government Printing Office, 2012), Glossary-2.

²⁵ Ibid., Glossary-3.

both technical and human sensors can employ in collecting data within the division's deep area, with the notable limitation of the tactic being its ability to engage the target for information beyond what can be observed.

Reconnaissance

According to FM 3-98, *Reconnaissance and Security Operations*, reconnaissance is "a mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area."²⁶ This term outlines a tactic that both technical and human sensors can employ to both observe and engage a target for information collection purposes. While technical sensors rely largely on observation by various means, human sensors are uniquely positioned to collect information through multiple detection methods, including, when necessary, fighting for information.

With these definitions in mind, it is important to recognize the underlying assumptions of this study.

Assumptions

This research is based on four assumptions. The first assumption is that the Army will restructure its divisions in the next decade to enable the division deep fight during LSCO through their own assigned or directly supporting deep sensing capabilities. Currently, according to FM 3-0, *Operations*, "Army forces are heavily dependent upon

²⁶ HQDA, FM 3-98, Glossary-5.

the joint force for fires and information collection in the deep area.”²⁷ There are many technical sensing capabilities that reside at echelons above the division that can sense within the division’s deep area, which include, for example, Ground Movement Target Indicator (GMTI) from a Joint Surveillance and Target Attack Radar System (JSTARS) aircraft. However, a future large-scale combat operation against a peer will drastically limit the availability of joint force technical sensors to individual divisions due to overwhelming demand requiring prioritization. This reality precludes future division dependency on the joint force if they are to play a crucial role in gaining and maintaining land dominance that doctrine outlines.

The second assumption is that divisions will be required to execute large-scale ground combat operations in terrain less permissive than what they experienced during ODS or the 2003 invasion of Iraq. The open terrain and relatively favorable weather of Iraq significantly enabled the employment of technical sensors at echelons above the division. However, if divisions are to execute large-scale ground combat operations against the pacing threats identified in the 2017 National Security Strategy—namely China and Russia—then divisions must be prepared to operate in less permissive terrain.²⁸ The crucial impact of this assumption is that the technical sensors adept at operating in the deserts of Iraq may be less effective in the dense vegetation, restrictive terrain, and more diverse weather patterns of Asia or Europe.

²⁷ Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-0, *Operations* (Washington, DC: Government Printing Office, 2017), 1-3.

²⁸ U.S. President, *National Security Strategy of the United States of America* (Washington, DC: The White House, 2017), 2.

The third assumption is that future divisions competing within LSCO against a near-peer or peer threat will conduct operations in a degraded environment. This assumption is based on an assessment by the Army that a near-peer threat in a future conflict will “seek to simultaneously degrade sensors and information systems used to create a multi-domain common operational picture.”²⁹ The threat will attempt to achieve these effects through multiple means, including cyberspace attacks, attacks within the electromagnetic spectrum (EMS), attacks against space-based systems, and chemical, biological, radiological, and nuclear (CBRN) attacks.³⁰ This assumption about a degraded OE is important, as any degradation within the OE will have disproportionately negative impacts on a division dependent on joint force sensing capabilities to sense within its AO. While human sensors are not immune to the effects of operating within a degraded OE, a division’s ability to employ dedicated human sensors would, unlike joint force technical sensors, remain within the control of the division who could best employ them based on conditions within their AO.

A final assumption is that no single sensing capability, either technical or human, can resolve the division deep sensing gap. This assumption means that, at a minimum, multiple sensing capabilities—either technical, human, or a combination of both—are necessary to close the sensing gap. In addition to these assumptions, there are various limitations that narrow the scope of this study.

²⁹ TRADOC, TRADOC Pamphlet 525-3-8, 11.

³⁰ Ibid.

Scope and Limitations

This study considers what the division's deep fight is within a large-scale combat operation and identifies the gap in sensing capabilities that currently exist. The study then addresses current Army doctrinal strategies to mitigate the effects of lost sensing capabilities within its divisions. Finally, this study analyzes what sensing a human capability can provide that would contribute to closing the division deep sensing gap in the future. This paper seeks to identify how a balanced approach between technical sensing and human sensing capabilities is necessary to effectively close the division deep sensing gap and thereby aid in the retention of Army land dominance during the next large-scale combat operation.

The research for this study has three primary limitations. The first limitation is access to classified information sources. While classified information exists about specific capabilities and limitations of various technical and human sensing capabilities available to a division, that information is not available for research or inclusion within this study. In addition, as this study is for public release, any information marked with a distribution limitation of "For Official Use Only" must also be excluded in the development of this study.

The second limitation is the time period in which relevant research material on the employment of a dedicated division human sensing capability during a large-scale combat operation is available. Relevant research material must include a division executing LSCO with the sensing capabilities to enable a deep fight. This focus generally restricts the available research material to combat operations conducted during or after

World War II, where divisions had a dedicated deep sensing capability in one form or another.

A final limitation to the research for this study is the amount of time available to conduct, analyze, and compile relevant research. While this topic has the potential to be a vast study covering numerous capabilities over a long time period, only approximately nine months are available to complete this study. With the initial scope and limitations of this study established, it is important to specify how further delimitations narrow and focus it.

Delimitations

This study has five delimitations that narrow or shapes its focus. First, this study focuses on the current deep sensing gap that divisions must confront within their deep areas. While the Army's current approach focuses its efforts at higher echelons to enable long-range precision fires beyond the division AO, those efforts are beyond the scope of this study. Instead, as references to these efforts or higher echelon capabilities are made throughout this study, they are to provide context and outline how a division is dependent on support from higher echelons to execute its role during LSCO. Similarly, while some of the technical and human sensing capabilities within a BCT or lower are discussed, they are in reference to a division's own sensing capacity.

The second delimitation of this study is its focus on LSCO. While human sensing is essential across the range of military operations, those operations—beyond informing sensor employment during LSCO—are outside of the scope of this study.

The third delimitation to this study is that it focuses on the role that proactive sensing capabilities, specifically human sensors, can undertake within the division deep

area. While context is provided by discussing technical and reactive sensing capabilities throughout this study, it is not meant to compare or contrast the merits or limitations of technical versus human sensing. Instead, this study maintains a deliberate focus on how a human capability can contribute to closing the division deep sensing gap.

The fourth delimitation of this study is that it does not seek to justify the benefits of a specific human sensing capability. While the divestiture of division-level human deep sensing capabilities like division cavalry squadrons and long-range surveillance detachments (LRSD) have been controversial, they have been equally well researched and represented. In this study, the discussion of specific sensing capabilities serves to define how human sensing as a whole can contribute to closing the division deep sensing gap.

The final delimitation of this study is that it does not discuss in any detail the potential application of cyber and Open-Source Intelligence (OSINT) toward human sensing for a division. Since Operation Iraqi Freedom (OIF), there has been an exponential growth in both state cyber capabilities and an individual's ability to access the cyber domain routinely. There is potential for a division to leverage OSINT capabilities to collect information toward its commander's critical information requirements. However, an analysis of that potential is beyond the scope of this study. With the scope of this research delineated and the research question and subsidiary questions in mind, it is now important to review the relevant literature available on this topic.

CHAPTER 2

LITERATURE REVIEW

There are many people that believe that through technology advancement, we can solve all of the issues of warfare,’ Odierno commented, ‘I absolutely reject that concept . . . Human interaction in a complex environment is key to our success in the future.

—Rosa Brooks, *How Everything Became War and the Military Became Everything*

Introduction

There is no literature currently available—at the publicly releasable level—that addresses a division’s deep sensing gap in those specific terms, largely due to how new the CAC capability gap study is. The debate about how a division can best gather information within its deep area, however, has existed for decades and experienced rapid growth since 2003. This chapter outlines many of the key pieces of literature to an ongoing dialogue in three sections—the development of a deep sensing gap, the rise of technical sensing predominance, and the employment of human sensing capabilities—while also identifying where a break exists within current the literature.

The first section details the division deep sensing problem by examining the development and characteristics of the division deep sensing gap using a review of the current literature. In the course of this gap description, this first section will also answer the first subsidiary question: What is the division’s sensor gap in its deep area during LSCO? Also, this first section will describe current doctrinal mitigation strategies to address the division deep sensing gap from a human sensing perspective.

The second section reviews the available literature on the growing predominance of technical sensing at EAB. It will also briefly discuss the role that the concept of

“knowledge dominance” has played in shaping a division’s sensing capabilities. In addition, this section discusses points of view from those who see the potential pitfalls of being dependent upon technical sensing, such as the idea of “iconology,” while also discussing the views of those who argue that technical sensing has made some forms of human sensing “no longer necessary.”

The third section assesses current literature on human sensing by focusing on historic division human sensing capabilities like division cavalry squadrons and long-range surveillance units (LRSU). Also, this section will discuss the roles other human sensing capabilities—SOF and inter-agency elements—have or can play in supporting division deep sensing. This section will establish a foundation that will be expanded upon during the Vietnam case study in Chapter 4 to answer the second subsidiary question: How has human sensing enabled division deep sensing in the past? The final portion of this chapter discusses the break in current literature and the need to ask: How can a human capability contribute to closing the division deep sensing gap during LSCO?

Gap Development

Over the last three decades, the organizations responsible for facilitating sensing across a division’s AO have changed multiple times, with each change varying a division’s ability to sense within its deep area. In the 1980s to the early 2000s, the Army fielded a Military Intelligence Battalion (MI BN) at the division level, as outlined in FM 34-10, *Division Intelligence and Electronic Warfare Operations*. Division MI BNs varied in their structure depending on the composition of the division it was to support, to include heavy, airborne, air assault, or light infantry divisions.

The MI BN, along with capabilities from the division artillery, combat aviation brigade, air defense artillery battalion, and the division cavalry squadron, comprised the division's ability to proactively sense within its deep area (see figure 5). By being proactive—versus reactive—these capabilities could collect information on the enemy prior to them attempting to gain effects against the division, thereby informing the commander's decision-making cycle instead of reacting to enemy actions. Before the restructuring of the Army toward a brigade-centric force, a division could leverage a mixture of dedicated proactive sensing capabilities such as the division artillery's movement target indicator radar and the MI BN LRSD.

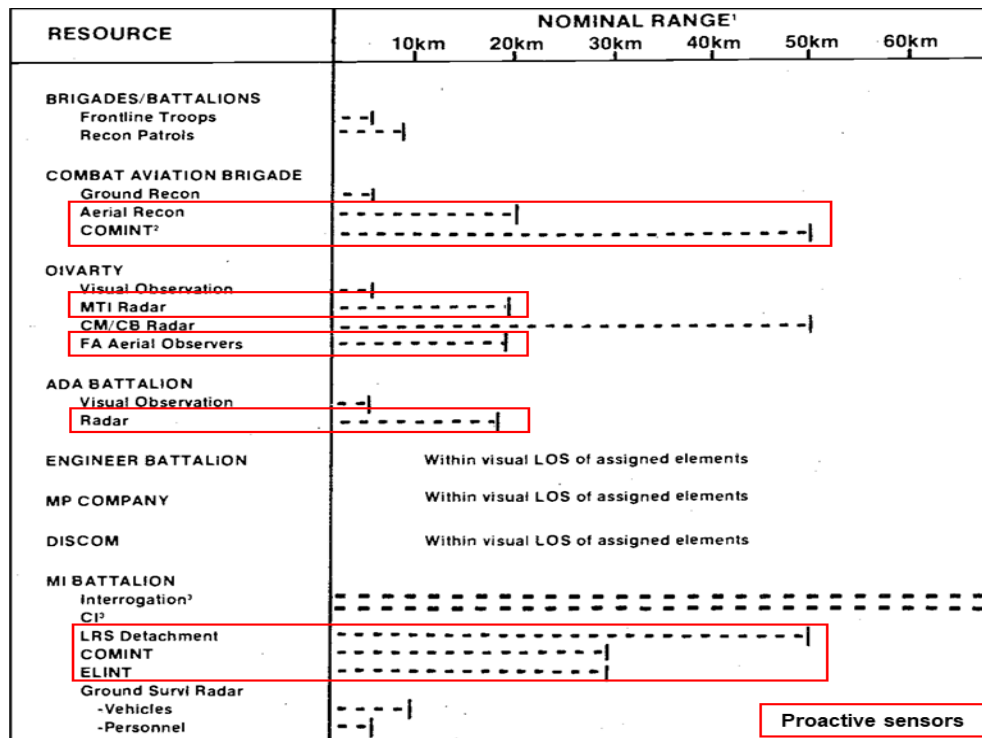


Figure 5. 1986-2003 Proactive Division Sensing Capabilities

Source: Headquarters, Department of the Army, Field Manual 34-10, *Division Intelligence and Electronic Warfare Operations* (Washington, DC: Government Printing Office, 1986) 2-1. Modified by author.

As illustrated by MAJ A. G. Smart in his 1993 School of Advanced Military Studies (SAMS) monograph, “Division MI Battalion Restructure,” the MI BN structure at the time of ODS provided a division with multiple capabilities, including technical and human, that could sense across the breadth of its AO. MAJ Smart’s monograph also discusses the development of direct support (DS) MI companies (MICO) from the MI BN down to a maneuver brigade. He concluded that a DS MICO would provide more assured and responsive support to a brigade, enabling it to access “all-source collection capabilities from the division through the national level,” but would be especially dependent on routine communications and data connectivity.³¹ Over the next decade, these companies became DS and ultimately organic to the brigades they supported as the brigades transformed into BCTs, and MI BNs were removed from divisions. As the Army moved toward modularity, it developed plans to devolve additional division sensing capabilities to the BCTs, consolidate them at echelons above division, or divest of them altogether.

Before going into more depth on the Army’s transition to modularity; however, it is important to note that the capabilities and structure of a MI BN changed as technology rapidly evolved. This change included the incorporation of new technologies—such as a UAS—as they became available at the division (see figure 6). This UAS capability, now assigned to a division’s combat aviation brigade (CAB) and upgraded to the Grey Eagle platform, is the only remaining assigned division sensor capable of proactively sensing

³¹ A. G. Smart, “Division MI Battalion Restructure: Can Change Coupled with Technology Help Clear the Fog from the Brigade Battle?” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1993), 41-42.

within the division's deep area without the division having to commit further aviation assets or a subordinate reconnaissance element. It is informative to look at how the Army fought and expected to fight after the Cold War to understand why the Army restructured around a brigade-centric force.

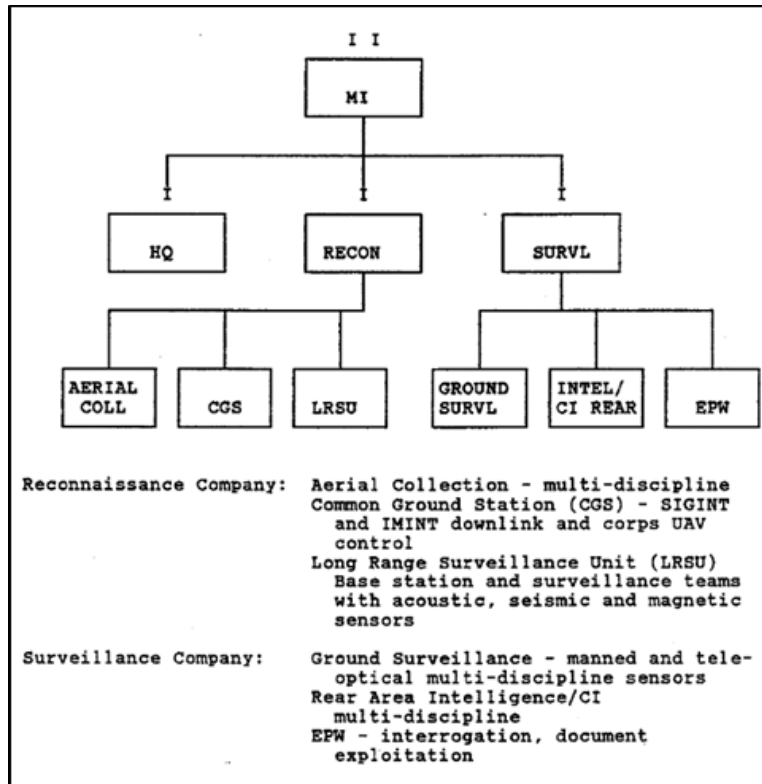


Figure 6. Plan for Future MI BN Structure as of 1993

Source: A. G. Smart, "Division MI Battalion Restructure: Can Change Coupled with Technology Help Clear the Fog from the Brigade Battle?" (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1993), 51.

In a new CAC publication called *Large-Scale Combat Operations: The Division Fight*, Dennis Burket reviews the evolution of the U.S. division as a combat formation.³² After briefly discussing the development of permanent divisions and their associated organizational and operational concepts, Dr. Burket turns to the Army's transition to, and back from, a brigade-centric force.³³ This transition period, especially the transition to a brigade-centric force, was instrumental in the development of the current division deep sensing gap. After the successful conclusion of ODS and throughout the 1990s to OIF in 2003, the Army found itself fighting a less intense form of warfare. With the collapse of the Army's only major peer conventional adversary in the 1990s (the Soviet Union) and facing what seemed to be the new character of war—small scale operations against a lightly armed enemy—the Army assumed risk in the early 2000s by stripping divisions of their capabilities.

While the Army had begun its restructuring with a near-peer adversary in mind, the post-invasion war in Iraq "...eclipsed all else, and recurrent rotations of units to it dominated all other concerns of the Army."³⁴ With the requirements of this new war—and reinforced by two resounding conventional force victories in just over a decade—the Army transitioned from a division-centric force to a force structured around modular BCTs. This transition resulted in some sensing capabilities devolving from the division to the brigade, including many of the technical sensing capabilities from the MI BNs, as

³² Burket, "The Evolution of the Division Formation," 7.

³³ Ibid., 7-12.

