

TIME FOR A CHANGE? COMPOSITE FIELD ARTILLERY BATTALIONS

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

MASTER OF MILITARY ART AND SCIENCE
General Studies

by

STEFAN W. HUTNIK, MAJOR, US ARMY
M.A., Webster University, St Louis, Missouri, 2005

Fort Leavenworth, Kansas
2014-01

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REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>		
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) 13-06-2014		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From - To) AUG 2013 – JUN 2014	
4. TITLE AND SUBTITLE Time for a Change? Composite Field Artillery Battalions			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Stefan W. Hutnik, Major			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 In response to the wars in Afghanistan and Iraq, the United States (U.S.) Army reorganized into a modular Brigade Combat Team (BCT) structure. Generally viewed as a positive step, the field artillery experienced a difficult transition to modularity. Arguably, field artillery effectiveness has diminished on the battlefield. One possible way to enhance effectiveness involves reorganizing an organic Field Artillery Battalion (BN) into a composite structure. Within a composite structure, a Field Artillery BN would be composed of a mix of different artillery systems such as cannons and rockets. In the past, other armies employed a composite Field Artillery BN. In the late 1980s, the South African Army created and employed a composite Field Artillery BN against hybrid threats while fighting in southern Angola.					
15. SUBJECT TERMS Field Artillery, Modularity, South Africa, South African Border War, Battle of Cuito Cuanavale					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. PHONE NUMBER (include area code)
(U)	(U)	(U)	(U)	118	

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

MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of Candidate: Major Stefan W. Hutnik

Thesis Title: Time for a Change? Composite Field Artillery Battalions

Approved by:

_____, Thesis Committee Chair
David W. Christie, M.A.

_____, Member
LTC Matthew McKinley, M.S.

_____, Member
William H. Kautt, Ph.D.

Accepted this 13th day of June 2014 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, 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

TIME FOR A CHANGE? COMPOSITE FIELD ARTILLERY BATTALIONS, by Major Stefan W. Hutnik, 118 pages.

In response to the wars in Afghanistan and Iraq, the United States (U.S.) Army reorganized into a modular Brigade Combat Team (BCT) structure. Generally viewed as a positive step, the field artillery experienced a difficult transition to modularity. Arguably, field artillery effectiveness has diminished on the battlefield. One possible way to enhance effectiveness involves reorganizing an organic Field Artillery Battalion (BN) into a composite structure. Within a composite structure, a Field Artillery BN would be composed of a mix of different artillery systems such as cannons and rockets. In the past, other armies employed a composite Field Artillery BN. In the late 1980s, the South African Army created and employed a composite Field Artillery BN against hybrid threats while fighting in southern Angola.

ACKNOWLEDGMENTS

I would like to express my unending gratitude to my wife Kelly and to my son Jacob. Kelly encouraged me to pursue this study. She also found innumerable ways to lend her support to a husband consumed by a war in Angola and using lessons from that war to, hopefully, improve the field artillery. Jacob allowed me many nights and weekends to think and write about the field artillery when he would have preferred that we played trains or monster trucks.

I also want to thank my committee. Mr. Christie, LTC McKinley, and Dr. Kautt you all provided tremendous insight and answered every question or concern that I had. Additionally, I want to express my appreciation to Mr. Wilsworth, COL Snodgrass, LTC Marshall, LTC Capra, and LTC Walker for their assistance through their valuable and insightful answers to my interview questions. I could not have completed this study without all of your help and assistance.

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ACRONYMS

BCT	Brigade Combat Team
BDE	Brigade
BN	Battalion
COIN	Counterinsurgency
DIVARTY	Division Artillery
DPICM	Dual-Purpose Improved Conventional Munition
DS	Direct Support
FA	Field Artillery
FAPLA	People's Army for the Liberation of Angola
FSCOORD	Fire Support Coordinator
HE	High Explosive
HIMARS	High Mobility Artillery Rocket System
HQ	Headquarters
IBCT	Infantry Brigade Combat Team
MLRS	Multiple Launch Rocket System
MRL	Multiple Rocket Launcher
SA	South Africa
SAAF	South African Air Force
SADF	South African Defense Force
SWAPO	South West African People's Organization
UNITA	National Union for the Total Independence of Angola
U.S.	United States

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CHAPTER 1

INTRODUCTION

Overview

The Field Artillery has gone through a period of transition since the end of the Cold War. Due to challenges presented by the wars in Iraq and Afghanistan, the artillery reorganized from a Division Artillery (DIVARTY) structure where individual battalions had a habitual relationship with a maneuver brigade. Within this structure, the DIVARTY retained the ability to mass subordinate battalions to meet the division commander's requirements to shape the battlefield. Currently, field artillery battalions are organic to a modular Brigade Combat Team (BCT) and focus on providing direct supporting fires to its parent brigade.

Since the end of the Cold War, the battlefield has changed as well. The Army has been fighting on a non-linear battlefield that challenges the ability of organic field artillery battalions to provide fires across a non-contiguous area against a hybrid threat. Since both the operational environment and the threat have changed, organizational structures also changed to reflect the new reality. The Army began this process with the creation of modular BCTs that have demonstrated flexibility during combat operations in both Afghanistan and Iraq. However, the field artillery has not introduced a battalion structure that can complement the inherent flexibility of the BCT.

The Army's decision to transform into modular BCTs conceptually improved the ability of a commander to employ combined arms by organizing a unit that possessed the minimum essential grouping of combined arms under a single commander. This transformation made training easier and more effective as well as ease the process of

deploying to combat. Overall, the concept reinforced the BCT's use of combined arms in support of its battalions. However, since transformation, some leaders believe the field artillery's capabilities have degraded. In the whitepaper, "The King and I" three former BCT commanders noted that the speed and precision of the field artillery has degraded, leading directly to a perceived decline in the artillery's effective support to maneuver units. Training can certainly help to improve the efficiency of the field artillery; however, a reorganization of field artillery battalions also could enhance effectiveness and efficiency. There are organizational structures that provide examples of different ways to employ field artillery. The United States (U.S.) Army has experimented and begun the process of reorganizing field artillery battalions into composite formations. Foreign armies also have employed composite field artillery units. One of these examples is the South African Army. Accordingly, this study will explore the South African Army experience with composite field artillery units.

From August to December 1987, the South African Army conducted a campaign in southeastern Angola. This campaign bore the hallmarks of what the U.S Army is calling hybrid war because the South African Army fought both a regular and an irregular enemy. Conventional South African Army units partnered with an indigenous insurgent group to defeat a Soviet and Cuban allied Angolan Army offensive. During this operation, a composite Field Artillery Battalion (BN) provided fire support to the South African Brigade. This composite battalion contained batteries of towed 155mm howitzers, self-propelled 155mm howitzers, 127mm rockets and 120mm mortars. As noted by both veterans and historians, this field artillery organization provided fires decisive to South African success.

Primary Research Question

Based on the Principles of Fires, would the field artillery's effectiveness increase by reorganizing into composite battalions?

Secondary Research Questions

How did the South Africans use a composite Field Artillery Battalion during Operation Modular and Operation Hooper?

Why did the South Africans develop this concept?

Did this concept increase effectiveness and ease coordination regarding the delivery of fires?

What are lessons learned concerning the use of ad-hoc composite field artillery battalions during Operation Enduring Freedom?

With the planned retirement of Dual-Purpose Improved Conventional Munitions (DPICMs), the field artillery's primary anti-tank munition, would a BCT benefit from rocket fires?

Qualifications

I am a Field Artillery Officer who has served in a variety of assignments from the platoon level through the BCT level. I have deployed to combat on multiple occasions. I deployed in support of Operation Enduring Freedom for three tours and deployed in support of Iraqi Freedom for one tour. Over the course of these deployments, I have been involved in and seen first-hand the challenges involved in integrating indirect fire into maneuver operations. I have also served as a fire support instructor at the Maneuver Center of Excellence (MCoE). At the MCoE, I taught both Captains and Lieutenants how

to integrate indirect fire into their operations. These experiences illuminated two important points. First, my former students expressed their opinion that the field artillery provides great effects on the battlefield. Secondly, my former students felt that the field artillery was not responsive. Therefore, I believe that energy be expended on maximizing the effects and efficiency of the field artillery.

Assumptions

Certain assumptions are necessary to complete this study. I assume that the South African artillery experience provides lessons learned relevant to the American field artillery. I assume that interview participants will answer all questions honestly and these answers will represent honest, professionally relevant opinions applicable to this study.

Definitions

The Principles of Fires:

Brigade Combat Team (BCT): A combined arms organization consisting of a Brigade (BDE) Headquarters (HQ), at least two maneuver battalions, and necessary supporting functional capabilities.¹

Composite: Made up of various types or components.

Composite Field Artillery Organization: A Field Artillery Unit comprised of more than one artillery system.

Modular Units: Units that are organized and fully trained to accomplish multiple missions simultaneously. The modular force is designed to be able to transition

¹Department of the Army, ADRP 1-02, *Operational Terms and Military Symbols* (Washington, DC: Department of the Army, 2012), 1-6.

seamlessly from combat to other stability, security and reconstruction missions, and immediately resume combat operations if necessary.²

Networked: Interconnected weapon systems and sensors that enable mission command and provide rapid target acquisition, target discrimination, and target engagement in accordance with the commander's intent.³

Precision: Providing a coordinated effect on a specific target characterized by having a high degree of accuracy using guidance control and correctable ballistics.

Responsive: Employment of fires capabilities in an expedient manner meeting the needs of the supported forces.

Scalable: Fires capabilities that are adaptable, versatile, and capable to a degree that allows intended effects to be achieved through nonlethal to lethal capabilities.

Synchronized: Fires arranged in time, space and purpose in order to produce the desired effect at a decisive place and time; in fires context, the application of sources and methods in concert with the operation plan to ensure lethal and non-lethal effects are executed in time to support the commander's objectives.

Limitations

Time is a major constraint concerning this study because it will limit the amount of information collected from interviews. The limited information could reduce the validity of the study because not all relevant professional opinions may be considered.

²*The Modular Force Primer* (Fort Belvoir: Army Force Management School, 2010), 28.

³Department of the Army, ADRP 3-09, *Fires* (Washington, DC: Department of the Army, 2012), 1-8.

Professional opinions may not represent the full thinking of either field artillery or maneuver professionals.

Delimitations

The creation of a composite Field Artillery BN will likely lead to doctrinal changes, this study does not question current field artillery doctrine. Interviews of American officers will be limited and share common professional experiences. These shared experiences include service in operational units that conducted combat operations and service in institutional organizations training and educating Army leaders. This group of officers represent three categories. The first type of participant includes field artillery officers currently serving as Field Artillery Battalion Commanders/ BCT Fire Support Coordinators (FSCOORDs). These officers are currently responsible for advising BCT commanders on the best ways to integrate fires into combined arms operations. The second type of participant includes field artillery officers who have served as BCT Fire Support Officers, Field Artillery Battalion Operations Officers, and Field Artillery Battalion Executive Officers. The third type of participant includes maneuver officers who receive the provided fire support.

Conclusion

This study explores the concept of a composite Field Artillery BN. Chapter 2 explores the background of this subject through a literature review. The literature review will focus on three major areas. The first area of exploration concerns the South African Border War where a composite Field Artillery BN supported a modular BCT during combat operations. The second area of exploration will be concerning the American

Army's concept of modularity and the transformation to BCTs. The third area will concern the American Field Artillery by exploring the challenges posed by transformation and the perception that the field artillery is no longer responsive to the needs of maneuver commanders. This third area will also note examples of U.S. ad-hoc composite battalions. Chapter 3 presents a case study centering on the South African employment of a composite Field Artillery BN during the Battle of Cuito Cuanavale in 1987.

Chapter 4 discusses the methodology used in this study. Chapter 5 analyses composite field artillery battalions using the Principles of Fires. Chapter 6 presents conclusions as well as recommendations for creation of composite field artillery battalions as well as recommendations for future study on the topic. Appendix A provides the strategic background to the South African Border War. Appendix B includes the complete interviews used in this study.

CHAPTER 2

BACKGROUND

This study concerns whether the reorganization of field artillery battalions into composite organizations would increase effectiveness. This chapter will present an overview of the literature that exists concerning this subject. Specifically examined will be South African operations during the Battle of Cuito Cuanavale (Operations Modular and Hooper) in 1987. During this battle, the South African Army organized their field artillery units into a composite structure that provided supporting fires throughout the five-month battle. It will examine the concepts of modularity because this concept is the current reality for Army organization and modularity will remain the basis for Army organization into the future. Also examined is the field artillery to illustrate the challenges faced by the artillery and recommendations made to overcome contemporary challenges.

South African Border War

Both historians and participants have written about the South African Border War. The war originated because Namibian insurgents sought independence from South Africa. The war spread to Angola when South African military forces intervened to destroy insurgent basecamps. The Angolan government, supported by Cuban military forces, also suffered from an internal insurgency. Military operations took place along the Namibian-Angolan border whose size, scope, and intensity grew until these operations climaxed during the Battle of Cuito Cuanavale in 1987. The majority of works concerning the Border War focus on the Battle of Cuito Cuanavale because it was the

largest land battle of the war. Many authors writing on the subject agree that South African artillery played a dominant role in the tactical evolution of the battle. Disagreements among the authors focus on the decisiveness of the battle. British and South African authors primarily describe a tactical victory that allowed the Republic of South Africa to achieve major strategic goals. These goals included the negotiated end of Communist support to the Namibian insurgency and the removal of Cuban combat forces from Angola. The accomplishment of these goals supported the primary South African strategic objective of free and fair elections in Namibia. An independent Namibia allowed South Africa (SA) to divest itself of its decades old League of Nations mandate. Therefore, South Africa, Angola, and Namibia could develop without foreign interference.⁴

Communist sources describe the tactical battle similarly to the South Africans, but they interpret the strategic results of the battle differently. The Cuban and Russian authors discussed below describe a situation where a battle-weary South African government entered into negotiations because it realized that it could not defeat the Cuban Army. These negotiations cause the black African populace of SA to assert their rights and the minority white government to end Apartheid.⁵ Although the consequences of the battle are interpreted differently, it should be noted that the South African use of artillery is a major component of all histories and recollections of the battle.

⁴Fred Bridgland, *The War for Africa: Twelve Months that Changed a Continent* (Gibraltar: Ashanti Publishing, 1990), 373-377.

⁵Vladimir Shubin, *The Hot Cold War: The USSR in Southern Africa* (Scottsville: University of KwaZulu-Natal Press, 2008), 112 and 264.

South African Border War

The South African Border War began, in part, due to the collapse of the Portuguese Empire. Various insurgent groups that fought the Portuguese for Angolan Independence would be on opposing sides during the civil war that climaxed at Cuito Cuanavale. Peter Abbott and Manuel Rodrigues' *Modern African Wars 2: Angola and Mozambique 1961-74* discusses the war between the Portuguese and these insurgent groups. John P. Cann discusses Portuguese counterinsurgency (COIN) tactics as part of the Angolan War of Independence in *Counterinsurgency in Africa: The Portuguese Way of War 1961-1974*. These works are crucial because it helps to explain the vacuum created by Portuguese withdrawal from Africa that led to South African intervention in Angola.

Fred Bridgland's *The War for Africa: Twelve Months that Transformed a Continent* is a significant source concerning the Battle of Cuito Cuanavale. Published in 1990, it recounts the battle primarily from post-combat reports and interviews with the South African participants. This book discusses both South African strategy, tactics and the integration of combined arms. Specific to the field artillery, the book presents assessments from both artillerymen and maneuver officers that speak to the effectiveness of a composite field artillery organization.

Peter Polack's *The Last Hot Battle of the Cold War* written by Peter Polack is the most recent book published on the battle. Released in 2013, it describes the battle as an important event within the prism of the Cold War. Polack's book expands the literature on the battle because he integrates information from all the major participants. Polack

provides detail on the role of both Cuban and National Union for the Total Independence of Angola (UNITA) forces and he integrates Soviet recollections.

South African author and Cuito Cuanavale veteran Clive Wilsworth wrote *First In Last Out: The South African Artillery in Action 1975-1988*. This is a significant work concerning the use of South African Field Artillery throughout the entire Border War. Former artillery officer Wilsworth explains South African artillery tactics, techniques, and procedures. The book also presents the evolution of the field artillery from a branch with obsolete equipment to the dominant arm on the battlefield. Additionally, the book presents the tactical evolution of the branch as composite formations were first used and as they evolved into formation of choice during the Battle of Cuito Cuanavale.

General (retired) Janie Geldenhuys' *At the Front* and Hilton Hamann's *Days of the Generals* present both the Border War and the Battle of Cuito Cuanavale from the operational and the strategic perspective. Both works discuss the decisions made by senior army officers throughout the period. These works help to describe why the South Africans became involved in a ground war in Angola and what the South African leadership hoped to gain through combat operations which was the defeat of insurgent groups operating in Namibia and Angola.

John W. Turner's *Continent Ablaze* and Helmoed-Romer Heitman's *Modern African Wars (3): South West Africa* provides a general overview of the Border War. These books also provide background information on the other conflicts that affected the conduct of the Border War. Both works discuss South African military units. Turner also provides significant discussion of UNITA and the People's Army for the Liberation of Angola (FAPLA).

The South African Army is discussed in detail in several books. Helmoed-Romer Heitman provided historical information about the development of the South African Army as well information about Army doctrine in his *South African War Machine*. He also provided information about weapons capabilities. David Williams' *On the Border* provided information about the experience of regular soldiers during the duration of the Border War. Author Michael H. H. Warren wrote *In the Name of God: Defending Apartheid* and discusses his experiences as an infantry platoon leader during the Border War. Although Warren did not fight at Cuito Cuanavale, his recollections provide background on both the South African Army and the Border War period in general. Piet Nortje's *32 Battalion* is a history of an Infantry BN during the Border War. It played an important role in the Battle of Cuito Cuanavale.

South African authors have written the majority of scholarship concerning the South African Border War and the Battle of Cuito Cuanavale. Therefore, to gain a balanced view and to validate if South African Field Artillery was as decisive as is claimed, it is important to find published material by their adversaries. Vladimir Shubin's *The Hot Cold War: The USSR in Southern Africa* provides the strategic and operational background to Soviet efforts in Southern Africa. The book also speaks to why the Battle of Cuito Cuanavale is seen by the Soviets as a strategic Communist victory. Editors Gennady Shubin and Adrei Tokarev provide a collection of remembrances written by Soviet advisors in *Bush War: The Road to Cuito Cuanavale*. These professional Soviet soldiers advised FAPLA throughout the Border War. Their memories of the Battle of Cuito Cuanavale are important because they testify to the significant effect that South African Field Artillery played in the battle.

Cuban military units and advisors also participated in the Cuito Cuanavale. Edward George's *The Cuban Intervention in Angola, 1965-1991: From Che Guevara to Cuito Cuanavale* provides a history of Cuban military intervention in Angola. It describes the Battle of Cuito Cuanavale from the Cuban perspective and provides testimony regarding the effectiveness of South African artillery. The article, "Days of Glory" is an English translation of portions of the official Cuban view of the Battle of Cuito Cuanavale. While the Cubans believe that they won a victory, they also provide evidence relating to the effectiveness of South African Field Artillery.