³⁴ John S. Brown, *Kevlar Legions: The Transformation of the U.S. Army, 1989-2005* (Washington, DC: Center of Military History, 2011), 282.

outlined above. Additional technical and human sensing capabilities were given to the BCTs through the development of BCT cavalry squadrons and artillery battalions.³⁵

In place of the now hollow MI BNs, the Army created battlefield surveillance brigades (BFSB) to consolidate the remaining technical and human sensing capabilities essential for a division and corps to operate effectively (see figure 7). FM 3-55, *Information Collection*, outlines the importance of these formations by describing these units as bridging the “gap between the tactical R&S executed at brigade level and the operational and strategic reconnaissance executed at levels above the division.”³⁶ Despite this essential role, these new formations did not exist long before reforming into Expeditionary-Military Intelligence Brigade (E-MIB), which focus largely on the processing, exploitation, and dissemination of intelligence instead of direct deep sensing support to a division or a corps. Also, with this last transition, remnants of a division human sensing capability disappeared, with the final LRSD deactivating in 2018.

³⁵ Nathan A. Jennings, “Reconsidering Division Cavalry Squadrons” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2017), 1.

³⁶ HQDA, FM 3-55, A-6.

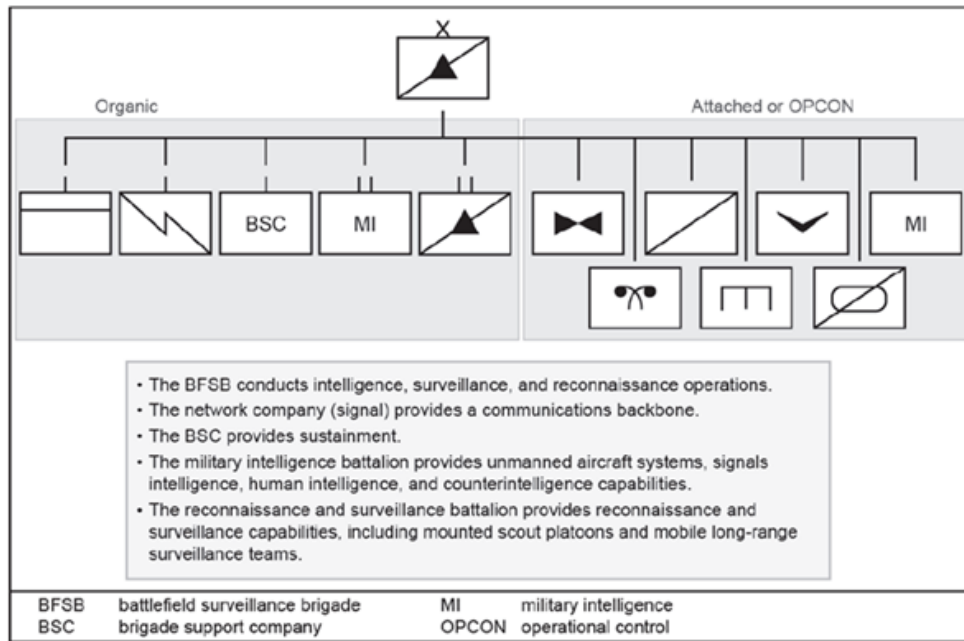


Figure 7. BFSB

Source: Headquarters, Department of the Army, Field Manual 3-94, *Theater Army, Corps, and Division Operations* (Washington, DC: Government Printing Office, 2014), 6-8.

With the transition to modularity, BCTs were the center of the fighting force, and divisions became a tailorable unit able to operate as both a headquarters and formation employing varied attached and supporting units (see figure 8).³⁷ Dr. Robert Mikaloff's *Division Intelligence: Looking Deep to Win Close* in the CAC's LSCO publication, discusses division intelligence fundamentals and the challenge division intelligence faces due to a lack of assigned sensing capabilities. A division no longer possesses the multiple technical and human sensing capabilities "directly responsive to division information

³⁷ HQDA, FM 3-0, 2-13.

requirements” as it had during ODS or OIF.³⁸ Instead, a division now has: a Grey Eagle UAS capability not optimized for the non-permissive OE anticipated in the next large-scale combat operation; BCTs enabled with multiple technical and human sensing capabilities that are effective within the close fight, and potential support from an E-MIB that does not have the technical and human sensing capabilities of its BFSB predecessor. While current doctrine states that divisions are once again the center of the fighting force, these formations are operating with a degraded capability to proactively sense within their deep areas due to a gap in their technical and human sensing capabilities.³⁹

³⁸ Robert S. Mikaloff, “Division Intelligence: Looking Deep to Win Close,” in *Large-Scale Combat Operations: The Division Fight* (Ft. Leavenworth, KS: U.S. Army Combined Arms Center and U.S. Army Command and General Staff College Press, 2019), 73-81, 79.

³⁹ Burket, “The Evolution of the Division Formation,” 12.

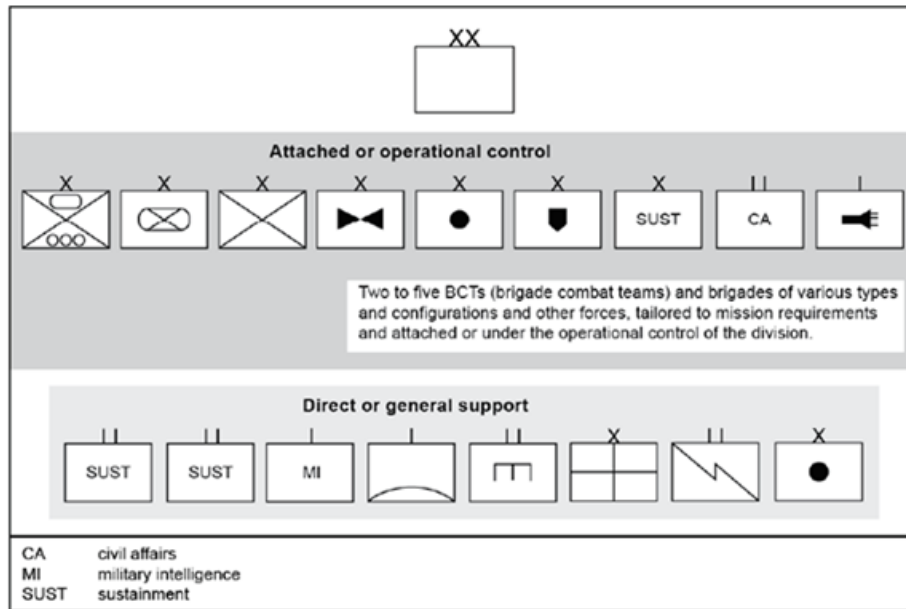


Figure 8. Division Task Organized for LSCO

Source: Headquarters, Department of the Army, Field Manual 3-0, *Operations* (Washington, DC: Government Printing Office, 2017) 2-14.

Within deep human sensing specifically, the Army has a doctrinal mitigation measure for the lack of assigned capability within a division. MAJ Nathan Jennings’ article, “Fighting Forward,” first outlines the historical significance of corps and division level cavalry formations and then provides a detailed account of the Army’s “stopgap measure” for the loss of some of these human sensing capabilities—the R&S BCT initiative.⁴⁰ The R&S BCT initiative, according to doctrine, consists of one ready BCT maintained by each corps for use in a division and above reconnaissance role.⁴¹ As assessed by MAJ Jennings, this initiative—tested by 1st Stryker BCT, 4th ID in 2017—

⁴⁰ Jennings, “Fighting Forward,” 104.

⁴¹ HQDA, FM 3-98, 1-7.

"leads to larger questions about the R&S BCT's realistic ability to enable timely and decisive decisions by senior tactical commanders in strongly contested environments." ⁴²

While MAJ Jennings goes on to outline other potential options, he assesses that current mitigation measures are not sufficient in compensating for a division's loss of their assigned cavalry squadron, and a significant capability gap remains. ⁴³

In answering the first subsidiary question, the current sensor gap in the division's deep area during LSCO consists of a lack of both technical and human sensing capabilities responsive to a division's deep sensing needs. ⁴⁴ With most division technical and human sensing capabilities currently committed at a different echelon or gone—replaced only potentially with unequal support from E-MIBs and R&S BCTs—the gap that BFSBs had once bridged is now a severe obstacle to a division's effectiveness. The result of this division deep sensing gap is that for a division to sense within its deep area proactively and to compete during LSCO effectively, it is "completely dependent on capabilities organic to subordinate brigades or joint, theater, or national assets." ⁴⁵ While numerous technical sensing capabilities exist at corps and above, "the priority of collection for those assets is set by another commander," and access is dependent upon availability and connectivity. ⁴⁶ Divisions are dependent upon the predominance of

⁴² Jennings, "Fighting Forward," 104.

⁴³ Ibid., 101.

⁴⁴ Mikaloff, "Division Intelligence," 79.

⁴⁵ Ibid.

⁴⁶ Ibid.

technical sensing held at echelons above the division as they prepare for the next large-scale combat operation against a threat capable of degrading access to those sensing capabilities.

Technical Sensing Predominance

Since the U.S. military's successful campaign against the Iraqi military during ODS, many have argued that the U.S. military has grown exponentially more dependent on its ability to sense through technical means. In retired LTG H. R. McMaster's Army War College paper, "Crack in the Foundation," completed as the initial phase of OIF was drawing to a close, he describes a military that believes in "technological dominance" and the "assumption of certainty in future war" that it brings with it.⁴⁷ This work by LTG McMaster is a crucial part of the overall literature as it sits at the crossroads of a military dominant in the last two LSCO and a military poised to reorganize itself away from the division-centric model drastically.

Throughout his paper, LTG McMaster routinely returns to the idea that policymakers and military leaders have embraced the idea of fighting on a battlefield where superior technical sensing has largely removed the fog of war. He thoroughly describes the Army's transition of effort from a division-centric Force XXI program to two brigade-centric initiatives: "the Interim BCT (IBCT) and the Objective Force."⁴⁸ While the Objective Force initiative was tied to the ill-fated future combat system program that was ultimately canceled, the IBCT program became the foundation for the

⁴⁷ McMaster, *Crack in the Foundation*, 19-20.

⁴⁸ Ibid., 37.

development of the modular BCT and wholesale restructuring of the U.S. Army. Between the additional technical sensing capabilities at the BCT level and the predominant technical sensing capabilities available at corps and above, the Army saw little use for divisions to retain significant organic sensing capabilities. This assessment, however, was based on the experience of dominating a non-near-peer threat in the desert of Iraq and driven by the need for additional rotational units in the Afghanistan and Iraq theaters of operations.⁴⁹

MAJ Jonathan Hartsock demonstrates this belief in technical sensing dominance in his SAMS monograph, “No Longer Necessary,” where he outlines the obsolescence of LRSUs. While he argues LRSUs are unnecessary on the modern battlefield for a variety of reasons including employment issues, cost, and risk to the individual LRSU teams; MAJ Hartsock ultimately concludes that it was the advancement of technology that had “eclipsed the need to employ LRSU to gather information.”⁵⁰ This literature is important in shaping the research of this study as it provides many of the negatives that go into the Army’s cost-benefit analysis of employing human sensing capabilities in a division deep area: the difficulty of employment, cost of resources in training and use, higher risk of casualties, and the belief that the costs of employing a human sensing capability can be avoided by employing technical sensors instead.

⁴⁹ Burket, “The Evolution of the Division Formation,” 11.

⁵⁰ Jonathan T. Hartsock, “No Longer Necessary: Long-range Surveillance Units in Unified Land Operations” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2016) 22.

Curtis D. Taylor, in his paper, *Trading the Saber for Stealth*, published by the Institute of Land Warfare, questions the hypothesis that modern technology eliminates the need for Army units to fight for information.⁵¹ This paper was written in 2005 as the Army continued its transition to a force centered on BCTs and began implementing the new BFSB structure. Taylor's main conclusion is that a heavily armored reconnaissance force is necessary to fight for information versus the collection of information by technical sensing capabilities, executed mainly through various means of observation.⁵² In his paper, Taylor also makes a couple of key observations that are of significance in informing this study.

The first of these observations include what is referred to as "iconology," or the tendency of intelligence officers to assume that the "threat is a cohesive collection of identifiable weapon platforms employed in a doctrinal manner."⁵³ Based on this false assumption, surveillance has grown in predominance due to a belief that on its own, it is capable of yielding significant information about the dispositions, composition, and course of action of the enemy.⁵⁴ Taylor goes on to discuss how this false sense of knowledge dominance is reinforced through computer simulations that do not adequately account for the restriction of terrain, the density of vegetation, or visibility for aerial

⁵¹ Curtis D. Taylor, *Trading the Saber for Stealth: Can Surveillance Technology Replace Traditional Aggressive Reconnaissance?*, The Land Warfare Papers 53 (Arlington, VA: The Institute of Land Warfare, Association of the U.S. Army, 2005) 1.

⁵² Ibid.

⁵³ Ibid., 17.

⁵⁴ Ibid.

observation in an urban area in potential future OEs.⁵⁵ This identified inability of technical sensing capabilities—when available to a division—to adequately provide all of the detailed information needed across the mission variables is a crucial observation for this study.

The second crucial observation made by Taylor and relevant to this study is that a future force will have to “meet the enemy on the ground and fight for information,” but that the “Modular Force is dangerously unprepared.”⁵⁶ As described throughout this study, divisions are mostly unprepared to collect information within their deep areas through assigned capabilities during a large-scale combat operation. Both of these observations are reminiscent of LTG McMaster’s warning against the development of an Army based on a belief of “knowledge dominance.” Despite these warnings, the Army continues to search for a technical solution to resolving the division deep sensing problem.

With the CAC’s identification of division deep sensing as a significant capability gap in the Army’s ability to compete within LSCO, the MI Corps developed solutions to address the problem. In 2018, it established the intelligence, surveillance, and reconnaissance task force (ISR-TF) to enhance Army ISR capabilities for MDO, “capitalize on complimentary [*sic*] capabilities across the joint force and intelligence community,” and work with the Army’s cross-function teams focusing on the Army’s

⁵⁵ Taylor, *Trading the Saber for Stealth*, 17.

⁵⁶ *Ibid.*, 7.

modernization priorities.⁵⁷ Three specific technical modernization efforts the ISR-TF has focused on in addressing this gap include the Tactical Intelligence Targeting Access Node (TITAN), the Multi-Domain Sensing System, and the Terrestrial Layer System (TLS).⁵⁸

All of these new technical capabilities seek to enhance knowledge dominance across echelons to enable commander visualization and precision targeting. While some of these new capabilities may aid in the narrowing of the current deep sensing gap at the division, as Mr. Taylor outlines in his paper, a division cannot depend on surveillance collection capabilities alone to gain dominance in the next large-scale combat operation. The following section reviews the available literature on the employment of human sensing capabilities.

Employment of Human Sensing Capabilities

The move to a modular force and the divestiture of division deep sensing capabilities was especially unpopular within the cavalry and LRSU communities. There have been numerous pieces of literature published within the last two decades arguing for the return of various division human sensing capabilities in one form or another. It is important to review this literature, as it provides crucial insight into what different

⁵⁷ Pomerleau, “The Army Targets Systems to ‘See’ 1,000 Miles.”

⁵⁸ Ibid. The TITAN program will specifically consolidate technical sensing capabilities across services, at the national level, and available commercially to enable deep targeting and will be fielded at all echelons. The TLS is ground-based technical sensing platform that will be fielded to BCTs and E-MIBs. Finally, the MDSS is meant to consolidate the aerial layer of ISR to sense enemy ground movements and will be fielded at division and above.

authors see as unique benefits to a division from different human sensing capabilities. This section is subdivided into two parts, the first reviews two works that provide a detailed account of a division's employment of both mounted and dismounted human deep sensing capabilities, while the second part discusses a division's leveraging of the human sensing capabilities of SOF and inter-agency elements within their deep area.

Division Human Sensing

The debate over the role and composition of division human sensing capabilities within the U.S. Army has been ongoing since before permanent combat divisions were formed during World War I.⁵⁹ Within the last two decades; however, this debate has transitioned from one of division human sensing's role and composition to one of necessity as capabilities were dispersed or divested of entirely. Having reviewed the reasons for the loss of these capabilities in the previous sections, two pieces of literature are crucial to understanding the argument for their necessity: MAJ Daniel Ludwig's 2017 SAMS monograph "Fighting Blind: Why U.S. Army Divisions Need a Dedicated Reconnaissance and Security Force" and James Gebhardt's 2005 CSI report *Eyes Behind the Lines: U.S. Army Long-Range Reconnaissance and Surveillance Units*.

MAJ Ludwig's work focuses on the necessity of a dedicated division reconnaissance capability that can actively operate within a division's deep area to shape the close fight for its BCTs. To justify this necessity, MAJ Ludwig reviews the historical development of division reconnaissance formations and discusses the current character of war using the recent conflict in eastern Ukraine. He specifically argues that human

⁵⁹ Burket, "The Evolution of the Division Formation," 7.

sensing capabilities in the form of a division reconnaissance element are essential to effectively sense the OE for the division, including the current attitudes of the local populace,⁶⁰ and enable operations within a degraded OE.⁶¹ He also assesses that current “work arounds” like the R&S BCT initiative and tasking a subordinate BCT are inadequate mitigation measures to compensate for the loss of a dedicated division deep human sensing capability.⁶²

Ultimately, MAJ Ludwig concludes that “history, trends in warfare, and U.S. Army doctrine all show the need for a dedicated division R&S force.”⁶³ As a recommendation, he suggests the reestablishment of highly maneuverable armored division cavalry squadrons that “integrate air and technical reconnaissance capabilities.”⁶⁴ This study will show that the combined approach between technical and human sensing capabilities—when balanced and complementary—recommended by MAJ Ludwig is one of the important ways in which a human capability can contribute to closing the division’s deep sensing gap.

The divesting of Army LRSUs has been a hotly debated decision, and there are many thoroughly researched pieces of literature advocating for their return. However,

⁶⁰ Daniel R. Ludwig, “Fighting Blind: Why U.S. Army Divisions Need a Dedicated Reconnaissance and Security Force” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2017) 12.