An American interpretation of the battle, "Fighting Columns in Small Wars: An OMFTS Model" by Major Michael F. Morris, uses the battle as a case study on future employment of Marine Forces. Significantly, Major Morris' analysis reveals the importance that the South African artillery played in the fighting. Calling it, "the star of the campaign."⁶ Major Morris also believes that the Marine Corps should emulate the South African example by employing multiple fire support systems in support of an operation.⁷

Modularity

Arguably, one of the most important changes to the U.S. Army since the end of the Cold War is the creation of modular BCTs. *Transforming an Army at War: Designing the Modular Force 1991-2005* relates the history behind the modular brigade. In "The

⁶Michael F. Morris, "Fighting Columns in Small Wars: An OMFTS Model" (Thesis, United States Marine Corps Command and Staff College, Quantico, VA, 2000), 47.

⁷Ibid., 88.

Genesis of Transformation: The Rise of the United States Army's Modular Brigade Combat Teams" author Jason Pardee recounts the reasons that the Army created modular BCTs. Pardee found three major reasons behind transformation to modularity. These reasons were a change in the world's security environment, civilian leadership demanding change, and innovative Army leaders. The Army Force Management School's *The Modular Force Primer* provides a brief description of modular transformation. The primer discusses the force structure and the capabilities of transformed BCTs.

The Rand Corporation produced a study for the Office of the Secretary of Defense entitled, "A Review of the Army's Modular Force Structure." This study found that modular BCTs have been successful in combat. The study reports that former commanders believe that BCTs possess enhanced organizational flexibility and responsiveness due to modular design, while reducing overall risk because more assets are organic to the BCT. The study concludes that BCTs are a superior force design structure and that BCTs are more versatile on the battlefield.

Many works concern the causes and the consequences of modularity. In "Transformation . . . Was it Worth It," Colonel John F. Dunleavy explains the causes of transformation, the challenges that modularity has caused, and recommendations on how to improve modular BCTs. Specifically related to the field artillery, Dunleavy recommends increasing the artillery capabilities within each BCT. In the article, "Why Small Brigade Combat Teams Undermine Modularity," Stephen L. Melton discusses the challenges associated with modular BCTs related to their force structure and size. Melton argues, at the time of publication, that BCT structures are too small to handle their battlefield missions. Specifically of interest to this study, Melton submits that field

artillery battalions should contain MLRS capability to support both deep fires and counterfire operations.

Artillery

Two works, written by maneuver officers, explore the reasons why these leaders believe that field artillery units are not responsive to their needs. In “Classical Fire Support vs. Parallel Fires,” Lieutenant Colonel Robert R. Leonhard argues that the field artillery is not responsive because of doctrinal differences that exist between the field artillery and the maneuver formations. Leonhard believes that the field artillery lost focus concerning providing direct supporting fire support. In the whitepaper, “The King and I: The Impending Crisis in Field Artillery’s Ability to Provide Fire Support to Maneuver Commanders,” states the responsiveness of the field artillery has degraded. The authors call for additional effort to maintain these responsive fire support capabilities because they are crucial to the success of combined arms operations.

Other works, written by artillery officers, explore the challenges faced by the field artillery internally. In “Fixing What Was Not Broken: A Future for Fires” Colonel Dennis C. Smith argues that modularity caused many of the challenges faced by today’s field artillery. Smith discusses training challenges that adversely affected the fire support system after assigning forward observers directly to maneuver formations. Additionally, Smith discusses the need for both precision and non-precision munitions to support combat operations. Overall, Smith identifies that the Force Design Update that returns forward observers to a BCT’s Field Artillery BN for training as a major step forward to enhancing the effectiveness of the field artillery on future battlefields. In the monograph, “Is the U.S. Army Field Artillery Prepared to Support the Next Major Combat

Operation?” Major James Cobb argues that the artillery needs to enhance the ability to mass fires, integrate indirect fires with Close Air Support, and ensure logistical capability.

In his monograph, “Effects of Modularity on the Field Artillery Branch,” Colonel Noel T. Nicolle chronicles the current state of the field artillery and offers recommendations to improve the branch. Nicolle illustrates that by 2009 modularity contributed to a growing perception within the Army that the field artillery was losing its relevance on the modern battlefield. Modularity reduced the focus on field artillery training within a maneuver centric BCT and therefore contributed to a reduction in field artillery effectiveness. Nicolle recommends that the field artillery increase the number of field artillery brigades and that one be aligned with each division, increase the rank of the Corps FSCOORD to improve fire support oversight, and reassign all BCT level fire support personnel to the BCT’s organic Field Artillery BN.

In his article, “Field Artillery at the Crossroads of Transformation,” Lieutenant Colonel Tommy Tracy presents the effectiveness of field artillery across multiple conflicts including Vietnam, Operation Desert Storm, and Operation Iraqi Freedom and argues that the artillery suffers from a perception problem regarding its capabilities. He also argues that artillery faces risk due to limited numbers of howitzers and limited ranges when compared with other nations. Tracy recommends equipment upgrades. He also advocates the establishment of composite battalions and endorses the inclusion of either MLRS or High Mobility Artillery Rocket System (HIMARS) into a BCT’s Field Artillery BN.

Similar recommendations calling for the establishment of a composite field artillery organization can be found in Major Sherman Watson's monograph, "Artillery is Here to Stay-For Now." Watson concludes that there should be two organizational changes to the field artillery. Watson believes that change within the General Support Field Artillery formations is required to make them more responsive to BCTs. Additionally, he believes that the addition of a rocket platoon within a BCT's organic Field Artillery BN will improve the scalability of fire support.

Although authors recommended the formation of composite field artillery organizations, the Army already has a history of forming composite field artillery organizations during period of need. "Task Force Hawk" and "The Operational Challenges of Task Force Hawk" recount operations in the Balkans where the Army formed a brigade sized combined arms organization named Task Force Hawk. If Task Force Hawk conducted combat operations, the unit would have received fire support from both MLRS and cannon units. The Army formed composite field artillery battalions to support combat operations in Afghanistan. The 10th Mountain Division provides examples of composite battalions. The article, "B/3-6FA: 120mm Mortar Battery in Afghanistan," discusses a mortar battery that was part of a 105mm Howitzer BN from 2003 to 2004. The article "Allons Artillery Battalion Reinvents Itself for Afghanistan Deployment," discusses a Field Artillery BN that certified its crews to employ both 105mm howitzers and 155mm howitzers for use in combat.

Other field artillery battalions that have used composite structures receive coverage in the 2012 Red Book article, "U.S. Army Field Artillery Units." Scott R. Gourley profiles the only composite Field Artillery BN in the Army at the time of

publication in “4-27 Field Artillery-The Army’s Fires Test Unit.” Gourley discusses the testing that supports the integration of the different systems used in the fire support community.

Over the past decade, the Army transformed its tactical organization to prosecute the wars in Afghanistan and Iraq. Modular BCTs became the formation of choice and allowed a Brigade Commander to lead a deployable combined arms organization. Studies indicated that modular structure improved the effectiveness and efficiency of a brigade. However, studies also indicated that field artillery units experienced an atrophy of their skills and thus both their effectiveness and responsiveness during this same period. Authors present differing recommendations regarding the best way to improve the field artillery. One possible solution involves a reorganization of the field artillery into a composite structure. In 1987, The South African Army provided a recent example of employment of a composite Field Artillery BN supporting a BCT during combat operations.

CHAPTER 3
COMPOSITE FIELD ARTILLERY
BATTALION IN COMBAT

Introduction

From 1966 to 1989, South Africa executed combat operations in both Namibia and Angola. The South African Defense Force (SADF) conducted COIN operations and conventional military operations throughout this conflict. Specifically related to this study, the South African Army employed composite field artillery units during conventional combat operations from 1985 to 1988. This case study focuses on the Battle of Cuito Cuanavale which took place in southern Angola from 1987 to 1988. During this battle, the South Africans fielded a BCT that received its fire support from an organic composite Field Artillery BN. This section discusses South African Field Artillery tactics, techniques, and procedures, weapons systems, and tactical employment. Additionally, a separate section presents the American Field Artillery to draw comparisons and identify lessons learned from the South African experience. This section aims to lay the framework for analysis on the potential use of a composite structure within the American Army.

South African Artillery Employment

The South African Army employed its artillery differently than the American Army. Therefore, it is important to understand the roles of the South African artillery and artillerymen to understand their employment. During Operations Modular and Hooper, individual batteries were task organized to individual maneuver battalions. The Battery

Commander was a Major who usually located himself with the supported maneuver BN Commander and served as the FSCOORD. However, the senior Field Artillery Commander retained the ability task batteries for specific missions to meet the brigade commander's intent. Additionally, the supported maneuver battalion was responsible for providing security including the defense of each individual battery. Normally, each battery was composed of two troops each with a troop commander. The troop commander, normally a captain, was in charge of a static firing point that their unit occupied. An Observation Post Officer led the forward observers when they were occupying a static observation post. A Forward Observation Officer led the forward observers who integrated directly into a maneuver unit. The system's demonstrated flexibility was dependent on how well the battery commander elected to employ the observers directly assigned to his command. A preferred tactic was to deploy the Observation Post Officer in an aircraft because all South African artillery officers received air observation training as a requirement for promotion to captain.⁸ The Forward Observation Officer deployed on foot with the maneuver unit. Battery commanders could also elect to infiltrate behind enemy lines to control their unit's fires.⁹ This system allows forward observers to be employed both flexibly and redundantly to meet the commander's intent at all levels.

⁸Clive Wilsworth, *First In Last Out: The South African Artillery in Action 1975-1988* (Johannesburg: 30 Degree SouthPublishers, 2010), 219.

⁹Ibid., 29.

South African Equipment

The SADF fielded a mix of modern and obsolete equipment. In 1977, The United Nations imposed an arms embargo due to South Africa's Apartheid policies that added to existing sanctions imposed over South Africa's control of Namibia. Constrained by the embargo, the navy and air force had difficulty replacing and upgrading its equipment. The South African Army developed the majority of its equipment domestically.¹⁰ The South African Army's equipment was considered world-class particularly in the areas of mine resistant vehicles due to the vehicle's survivability and field artillery due to accuracy.¹¹

The South African Army fielded two types of 155mm howitzers. These howitzers were the G5 and the G6. The G5 is a 155mm towed howitzer that was the primary artillery system used by the South Africans. The second howitzer was the G6. The G6 is a wheeled self-propelled 155mm howitzer that had the advantage of driving itself into the area of operations. The G6s employed during Operation Modular were preproduction models.¹² Both systems had a maximum conventional range of 30,000 meters and an extended range of 37,500 meters with base-bleed ammunition.¹³ Ammunition included

¹⁰Helmoed-Romer Heitman, *South African War Machine* (New York: Gallery Books, 1986), 122.

¹¹David Williams, *On the Border: The White South African Military Experience* (Cape Town: Tafelberg, 2008), 66.

¹²Wilsworth, *First In Last Out*, 264.

¹³Heitman, *South African War Machine*, 45.

High Explosive (HE), White Phosphorus, Red Phosphorus, HE Cluster (contained 72 sub-munitions for use against armor), smoke, colored smoke, and leaflet munitions.¹⁴

The Valkiri is a self-propelled multiple rocket launcher (MRL) that was fielded in 1981.¹⁵ The Valkiri is armed with twenty-four 127mm rockets. Each rocket contains 6,400 steel balls and a ripple effects a 1,500 square meter area. Designed to strike either personnel or soft-skinned vehicles, the fuzes are either point detonating or proximity. The Valkiri can fire one rocket every second or programmed for particular intervals. The Valkiri has a minimum range of 7,500m and a maximum range of 22,500m.¹⁶

The South African Army also employed mortars. Maneuver units employed both 60mm and 81mm mortars for organic close supporting fires. The South African artillery employed the M5 120mm mortar. The South Africans ruggedized the Israeli designed M5 to meet local requirements. The M5 fired HE, HE Rocket Assisted Projectile (RAP), white phosphorus, colored smoke, and illumination rounds. The M5 had a conventional range of 6,500 meters and HE RAP rounds had a range of 12,000 meters. Normally mounted on a 10-ton truck, the M5 had the same mobility as maneuver units.¹⁷

The majority of South African Army maneuver units employed around Cuito Cuanavale used wheeled vehicles. The Eland family of vehicles were armored cars armed with either a 90mm low-recoil gun or a co-axial machine gun. Elands provided flexibility

¹⁴Wilsworth, *First In Last Out*, 307.

¹⁵Ibid., 217.

¹⁶Wilsworth, *First In Last Out*, 217; Heitman, *South African War Machine*, 45.

¹⁷Wilsworth, *First In Last Out*, 218.

by executing reconnaissance and anti-tank missions.¹⁸ The Ratel family of vehicles were infantry fighting vehicles armed with a 90mm low-recoil gun, a 20mm semi-automatic cannon, or a 12.7mm machine gun. Configured as mortar carriers, Ratels carried 60mm or 81mm mortars.¹⁹ The South Africans also fielded the Olifant Main Battle Tank. The Olifant, based on the 1950s British Centurion tank, received capabilities upgrades to include a 105mm main gun and a modern fire control system.²⁰

The South Africans also used drone aircraft, which were uncommon in 1987. The Seeker had a range of 200 km and could provide roughly two hours of real-time video surveillance. The Seekers provided valuable information and attracted FAPLA Surface to Air Missile fire that inadvertently served to provide additional targets for the artillery.²¹

Early Composite Experiments

The South African Army executed multiple operations across the Namibian-Angolan border. The Angolan province of Cuando Cubango was an area of prolonged conflict. Cuando Cubango province contained logistical hubs used by both FAPLA and UNITA. UNITA's basecamps were the towns of Mavinga and Jamba. The area around Mavinga provided UNITA with foodstuffs, and housed two logistical bases, a training base, and a hospital. UNITA used Mavinga's airfield to receive supplies from SA and later from the United States. Jamba served as UNITA's capital. FAPLA controlled a

¹⁸Williams, 64.

¹⁹Ibid., 65.

²⁰Heitman, *South African War Machine*, 44.

²¹Peter Polack, *The Last Hot Battle of the Cold War* (Philadelphia: Casemate Publishers, 2013), 47.

basecamp and an airstrip at the town of Cuito Cuanavle. The area between Cuito Cuanavale and Jamba would be the site of multiple operations as the opposing sides attempted to wrest control of their enemy's bases.²² The South African Army introduced composite artillery formations during operations in Cunado Cubango province.

In September 1985, FAPLA deployed its Cuban supported conventional brigades into southeastern Angola. This deployment threatened the UNITA bases located at the towns of Mavinga and Jamba. Due to this FAPLA action, the South African Army deployed a rocket battery and an observer team to integrate rocket fires with UNITA's 120mm mortar units.²³ Titled Operation Wallpaper, South African observers infiltrated behind FAPLA lines to adjust UNITA mortar fire and provide BDA concerning South African rocket fire. During the initial phases of Operation Wallpaper, the South Africans reported that fires killed 112 FAPLA soldiers to include a Brigade Commander. Additionally, the South Africans assessed that fires delayed FAPLA movement for eight days.²⁴

On 26 September 1985, FAPLA shifted their axis of advance to outflank UNITA positions and continued their movement westwards towards Mavinga.²⁵ FAPLA attacked UNITA positions and the South African artillery delivered fire support to their UNITA allies. During the fighting around Mavinga, the South African artillery fired 3240 rockets across 37 fire missions. These fires inflicted 1,500 FAPLA casualties, damaged or

²²Ibid., 22-23.

²³Wilsworth, *First In Last Out*, 241.

²⁴Ibid., 243.

²⁵Ibid., 244.

destroyed 71 vehicles, and destroyed one MI-25 helicopter.²⁶ Due to its heavy casualties, on the night of 30 September 1985, FAPLA's four brigades received orders to retreat. UNITA retained its basecamps and the SADF supported the defeat of their common enemy. FAPLA's Cuban allies stated South African fires defeated the offensive²⁷ and described the operation as disastrous.²⁸ Specifically relating to fires, "this operation finally proved that the judicious use of rockets in the right hands could be the deciding factor in a defensive battle."²⁹ Additionally, Operation Wallpaper demonstrated the "deadly accuracy" and effectiveness of rocket fire to South African maneuver leaders.³⁰

The South African Army continued its experimentation with composite field artillery formations during Operation Alpha Centauri. Executed in August 1986, Operation Alpha Centauri involved South African units supporting UNITA's preemptive offensive to disrupt FAPLA forces located near their basecamp of Cuito Cuanavale. The South African Army committed the newly formed 32nd Artillery Group that contained a rocket battery and a towed 155mm howitzer battery. These two batteries would provide fire support to the 13 UNITA battalions scheduled to attack towards Cuito Cuanavale.³¹

²⁶Ibid., 245.

²⁷Edward George, *The Cuban Intervention in Angola, 1965-1991: From Che Guevara to Cuito Cuanavale* (New York: Routledge, 2005), 194.

²⁸*Days of Glory: The Final Defeat of South Africa in Angola* (Cuban Government Publication), 2.

²⁹Wilsworth, *First In Last Out*, 246.

³⁰Piet Nortje, *32 Battalion: The Inside Story of South Africa's Elite Fighting Unit* (Cape Town: Zebra Press, 2004), 218.

³¹Wilsworth, *First In Last Out*, 252.

The 32nd Artillery Group arrived in Angola on 1 August 1986.³² South African artillery planners decided to integrate UNITA 120mm and 81mm mortars into the combined fire plan. This integration was necessary because South African planners wanted their artillery to conduct preparatory fires, use UNITA mortars to provide close supporting fires thus allowing South African artillery to shift focus to deeper targets.³³

The 32nd Artillery Group began executing fire missions on 10 August 1986. One of the first fire missions of the battle set the tone. A single G-5 fired one round at maximum charge to the north-northwest of Cuito Cuanavale. This single round impacted inside a FAPLA ammunition point and set off a series of explosions that burned for two days.³⁴ South African artillery continued supporting UNITA by engaging targets until 15 August 1986 when the operation ended. Through both radio intercepts and reporting, the South Africans determined artillery effectiveness. 32nd Artillery Group fires destroyed three radars, five PT-76s, the fuel point, ammunition point, and rendered the Cuito Cuanavale airfield incapable of operations.³⁵ Cuban reports stated that two days of South African artillery fire damaged the airfield's radar, anti-aircraft systems, closed the runway and destroyed several ammunition supply points.³⁶ Furthermore, SADF analysts

³²Ibid., 255.

³³Ibid., 252, 255.

³⁴Ibid., 259.

³⁵Nortje, 229.