⁶¹ Ibid., 19.

⁶² Ibid., 35.

⁶³ Ibid., 33.

⁶⁴ Ibid., 34.

what is of importance for this study is understanding the deep sensing capability that these formations provided to a division. The 1995 doctrine for the employment of LRSUs, FM 7-93, *LRSU Operations*, clearly stated that LRSUs existed to “augment and complement other collection systems that are more vulnerable to limitations such as weather, range, terrain masking, and enemy countermeasures.”⁶⁵ Mr. Gebhardt’s work nests closely with this definition as he discusses the history of LRSUs and their limited role during ODS and OIF.

The lack of employment of LRSU elements during ODS and OIF—their use during OIF will be discussed in detail in Chapter 4—catalyzed Mr. Gebhardt’s research. While he makes many important conclusions about the employment of LRSUs, the most relevant to this study include his discussion of their role with technical means and their employment in different OEs. First, Mr. Gebhardt emphasizes that LRSUs used to “compensate for gaps not covered by technical means, to confirm information derived from technical means..., or to deliver and service the technical means” are not in competition with technical sensing but instead are in a cooperative relationship.⁶⁶ This idea of an all of the above sensor approach to deep sensing is a crucial insight into the utility of human sensing in contributing to the closure of the division deep sensing gap. A final conclusion from Mr. Gebhardt’s work is that different sensing capabilities are more effective in different OEs. Specifically, while LRSUs may not be optimal for

⁶⁵ HQDA, FM 7-93, 1-1.

⁶⁶ James F. Gebhardt, *Eyes Behind the Lines: U.S. Army Long-Range Reconnaissance and Surveillance Units*, Global War on Terrorism Occasional Paper 10 (Fort Leavenworth, KS: Combat Studies Institute Press, 2005), 163.

employment in the open desert of Iraq, they have proven effective while operating in the “highly urbanized broken terrain of central and southeast Europe, in the variegated terrain of southeast Asia, or in the forested and desert terrain of the continental western United States.”⁶⁷ This concept of OE driven employability becomes more evident in Chapter 4 when LRSU operations are assessed in the context of the jungles of Cambodia versus the deserts of Iraq.

Leveraging SOF and Inter-Agency Elements

Nearly all of the literature available about the leveraging of SOF elements within a division deep area approaches the topic from the perspective of LRSUs. With LRSUs as most authors reference points, they set it as their task to show that “SOF is Not the Answer” as MAJ Michael Larsen states in his 2006 SAMS Monograph, “Organizational Structure of Deep Ground Reconnaissance for Future Divisions and Corps.”⁶⁸ MAJ Larsen makes a doctrinal and quality argument against SOF elements being the deep ground reconnaissance element for a corps or division. First, he outlines that in the 2004 version of FM 3-05.20, *Special Forces Operations*, the doctrine states that Special Forces elements will not regularly conduct reconnaissance within a corps battle area but instead defer to LRSUs.⁶⁹ Second, he makes the case that since reconnaissance is only one of

⁶⁷ Gebhardt, *Eyes Behind the Lines*, 163.

⁶⁸ Michael M. Larsen, “Organizational Structure of Deep Ground Reconnaissance for Future Divisions and Corps” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2006), 29.

⁶⁹ *Ibid.*, 30.

many SOF core tasks, whereas it is central to LRSUs, that LRSUs would have a performance advantage.⁷⁰

While MAJ Larsen may or may not make a convincing argument for why SOF should not be seen as a replacement for LRSUs, a division also should not take a this-or-that approach to deep sensing. Instead, a division should be able to employ its own deep human sensing capabilities while also leveraging other human sensing capabilities operating within its AO. Current SOF doctrine outlined in ADP 3-05, *Army Special Operations*, states that special reconnaissance “provide[s] an additive capability for commanders and supplement other conventional reconnaissance and surveillance actions.”⁷¹ The unique human sensing capabilities that a SOF element can provide to a division if they are operating in their deep area must be leveraged whenever available. Nevertheless, as MAJ Larsen outlines, these unique human sensing capabilities should not be seen as an effective mitigation measure for the lack of a division’s own human sensing capability. In addition to SOF elements that may be operating within a division deep area, there may also be inter-agency elements collecting information as well.

There is little literature available that is directly applicable to an Army division’s interaction with an inter-agency element during a large-scale combat operation. One notable exception, however, is MAJ David Oakley’s 2013 SAMS monograph, “Partners or Competitors? The Evolution of the DOD/CIA Relationship Since Desert Storm and Its

⁷⁰ Larsen, “Organizational Structure of Deep Ground Reconnaissance for Future Divisions and Corps” 30.

⁷¹ Headquarters, Department of the Army (HQDA), Army Doctrine Publication (ADP) 3-05, *Army Special Operations* (Washington, DC: Government Printing Office, 2019), 2-10.

Prospects for the Future.” In this monograph, MAJ Oakley largely outlines how the Department of Defense (DOD)/Central Intelligence Agency (CIA) relationship developed since ODS, while also discussing how agency elements worked directly with 3rd ID during OIF “feeding real-time information to the ‘warfighter.’”⁷² He concludes that the relationship between the DOD and the CIA is the strongest that it has ever been. This conclusion strongly indicates the potential for further engagement with inter-agency elements during the next large-scale combat operation. As this section has outlined, regardless of a division’s own ability to conduct deep human sensing operations, there will most likely be other deep human sensing elements within its AO that it must consider.

Chapter Conclusion

There is significant research available on the importance of specific human deep sensing capabilities, including division cavalry formations and LRSUs. Much of this research focuses on the ongoing debate about the optimal structure and role of these individual capabilities. None of the literature, however, seeks to incorporate the specific contributions of individual human sensing capabilities into a holistic concept of human sensing that can facilitate a division’s ability to sense deep. This study seeks to fill that gap in the literature through a holistic review of human sensing capabilities that could be employed or leveraged by a division to contribute to closing its deep sensing gap.

⁷² David P. Oakley, “Partners or Competitors?: The Evolution of the DOD/CIA Relationship Since Desert Storm and Its Prospects for the Future” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2013), 29.

CHAPTER 3

RESEARCH METHODOLOGY

Purpose of the Research

The research methodology, as outlined in this chapter, describes the framework applied in the course of collecting and assessing data for this study as well as the analysis and interpretation of results. This chapter also details how the chosen methodology addresses the research problem, while also outlining what steps the researcher will take to obtain the necessary information to address the primary and subsidiary questions. The first and second chapters of this thesis focused on summarizing the current problem and establishing context. This chapter focuses on the methodological approach to conducting research for this study to answer the primary research question: How can a human capability contribute to the closing of the division deep sensing gap during LSCO?

Methodology

It is helpful to focus on historical examples to understand how human sensing capabilities have or can contribute to division deep sensing. This study will use a qualitative methodology based on an aggregated case study approach consisting of two case studies. The first case study uses specific criteria and metrics to analyze the 1st Cavalry (Airmobile) Division's (1st CD) actions during TF Shoemaker's execution of Toan Thang (Total Victory) 43—from May 1-5, 1970—into the AO known as the Fishhook inside of Cambodia during the Vietnam War. This case study will focus on the employment of human sensing capabilities in support of TF Shoemaker's operations in Cambodia. It will seek to answer the second subsidiary question: How has human sensing

capabilities enabled division deep sensing in the past? Also, it will provide contextual evidence that in aggregate with the second case study, will answer the third subsidiary question and the primary research question.

The methodological approach to the second case study will use specific criteria and metrics to analyze the contribution of human sensing in the 3rd ID's attack toward Baghdad at the start of OIF. The case study will specifically review 3rd ID's operations conducted at the V Corps objectives of CHATHAM, RAMS, PEACH, and MONTGOMERY through a human sensing lens. The criteria and metrics are covered below. This analysis will answer the third subsidiary question: What advantages can human sensing capabilities in the division deep area provide during LSCO? By doing so, and in aggregation with the first case study, it will also provide evidence for answering the primary research question.

Organization of the Research Process

To start the research process, it was first important to identify the relevant information about human sensing, division deep operations, and technical sensing that required reading and understanding. The material spanned multiple sources—primary and secondary—to include previously conducted oral interviews, official reports, doctrine, student papers, scholarly journal articles, and books, the diversity of which gives credence to the credibility of the overall research for this study. With the various sources gathered, the next steps included delineation between supporting material for primary and secondary questions and the analysis of the data to provide informed conclusions.

Case Selection and Screening Criteria

There were three screening criteria for selecting the first historical case. The first criterion required that the case involved the actions of human sensing capabilities in support of a division operation during a large-scale combat operation. The second criterion involved the availability of the necessary data to outline the human sensing conducted during the division operation. The final criterion for case selection required that the necessary data was available to assess how human sensing in the division deep area aided a division in visualizing and conducting shaping operations within that area. Meeting the first two criteria was essential to answering the second subsidiary question, while the third criterion provided contextual support from a historical example to aid in answering the third subsidiary and primary research questions.

The employment of the same screening criteria was used in the selection of the second historical case, with the following additional emphasis and an additional screening criterion. While the first two criteria continued to be the foundation in case selection, the third criterion gained further emphasis as this case was focused on specifically answering the third subsidiary question. In addition to these three criteria, an additional criterion was necessary. This fourth criterion, unique to the second historical case, was that the data available for the case must include references to technical sensing capabilities that were employed to support a division's deep sensing ability. With this fourth criterion added, an assessment could be made within the context of the total deep sensing capabilities available to the division on how human sensing capability contributed to 3rd ID's ability to sense deep.

Hypothesis

The research hypothesizes that a human sensing capability can contribute to closing the division deep sensing gap in its deep area during LSCO. This study will attempt to disprove the null hypothesis that a human sensing capability cannot contribute to closing a division's deep sensing gap in its deep area during LSCO.

Data Collection

This section discusses the resources employed in gathering data for the two case studies, along with a brief review of the major sources used by each case study. No original human interviews were conducted or are included in this study and its associated research. The most significant resource used to gather data included the online and physical archives of the Ike Skelton Combined Arms Research Library (CARL) located at Fort Leavenworth. Many primary and secondary sources were collected through this medium for the research of information detailed in the first two chapters of this study and for both case studies. Another source of primary documents, specifically for the Vietnam case study, came from The Vietnam Center & Sam Johnson Vietnam Archive at Texas Tech University through their Virtual Vietnam Archive. A final significant research resource for this study was U.S. Army doctrine, which was instrumental in providing context developed in the first chapter of this study and in answering the first subsidiary question in Chapter 2.

A review of the most significant literature resources on this topic was conducted in Chapter 2; however, a brief discussion of the resources used for the case studies is also necessary. The most significant research resources for the first case study—TF Shoemaker's participation in Toan Thang 43—came from a mix of the CARL and the

Virtual Vietnam Archive. The Virtual Vietnam Archive contained multiple primary source documents including the *Senior Officer Debriefing Report* for MG Elvy B. Roberts—commander of 1st CD through May 5, 1970—and a presentation for senior leaders called *A Glimpse of Cav Country: Senior Officers' Slide Briefing* from August of 1970 detailing 1st CD's involvement in the Cambodia incursions.

The first piece of literature obtained through the CARL was the Army Indochina Monograph: *The Cambodia Incursion* by Brigadier General (BG) Tran Dinh Tho. This monograph provides an official account of the U.S. Army and Army of the Republic of Vietnam (ARVN) operations in Cambodia during 1970. Its comprehensive account enables a specific focus on TF Shoemaker's planning and execution of Toan Thang 43, also known as Operation Rockcrusher, to the U.S. military. Additional secondary sources collected through the CARL that provided significant support in developing the Vietnam case study included *Into Cambodia* by William Nolan, *The Cambodia Campaign* by John Shaw, *Rangers at War* by Shelby L. Stanton, and *Inside the LRRPS* (Long-Range Reconnaissance Patrols) by Michael Lanning. These sources provide detailed accounts of TF Shoemaker's and 1st CD's Cambodia operations beyond the official account and from multiple human sensing perspectives.

The data collected for the second case study—3rd ID's attack toward Baghdad at the start of OIF—was collected at the CARL. The first piece of literature was *Takedown* by Jim Lacey. This source provides a detailed day-by-day account of 3rd ID's operations from their crossing of the Kuwait and Iraq border to their arrival in Baghdad. Additional secondary sources that provided further context for the case study include Gregory Fontenot's *On Point* (a seminal study of the initial phase of OIF) and *Scouts Out!* by John

McGrath, a detailed account of U.S. reconnaissance elements throughout history. In addition to these secondary sources, the CARL archives store numerous primary source oral interviews conducted by the Operation Iraqi Freedom – Study Group (OIF-SG) shortly after 3rd ID completed their invasion of Iraq. These accounts from individuals of various ranks and in diverse duty positions throughout the division provide a comprehensive understanding of how 3rd ID conducted deep sensing throughout its drive toward Baghdad.

Data Analysis Method

The analysis conducted within this study will use a sequential “step” approach as its methodology. The first step includes the literature review conducted in Chapter 2, which provides a comprehensive assessment of literature regarding the division deep sensing gap, the growing predominance of technical sensing capabilities, and the employment of human sensing capabilities. The second step consists of the development of a hypothesis and evaluation criteria to evaluate the primary and subsidiary research questions. Steps three and four include analyzing the primary and subsidiary questions using the evaluation criteria against the data. The fifth and final step, in Chapter 5 of this study, includes the presentation of conclusions and recommendations.

The analysis performed on the data gathered for these case studies is qualitative. The first case study involves an account of how human sensing has contributed to deep sensing historically, while the second case study requires a more detailed qualitative assessment of the success or failure of human sensing in support of a division’s operation. Before moving on, it is important to acknowledge that while a quantitative method involving the identification of the number of human sensing reports against the

amount of division priority intelligence requirements answered would be of significant use, this detailed data is mostly unavailable or unable to be compiled in the time span of this study.

Evaluation Criteria and Metrics

To effectively analyze the primary and subsidiary research questions, evaluation criteria and metrics must be established to assess the data collected from both case studies. The criteria and metrics used to guide the collection, analysis, and interpretation of data for the historical case studies are summarized below (see table 1).

Table 1. Historical Case Studies Evaluation Criteria and Metrics

Case Study Criteria and Metrics		<i>Metrics</i>		
		Low	Medium	High
<i>Criteria</i>	Enemy Dispositions			
	Enemy Composition			
	Enemy Course of Action			
	Terrain & Weather			
	Civil Considerations			
	Availability			
Criteria based on a human sensor's ability to provide information; but for availability it is based on an asset's ability to be employed upon request or tasking.				

Source: Created by the author.

The analysis of data within each case study is based on six criteria evaluated through the metrics of low, medium, and high. Five of the criteria are from the mission variables of enemy, terrain and weather, and civil considerations. They were chosen as they most closely align with information requirement categories that a division would

commit forces to collect on within its deep area.⁷³ The final criterion of availability was added to address the finite nature of sensing assets during a large-scale combat operation. For the first five criteria, the metrics of low, medium, and high are based on a human sensor's ability to provide information, applicable to these criteria, back to the division for further use. For the final criterion of availability, the metrics of low, medium, and high are based on an asset's ability to be employed by a division upon request or tasking.

With the link between metric and criterion established, it is also essential to further delineate the information that each criterion encompasses. The first criterion, enemy dispositions, includes information about the enemy's "organization, strength, location, and tactical mobility."⁷⁴ The second criterion, enemy composition, includes information on enemy equipment, capabilities, and vulnerabilities. The third criterion, enemy course of action, includes information that provides a window into the enemy's intent for current and future operations. The fourth criterion, terrain and weather, includes information about both natural and manmade features along with the effects that the military aspects of weather have within the OE.⁷⁵ The fifth criterion, civil considerations, includes information about "areas, structures, capabilities, organizations, people, and events" (ASCOPE) within an AO.⁷⁶ The final criterion, availability, includes information

⁷³ These categories include enemy activities and resources, geographical, hydrological, and meteorological characteristics, and civilian considerations. HQDA, ATP 3-94.2, 1-7.

⁷⁴ HQDA, ADP 6-0, 3-6.

⁷⁵ "The military aspects of weather include visibility, wind, precipitation, cloud cover, temperature, and humidity." Ibid.

⁷⁶ Ibid.

about the division's ability to employ the sensing capability when requested or tasked. By applying these evaluation criteria and metrics to the data collected for each historical case study, this study can answer the primary and remaining subsidiary research questions.

Validity and Limitations

The issue of generalizability is more pronounced in the use of case studies—with their focus on single cases—as opposed to other types of qualitative research. Although a comprehensive and detailed analysis of these two cases is desirable, both time and the availability of resources are limitations. The findings and conclusions from a qualitative analysis based on a case study methodology can also be influenced by the perspectives, background, and biases of the researcher. The validity of the data gathered is increased in this research as it is from multiple resources, including primary source documents. However, the data available for collection is limited to data that was preserved, the accessibility of this data, and the time available to conduct detailed research.

Chapter Conclusion

This chapter demonstrates the sequential methodological approach used throughout this study and details the qualitative assessments to be used in the two historical case studies. This methodology sets conditions to apply the evaluation criteria against the data collected to reach conclusions and recommendations for both the primary and subsidiary research questions. It is to the historical case studies that this study now turns, starting with the execution of human sensing in support of deep sensing during the Cambodia incursion in the Vietnam War.

CHAPTER 4

ANALYSIS

Pursued in this manner, in width, in depth, and in context, the study of military history should...directly improve the officer's competence in his profession.

—Sir Michael Howard, “The Use and Abuse of Military History”

Introduction

A successful study of military history, as detailed by Sir Michael Howard in the quote preceding this introduction, must be a study in width, depth, and context.⁷⁷ The two case studies in this chapter, TF Shoemaker's planning and execution of Toan Thang 43 in Vietnam and 3rd ID's attack toward Baghdad in OIF, are a study in width, in that they cover a time span of more than 30 years and are diverse in the OE and enemy the Army had to confront. The case studies are also a study in depth, as each one is a detailed discussion of the events of each operation through the lens of the human sensing capabilities within their AOs.