³⁶George, 198.

assessed the destruction of FAPLA's 25th BDE and that FAPLA would be unable to conduct offensive operations for a year.³⁷

Battle of Cuito Cuanavale

In 1987, Communist Angolan and Cuban forces mounted an offensive in southeastern Angola. Similar to the previous two years, the Communist objective was to seize the UNITA basecamps at Mavinga and Jamba. The Battle of Cuito Cuanavale can be broken into four phases. Phase I involved the Communist build-up near Cuito Cuanavale and their springtime advance to the Lomba River. The SADF focused on intelligence gathering and training UNITA units actively defending against FAPLA. During Phase II, August and September 1987, FAPLA units crossed the Lomba River and the SADF committed ground forces to support UNITA's defense. Phase III took place during September to December 1987 and saw FAPLA units retreating under pressure from both UNITA and the South Africans. FAPLA retreated to their start point of the offensive. During Phase IV, December 1987, FAPLA continued to retreat to a third defensive line. After this retreat, the battle effectively ended because South African artillery destroyed the Communist logistics hub located at Cuito Cuanavale.³⁸

Phase I

In March, South African reconnaissance teams operating in Angola identified Communist forces deploying to the southeastern part of the country.³⁹ By April, SADF

³⁷Wilsworth, *First In Last Out*, 260.

³⁸*Ibid.*, 262-263.

³⁹Bridgland, 27.

elements confirmed large FAPLA movements centered on Cuito Cuanavale.⁴⁰ The FAPLA force was composed of five brigades (16 BDE, 21 BDE, 25 BDE, 47 BDE, and 59 BDE).⁴¹ FAPLA instituted reforms based on lessons learned from the 1985 and 1986 battles. FAPLA debuted aggressive maneuver tactics integrated with artillery, employed advanced Soviet systems, and enjoyed enhanced logistics.⁴² Accompanying the communist advance were Soviet advisors. Impressed by his Angolan allies, one Soviet advisor believed the well-armed and trained Angolans would acquit themselves well during the coming offensive.⁴³

The South African government deliberated whether to intervene in Angola again. Presented with different courses of action, the President of South Africa, P.W. Botha, determined that intervention was necessary to support UNITA and halt the communist offensive threatening their allies. Directed to fight a defensive battle, the SADF would credit all tactical success to UNITA. Additionally, SADF leaders were told to lose no men or equipment while accomplishing all of their assigned objectives.⁴⁴

⁴⁰Hilton Hamann, *Days of the Generals* (Cape Town: Zebra Press, 2001), 88.

⁴¹Bridgland, 29.

⁴²*Ibid.*, 45.

⁴³Gennady Shubin and Andrei Tokarev, eds., *Bush War: The Road to Cuito Cuanavale* (Auckland Park: Jacana Media, 2012), 152.

⁴⁴Bridgland, 33.

Phase II

On 8 August 1987, the elements of the 32 BN arrived at Mavinga to support UNITA units defending the Lomba River.⁴⁵ On 13 August 1987, the South African artillery fired its first mission when M5s fired at FAPLA's 47 BDE and 49 BDE. This mission temporarily halted FAPLA's advance.⁴⁶ On 14 August 1987, the five FAPLA brigades prepared to cross the Lomba River and begin the offensive to seize Mavinga and Jamba. The South African artillery initiated fire missions with both Valkiris and M5s.⁴⁷ FAPLA's advance stalled for several days.

During this interim, the SADF initiated a significant administrative step by creating the 20th Artillery Regiment. Primarily composed of batteries originating from the 4th Artillery Regiment, the field artillery now had one headquarters to command and control operations. The command and control structure of the artillery paid significant dividends during the upcoming battle especially by forming the core of the soon to be established 20th BDE HQ.⁴⁸ The 20th Artillery Regiment was composed of three firing batteries and attachments:

P Battery (127mm Valkiri), an anti-aircraft troop, and UNITA Stinger teams

Q Battery (155mm G5) and UNITA Stinger Teams

S Battery (120mm M5).⁴⁹

⁴⁵Wilsworth, *First In Last Out*, 264.

⁴⁶Nortje, 236.

⁴⁷Hamann, 89.

⁴⁸Wilsworth, *First In Last Out*, 267.

⁴⁹Polack, 45.

The FAPLA's units continued their advance on 17 August 1987. On 19 August 1987, 47 BDE and 59 BDE assembled on slightly elevated terrain roughly seven km from advanced SADF artillery positions. The South Africans initiated fire missions against the Angolan concentration. S Battery fired 32 120mm mortar rounds and P Battery fired two MRL ripples. Following these missions, the South African artillery jumped to new firing points to avoid Angolan counterbattery fire.⁵⁰

On 25 August 1987, P Battery fired multiple ripples at both 47 BDE and 59 BDE. Signals Intelligence (SIGINT) intercepts reported that these missions destroyed five tanks, an artillery battery and an infantry company.⁵¹ Angolan counterbattery fires were inaccurate.⁵²

During August 1987, UNITA engaged in direct combat with FAPLA. UNITA withdrew under pressure, but used their own mortars effectively against their adversaries. UNITA also limited the ability of FAPLA to employ their Soviet built aircraft by employing American supplied Stinger missiles.⁵³ The SADF also employed mobile teams to disrupt FAPLA's armor while they consolidated their arriving forces.⁵⁴

On 4 September 1987, the South Africans received a new commander. Colonel Deon Ferreira who assumed command of the newly designated 20 SA BDE. Ferreira had the reputation as an aggressive commander and his subordinates believed that the BDE

⁵⁰Wilsworth, *First In Last Out*, 269; Bridgland, 39-40.

⁵¹Wilsworth, *First In Last Out*, 270.

⁵²Bridgland, 41.

⁵³*Ibid.*, 37.

⁵⁴*Ibid.*, 45.

would soon begin offensive operations. Upon taking command, Ferreira reorganized his unit into three combined arms combat groups (CG). Combat Group A's (CGA) mission was to halt FAPLA's 47 BDE located south of the Lomba River and moving eastwards to link-up with 21 BDE and 59 BDE. Combat Group B's (CGB) mission was to prevent FAPLA's 21 BDE and 59 BDE from crossing the Lomba River and threatening Mavinga. Both CGA and CGB were task organized with UNITA forces.⁵⁵ Combat Group C (CGC) served as the BDE reserve. All three CGs had roughly the same number of soldiers.⁵⁶

In early September, the first G5s arrived and immediately began executing fire missions. The first G5 fire mission of the battle struck the 21 BDE's HQ.⁵⁷ 21 BDE's advance began to stall because of the constant artillery bombardments. South African fires were so effective that 21 BDE dispersed their units.⁵⁸ 47 BDE also saw their advance stall because of South African fires. Subjected to nightly rocket and artillery fires, 47 BDE only moved a kilometer per day.⁵⁹

Phase III

Fighting intensified during the second week of September after 21 BDE established a bridgehead over the Lomba. From 10 to 11 September 1987, CGB attacked the bridgehead, destroyed one FAPLA BN, and forced another battalion to retreat. G5s,

⁵⁵Ibid., 61-62.

⁵⁶Polack, 47.

⁵⁷Bridgland, 52.

⁵⁸Ibid., 64.

⁵⁹Ibid., 63.

Valkiris, and M5s provided fire support to the operation.⁶⁰ Artillery fires damaged a FAPLA mobile bridge, destroyed two D30s, destroyed a 120mm mortar, and inflicted heavy casualties on FAPLA infantry.⁶¹

On 13 September 1987, CGB continued its offensive by attacking a FAPLA logistics base. The South African attack penetrated through prepared defenses and through lines of retreating FAPLA infantry. Both G5s and M5s provided close supporting fires with rounds impacting within 200m of South African forces.⁶² FAPLA unsuccessfully counterattacked to recover their logistics base. At the end of the fighting, the South Africans assessed that 250-300 FAPLA were killed, five tanks were destroyed, one truck destroyed, and a TMM bridging vehicle captured.⁶³ Directed not to cross the Lomba, CGB prepared to block any future crossings.

Despite not crossing the Lomba, South African fires continued to inflict damage on 21 BDE. On 17 September 1987, P battery fired a ripple of rockets and Q Battery fired cannons that killed and wounded FAPLA Infantrymen and destroyed a tank. On 19 September 1987, both P Battery and Q Battery fired together again when forward observers located a concentration of FAPLA infantry and vehicles. South African observers reported all vehicles destroyed. On 20 September 1987, P Battery, firing 96 rockets, counter-fired on 21 BDE's BM-21s silencing FAPLA fires. On 24 September 1987, Q Battery damaging two vehicles and killed many infantryman. On 25 September

⁶⁰Ibid., 67.

⁶¹Wilsworth, *First In Last Out*, 276-277.

⁶²Bridgland, 75.

⁶³Ibid., 80.

1987, after targeting likely landing zones, South African fires destroyed a helicopter gunship evacuating personnel from the 21 BDE area.⁶⁴ A Soviet military advisor recorded that 21 BDE suffered calamity caused by the effects of South African Field Artillery.⁶⁵

P Battery and Q Battery also worked together during fire missions targeting 59 BDE. On 22 September 1987, both batteries fired at elements of 59 BDE. The BDA, established from different source reporting, included damaging a D30, an air defense system, and the destruction of an ammunition supply point containing both small arms and artillery munitions.⁶⁶

Ordered to retreat north of the Lomba River, 47 BDE established tactical bridges and assembly areas to support their movement.⁶⁷ Ferreira planned an attack on FAPLA's 47 BDE. In preparation for the South African offensive, forward observers established observation posts and guided the maneuver units into position.⁶⁸ Additionally, these forward observers executed numerous fire missions targeting the FAPLA assembly areas. Fire missions on 30 September 1987 destroyed at least 11 FAPLA vehicles⁶⁹ and

⁶⁴Wilsworth, *First In Last Out*, 278-280.

⁶⁵Shubin and Tokarev, 36.

⁶⁶Wilsworth, *First In Last Out*, 279.

⁶⁷Bridgland, 133.

⁶⁸Wilsworth, *First In Last Out*, 282.

⁶⁹*Ibid.*, 281.

employing both rockets and cannons, the South African fires isolated elements of 47 BDE from each other.⁷⁰

On 3 October 1987, CGA attacked 47 BDE from east to west. CGA executed preparatory cannon and rocket fires on FAPLA positions.⁷¹ South African forces conducted attacks until their ammunition needed replenishment. After the South Africans broke contact to resupply, FAPLA reorganized their armor and infantry and executed a counterattack. South African observers used G5 fires to disrupt the FAPLA counterattacks.⁷² As the FAPLA counterattacks stalled, the South Africans resumed their offensive actions. CGA launched five total attacks throughout the day.

As the fighting raged, small groups of FAPLA infantry began running from the protection and concealment of their defensive positions into an open grassy plain adjacent to the Lomba. Over time, hundreds of infantrymen and numerous vehicles retreated onto this open area. South African observers noted the growing concentration of FAPLA forces and initiated G5 fire missions. Later during the fighting, increasing numbers of FAPLA infantry and vehicles continued to retreat onto this open plain. South African observers continued to employ fires to destroy FAPLA. Valkiri rocket fires inflicted heavy casualties on FAPLA infantry while G5 fires destroyed FAPLA vehicles.⁷³ Observers also integrated effective high explosive and white phosphorus mortar fires

⁷⁰Bridgland, 139.

⁷¹Ibid., 148.

⁷²Ibid., 144.

⁷³Ibid., 148.

onto the retreating communist forces.⁷⁴ A FAPLA survivor of the battle recalled that South African fires proved terrifying. A Soviet advisor recorded that SA fire superiority created complete pandemonium.⁷⁵

The SADF Chief of Staff, General Janie Geldenhuys, described the fighting as “the turning point.” of the campaign.⁷⁶ BDA attributed solely to the three batteries involved in the battle included, 12 tanks, seven BTR-60s, three BMPs, five BRDMs, 85 soft skin vehicles, three 23mm AA guns, two D30s, two SA-9s, one ZSU23-4s, 45 EKIA, nine EPWs.⁷⁷ It is likely that South African fires would have inflicted greater damage on 47 BDE, but Ferreira, due to religious convictions, permitted FAPLA soldiers to flee.⁷⁸ Due to the heavy FAPLA losses, the Cubans considered redeploying forces directly into the fighting. However, the Cuban leaders assessed that the South African artillery would destroy Cuban maneuver units.⁷⁹

After the battle, FAPLA sent multiple teams onto the battlefield in an attempt to recover and demolish damaged or abandoned equipment for future use. South African forward observers directed Valkiri fires onto these teams. These fires limited the ability of FAPLA to police the battlefield and contributed to the South African capture of Soviet

⁷⁴Ibid., 145.

⁷⁵Shubin and Tokarev, 40-41.

⁷⁶Jannie Geldenhuys, *At the Front: A General's Account of South Africa's Border War* (Jeppestown: Jonathan Ball Publishers, 2009), 233.

⁷⁷Wilsworth, *First In Last Out*, 283.

⁷⁸Bridgland, 163.

⁷⁹*Days of Glory: The Final Defeat of South Africa in Angola*, 2.

built SA-8s. South Africa became the first western nation to capture these modern Soviet air defense systems.⁸⁰

Having accomplished the mission of stopping the FAPLA offensive, the SA 20 BDE received orders to pursue, receive reinforcements, and transition to offensive operations.⁸¹ Specifically, the South Africans had to clear FAPLA from the eastern side of the Cuito River and inflict significant casualties that would preclude a future FAPLA offensive in either 1987 or 1988. These tasks had to be accomplished prior to 15 December 1987 so that soldiers nearing the end of their conscription period would be home for Christmas.⁸²

The 20 SA BDE received its promised reinforcements that included the mechanized 4th South African Infantry Battalion, an Armor Squadron, a G5 Battery, and a G6 Troop. Ferreira conceived and executed an artillery centric plan. Secured by maneuver units and directed to focus fires on the Cuito Cuanavale airfield, the artillery batteries would make the airfield unusable. This was crucial because FAPLA staged MIG-21s, MIG-23s, and MI-24s at Cuito Cuanavale. Forward observers infiltrated behind FAPLA lines to enhance the disruption of FAPLA's logistics.⁸³

The South African artillery organized itself:

Artillery HQ located with 20 SA BDE HQ

P Battery (127mm Valkiri) Direct Support (DS) to 32 BN

⁸⁰Bridgland, 150.

⁸¹Ibid., 164.

⁸²Ibid., 172.

⁸³Ibid., 173.

Q Battery (155mm G5) DS to 4th South African Infantry Battalion

R Battery (120mm mortar M5) 4 Artillery Regiment

S Battery (155mm G5) DS to 61 Mech

I Troop (127mm Valkiri) 4 Artillery Regiment

J Troop (3x155mm G6).⁸⁴

On 14 October 1987, the South Africans initiated the first fire mission on Cuito Cuanavale killing 25 FAPLA soldiers.⁸⁵ A three-gun troop of G6s arrived to support the 20 SA BDE by firing at the Cuito Cuanavale airfield. G6 fire destroyed a Mi-8 Hip as passengers disembarked from the aircraft. G6 fire also destroyed a helicopter attempting to land in a field offset from the main airstrip.⁸⁶ G5 fires destroyed other aircraft, buildings and equipment on the airfield.⁸⁷

By 17 October 1987, South African forward observers established observation posts over-watching 21 BDE, 25 BDE, and 59 BDE. Additionally, observers infiltrated inside 59 BDE's positions. On 18 October 1987, a group of Soviet advisors, located 15km from 59 BDE, halted their work and observed Valkiri missions impacting on 59 BDE.⁸⁸ On 19 October 1987, using SIGINT intercepts, Q Battery and S Battery fire missions prevented a FAPLA armored unit from reinforcing 59 BDE. UNITA soldiers also initiated fire missions that damaged a FAPLA tactical bridge used to support 59

⁸⁴Wilsworth, *First In Last Out*, 286.

⁸⁵Bridgland, 175.

⁸⁶Wilsworth, *First In Last Out*, 294-295.

⁸⁷Polack, 119.

⁸⁸Shubin and Tokarev, 44.

BDE.⁸⁹ Observers also integrated South African airstrikes with artillery missions. 59 BDE absorbed daily G5 and Valkiri missions integrated with South African Air Force (SAAF) airstrikes.⁹⁰ One specific example involved an observer using rocket fires to destroy 59 BDE Infantrymen after they emerged from their foxholes following an airstrike.⁹¹

Around this time, the 20 SA BDE underwent a significant reorganization. The BDE transformed into a divisional structure with the newly formed maneuver BDEs being designated Task Force (TF) A and TF B. This reorganization changed the artillery structure and the 10 Artillery BDE was born. The 10 Artillery BDE was composed of the 20 Artillery Regiment supporting the light infantry and motorized TF A and 4 Artillery Regiment supporting the mechanized TF B.⁹²

The 10 Artillery BDE's Commander, Colonel Jean Lausberg, identified and updated employment guidance for his new command. Regarding joint fires, the SAAF would fly limited missions due to the FAPLA Surface to Air Missile threat, therefore, 10 Artillery BDE planned to provide the majority of fires. The first priority was to neutralize FAPLA artillery. Secondly, artillery fires would neutralize FAPLA air defense guns. Air defense guns became an important target set because analysts predicted employment of

⁸⁹Wilsworth, *First In Last Out*, 287.

⁹⁰Bridgland, 210.

⁹¹Ibid., 178.

⁹²Bridgland, 179; Wilsworth, *First In Last Out*, 299.

these weapons against South African maneuver units due to the lack of SAAF aircraft supporting the battle. The third priority focused on keeping the BDE supplied.⁹³

Throughout the second half of October 1987, South African artillery continued to engage communist targets. Soviet advisors embedded with 21 BDE and 59 BDE continued moving with their FAPLA partners and experienced the effects of South African fire missions. On Thursday 22 October 1987, South African artillery maintained a continual bombardment into Friday morning. Later that day, South African artillery counter-fired on FAPLA artillery. On Saturday 24 October 1987, mortar fire influenced movement throughout the day and into the night. On Sunday, Valkiri and M5 munitions impacted on targets during the dinner meal. On Monday the 27th, South African fires focused on both 21 BDE and 59 BDE in what a Soviet advisor described as perpetual. By Tuesday, the Soviet advisor reported receiving South African artillery fire from all sides and counted 148 rounds impacting during the night. On 29 October 1987, South African artillery fired at FAPLA during breakfast and executed M5 missions later in the day. On Friday the 30th, the Soviets seemed frustrated because of both the continuing South African artillery and mortar bombardment as well as FAPLA's inability to locate the South African batteries. By Saturday, the psychological effects of the South African bombardment became evident because the Soviets expressed an inability to sleep because the South Africans did not fire any missions.⁹⁴

On 9 November 1987, the South Africans attacked FAPLA's 16 BDE near the Chaminga and Hube Rivers. Q Battery, R Battery, and J Troop fired 10 minutes worth

⁹³Wilsworth, *First In Last Out*, 298-299.