These case studies provide the necessary data for analysis against the outlined criteria and metrics. This chapter uses this analysis to answer the second and third subsidiary research questions in their respective case studies. With the subsidiary questions answered, Chapter 5 will outline the overall conclusions of the study answering the primary research question: How can a human sensing capability contribute to closing the division deep sensing gap during a large-scale combat operation? Before diving into

⁷⁷ Sir Michael Howard, “The Use and Abuse of Military History,” *Parameters* (March 1981): 14, reprint from *Journal of the Royal United Service Institution* (February 1962): 4-8.

the details of the first case study, it is important to establish the context for 1st CD's role in the 1970 Cambodia Incursion during the Vietnam War.

Case Study #1: TF Shoemaker and Toan Thang 43

This case study, using the criteria and metrics established in Chapter 3, seeks to answer the second subsidiary question: How has human sensing enabled division deep sensing in the past?

Context

By 1970, the U.S. Army in Vietnam had transitioned from a search and destroy strategy to one of civil pacification and interdicting enemy logistics.⁷⁸ The metrics they used to assess success, however, still largely relied on crude measures like enemy body counts and pieces of equipment captured or destroyed. As the U.S. planned for withdrawal, it sought opportunities to provide breathing room for the South Vietnamese government and prove the success of its Vietnamization policy by interdicting threats emanating from across its borders with Cambodia and Laos. This policy's ultimate aim was to bring the South Vietnamese government and military forces up to an appreciable level of performance that would allow for a U.S. withdrawal.

Beginning in 1967, the U.S. military and covert inter-agency elements—specifically the Studies and Observation Group (SOG)—paid closer attention to North Vietnamese logistics support coming from basing areas in eastern Cambodia.⁷⁹ U.S.

⁷⁸ John M. Shaw, *The Cambodia Campaign: The 1970 Offense and America's Vietnam War* (Lawrence, KS: University Press of Kansas, 2005), 17-18.

⁷⁹ *Ibid.*, 37.

policy, however, precluded any direct overt action on the part of Military Assistance Command, Vietnam (MACV) inside of Cambodia, although SOG elements routinely conducted reconnaissance missions that leveraged both human and technical sensing capabilities.⁸⁰ In addition, the 525th MI Group conducted source operations within Cambodia, and the Air Force conducted reconnaissance overflights.⁸¹ Most important for this study, MACV found that compiling “sensor and SOG/Special Forces reports over several days could indicate patterns of communist activity and the size of units.”⁸² These reports were subsequently used to facilitate a covert bombing campaign in eastern Cambodia—Operation MENU. This is an indicator that, at the operational level of war in Vietnam, the combination of human and technical sensing capabilities was effective in facilitating targeting. These same reports, though with significant restrictions due to classification, were also used by MACV to provide 1st CD and other divisions with a broad intelligence estimate before the start of their operations in Cambodia.

In March of 1970, the strategic picture within the region rapidly changed with the deposition of Prince Sihanouk—the leader of Cambodia at the time—on March 18 by his prime minister, Lon Nol.⁸³ This strategic shift rapidly took on operational significance as Lon Nol formally requested all North Vietnamese military forces to exit Cambodia within

⁸⁰ Shaw, *The Cambodia Campaign*, 37.

⁸¹ *Ibid.*, 38.

⁸² *Ibid.*

⁸³ *Ibid.*, 24-25.

72 hours.⁸⁴ Facing a crucial threat to their ability to project combat power into Southern Vietnam, the North Vietnamese rapidly seized a significant portion of the Cambodian border with South Vietnam and Northeast border areas near Laos.⁸⁵ As North Vietnam sought to take advantage of the chaos over the following weeks to solidify its control and influence throughout Cambodia, the U.S. continued targeted strikes through Operation MENU and South Vietnamese forces began conducting cross-border raids.

Some of these bombings and raids came close to “annihilating or capturing the core of the Southern resistance.”⁸⁶ However, by the end of March, many of the elements of the Central Office for South Vietnam (COSVN)—the military headquarters of the southern resistance—had withdrawn deeper into North Vietnamese-held Cambodia.⁸⁷ It would take another month before U.S. conventional ground forces were authorized to begin operations into eastern Cambodia. By the end of April, it was determined that “diplomacy and MENU’s bombs had not stopped Hanoi’s use of the Cambodian border zone, so America would remove by ground action the threat posed by the base areas.”⁸⁸

TF Shoemaker’s Planning of Toan Thang 43

With the policy and strategic decisions approved to go forward with ground operations, operational- and tactical-level planning quickly commenced, resulting in

⁸⁴ Shaw, *The Cambodia Campaign*, 25.

⁸⁵ Ibid.

⁸⁶ Ibid. 26

⁸⁷ Ibid.,

⁸⁸ Ibid., 40.

operations throughout most of the Cambodian border with South Vietnam (see figure 9). Within the ARVN II Corps and U.S. Field Force II AO, major operations under the name Toan Thang were planned and conducted in the places known as the Parrot's Beak, Angel Wing, and the Fishhook. The first two areas were within the U.S. 25th Infantry Division's AO, while the Fishhook was within 1st CD's AO. 1st CD was alerted on April 26, to plan for operations into the Fishhook within the next 72 hours to "destroy COSVN headquarters."⁸⁹ While this was the declared objective at the strategic level as outlined by President Nixon in his speech announcing the incursion, at the tactical level, 1st CD understood that their objective was to "neutralize the COSVN supply bases."⁹⁰

⁸⁹ Tran Dinh Tho, *The Cambodian Incursion*, Indochina Monographs (Washington, DC: U.S. Army Center of Military History, 1979), 70.

⁹⁰ 1st Cavalry Division Information Office, "A Glimpse of Cav Country: Senior Officers' Slide Briefing," The Vietnam Center & Sam Johnson Vietnam Archive, Texas Tech University, accessed February 18, 2020, <https://www.vietnam.ttu.edu/reports/images.php?img=/images/2770/27700323001.pdf>, slide.2.

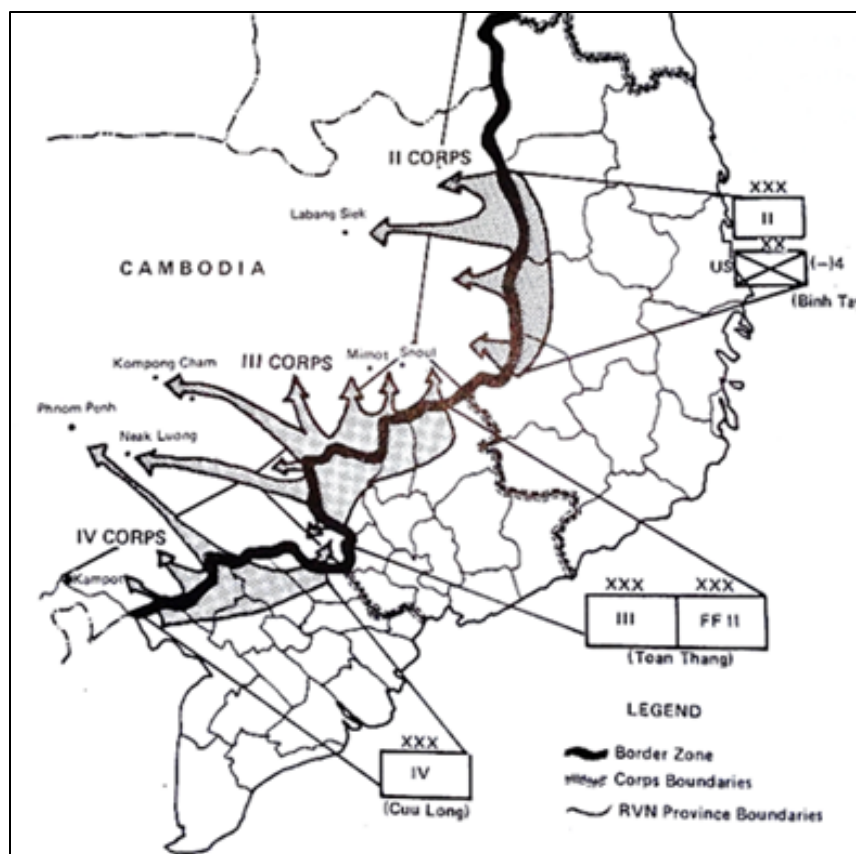


Figure 9. Major Areas of Operation for the Cambodian Incursion

Source: Tran Dinh Tho, *The Cambodian Incursion*, Indochina Monographs (Washington, DC: U.S. Army Center of Military History, 1979), 52.

Shortly after receiving this new mission, TF Shoemaker—named after the 1st CD’s deputy commander BG Robert Shoemaker who led the TF—was established. This TF was composed of maneuver forces that “included the 3[r]d Brigade, 1st Cavalry Division, and the 11th Armored Cavalry Regiment (11th ACR).⁹¹ and from the 25th

⁹¹ Although the 11th ACR was employed as both a human sensor and maneuver element by U.S. Field Force II, while it operated as part of TF Shoemaker in Cambodia, the 11th ACR was employed as a maneuver element in support of clearance operations and in the seizure of Snoul.

Infantry Division the 2[n]d Battalion, 47th Infantry (Mechanized), and the 2[n]d Battalion, 34th Armor.”⁹² In support of this TF, was 1st CD’s reconnaissance squadron 1-9 CAV along with additional ARVN forces, including the 1st Armored Cavalry Regiment and 3rd Airborne Brigade.⁹³ As detailed planning began in earnest, much of the intelligence gained by MACV employing various covert reconnaissance and intelligence operations remained classified and unavailable to TF Shoemaker for planning or coordination.⁹⁴ The division’s inability to effectively leverage information gathered by human sensors that had operated within its deep area forced the division to plan for the enemy’s most dangerous course of action.

Instead of attacking in a pursuit to rapidly overrun withdrawing elements degraded by the MENU bombing, TF Shoemaker’s concept of the operation was a limited raid that would focus on “using any clue that came up, to root around and destroy and make unusable that base area.”⁹⁵ Without detailed information on the enemy’s current dispositions, composition, or course of action, BG Shoemaker instead focused on finding the enemy “simply by bumping into him” (see figure 10).⁹⁶ In essence, TF Shoemaker would be conducting a movement to contact in terrain they had not

⁹² Edward J. Cheney, “The 11th Armored Cavalry Regiment in Vietnam, January 1969 Through June 1970” (Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2002), 78.

⁹³ Ibid.

⁹⁴ Shaw, *The Cambodia Campaign*, 67.

⁹⁵ Ibid.

⁹⁶ Ibid.

previously operated in and against a relatively unknown enemy. The division's assigned human sensing capabilities would prove crucial in this effort.

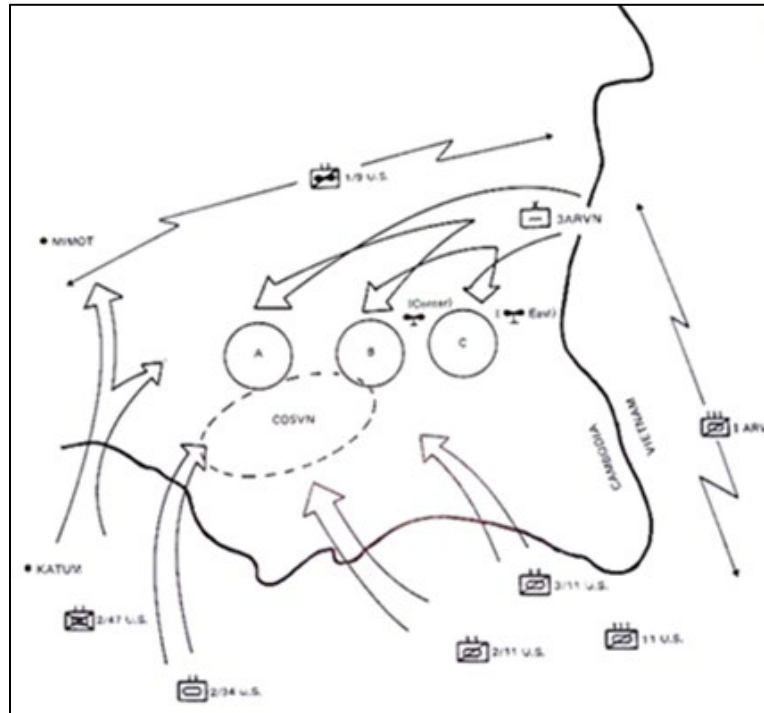


Figure 10. AO for Toan Thang 43

Source: Tran Dinh Tho, *The Cambodian Incursion*, Indochina Monographs (Washington, DC: U.S. Army Center of Military History, 1979), 72.

In support of the division, 1-9 CAV would conduct “reconnaissance patrols over the northern part of the area of operation to detect and further block enemy escapes.”⁹⁷ This task primarily consisted of an initial zone and area reconnaissance, specifically of each of the three landing zones, before executing a reconnaissance in force within the division deep area. 1-9 CAV was formed early in the Vietnam War as an experimental air

⁹⁷ Shaw, *The Cambodia Campaign*, 74.

reconnaissance squadron. It consisted of aerial weapons, scouts, and rifle platoons that worked in close coordination with fire support elements to both sense and conduct shaping operations within the division's deep area.⁹⁸ Like traditional cavalry squadrons, however, 1-9 CAV purposefully avoided becoming decisively engaged to maximize their sensing capabilities for the division and turned over more significant engagements or crucial discoveries to other elements within 1st CD.

In addition to 1-9 CAV, 1st CD also employed another human sensing capability—the rangers of H Company. Prior to February 1969, H Company was an elite conventional unit that conducted LRRPs and was designated as E Company, 52nd Infantry. In 1970, H Company's mission was similar, including “reconnaissance and direct-action activities” in the form of long-range patrols (LRP).⁹⁹ This elite human sensing capability consisted of up to 14 six-man teams that executed operations developed by the division's intelligence and operations sections.¹⁰⁰ With a lack of detailed ground intelligence from higher, the human sensing capabilities of 1-9 CAV and H Company's LRP teams were to prove crucial in enabling the TF commander's visualization and situational understanding of the battlefield.

⁹⁸ John J. McGrath, *Scouts Out!* (Fort Leavenworth, KS: Combat Studies Institute Press, 2008), 159.

⁹⁹ Gebhardt, *Eyes Behind the Lines*, 55.

¹⁰⁰ Michael Lee Lanning, *Inside the LRRPs: Rangers in Vietnam* (New York, NY: Ballantine Books, 1988), 211.

TF Shoemaker's Execution of Toan Thang 43

Toan Thang 43 kicked off in the early hours of May 1, 1970, using coordinated B-52 strikes followed by an artillery barrage and the employment of tactical fighter-bomber aircraft. At 0730, 1-9 CAV crossed the Cambodian border to patrol over the three helicopter landing zones that had been blasted out of the jungle by 15,000-pound bombs earlier that morning. As they moved north of the objective area to conduct their reconnaissance mission, they made the TF's initial contact with the enemy, destroying two enemy trucks and killing five personnel.¹⁰¹ Later that morning, as elements of the 3rd ARVN Airborne Brigade landed in their cleared landing zones, 1-9 CAV pursued up to 200 enemy personnel withdrawing from the area.¹⁰²

By the end of the first day of operations, 1-9 CAV's operations in the division deep area covering the northern approaches to the Fishhook painted a picture starkly different from the most dangerous enemy course of action initially assessed by the division intelligence section. Instead of COSVN elements executing a deliberate defense, 1-9 CAV engaged scattered remnants that remained behind to cause disruption or were withdrawing from the area. This information provided TF leadership with the ability to visualize and understand the situation across the breadth and depth of the battlefield. Armed with this information, the TF quickly decided to transition from enemy-focused maneuvering to a focus on finding and reducing enemy infrastructure and resources.¹⁰³

¹⁰¹ Tho, *The Cambodian Incursion*, 74.

¹⁰² Keith W. Nolan, *Into Cambodia: Spring Campaign, Summer Offensive, 1970* (Novato, CA: Presidio Press, 1990), 101-103.

¹⁰³ Shaw, *The Cambodia Campaign*, 63.

Also supporting this battlefield visualization were numerous ranger teams who “led the advance of both the 1st Cavalry Division and the South Vietnamese Airborne Division.”¹⁰⁴ These teams executed LRPs generally within a four square kilometer AO throughout the Fishhook for a few days to collect information before establishing an ambush and then being extracted.¹⁰⁵ Throughout 1st CD’s operations in Cambodia, the “Rangers of H Company ‘conducted 50 reconnaissance missions in Cambodia and provided the Division with numerous intelligence reports.’”¹⁰⁶ The result of these LRPs were “[38] major enemy sightings, [15] significant contacts, and numerous enemy killed by direct ranger fire or ranger-directed artillery and air strike.”¹⁰⁷

From May 2-5, 1970, TF Shoemaker expanded operations and began to systematically search the AO for any signs of enemy base camps (see figure 11). In addition to its human sensors, 1st CD had technical sensors to include “electronic warfare and radio monitoring teams” from the 303rd Radio Research Battalion and the 101st Radio Research Company, in support.¹⁰⁸ These sensors could employ a variety of electronic means to identify the enemy’s dispositions and composition.¹⁰⁹ However, as the enemy had largely withdrawn from the Fishhook, the technical sensors were of little

¹⁰⁴ Shelby L. Stanton, *Rangers at War: Combat Recon in Vietnam* (New York, NY: Orion Books. 1992), 65.

¹⁰⁵ Lanning, *Inside the LRRPs*, 143.

¹⁰⁶ *Ibid.*, 142.

¹⁰⁷ Stanton, *Rangers at War*, 65-66.

¹⁰⁸ Shaw, *The Cambodia Campaign*, 61.

¹⁰⁹ *Ibid.*

use as there were limited enemy electronic signatures to collect. Fortunately, 1-9 CAV was well suited to the task due to their unique reconnaissance training, mobility, and task organization. Despite limited enemy physical signatures as most of the base camps and caches were well camouflaged in dense terrain and vegetation, 1-9 CAV's aerial vantage point enabled them to contribute to the direction of TF clearance operations significantly.¹¹⁰ On average, the squadron found five different enemy bases and cache sites per day while simultaneously continuing to conduct R&S operations.¹¹¹

¹¹⁰ Shaw, *The Cambodia Campaign*, 77.

¹¹¹ Ibid.

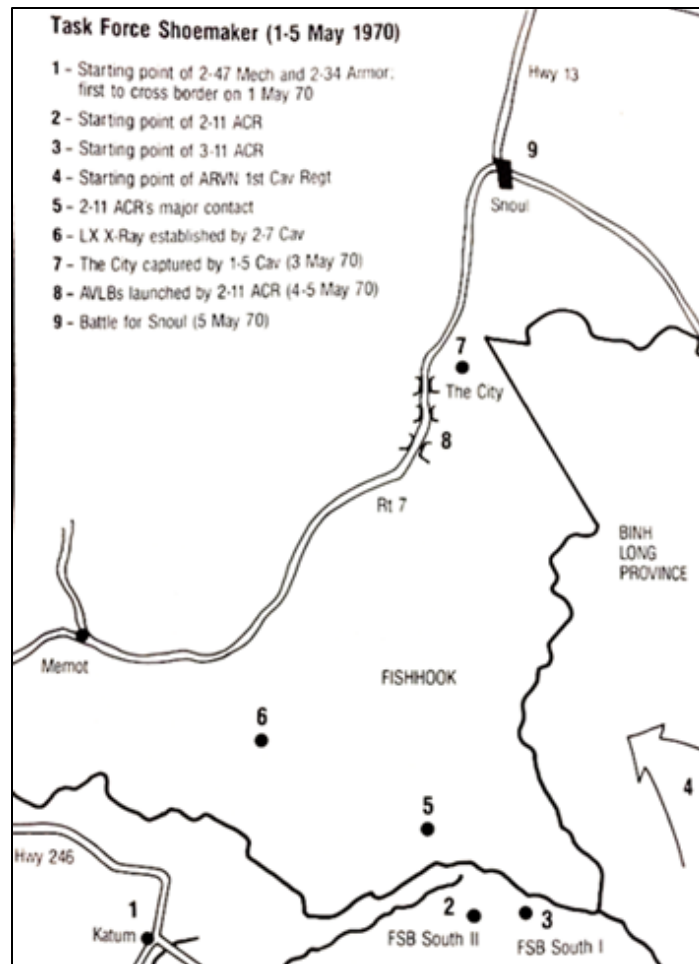


Figure 11. Task Force Shoemaker (1-5 May 1970)

Source: Keith W. Nolan, *Into Cambodia: Spring Campaign, Summer Offensive, 1970* (Novato, CA: Presidio Press, 1990), 102.

The identification of base areas often led to the destruction of the sites using fire support or, in some cases, like the squadron's most significant find at that time, "The City," it prompted the allocation of an entire battalion's worth of combat power.¹¹² The ground force commander in the area coordinated with BG Shoemaker to have another

¹¹² Shaw, *The Cambodia Campaign*, 78.

battalion inserted into the area identified by the division cavalry. Within 24 hours elements of the 1st Battalion, 5th Cavalry were in an enemy base camp that was approximately six square kilometers in size and composed of 182 bunkers filled with 171 tons of ammunition, clothing, food, and weapons.¹¹³ A few days later, in support of a subsequent division operation, Toan Thang 45, 1-9 CAV would again prove instrumental in finding what would become known as “Rock Island East,” which was the “single greatest trove of all the operations into Cambodia.”¹¹⁴

A final significant operation started under TF Shoemaker during the Toan Thang 43 operation was the 11th ACR’s seizure of the city of Snoul in the division’s deep area, at the Northeastern end of Route 7. On May 3, 1970, the regiment was tasked with seizing Snoul, 40 kilometers from their current position south of Route 7.¹¹⁵ 1-9 CAV confirmed initial intelligence reports that “Snoul was defended by a large number of North Vietnamese troops.”¹¹⁶ With 1-9 CAV confirming initial reports and H Company LRP teams conducting R&S operations throughout the AO, 11th ACR was able to rapidly maneuver and attack the defending *141st People’s Army of Vietnam (PAVN) Regiment* in and around Snoul starting on May 5.¹¹⁷ By the end of the next day, 11th ACR had secured Snoul and “pushed outward...in a series of sweeps to find and destroy the

¹¹³ Shaw, *The Cambodia Campaign*, 78.

¹¹⁴ *Ibid.*, 102.

¹¹⁵ Cheney, “The 11th Armored Cavalry Regiment in Vietnam, January 1969 Through June 1970,” 84.

¹¹⁶ *Ibid.*, 85-86.

¹¹⁷ *Ibid.*, 89.

enemy's logistic bases.”¹¹⁸ The ability of 1-9 CAV and the LRP teams to provide a clearer picture both of 11th ACR's route and the enemy forces at Snoul, greatly enabled the regiment to employ the speed and firepower of its armored forces to achieve its mission rapidly.

As the battle for Snoul was underway on the afternoon of May 5, TF Shoemaker was disbanded. The 1st CD division commander, MG Roberts, and the division staff assumed responsibility for Toan Thang 43 while simultaneously launching Toan Thang 45 further north in Cambodia on May 6. In less than two weeks, TF Shoemaker had planned and executed a large-scale combat operation with its ARVN partners, which included an attack with nearly 17,000 men into unknown terrain and against an unknown enemy. The limited raid as planned initially turned into a prolonged operation as the division would stay in Cambodia until the end of June. Intelligence on the enemy, the terrain, and civilians within the AO came from the bottom up and drove the TFs execution of operations from May 1-5 in Cambodia.

Case Study #1: Analysis

In analyzing the above data about TF Shoemaker's division-level large-scale combat operation into Cambodia during Toan Thang 43, it is crucial first to identify those human sensing capabilities that operated within the division deep area. The analysis is divided by those capabilities that were not available to TF Shoemaker—SOF and SOG elements—and those elements that were available for tasking by the TF, the LRP teams

¹¹⁸ Cheney, “The 11th Armored Cavalry Regiment in Vietnam, January 1969 Through June 1970,” 89.

and 1-9 CAV. The operation of SOF elements and inter-agency elements under SOG was ongoing throughout Cambodia before the incursion. While these elements enabled a better operational understanding of the Cambodian border region, they were mostly used to enable targeted strikes under Operation MENU.

The significant amount of intelligence reports compiled from these activities was not focused enough on a specific area like TF Shoemaker's future AO for them to be of significant tactical use. However, these reports did provide operational leaders with the indicators to assess that, by the start of Toan Thang 43, the opportunity to destroy COSVN had already passed. Besides this limited operational support during the planning phase of Toan Thang 43, SOF and SOG human sensing elements had a low impact on the first five mission variable criteria and are also marked low in availability as they were not available to TF Shoemaker during the operation.

The two sources of human sensing within TF Shoemaker's control were the rangers of its attached H Company conducting LRPs and its aerial reconnaissance squadron 1-9 CAV. Within the first criteria of enemy dispositions, both human sensing elements were able to rapidly assess that most of the combat power of the anticipated enemy formations were not located in the Fishhook. Instead, they found dispersed remnants of various units, mostly withdrawing from the immediate AO. In the one significant instance where the enemy intended to defend in strength, the city of Snoul, 1-9 CAV was able to identify this concentration in support of the 11th ACR's attack. Simultaneously, within the second criteria, LRP teams and the 1-9 CAV troops were also able to identify the composition of the enemy units throughout the AO, which they engaged directly, employed fire support to destroy, or passed along to the maneuver

elements of the TF. In addition, the finding of numerous enemy base camps by 1-9 CAV specifically enabled a detailed understanding of enemy composition within the area by the division and higher. Based on the above assessment, 1-9 CAV and the LRP teams were both able to provide a high-level of information to the TF about the enemy's dispositions and composition.

Within the third criterion, the reports from both division human sensing capabilities from across the AO enabled TF Shoemaker to assess the enemy's course of action rapidly. Instead of COSVN executing a deliberate defense of their base camps, they had largely withdrawn, leaving remnants to disrupt division operations. This situational understanding of the enemy course of action within the AO enabled the TF to transition rapidly from maneuvering against an assessed enemy to base-clearing operations. Based on this analysis, the ability of 1-9 CAV to provide information to the division about the course of action of the enemy was high. While the ranger LRP teams also provided valuable information about the enemy's intended course of action to TF Shoemaker, the lack of initial reconnaissance objectives to orient against limited the breadth of information they could provide about the enemy's intended course of action. Based on this assessment, the ability of the LRP teams to provide information to TF Shoemaker about the intended course of action of the enemy was medium.

Within the fourth criteria, terrain and weather, both the LRP teams and 1-9 CAV were instrumental in providing assessments of the unknown enemy terrain and how it was affected by the weather conditions. The LRP teams could provide a detailed analysis of terrain and weather effects on operations through precision insertions and being on the ground below the jungle canopy. Similarly, 1-9 CAV was able to provide significant

information on the terrain across the breadth of the AO and was particularly useful in identifying and clearing initial landing zones for the air infiltration of ground units. In addition, 1-9 CAV's unique vantage point above the jungle while conducting reconnaissance made them particularly adept at assisting in locating numerous enemy base areas. Based on this analysis, both the ranger LRP teams and 1-9 CAV had a high ability to provide information to TF Shoemaker about the terrain and weather within the AO.

The fifth criterion, civil considerations, did not play a significant role in the human sensing of either the LRP teams or 1-9 CAV. Much of the Fishhook AO had been taken over by enemy forces and turned into a significant staging area, eliminating most ASCOPE considerations within the AO. The LRP teams specifically avoided engagement with the remaining civilian population due to the risk of being compromised. Instead, throughout this operation, they remained oriented on the identification of enemy elements within the AO. Similarly, 1-9 CAV was not focused on civil considerations, but instead remained enemy-oriented or focused their reconnaissance on base area identification in support of TF clearing operations. 1-9 CAV's mission focus and lack of routine engagement with the populace on the ground, prevented the gathering of any significant information that supported TF Shoemaker's situational understanding of civil considerations within the AO. Based on this analysis, both the LRP teams and 1-9 CAV had a low ability to provide information to TF Shoemaker on civil considerations within the AO.

In assessing the final criteria, availability, it must be noted that the consistent and close command relationship between the H company rangers and 1-9 CAV greatly enabled their rapid and flexible employment across the AO. By possessing trained and

prepared human sensing elements capable of conducting sensing within an unknown division deep area, the division was able to quickly transition from a movement to contact to deliberate clearance operations. This decision was only possible because of the high availability of both the LRP teams and 1-9 CAV to TF Shoemaker. Below is an aggregation of the evaluated criteria for the LRP teams and 1-9 CAV (see table 2).¹¹⁹

Table 2. Summation of Evaluated Criteria for Case Study #1

Case Study Criteria and Metrics		Metrics		
		Low	Medium	High
<i>Criteria</i>	Enemy Dispositions			X
	Enemy Composition			X
	Enemy Course of Action		X	
	Terrain & Weather			X
	Civil Considerations	X		
	Availability			X
Criteria based on a human sensor's ability to provide information; but for availability it is based on an asset's ability to be employed upon request or tasking.				

Source: Created by author.

Answering Subsidiary Question #2

This case study started by focusing on the second subsidiary question: How has human sensing enabled division deep sensing in the past? A few answers to this question can be drawn from the analysis of human sensing support to TF Shoemaker during Operation Toan Thang 43. First, human sensing capabilities have historically enabled division deep sensing by being enemy focused and having a medium to high ability to provide a division with information about an enemy's dispositions, composition, and course of action. Second, human sensing elements maneuvering into the division deep

¹¹⁹ SOF and SOG evaluations were not included in the aggregation of evaluated criteria for this case study, as they did not operate in support of TF Shoemaker's operations in Cambodia.

area had a high ability to provide information to a division—either new or validating information provided from a higher headquarters—about the terrain within the AO and weather effects. Third, division human sensing capabilities employed as part of offensive operations within a large-scale combat operation have not been a significant enabler in a division’s ability to gain information about civil considerations within its AO. Finally, multiple human sensing capabilities with a high availability rate have historically enabled division leaders to rapidly visualize and understand the battlefield, increasing the time, space, and flexibility available to adjust operations. MG Roberts was clear about the importance of human sensing capabilities to the division when he said that “...more than any other single unit, the air cavalry squadron [1-9 CAV] has stepped out into the limelight in our operations...”¹²⁰ and the “Rangers [H Company] in my estimation have done a harder job and a more significant job than any of their predecessors.”¹²¹

Case Study #2: 3rd ID’s Attack to Baghdad

This case study seeks to answer the third subsidiary question: What advantages can human sensing capabilities in the division deep area provide during LSCO? This question will be answered by first discussing 3rd ID’s actions at four V Corps objectives—CHATHAM, RAMS, PEACH, and MONTGOMERY—during its attack toward Baghdad. Second, this data will be analyzed against the criteria and metrics

¹²⁰ Elvy B. Roberts, “Senior Officer Debriefing Report: MG Elvy B. Roberts, CG, 1st Cavalry Division, Period 23 April 1969 to 5 May 1970 (U),” The Vietnam Center & Sam Johnson Vietnam Archive, Texas Tech University, accessed February 18, 2020, <https://www.vietnam.ttu.edu/reports/images.php?img=/images/2770/27700340004.pdf>, 25.

¹²¹ Ibid., 9.

established in Chapter 3 to assess both the availability of human sensing capabilities and their effectiveness in providing the necessary information to the division.

Context

More than three decades after TF Shoemaker began operation Toan Thang 43 in Cambodia, 3rd ID was preparing to execute its own large-scale ground combat operation against a different enemy, in a different OE, and for significantly different objectives. Since 1970, the information revolution occurred with significant technological impacts on how sensing capabilities could and would be employed across echelons. Also, the U.S. Army underwent a holistic change in how it was manned, equipped, and trained to fight the next large-scale ground combat operation. Army leaders were in the process of conceptually piecing together the Army's future Full Spectrum Operations concept, while its AirLand Battle concept—employed to devastating effect during ODS—was further enabled by rapid technological development.

By 2003, the Iraqi armed forces were only a shell of what they had been when they last faced coalition ground forces during ODS. The Iraqi Army and even the elite Republican Guard could only muster a fraction of the men and equipment that they had more than a decade before. This reality, along with the greatly enabled Army V Corps and I Marine Expeditionary Force (I MEF), allowed an attack with substantially fewer forces than in ODS. V Corps was to “attack along the west bank of the Euphrates River

as the main effort” with I MEF maneuvering up the Tigris-Euphrates river valley as the supporting effort, with the ultimate objective of seizing Baghdad (see figure 12).¹²²

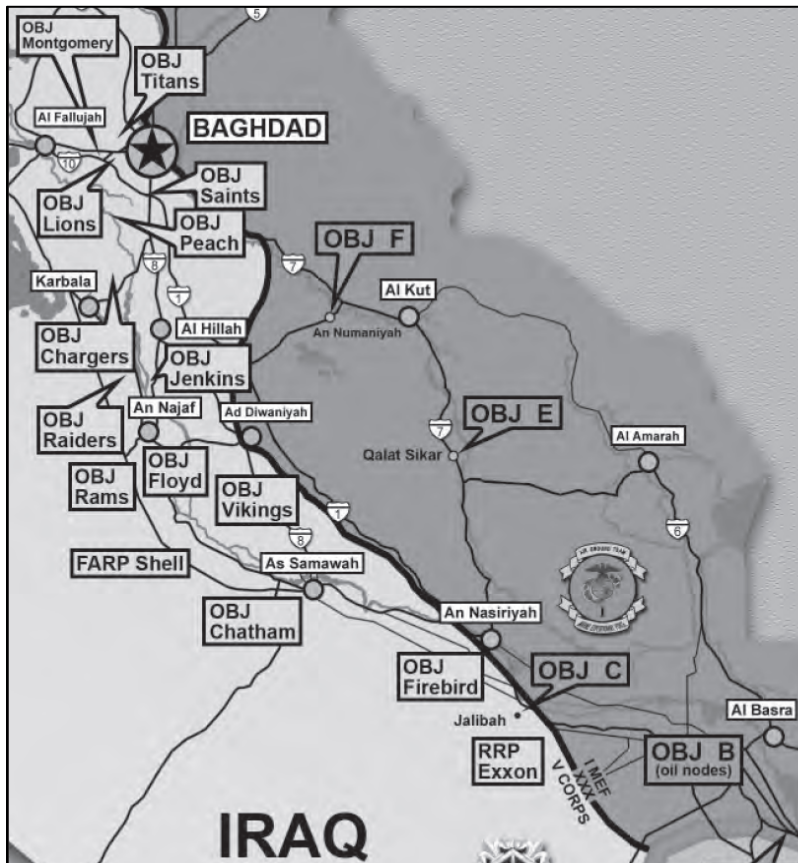


Figure 12. V Corps Objectives

Source: Gregory Fontenot, E. J. Degan, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Ft. Leavenworth, KS: Combat Studies Institute, U.S. Army Command and General Staff College, 2004), 48.

¹²² Gregory Fontenot; E. J. Degan and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute, U.S. Army Command and General Staff College, 2004), 55.

The overwhelming coalition advantages, expected to be even more pronounced than in ODS, and a perceived lack of the Iraqi will to fight shaped the perspectives of many ground commanders at the start of OIF. Many initially believed that the seizure of Iraqi cities would include having to accept the city's surrender, "...greet the local officials, and perhaps organize a quick parade to impress the locals."¹²³ As the Iraqi course of action became clear, elements within 3rd ID quickly realized that the civil considerations within the AO would not be centered on parade planning.