⁹⁴Shubin and Tokarev, 44-49.

of preparatory missions on FAPLA positions. Following these fire missions, South African forces supported by UNITA elements attacked 16 BDE's defenses. The South African mechanized and armored forces penetrated 16 BDE's trenches but the South African advance stalled when FAPLA armor arrived on the battlefield. South African maneuver units continued their attack and defeated 16 BDE with artillery support. At one point, a Forward Observation Officer oriented both G6 fire onto 16 BDE 23mm gun locations and M5 fire on 16 BDE mortars, destroying both sets of targets. Decisive to the day's success, South African artillery fired 760 rounds destroying multiple targets and accounted for 30 percent of destroyed 16 BDE armor. Lausberg commented on his surprise at the accuracy of his artillery. Despite heavy losses of personnel and equipment, 16 BDE escaped destruction.⁹⁵

P Battery, Q Battery, S Battery, and J Troop executed multiple fire missions on 10 November 1987 to set the conditions for the next scheduled South African attack on 11 November 1987. The G5s and the G6s fired 1,134 rounds during the day and P Battery fired over 1000 rockets. South African observers reported that the artillery inflicted significant damage.⁹⁶ On 11 November 1987, the South Africans launched their attack. By then end of the day, FAPLA suffered over 300 casualties and lost 14 tanks, but the South Africans failed to seal 16 BDE's escape route.⁹⁷

Operation Modular culminated at the end of November 1987. The fighting continued and the SADF shifted operations under the name of Operation Hooper. The

⁹⁵Bridgland, 179; Wilsworth, *First In Last Out*, 192-198.

⁹⁶Bridgland, 198-199.

⁹⁷*Ibid.*, 205-209.

driving force behind the change in operational name was due to the rotation of SADF units out of Angola and their replacement with new units.⁹⁸ The end of Operation Modular coincided with the Cuito Cuanavale airfield no longer supporting fixed wing aircraft. Communist helicopters continued to use the airstrip, but stayed as far to the west as possible.⁹⁹

Phase IV

On 5 December 1987, additional Cuban advisors helicoptered into the Cuito Cuanavale airfield. These advisors included leaders educated in both artillery and armor employment. The Cubans rapidly began the process to enhance the FAPLA defenses against the expected South African attack to seize the Cuito Cuanavale airfield.¹⁰⁰ For the next several days, both sides focused on preparing for upcoming operations. Cuban forces continued to increase their presence throughout the month. By the end of December, the Cubans deployed a division into the area between Cuito Cuanavale and Menongue.¹⁰¹

During the second week of December, the pace of activity increased. On 12 December 1987, S Battery fired a mission yielding impressive results. Reporting confirmed that the mission killed 41, wounded 85, and damaged 34 vehicles.¹⁰² On 21 December 1987, SAAF aircraft anti-aircraft systems supporting 21BDE. The FAPLA air

⁹⁸Wilsworth, *First In Last Out*, 300.

⁹⁹*Ibid.*, 303.

¹⁰⁰*Days of Glory: The Final Defeat of South Africa in Angola*, 5.

¹⁰¹Wilsworth, *First In Last Out*, 322.

¹⁰²*Ibid.*, 306.

defenders returned fire after the SAAF aircraft completed their strikes allowing identification of their positions by South African observers. G5 fire missions destroyed two 23mm anti-aircraft guns and inflicted casualties among the FAPLA air defenders.¹⁰³

Throughout December, South African observers noted the areas that FAPLA soldiers refilled their canteens and bathed. In one case, roughly 45 FAPLA soldiers were in the river when a fire mission struck in and around their position killing between 15 and 20 soldiers. FAPLA soldiers searched for the South African Observation Posts, but they continued to use the same river crossing sites during these operations. Once again, when scores of FAPLA congregated, South African fires from both G5s and Valkiris impacted on target. UNITA reported that these missions inflicted 78 FAPLA casualties.¹⁰⁴ On 31 December 1987, both cannon and rocket units fired on two FAPLA air defense radar positions. South African intelligence assessed fires killed 23 FAPLA soldiers.¹⁰⁵

Conclusion of the Campaign

The fighting around Cuito Cuanavale continued into 1988. The South African forces continued to conduct offensive operations but these operations produced limited tactical gains.¹⁰⁶ The fighting became stationary as additional Cuban forces flowed into the area and the communist forces rededicated their efforts to maintain control of Cuito Cuanavale. The South African artillery continued to play an important role in the

¹⁰³Ibid., 308.

¹⁰⁴Ibid., 308-309.

¹⁰⁵Ibid., 312.

¹⁰⁶Morris, 32.

fighting. G5s continued to fire multiple missions a day at the Cuito Cuanavale airfield.¹⁰⁷ Suppression of Enemy Air Defense fire missions also continued during this period. One mission, targeting air defense radar, produced unexpected results. G5 fires destroyed the radar, an ammunition supply point, a fuel point, 42 vehicles, and inflicted 40 casualties.¹⁰⁸ Concerning G5 fires, a Cuban officer later remarked, “Those fucking guns give us terrible fear.”¹⁰⁹ The South Africans also continued to employ their composite Field Artillery Unit. On 13 January 1988, fires from M5s, G5s, and Valkiris focused their efforts on the 21 BDE.¹¹⁰

Although combat operations continued, neither side gained a clear advantage in the increasingly static fighting. American sponsored negotiations began that sought to end the bloodshed. Eventually, both sides reached an acceptable diplomatic agreement that ended combat operations and resolved the disputes that led to the fighting in southern Angola.

The South African artillery demonstrated the utility and the capability of a composite Field Artillery BN during combat operations. Moreover, they demonstrated this over the course of three different operations taking place in three different years. In each subsequent operation, the South African artillery employed composite formations of growing size with different weapons systems. Judging the effectiveness of composite field artillery battalions is accomplished not just from South African sources, but also

¹⁰⁷Polack, 139.

¹⁰⁸Wilsworth, *First In Last Out*, 313.

¹⁰⁹Bridgland, 370.

¹¹⁰Wilsworth, *First In Last Out*, 316; Polack, 139.

from the recollections of their enemies. While sources may disagree as to the meanings of the eventual outcome of South Africa's campaigns in Angola, all agree that the South African artillery provide valuable and effective fire support to their maneuver formations.

American Brigade Combat Teams and the Field Artillery

This study's focus concerns the potential reorganization of BCT organic field artillery battalions into a composite structure; therefore, it is necessary to describe the current organization of both BCTs and their organic field artillery units. It is also important to describe why the Army developed and fielded BCTs. The U.S. Army fields three distinct BCTs and each BCT contains an equally distinct organic Field Artillery BN. These BCTs are Infantry Brigade Combat Teams (IBCTs), Stryker BCTs (SBCT), and Armor BCTs (ABCT).

BCTs developed due to security challenges after the end of the Cold War. Identified as a challenge, during peacekeeping operations in Kosovo, the Army created ad-hoc organizations through task-organization changes to deploy and employ forces into the Balkans.¹¹¹ These ad-hoc organizations could be more efficient and effective. Army leaders developed the modular BCT because units that were both expeditionary and self-sustaining were required. Leaders believed that the modular structure made BCTs more deployable and less dependent upon task-organization changes to complete wartime missions. Another impetus for change was the wars in Afghanistan and Iraq. The Army created BCTs because of the need to deploy combat power on a rotational basis to

¹¹¹Jason A. Pardee, "The Genesis of Transformation: The Rise of the United States Army's Modular Brigade Combat Teams" (Thesis, Naval Postgraduate School, Monterey, CA, 2013), 18.

prosecute both wars.¹¹² Assessed as a success, BCTs allow the Army to more effectively meet modern security challenges and execute wartime requirements.¹¹³

An IBCT is a light infantry centric organization that comprised of three infantry battalions, a cavalry squadron, an Engineer BN, and a Support BN. The IBCT's organic Field Artillery BN contains two 105mm towed batteries (M119A3) and one 155mm towed battery (M777A2). This newly reorganized battalion represents the first attempt to employ a composite Field Artillery BN structure across an entire class of BCT.

A SBCT is a motorized organization whose maneuver combat power revolves around the Stryker wheeled vehicle. A SBCT contains three infantry battalions, a cavalry squadron, an Engineer BN, and a Support BN. The Field Artillery BN that is organic to an SBCT is composed of three firing batteries. Each firing battery fields 155mm towed howitzers (M777A2).

An ABCT is an armor centric organization composed of three combined arms battalions, which is a mix of armor and mechanized companies. The ABCT also contains a cavalry squadron, an Engineer BN, and a Support BN. The ABCT's organic Field Artillery BN fields three batteries of 155mm self-propelled howitzers (M109A6).

In the U.S. Army, additional cannon units and all rocket units are contained inside a Field Artillery BDE. Regarding rockets, these brigades field either Multiple Launch Rocket System (MLRS) or HIMARS units. The M270A1 MLRS is a tracked rocket launcher. The MLRS fires either 12 rockets or two ATACMs missiles. The M142 HIMARS is a wheeled vehicle that fires either six rockets or one ATACM missile.

¹¹²Pardee, 56.

¹¹³Ibid., 30.

Both the MLRS and the HIMARS fire the MLRS family of munitions. The MLRS family of munitions includes the M26 rocket with a range of 32 kilometers and the M26A1/A2 extended range munition with a range of 45 kilometers. Included within this family of munitions are precision munitions. The M30 and M31 Guided Multiple Launch Rocket System rockets are GPS guided and deliver effects with either sub-munitions or a unitary warhead. The M39 Army Tactical Missile System is a family of precision guided missiles with a 300-kilometer range.