3rd ID Planning its Attack to Baghdad

3rd ID comprised the armored ground combat power within V Corps but was further backed by corps enablers to include a regiment of attack helicopters and part of the corps artillery.¹²⁴ In addition, two human sensors—SOF and covert inter-agency elements—with a low impact during TF Shoemaker's operations in Cambodia and not directly available to it, were actively operating within 3rd ID's AO. Both of these human sensing capabilities continued to provide reports to 3rd ID throughout their operation. Within 3rd ID itself, the division had an armored BCT and two mechanized BCTs as its primary maneuver forces, along with 3rd Squadron, 7th Cavalry Regiment (3-7 CAV) as its division cavalry squadron. As with 1st CD, 3rd ID employed long-range dismounted reconnaissance element in the form of teams from V Corps' Long-Range Surveillance Company E company, 51st Infantry (E/51st IN).

¹²³ James Lacey, *Takedown: The 3rd Infantry Division's Twenty-One Day Assault on Baghdad* (Annapolis, MD: Naval Institute Press, 2007), 45.

¹²⁴ Fontenot, Degan, and Tohn, *On Point*, 54.

As the division's reconnaissance element, 3-7 CAV was not part of any of the maneuver BCTs. However, it was similarly equipped and enabled to fight for information like no reconnaissance element had been before. Because the squadron was expected to continually sense and gather information to the front or flanks of the division, it was allocated significant combat power to make it nearly self-sufficient.¹²⁵ Its ground cavalry troops consisted of a mix of M-1 Abrams tanks and Bradley fighting vehicles. At the same time, it also had its own dedicated armed Kiowa helicopter troop and a mechanized artillery battery.¹²⁶

The LRS teams operating in direct support of 3rd ID from E/51st IN were focused on the opposite end of human sensing. Instead of actively fighting for information, they were "trained in infiltration, hide-site construction, enemy equipment and tactics, advanced communications, and a staggering host of survival and evasion skills" to stealthy "maintain constant 'eyes on' a key piece of terrain."¹²⁷ These LRS teams were the division's "only all-weather, 24-hour-a-day capability to watch a critical piece of terrain."¹²⁸ With an abortive strategic strike on March 19 that attempted to eliminate the Iraqi regime leadership, 3rd ID was off to a running start on March 20, 24 hours before air operations were scheduled to commence (see figure 13).

¹²⁵ Lacey, *Takedown*, 44.

¹²⁶ Ibid.

¹²⁷ Fontenot, Degan, and Tohn, *On Point*, 162.

¹²⁸ Ibid.

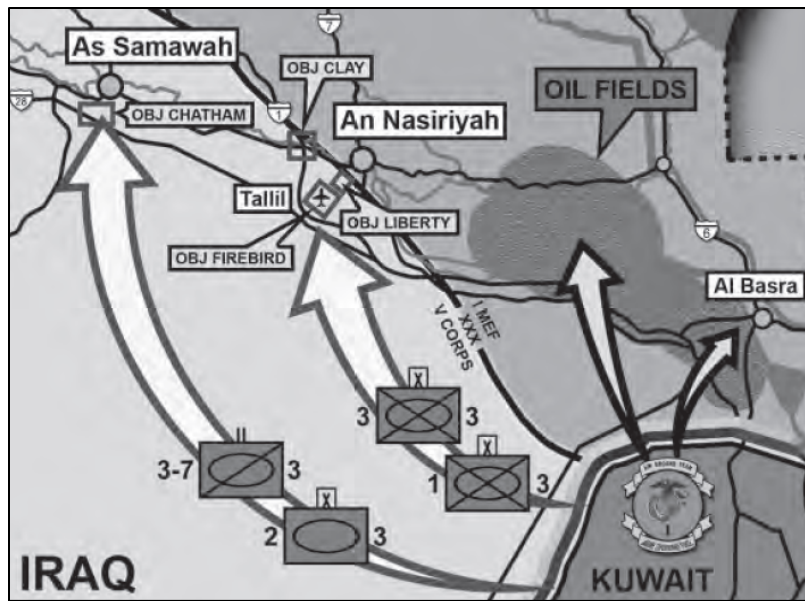


Figure 13. 3rd ID Running Start Concept of the Operation

Source: Gregory Fontenot, E. J. Degan, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute, U.S. Army Command and General Staff College, 2004), 87.

3rd ID's Attack to Baghdad

While two of 3rd ID's BCTs attacked toward southern objectives, 3-7 CAV's Kiowa troop conducted a zone reconnaissance into the division's deep area, "200 [kilometers] forward of the ground troops to confirm the terrain and the bridges at [Objective] CHATHAM."¹²⁹ As 3-7 CAV approached its objective and the city of As Samawah, they received a report from an inter-agency element that they could expect a peaceful welcoming from the Iraqi populace.¹³⁰ This report was in-line with 3rd ID's expectations of only lightly armed and untrained militia operating within the AO.

¹²⁹ Fontenot, Degan, and Tohn, *On Point*, 126.

¹³⁰ Lacey, *Takedown*, 46.

Fortunately, 3-7 CAV also linked up with a SOF element that had been conducting operations within the town for multiple days. The SOF team provided a picture of civil considerations within the area, such as information about the bridge at Objective CHATHAM being intact, while also outlining the dispositions and composition of paramilitary elements active within the area.¹³¹

Despite the warning from the SOF element, 3-7 CAV was still expecting a positive reception from a liberated populace and an enemy that was unwilling to fight. Instead, 3-7 CAV experienced the dominant course of action that the enemy would take throughout the next few weeks as “well-armed paramilitary forces—indistinguishable, except from their weapons, from civilians—attacked the squadron.”¹³² These paramilitary forces were not the unwilling and meagerly armed militia forces that 3rd ID had been expecting; instead, they were the well-armed and fanatical Fedayeen. During 3-7 CAV’s fight around Objective CHATHAM, 3rd ID’s commander was informed that the “biggest threat 3rd ID would face between Kuwait and Baghdad was not the conventional threat the division was superbly prepared to take on.”¹³³ While intelligence estimates had accounted for paramilitary forces like the Fedayeen, these estimates did not anticipate that they would be located outside of Baghdad or that they would fight so fanatically.¹³⁴

¹³¹ Fontenot, Degan, and Tohn, *On Point*, 127.

¹³² Ibid.

¹³³ Lacey, *Takedown*, 49.

¹³⁴ Fontenot, Degan, and Tohn, *On Point*, 152-153.

An accurate update to the enemy's dispositions, composition, and intended course of action required human sensing in the forms of SOF and 3-7 CAV.

As elements of 3rd BCT began to arrive, 3-7 CAV conducted a battle hand-over of the fight and continued to push north. 3rd BCT, meanwhile, continued to receive effective human sensing support from the SOF team in the town who were collecting and disseminating multiple reports a day on “enemy disposition and command and control nodes” throughout the town.¹³⁵ According to the 3rd BCT commander, COL Daniel Allyn, “the integration with SOF at As Samawah was the best of the whole war and helped shape the fight decisively.”¹³⁶

Simultaneous to 3-7 CAV's fight around Objective CHATHAM, 2nd BCT continued its attack to the north to seize Objective RAMS. Despite one of the division's deep human sensing capabilities being currently engaged, 2nd BCT was able to turn to two LRS teams from E/51st IN that were in overwatch positions to report on Objective RAMS (see figure 14).¹³⁷ The importance of Objective RAMS, which was simply a flat piece of open desert, was that V Corps intended to use it as a main logistical base and site for its headquarters during the final push to Baghdad.¹³⁸ Throughout March 21 and 22,

¹³⁵ Fontenot, Degan, and Tohn, *On Point*, 134.

¹³⁶ Ibid.

¹³⁷ A third team was also successfully inserted but was compromised and broke contact before being able to successfully establish overwatch on Objective RAMS.

¹³⁸ Lacey, *Takedown*, 59.

the LRS teams reported a mixture of lightly armed militia and Fedayeen in technical vehicles defending in the vicinity of Objective RAMS.¹³⁹

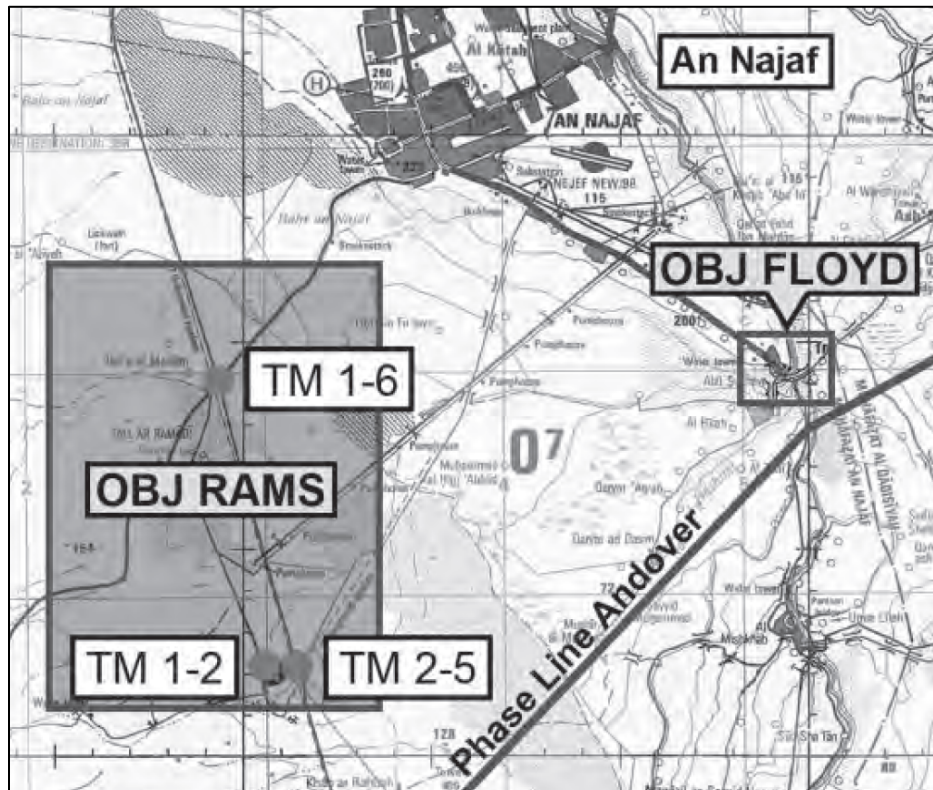


Figure 14. LRS Team Positions Around Objective RAMS

Source: Gregory Fontenot, E. J. Degan, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute, U.S. Army Command and General Staff College, 2004), 163.

Unfortunately, the communications plan to relay this information to the forces on the ground was cumbersome, and direct communication from the LRS teams to the maneuver elements was not established. Late in the afternoon of the 22nd, the 2nd BCT

¹³⁹ Fontenot, Degan, and Tohn, *On Point*, 164.

reconnaissance troop and TF 1-64 AR arrived at Objective RAMS. According to CPT Scott Woodward, the commander of the BCT reconnaissance troop, without direct communication with the LRS teams, the information received from them “was old” by the time the troop received it.¹⁴⁰ Throughout the night and the next day, CPT Woodward’s troop was able to link up and start the extraction of the LRS teams as 1-64 AR fought to clear and secure Objective RAMS from Fedayeen counterattacks that emerged out of the nearby city of An Najaf.¹⁴¹

Over the next week, as 3rd ID’s attack progressed north toward Baghdad, the division fought through numerous engagements and a tremendous sandstorm, before penetrating the Karbala Gap. During this rapid advance, 3rd ID had few units adjacent to its flanks, so that the division’s deep area was not strictly to their front, but also extended to their flanks. The importance of this battlefield dynamic would impact the employment of 3-7 CAV throughout the rest of the 3rd ID’s attack. V Corps, meanwhile, learned a hard lesson in the limit of the 11th Attack Helicopter Regiment’s employability when attempting to target an Iraqi armored division, it lost two helicopters and nearly became combat ineffective for the remainder of the operation.¹⁴² This rebuff demonstrated that even a less than near-peer advisory had the air defense capabilities to drastically limit a corps aerial freedom of movement within its deep area.

¹⁴⁰ Summary Transcript of OIF-SG Interview with CPT Scott Woodward, Commander, Brigade Reconnaissance Troop, 2 BCT, 3rd ID. May 19, 2003, by Mr. William Connor (Combined Arms Library Archives, Ft. Leavenworth, KS), 4.

¹⁴¹ Fontenot, Degan, and Tohn, *On Point*, 162.

¹⁴² Lacey, *Takedown*, 120.

Also, during this time, LRS elements were withdrawn from Objective RAMS and moved back to the support area to reset. Due to a combination of time-intensive planning and the rapid pace of 3rd ID's advance, the LRS teams were not recommitted before the fall of Baghdad. 3-7 CAV also provided limited human sensing support to the division throughout the end of march as 3rd ID consolidated gains and executed simultaneous limited attacks in advance of its penetration of the Karbala Gap. The squadron resumed their human sensing role for the division once they maneuvered through the Karbala Gap. At that point, they established guard positions along 3rd ID's northwestern flank against a templated threat from the Hammurabi Division, allowing 1st BCT to seize Objective PEACH.¹⁴³

After the unexpectedly rapid advance through the Karbala Gap on April 2, 1st BCT's lead element quickly closed in on Objective PEACH. Objective PEACH contained a bridge spanning the Euphrates River—the last major terrain obstacle on the division's advance to Baghdad—that was essential to maintain the division's momentum. The division's attack to seize this key piece of terrain was not accompanied by any division human sensing element but was instead executed mainly by TF 3-69 AR alone. After coming through the Karbala Gap, 3-69 AR was surprised to find themselves maneuvering in terrain like “the middle of Vietnam—palm trees, rice paddies, and canals.”¹⁴⁴ With 3-7 CAV committed to guarding the division's flank to the west, the LRS teams resetting in the support zone, and no SOF or inter-agency support in the area,

¹⁴³ Fontenot, Degan, and Tohn, *On Point*, 285.

¹⁴⁴ Ibid., 288.

3-69 AR was dependent on the technical sensing of the BCT and higher to enable its maneuver, seizure, and retention of the bridge at Objective PEACH.

At this point, despite the vast enterprise of technical sensing capabilities across echelons in support of 3rd ID, the division did not have a clear picture of the enemy dispositions, composition, or intended course of action on Objective PEACH. Instead, the TF's commander, LTC Ernest Marcone, led with his battalion scouts who were far too lightly armed to contend with the conventional Iraqi forces defending in the vicinity of the bridge. After coordinating for massed fires and executing a hasty assault by armor, infantry, and engineer elements, 3-69 AR secured the bridge and established defensive positions on the far side of the river.

Unknown to 3-69 AR, the fight for Objective PEACH had only just begun. The TF had made 3rd ID's first significant contact with Iraqi conventional forces of the war. Throughout the night, significant Iraqi conventional forces reinforced those that retreated from the bridge and launched mass armor and infantry attacks against the eastern bridgehead defenses. Without any human sensing capabilities to 3-69 AR's front, LTC Marcone was dependent on technical sensors at echelons above his TF. Unfortunately for LTC Marcone, however, these "advanced sensors and communications...failed to tell him about a very conventional massed attack."¹⁴⁵

¹⁴⁵ David Talbot, "How Technology Failed in Iraq," *MIT Technology Review* (November 1, 2004), <https://www.technologyreview.com/s/403319/how-technology-failed-in-iraq/>.

Throughout the night, LTC Marcone received “one communications intercept [that] a single Iraqi brigade was moving south from the airport.”¹⁴⁶ Instead, a couple of hours later, 3-69 AR faced “not one brigade but three: between 25 and 30 tanks, plus 70 to 80 armored personnel carriers, artillery, and between 5,000 and 10,000 Iraqi soldiers coming from three directions.”¹⁴⁷ By sunrise, however, regardless of the lack of human sensors or technical sensing reports making it to 3-69 AR, the TF was able to defeat a non-peer enemy through superior integration of combined arms and joint fires. It is unlikely that a similar fight against a peer adversary would have ended as favorably for 3-69 AR.

With Objective PEACH retained through sever fighting on the part of 3-69 AR, the 2nd BCT began to maneuver to seize Objective SAINTS, and the 1st BCT began to maneuver to seize Objective LIONS (Baghdad International Airport). Meanwhile, 3-7 CAV’s commander, LTC Terry Ferrell, held a face-to-face meeting with 3rd ID’s commander, MG Buford Blount, on Objective PEACH. At this meeting, MG Blount stated that the “enemy picture to the west was unclear, but he anticipated [3-7 CAV] would encounter one of the Republican Guards divisions attempting to counterattack.”¹⁴⁸ With this update, 3-7 CAV maneuvered to the northwest to provide a clearer enemy picture and establish a blocking position at Objective MONTGOMERY (see figure 15).

¹⁴⁶ Talbot, “How Technology Failed in Iraq.”

¹⁴⁷ Ibid.

¹⁴⁸ Lacey, *Takedown*, 180.

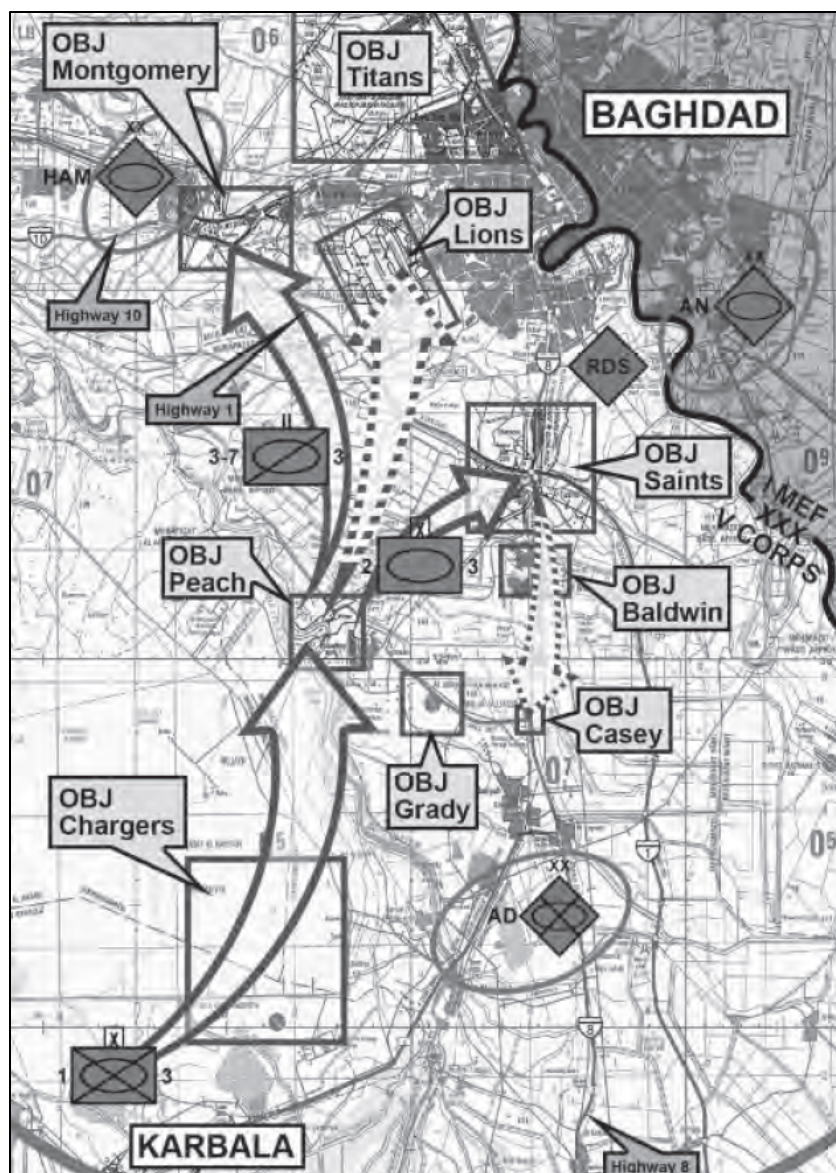


Figure 15. 3rd ID's Plan for Isolating Baghdad

Source: Gregory Fontenot, E. J. Degan, and David Tohn. *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute, U.S. Army Command and General Staff College, 2004), 257.

As 3-7 CAV was maneuvering to establish its blocking positions at Objective MONTGOMERY, V Corps and 3rd ID were using both technical sensing means, primarily GMTI, and air reconnaissance from strike aircraft to track what they believed to

be a counterattack force preparing to attack toward the Airport.¹⁴⁹ The credibility of GMTI throughout the drive to Baghdad was, at times, spotty but relatively high overall. The commander of 2nd BCT's MICO, CPT Corey Somers, said that "we know that a JSTARS [GMTI] read is about 75% accurate."¹⁵⁰ What was required was a human sensing capability to validate those reports and protect the division's main effort at Objective LIONS. The division's cavalry was in position, properly equipped, and effectively integrated with other division sensing elements to achieve both.

In maneuvering to establish their blocking positions, 3-7 CAV again faced the fanatical attacks of Iraqi paramilitary forces. However, throughout the night of April 3 and into the morning of April 4, Iraqi armor elements appeared and attempted to bypass 3-7 CAV to attack 1st BCT elements seizing Objective LIONS.¹⁵¹ The squadron stopped this enemy counterattack and later in the day was informed by pilots conducting close area support that there was a battalion-size tank formation three kilometers north of their position.¹⁵² With this sensing support, LTC Ferrell coordinated an attack that destroyed 20 T-72 tanks and numerous BMPs (infantry fighting vehicle). This attack set conditions for 3rd BCT to conduct a forward passage of lines and seize Objective TITANs, effectively isolating Baghdad from the west. With the neutralization of any external Iraqi

¹⁴⁹ Fontenot, Degan, and Tohn, *On Point*, 310.

¹⁵⁰ Summary Transcript of OIF-SG Interview with CPT Somers, Commander, B CO 103 MI BN, 2 BCT 3rd ID. May 19, 2003 by Major Corey (Combined Arms Library Archives, Ft. Leavenworth, KS), 4.

¹⁵¹ Lacey, *Takedown*, 183.

¹⁵² Fontenot, Degan, and Tohn, *On Point*, 310.

armored support and Baghdad isolated west of the river, 2nd BCT was poised in the vicinity of Objective SAINTS to conduct its “Thunder Runs” into the heart of Baghdad and collapse the regime.

Case Study #2: Analysis

This section analyzes the data presented in the second case study against the criteria and metrics outlined in Chapter 3 by reviewing human sensing, or the lack of it, at each of the four V Corps objectives—CHATHAM, RAMS, PEACH, and MONTGOMERY.

Actions at Objective CHATHAM saw the employment of three separate human sensing capabilities while this objective was part of the division deep area. First, both SOF and inter-agency elements were conducting human sensing around Objective CHATHAM and within the city of As Samawah. These elements, although at times giving conflicting reports, were able to inform 3-7 CAV—the third human sensing capability—about the dispositions and composition of the enemy and crucial civil considerations within the area. Most significantly, the SOF elements were able to relay that a key bridge was intact and that significant paramilitary forces were operating within the area instead of conventional Iraqi Army forces. This sensing support continued throughout the 3rd BCT’s containment of the city and its clearance by elements from the 82nd Airborne Division.

As 3-7 CAV cleared Objective CHATHAM and moved into As Samawah, they validated the information passed to them by the SOF team and began to develop an understanding of the enemy course of action. It was at this point that LTC Terrell was able to tell MG Blount that a fanatical, well-armed, paramilitary force was going to be

3rd ID's primary threat as they advanced toward Baghdad. This information proved crucial in providing battlefield visualization for both 3rd ID and V Corps as they began to adjust their assessments on the enemy course of action. Also, this understanding of the enemy enabled 3rd ID's division commander and BCT commanders to accept more risk as they increased their operational tempo, which ultimately proved decisive in defeating the Iraqi regime.

At Objective RAMS, the division had significantly fewer human sensing capabilities operating within its deep area as its maneuver forces approached. Of the three LRS teams that were inserted, two were able to establish overwatch of the objective. These two teams were able to provide timely and accurate information about the dispositions and composition of the enemy forces on Objective RAMS to the division. However, the rapid tempo of the maneuver forces, the lack of timely information relay to the maneuver elements, and the inability of lead elements of the BCTs to communicate directly with the LRS teams prevented this information from being of use to the attacking U.S. forces. Instead, the BCT reconnaissance troop and 1-64 AR conducted a movement to contact and hasty attack on to Objective RAMS.

As 3rd ID wanted to maintain its momentum coming out of the Karbala Gap and 3-7 CAV was committed to guarding the division's flank, 3-69 AR was committed to seizing and retaining Objective PEACH without the benefits of any division human sensing capabilities to their front. The effects were felt immediately as the armored TF began moving through significantly denser terrain and vegetation without any prior ground route reconnaissance, ultimately leading to the miring of two tanks before getting

to Objective PEACH.¹⁵³ The TF commander attempted to lead with his battalion scouts, but they proved to be too lightly equipped when 3-69 AR came up against the first conventional Iraqi forces. Through superior application of combat power, 3-69 AR was able to seize its objective and retain it against significant odds despite limited information about the enemy. If this was a similar fight against a near-peer adversary, where 3-69 AR might not have some of the tremendous advantages it did during this battle—vastly superior equipment and air superiority—the lack of human sensing support forward could have resulted in significantly higher losses and a different outcome.

If 3-69 AR's experience at Objective PEACH is an example of the dangers of ineffective sensing support, 3-7 CAV's collaboration with technical sensing support on Objective MONTGOMERY is an example of the benefits of a coordinated division sensing effort. Technical sensing provided the division with initial indicators about the enemy's dispositions, composition, and intended course of action. However, as 3rd ID's commander made clear to LTC Ferrell, the situation needed to be developed further. 3-7 CAV further developed and refined these initial reports by employing maneuver, leading to the development of a clear picture of the dispositions and composition of elements of the Hammurabi Division, while also verifying the enemy's intended course of action to counterattack toward Objective LIONS. By having a human sensing capability available in the strength of an armored cavalry squadron, 3rd ID was able to verify information from its other sensing capabilities while gaining new information developed and refined

¹⁵³ Fontenot, Degan, and Tohn, *On Point*, 288.

by 3-7 CAV. It was then also able to employ 3-7 CAV and supporting firepower to rapidly act on this information, defeating the enemy's planned counterattack.

One final criterion that has not been discussed in the analysis of human sensing during action at each of these corps objectives is the ability of human sensing capability to provide information about the terrain and weather. Because 3-7 CAV was employed as a maneuver element as well as a human sensing element, it was only marginally effective in developing an understanding of the terrain and weather effects across the AO. An example of the limited role 3-7 CAV had in developing information about this mission variable can be seen in 3rd ID's use of its BCTs to maneuver through the Karbala Gap without prior ground route reconnaissance.¹⁵⁴ As the LRS teams, SOF, and inter-agency elements were mostly static, they had an even lower ability to provide effective terrain and weather information to the division.

Based on the above analysis, SOF and inter-agency elements were able to provide a high-level of information about criterion five (civil considerations) before, during, and after the fight to secure Objective CHATHAM. They were able to provide a medium-level of information for criteria one (enemy dispositions) and two (enemy composition). However, they were only capable of providing a low-level of information about criterion three (enemy course of action) and criterion four (terrain and weather). Also, while these capabilities made themselves available in support of the division's fight for Objective CHATHAM, they could not be tasked by 3rd ID and were not positioned

¹⁵⁴ Fontenot, Degan, and Tohn, *On Point*, 287.

throughout the breadth of the division deep area. SOF and inter-agency elements, therefore, had a low overall availability to the division.

Due to the rapid tempo of operations and the long planning cycle for the use of LRS teams, their employment was drastically limited. While they were able to provide a medium-level of information about criteria one (enemy dispositions) and two (enemy composition), their limited duration and maneuverability only allowed them to provide a low-level of information about criteria three (enemy course of action), four (terrain and weather), and five (civil considerations). Also, while the LRS elements had a supporting relationship to 3rd ID, unlike the SOF and inter-agency elements, the long planning timeline to coordinate their employment meant that they could not be leveraged immediately, giving them only a medium-level of availability to the division.

3-7 CAV, while being employed both as a maneuver element and a human sensing capability for the division, was able to provide the division with a high-level of information about the enemy for criteria one (enemy dispositions), two (enemy composition), and three (enemy course of action). The squadron was also capable of providing a high-level of information about the terrain and weather effects (criterion four) to the division thanks to its air-ground task organization. However, information about criteria one through four was available from 3-7 CAV to the division only sporadically due to their mixed mission as a maneuver and sensing element. Due to this, 3-7 CAV had only a medium-level of overall availability to conduct human sensing for the division. Finally, as 3-7 CAV was enemy-focused in both its maneuver and sensing roles, it had a low ability to provide information to the division about civil considerations (criterion

five). Below is an aggregation of the evaluated criteria across all human sensing capabilities involved during the period of the case study (see table 3).¹⁵⁵

Table 3. Summation of Evaluated Criteria for Case Study #2

Case Study Criteria and Metrics		<i>Metrics</i>		
		Low	Medium	High
<i>Criteria</i>	Enemy Dispositions		X	
	Enemy Composition		X	
	Enemy Course of Action		X	
	Terrain & Weather		X	
	Civil Considerations		X	
	Availability		X	
Criteria based on a human sensor's ability to provide information; but for availability it is based on an asset's ability to be employed upon request or tasking.				

Source: Created by author.

Answering Subsidiary Question #3

This case study was prefaced with the third subsidiary question: What advantages can human sensing capabilities in the division deep area provide during LSCO? Three specific advantages stand out after reviewing and analyzing 3rd ID's employment of multiple human sensing capabilities during its attack toward Baghdad. These advantages include a holistic visualization of the battlefield across multiple mission variables, the ability to both gain and validate information, and finally, the ability to gain time, space, and flexibility to enable a commander's decision making.

¹⁵⁵ This aggregation includes both SOF and inter-agency elements as they supported 3rd ID's operations during its attack toward Baghdad.

An example of the first advantage gained by the 3rd ID can be seen at Objective CHATHAM. While SOF and inter-agency elements were not able to provide a high-level of information about the enemy course of action, they were able to provide a high-level of information about civil considerations both at Objective CHATHAM and within As Samawah. By pairing this information with the information gained by 3-7 CAV about the enemy's dispositions, composition, and course of action, a holistic picture of 3rd ID's deep area—up to that point—was developed. Thus, when divisions pair multiple human sensing capabilities, especially those with varied collection abilities, it provides a more holistic visualization of the battlefield.

The second advantage that a human sensing capability in the deep area can provide to a division is its ability to gain new information while validating and refining information provided by other sensing means. While technical sensing can provide a significant amount of information when it is available to a division commander, it cannot provide the entire picture. A human sensing capability in the division deep area, working cooperatively with technical sensing capabilities, can move rapidly to validate and refine the initial information provided. 3-7 CAV's actions at its blocking position on Objective MONTGOMERY, with support from technical sensing capabilities like GMTI, is an excellent example of how cooperative sensing can greatly enable a division's deep fight. Through coordination and cooperation with technical sensing capabilities, 3-7 CAV validated reports about the enemy, gained additional information, and conducted a deep shaping operation to prevent the Iraqi Hammurabi Division from effecting operations within 3rd ID's close fight at Objectives LIONS and SAINTS.

3-7 CAV's actions against the Hammurabi Division is also an example of the final advantage human sensing can provide in the division deep area. By being in the division deep area to rapidly validate or report new information and then take action, 3-7 CAV was able to provide the division commander time, space, and flexibility in his plan to isolate Baghdad. Through the validation of the enemy's disposition, composition, and course of action, 3-7 CAV was able to coordinate significant direct and indirect fires to defeat the Hammurabi Division's counterattack, buying both time and space for the division to consolidate gains at Objective LIONS and SAINTS. This significant defeat of one of the enemy's few remaining combat effective units opened a window of opportunity allowing 3rd ID the flexibility to pass the 3rd BCT through 3-7 CAV to rapidly seize Objective TITANS and complete the isolation of Baghdad from the west.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Introduction

This study has reviewed the current deep sensing gap within a division and its development over time. It has analyzed how human sensing capabilities have contributed to division deep sensing in the past and has outlined the advantages that human sensing in the division deep area can provide. With this context and analysis completed, it is now possible to outline a few overall conclusions about human sensing that can further inform the answering of the research question: How can a human capability contribute to the closing of the division deep sensing gap during LSCO?

Conclusions about Human Sensing

The below table is a combination of the case study analysis from Chapter 4 based on the criteria and metrics established in Chapter 3 for all of the human sensing capabilities employed in both case studies, including division cavalry squadrons, LRSUs, SOF teams, and inter-agency elements.

Table 4. Aggregated Human Sensing Contributions from both Cases

Case Study Criteria and Metrics		Metrics		
		Low	Medium	High
<i>Criteria</i>	Enemy Dispositions			X
	Enemy Composition			X
	Enemy Course of Action		X	
	Terrain & Weather		X	
	Civil Considerations	X		
	Availability		X	
Criteria based on a human sensor's ability to provide information; but for availability it is based on an asset's ability to be employed upon request or tasking.				

Source: Created by the author.

Based on this overall analysis, the null hypothesis—that a human sensing capability cannot contribute to closing a division’s deep sensing gap in its deep area during LSCO —can be rejected. The above case studies have shown that both a dedicated cavalry squadron and LRSUs have the potential to provide information across the mission variables, though limited when it comes to civil considerations, to a division during a large-scale combat operation. This ability, currently absent with U.S. divisions, can contribute—if properly equipped and employed—to the closing of a division’s deep sensing gap in its deep area during LSCO. In addition to rejecting the null hypothesis, a few crucial conclusions can be drawn from this overall analysis.

First, different human sensing capabilities strengths appear in different mission variables and are best employed in different OEs. For example, while neither division cavalry squadrons nor LRSUs were adept at providing information about civil considerations during these two case studies, SOF and inter-agency elements were in the position to provide a high-level of information about this specific variable. Also, while

LRSUs could both maneuver and excel in a relatively consistent AO like the Fishhook in the dense jungle terrain of Cambodia, they were found to be very difficult to employ in a consistently changing AO based on a rapid operational tempo and in the openness of Iraq that limited their maneuverability.

As ULO anticipates a future need for both rapid advances and defenses, it is important to consider what human sensing capabilities are optimized across various mission requirements. In addition, as both of the current U.S. pacing threats, as outlined in Chapter 1, include the potential for fighting in highly dense terrain and vegetation, it is essential to pair human sensing capabilities with appropriate OEs. For a division to benefit from the advantages that a human sensing capability brings, it is essential to match those capabilities to a specific mission requirement in an OE that supports its employment.

A second conclusion from the above analysis is that dedicated human sensing capabilities can provide a division with time, space, and flexibility in their planning and execution of operations. While the availability of human sensing assets varied throughout both case studies, one consistency across a more than 30-year time period was that the availability of the division's cavalry squadron played a crucial role throughout the execution of LSCO. In Vietnam, 1-9 CAV's ability to rapidly maneuver across the battlefield provided TF Shoemaker with a situational understanding of the battlefield, shortened the leadership's decision-making timeline, and provided flexibility to the TF's next course of action. Similarly, during OIF, 3-7 CAV on numerous occasions was able to provide 3rd ID's commander with the ability to visualize his division's deep area, confirm and refine technical sensing reports, and provide flexibility for the execution of

other division operations. Throughout LSCO in both Vietnam and OIF, the dedicated division cavalry squadron's ability to sense within the division deep area proved vital in providing the division with time, space, and flexibility in the planning and execution of operations.

A third conclusion is that human sensing capabilities dedicated to a division are best employed when they are enemy focused. This focus seeks to provide information to the division about the enemy's dispositions, composition, and course of action in the deep area. Some human sensing elements not dedicated to the division, like SOF and inter-agency teams, proved very useful at filling sensing gaps in areas like civil considerations. A division should leverage these additional human sensing capabilities that are operating within its AO whenever possible to build a holistic situational understanding of the AO. This arrangement during the OIF case study proved very useful to the division as it enabled both 3-7 CAV and the LRS teams to remain enemy-focused in support of the rapid tempo being set by the division, without a complete gap of knowledge about civil considerations.

A final conclusion is that sensing gaps during LSCO are inevitable based on the finite sensing means available and the fluid nature of warfare but can be narrowed. Divisions can mitigate and narrow the gap—especially when focused in support of a decisive operation or main effort—by using both paired human and technical sensing capabilities in a cooperative and coordinated manner. 3-7 CAV's advance to and success at Objective MONTGOMERY is a demonstration of how divisions can progressively resolve sensing gaps and unclear pictures of the enemy in their deep area and turn it into an opportunity and exploit it. This successful operation was dependent on

3rd ID having access to information from both technical sensing and human sensing capabilities. For the next U.S. division to maintain land dominance in the next large-scale combat operation, it cannot afford to take an either/or approach to sensing. Instead, it must have a cooperative technical-human sensing approach that is in line with each sensor's unique capabilities and cognizant of the OE in which they are employed.

Answering the Research Question

The chaotic nature of war and the finite resources available to a division dictates that its ability to sense within its deep area will likely never be perfect. **However, a human sensing capability can primarily contribute to narrowing the gap by providing a division commander with additional time, space, and flexibility to further develop plans and execute operations.** This contribution comes primarily from a human sensor's ability to provide additional battlefield visualization and a more detailed situational understanding of an enemy's dispositions, composition, and course of action. This detail enables more accurate and effective action by the division, ideally at a pace that the enemy cannot effectively counter. For a division to take full advantage of this contribution to narrow the sensing gap in its deep area, it must have dedicated sensing capabilities—technical and human—capable of collecting within its deep area, employ its technical and human sensing capabilities in a coordinated and complementary way, and seek to leverage all human sensing capabilities within its deep area to include SOF and inter-agency elements.

Recommendations

Based on the conclusions listed above and the current sensing gap within U.S. Army divisions, this study recommends that a division expected to execute LSCO be provided with dedicated human sensing capabilities. This recommendation does not mean that divisions should holistically apply the template of 3-7 CAV or the LRS teams of the past to future LSCO. Instead, in line with the first conclusion, these assets should be provided to a division per the anticipated threat and OE they are to face. If the U.S. Army must be prepared for operations within the OE of its current pacing threats—Russia and China—then it must have human sensing capabilities structured and equipped to operate effectively within either OE.

A second recommendation from this study is that these dedicated human sensing capabilities be deliberately planned and employed in coordination with technical sensing capabilities, while purposefully leveraging all SOF and interagency elements within the division’s deep area. While divisions currently employ collection management personnel to effectively synchronize the collection of information nested with the division’s plan, the Army should review the potential for the use of a *Chief of Reconnaissance* to synchronize and integrate all sensing capabilities. This person, while leveraging the technical sensing capabilities coordinated by the collection manager, would be in direct communication with the division’s dedicated human sensing capabilities in its deep area and in contact with SOF and inter-agency elements within the AO before, during, and after initial operations. This unity of effort across all available technical and human sensing capabilities will aid significantly in

narrowing the division's deep sensing gap while also providing it with redundant sources of information if capabilities are lost or degraded.

Chapter Conclusion

With the conclusion that a human sensing capability can contribute to closing a division's deep sensing gap within its deep area during a large-scale combat operation, two areas for further research stand out. First, and most importantly, further research should be conducted into how dedicated human sensing capabilities, both mounted and dismounted, could most effectively be structured and employed to support a division's sensing needs. While the 3-7 CAV's astounding performance during OIF can serve as a basis, a future division cavalry formation must be developed in the context of the future OE it may operate in, while being prepared to dominate a peer adversary. In addition, the future structuring and employment of LRSUs must be done in consideration of the OE and mission set that they can most effectively operate in. Unlike the current modular force, these dedicated human sensor formations cannot be a one size fits all, and further research should be conducted to assess the optimal fit per OE and against each adversary.

A second recommendation for further research is on the potential benefits of cyber and OSINT in the execution of human sensing within a division's deep area. As the world continues to grow more connected through technology and the barrier to the sharing of information is further lowered, the potential for leveraging information from the host populace within a division's AO during a future large-scale combat operation grows. While its specific research was outside the scope of this study, OSINT's potential as yet another source of information to be leveraged by a division should be further studied from a human sensing perspective.

EPILOGUE

Summer 2021: It had been a steep learning curve for the 16th AD. While U.S. forces had taken a severe blow, they were recovering and gaining windows of relative advantage across various domains against the enemy. During the spring, while the division was reconstituting in corps reserve, it received the mechanized 3rd Squadron, 89th Cavalry Regiment to act as its division cavalry and a LRSD to act in direct support of its operations. The 16th AD's commander and chief of staff immediately integrated these new human sensing capabilities into the division's collection process. They appointed a chief of reconnaissance, which, in coordination with the division collection manager, ensured that both the cavalry squadron and the LRS teams could execute their operations in coordination with technical sensors from the division and the joint force. In addition to the internal coordination, the chief immediately began a constant dialogue with SOF and inter-agency elements in the perspective AO they were to assume in the summer.

In July, the 16th AD moved out of corps reserve and promptly received a mission to attack a degraded enemy motorized division conducting a hasty defense in 72 hours. Fortunately, through continuous contact with SOF and inter-agency elements operating beyond the forward line of troops, the chief of reconnaissance and division collection manager had draft plans in place for the employment of available joint force and division collection assets. Due to this, the division rapidly deployed its cavalry squadron into its deep area against initial reconnaissance objectives in anticipation of the 16th AD's attack. Simultaneously, the division inserted its highly mobile LRS teams deep into the enemy's support area based on information gained from SOF and inter-agency elements engaging

with the local populace. These teams were able to both validate the condition of key infrastructure as well as survey high payoff targets for the division.

At 0600 on July 4, 24 hours before 16th AD's attack, the LRS teams received intelligence from a GMTI report of unidentified enemy movement inconsistent with the expected enemy defensive course of action. Corps and division UAS had not been able to provide additional clarification of the report due to a high enemy air defense threat; however, corps assessed the anomaly to be heavy logistical traffic. An hour later, a LRS team surveying a key intersection behind the enemy's front gained visual identification of a column of at least a battalion of enemy armor moving toward the front. The enemy was supposed to be badly mauled and, according to the most likely enemy course of action, in a hasty defense. It was not supposed to have armor, and it certainly was not supposed to be moving rapidly west along this avenue of approach. The team immediately transmitted this information back to the division, where the chief of reconnaissance informed the division cavalry, and the division collection manager began queuing available sensors to look at named areas of interest associated with the enemy's assessed most dangerous course of action—a spoiling attack.

Armed with this information early (time), the division commander rapidly considered the options available as the division cavalry prepared to meet a potential armored attack (space). If the cavalry, along with fires from the division and the joint force, was able to fix this attack, an opportunity might present itself to conduct the division attack early and under more favorable circumstances. The division began coordinating internally and externally to prepare for the armored attack and to conduct an immediate counterattack (flexibility).

At 1100 on July 4, the smoldering remains of an enemy armored column still in traveling formation sit along a dirt road in Eastern Europe. Off to the left and right, burned-out hulks of an enemy motorized rifle division sit in their hastily dug battle positions. Earlier that morning, as LRS teams began directing long-range precision fires against enemy air defense and command and control nodes, the division's artillery and attack helicopters quickly destroyed the attacking enemy armor column as 3-89 CAV first made contact and then quickly maneuvered to decisive points within the enemy's defense. Over the next hour, what had started as an enemy spoiling attack, rapidly turned into an enemy rout as a coordinated and complementary sensing plan focused the full might of the 16th AD and the joint force. Not only had the division regained its ability to sense within its deep area, but more importantly, it had reclaimed its ability to dominate on the battlefield.

BIBLIOGRAPHY

- 1st Cavalry Division Information Office. "A Glimpse of Cav Country: Senior Officers' Slide Briefing." The Vietnam Center & Sam Johnson Vietnam Archive. Texas Tech University. Accessed February 18, 2020. <https://www.vietnam.ttu.edu/reports/images.php?img=/images/2770/27700323001.pdf>.
- Brooks, Rosa. *How Everything Became War and the Military Became Everything: Tales from the Pentagon*. New York, NY: Simon and Schuster, 2016.
- Brown, John S. *Kevlar Legions: The Transformation of the U.S. Army, 1989-2005*. Washington, DC: Center of Military History, 2011.
- Burket, Dennis M. "The Evolution of the Division Formation." In *Large-Scale Combat Operations: The Division Fight*, 7–18. Ft. Leavenworth, KS: U.S. Army Combined Arms Center and U.S. Army Command and General Staff College Press, 2019.
- Cameron, Robert S. *To Fight or Not to Fight? Organizational and Doctrinal Trends in Mounted Maneuver Reconnaissance from the Interwar Years to Operation IRAQI FREEDOM*. Ft. Leavenworth, KS: Combat Studies Institute Press, 2009.
- Cheney, Edward J. "The 11th Armored Cavalry Regiment in Vietnam, January 1969 Through June 1970." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2002.
- Fontenot, Gregory, E. J. Degan, and David Tohn. *On Point: The United States Army in Operation Iraqi Freedom*. Fort Leavenworth, KS: Combat Studies Institute, U.S. Army Command and General Staff College, 2004. Accessed 15 October 2019. <http://cgsc.contentdm.oclc.org/cdm/ref/collection/p16040coll3/id/182>
- Gebhardt, James F. *Eyes Behind the Lines: U.S. Army Long-Range Reconnaissance and Surveillance Units*. Global War on Terrorism Occasional Paper 10. Fort Leavenworth, KS: Combat Studies Institute Press, 2005.
- Harstock, Jonathan T. "No Long Necessary: Long-range Surveillance Units in Unified Land Operations." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2016.
- Headquarters, Department of the Army. Army Doctrine Publication 3-0, *Operations*. Washington, DC: Government Printing Office, 2019.
- . Army Doctrine Publication 3-05, *Army Special Operations*. Washington, DC: Government Printing Office, 2019.

- . Army Doctrine Publication 6-0, *Mission Command: Command and Control of Army Forces*. Washington, DC: Government Printing Office, 2019.
- . Army Techniques Publication 3-91, *Division Operations*. Washington, DC: Government Printing Office, 2014.
- . Army Techniques Publication 3-94.2, *Deep Operations*. Washington, DC: Government Printing Office, 2016.
- . Field Manual 1-02.1, *Operational Terms*. Washington, DC: Government Printing Office, 2019.
- . Field Manual 3-0, *Operations*. Washington, DC: Government Printing Office, 2017.
- . Field Manual 34-10, *Division Intelligence and Electronic Warfare Operations*. Washington, DC: U.S. Government Printing Office, 1986.
- . Field Manual 3-55, *Information Collection*. Washington, DC: Government Printing Office, 2012.
- . Field Manual 3-94, *Theater Army, Corps, and Division Operations*. Washington, DC: Government Printing Office, 2014.
- . Field Manual 3-98, *Reconnaissance and Security Operations*. Washington, DC: Government Printing Office, 2015.
- . Field Manual 7-93, *Long-Range Surveillance Unit Operations*. Washington, DC: Government Printing Office, 1995.
- Howard, Michael. "The Use and Abuse of Military History." *Parameters* (March 1981): 9-14. Reprint from *Journal of the Royal United Service Institution* (February 1962): 4-8.
- Iwicki, Stephen K. "CSA's Focus Area 16: Actionable Intelligence...One Year Later." *Military Intelligence Professional Bulletin* 30, no. 4 (October 2004): 43-48.
- Jennings, Nathan A. "Fighting Forward: Modernizing U.S. Army Reconnaissance and Security for Great Power Conflict." *Military Review* 99, no. 6 (November-December 2019): 100-108.
- . "Reconsidering Division Cavalry Squadrons." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2017.

- Johnson, Stephen M. "Blind, Deaf, and Dumb: We Must Be Prepared to Fight for Information." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2017.
- Kane Jr., James P. "The Broken Machine: The U.S. Army Division in the Age of Brigade Modularity." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2017.
- Keaveny, Valery C. "Ensuring the continued relevance of long-range surveillance units." Master of Military Art and Science Thesis, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2002.
- Keller, Brian A. "Seeing the airland battlefield: can the heavy division military intelligence battalion do its job?" Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1991.
- Kem, Jack K. *Deep Maneuver: Historical Case Studies of Maneuver in Large-Scale Combat Operations*. Ft. Leavenworth, KS: Army University Press, 2018.
- Kindersvatter, Peter S. "Army-of-Excellence divisional cavalry squadron -- a doctrinal step backward?" Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1985.
- Kraber, Philip A. *"Lessons Learned" From the Russo-Ukrainian War Personal Observations*. The Potomac Foundation, 2016. Accessed September 15, 2019. <https://prodev2go.files.wordpress.com/2015/10/rus-ukr-lessons-draft.pdf>.
- Lacey, James. *Takedown: The 3rd Infantry Division's Twenty-One Day Assault on Baghdad*. Annapolis, MD: Naval Institute Press, 2007.
- Lanning, Michael Lee. *Inside the LRRPs: Rangers in Vietnam*. New York, NY: Ballantine Books, 1988.
- Larsen, Michael M. "Organizational Structure of Deep Ground Reconnaissance for Future Divisions and Corps." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2006.
- Ludwig, Daniel R. "Fighting Blind: Why U.S. Army Divisions Need a Dedicated Reconnaissance and Security Force." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2017.
- McGrath, John J. *Scouts Out! The Development of Reconnaissance Units in Modern Armies*. Fort Leavenworth, KS: Combat Studies Institute Press, 2008.

- McMaster, H. R. *Crack in the Foundation and the Underlying Assumption of Dominant Knowledge in Future War*. U.S. Army War College, 2003. Accessed October 26, 2019. <https://pdfs.semanticscholar.org/0b00/39f42d37b649d87fc2d7e2a9ebc38848188e.pdf>.
- Mikaloff, Robert S. "Division Intelligence: Looking Deep to Win Close." In *Large-Scale Combat Operations: The Division Fight*, 73-81. Ft. Leavenworth, KS: U.S. Army Combined Arms Center and U.S. Army Command and General Staff College Press, 2019.
- Nolan, Keith W. *Into Cambodia: Spring Campaign, Summer Offensive, 1970*. Novato, CA: Presidio Press, 1990.
- Oakley, David P. "Partners or Competitors?: The Evolution of the DOD/CIA Relationship Since Desert Storm and Its Prospects for the Future." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2013.
- Pomerleau, Mark. "The Army Targets Systems to 'See' 1,000 Miles." C4ISRNET, April 2, 2019. <https://www.c4isrnet.com/c2-comms/2019/04/02/the-army-targets-systems-to-see-1000-miles/>. Accessed September 19, 2019.
- Rayburn, Joel D., and Frank K. Sobchak, eds. *The U.S. Army in the Iraq War*. Vol. 1, *Invasion, Insurgency, Civil War*. Carlisle Barracks, PA: Strategic Studies Institute and U.S. Army War College Press, 2019. Accessed November 1, 2019. <https://publications.armywarcollege.edu/pubs/3667.pdf>.
- Roberts, Elvy B. "Senior Officer Debriefing Report: MG Elvy B. Roberts, CG, 1st Cavalry Division, Period 23 April 1969 to 5 May 1970 (U)." The Vietnam Center & Sam Johnson Vietnam Archive. Texas Tech University. Accessed February 18, 2020. <https://www.vietnam.ttu.edu/reports/images.php?img=/images/2770/27700340004.pdf>.
- Shaw, John M. *The Cambodia Campaign: The 1970 Offense and America's Vietnam War*. Lawrence, KS: University Press of Kansas, 2005.
- Smart, A. G. "Division MI Battalion Restructure: Can Change Coupled with Technology Help Clear the Fog from the Brigade Battle?" Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1993.
- Stanton, Shelby L. *Rangers at War: Combat Recon in Vietnam*. New York: Orion Books, 1992.

- Swart-Entwistle, Tisha. 2020. "Lundy Retires, Becoming Senior Mentor." *Fort Leavenworth Lamp*, January 16, 2020. <https://www.ftleavenworthlamp.com/community/2020/01/16/lundy-retires-becoming-senior-mentor/>. Accessed April 2, 2020.
- Talbot, David. "How Technology Failed in Iraq." *MIT Technology Review* (November 1, 2004). <https://www.technologyreview.com/s/403319/how-technology-failed-in-iraq/>.
- Taylor, Curtis D. *Trading the Saber for Stealth: Can Surveillance Technology Replace Traditional Aggressive Reconnaissance?* The Land Warfare Papers 53. Arlington, VA: The Institute of Land Warfare, Association of the U.S. Army, 2005.
- Terry, Brendon E. "Maintaining capability and options: dismounted reconnaissance in the division and corps deep area." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 2018.
- Tho, Tran Dinh. *The Cambodian Incursion*. Indochina Monographs. Washington, DC: U.S. Army Center of Military History, 1979.
- U.S. Army Training and Doctrine Command (TRADOC). TRADOC Pamphlet 525-3-1, *The U.S. Army in Multi-Domain Operations 2028*. Washington, DC: Government Printing Office, 2018.
- . TRADOC Pamphlet 525-3-8, *U.S. Army Concept: Multi-Domain Combined Arms at Echelons Above Brigade 2025-2045*. Washington, DC: Government Printing Office, 2018.
- U.S. Joint Chiefs of Staff. Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*. Washington, DC, U.S. Government Printing Office, 2016.
- . Joint Publication 5-0, *Joint Planning*. Washington, DC: Government Printing Office, 2017.
- U.S. President. *National Security Strategy of the United States of America*. Washington, DC: The White House, 2017.