The location of MLRS and HIMARS units within the Army structure is an important consideration. Rockets provide significant capability in terms of both range and lethality. Rockets allow a commander to shape the deep-fight while cannons provide direct supporting fires to maneuver units. The differing capabilities of both cannon and rocket systems complement one another. However, due to the Army's reorganization, rocket units will support either a corps level headquarters or a division if a Field Artillery BDE is task organized to that division. Therefore, under current design, a BCT requires an external field artillery organization to shape the battlefield.

Conclusion

In 1987, the South African Army created and employed a BCT to defeat a hybrid threat in southern Angola. Currently, the U.S. Army also employs a BCT structure designed to defeat hybrid threats. Both armies won significant tactical victories during their respective wars. However, the South African Army employed its field artillery in a unique manner. Through the creation and use of a composite field artillery structure, the South Africans generated impressive results on the battlefield. The combination of

systems, cannons and rockets in particular, provides a historical example of a composite Field Artillery BN in action.

CHAPTER 4

METHODOLOGY

This study seeks to determine if the reorganization of field artillery battalions would increase effectiveness. Specifically, the reorganized field artillery battalions would have a composite structure where each Field Artillery BN would be composed of batteries fielding different weapon systems. The American Army uses composite field artillery battalions currently in Operation Enduring Freedom and part of the artillery Force Design Update creates permanent composite battalions within IBCTs.

The methodology applied in this paper involves a qualitative research design using a case study, coupled with interviews, and analyzed through the Principles of Fires. The case study centers on the Battle of Cuito Cuanavale, which took place in southern Angola during 1987 and 1988. The battle provides examples of hybrid threats, combined arms maneuver and wide area security operations. This battle provides a documented example of a Western military force employing a single BCT over the course of several months. Additionally, during the Battle of Cuito Cuanavale, the South African Army employed a composite Field Artillery BN. South African artillery provided close supporting fires to their maneuver units and shaped the battlefield for both defensive and offensive operations. The case study provides an example of a foreign army engaged in operations that are comparable to activities envisaged by American military leaders including similar doctrine and partnership with an indigenous force.

The South African Army employed doctrine, organizations, and technology that should be familiar to contemporary American Army officers. South African doctrine was similar to Unified Land Operations with a focus on defeating both conventional and

unconventional threats. Besides operating in southern Angola, the South African Army was simultaneously conducting stability operations in Namibia and supporting civil authorities conducting internal security due to domestic unrest.

In Angola, the South African Army engaged in combat operations because they were supporting a partnered force. Backing their partners, the South Africans fielded a BCT composed of a Light-Infantry BN, a Motorized Infantry BN employing wheeled tactical vehicles, and an armored contingent. South African technology included the use of GPS and the employment of drones to provide targeting information. Pitted against the South Africans and their partners was a conventional force trained and organized along Soviet lines and armed with Soviet equipment.

Besides the case study, interviews with Army leaders will seek to validate or invalidate the concept of composite field artillery structures. These leaders include current field artillery and maneuver officers. The purpose of these interviews is to gain an appreciation for the professional opinions of both artillerymen and maneuver leaders. The selected officers have served in command and leadership positions during combat operations. Additionally, these officers also served in the institutional Army where they all contributed to leader training and development. Since these leaders operated at different locations, email served as the interview medium (the interviews are found in Appendix B).

The Principles of Fires serve as the analytical framework for the analysis and the conclusion of this study. The analysis will combine both the example and lessons learned provided by the Battle of Cuito Cuanavale coupled with current insights from Army leaders. Within the combinations of these two factors, a recommendation follows on a

possible way to enhance the ability of the field artillery to provide the requisite fire support needed on a modern battlefield.

CHAPTER 5

ANALYSIS

Although the South African artillery proved that their composite structure worked during combat operations, the utility of a composite structure requires additional analysis to determine if such a structure would work for the American Army. Therefore, the analysis of this study will attempt to fuse both the example provided by SA with contemporary opinions provided by American military professionals. The analysis uses the Principles of Fires as a doctrinal framework to extract lessons learned both supporting the establishment of composite field artillery battalions as well as determine what friction points exist regarding these formations.

Precision

The principle of precision has always been important to the field artillery. During the Cuito Cuanavale campaign, the remarkable accuracy of South African artillery contributed significantly to victory.¹¹⁴ The importance for precise calculations and procedures inculcates into field artillery personnel at the start of their career. Precision has grown in importance due to recent COIN operations and the desire to limit collateral damage. The field artillery community understands the importance of precision through the development of munitions including Excalibur and Guided Multiple Launch Rocket System. These munitions provide the American Field Artillery with an unmatched

¹¹⁴Morris, 47.

capability to provide accurate fire support. The growth in precision munitions increases the lethality¹¹⁵ and the effectiveness¹¹⁶ of the field artillery.

Despite the forward strides on the employment of precision fires, the field artillery can increase its level of precision. A composite Field Artillery BN containing rockets can achieve greater accuracy using precision munitions belonging to the MLRS family of munitions. Therefore, an increased volume of precision artillery fires at the tactical level is possible. However, due to the fielding of precision cannon munitions, every Field Artillery BN in the Army has the ability to employ precision and near precision munitions. Thus, the addition of rockets could increase the volume of precision fires, but all field artillery battalions already possess this capability.

Scalable

The composite Field Artillery BN structure possesses a greater ability to scale effects on the battlefield. Due to a mix of systems, one headquarters manages and employs these systems to meet the BCT's fire support requirements. The South African artillery unit possessed scalability and the composite structure increased flexibility.¹¹⁷

As a principle, scalability is growing in importance as it relates to supporting a maneuver BCT. Due to planned reductions in the number of Fires BDEs, maneuver BCTs will soon have less access to deep shaping fires. Additionally, while divisions are currently creating DIVARTY structures, these new organizations have limitations. The

¹¹⁵Dennis C. Smith, "Fixing What Was Not Broken: A Future for Fires" (Strategic Research Project, U.S. Army War College, Carlisle, PA, 2012), 15.

¹¹⁶LTC Robert Marshall, Electronic correspondence with author, 1 February 2014.

¹¹⁷Mr. Clive Wilsworth, Electronic correspondence with author, 2 January 2014.

DIVARTY structure is a headquarters that possesses no subordinate artillery battalions. DIVARTYs will receive subordinate battalions from other sources, likely the National Guard. As a result, a division deploying unexpectedly will likely be without any organic fire support assets. This limits the ability of a division commander to shape the battlefield for his subordinate BCTs. Due to this limitation, it would make sense to “decentralize rocket systems” and enable rocket capability to provide direct support to BCTs.¹¹⁸

A second consideration regarding scalability relates to ammunition. Currently, the Army’s principle anti-armor munition is the DPICM. The DPICMs proved effective at destroying armored vehicles during both Operation Desert Storm and Operation Iraqi Freedom. Despite this effectiveness, DPICM produces unexploded ordinance that litters a battlefield. Due to the level of unexploded ordinance, the DoD Policy on Cluster Munitions & Unintended Harm to Civilians will remove DPICM from the basic load of artillery formations. Adherence to this policy will degrade the ability of field artillery battalions to destroy enemy armor formations.

Although the pending lack of DPICM is a concern, the artillery foresaw the problem planned for this reality. The artillery developed and is currently testing a new warhead to replace the Guided Multiple Launch Rocket System DPICM warhead. This replacement known as the Alternative Warhead (AW) will strike area targets without producing unexploded ordinance. AW testing effectively demonstrated its capability to destroy armored vehicles without leaving unexploded ordinance on the battlefield.

¹¹⁸Sherman C. Watson, “Artillery is Here to Stay-For Now” (Monograph, School of Advanced Military Studies, Ft Leavenworth, KS, 2013), 30.

Expected to be fielded in FY17, the AW should allow the artillery community to destroy armored threats.¹¹⁹

While the AW solves a problem related to the effectiveness of the MLRS, it does not address the problem relating to how cannon units will destroy armored threats. As rocket units become further removed from the tactical fight, BCTs require an organic ability to destroy armored vehicles. By adopting a composite structure that includes a rocket unit, a maneuver BCT will possess the ability to scale their fires and thus their effect on the enemy. One way to solve this shortcoming is for a BCT Field Artillery BN to include either MLRS or HIMARS system.¹²⁰

Synchronized

One advantage to the composite structure is the ability to synchronize fires from multiple systems. On multiple occasions, the South African artillery demonstrated the ability to synchronize their fires throughout the Cuito Cuanavale campaign. The example provided by the South African artillery demonstrates that cannon and rocket synchronization is possible within a Field Artillery BN HQ.

The ability of a headquarters to synchronize fires would improve the effectiveness of artillery when supporting maneuver formations. A composite battalion has the ability to execute an echelonment of fire for maneuver units.¹²¹ One artillery headquarters controlling the majority of the systems associated with an echelonment would provide

¹¹⁹Tamir Eshel, "GMLRS to Get New Warhead," http://defense-update.com/20120424_gmlrs-to-get-a-new-warhead.html (accessed 22 January 2014).

¹²⁰Watson, 28.

¹²¹COL David Snodgrass, Electronic correspondence with author, 6 March 2014.

efficiencies. The efficiency gained by a composite structure begins in training and would carry forward into combat operations.

In a future conflict, artillery units may need to mass fires on a particular target.¹²² With this in mind, one challenge with a composite structure may be the ability to synchronize all systems to mass on a particular target.¹²³ While this is a valid concern, the example provided by the South Africans during the Battle of Cuito Cuanavale demonstrate that massing different systems on target is possible. On multiple occasions throughout the battle, the South Africans massed fires from batteries fielding different systems. The South Africans also massed their entire battalion during the fighting along the Lomba River, destroying FAPLA formations.¹²⁴

Responsive

During its border war, the South African artillery demonstrated effectiveness, but in the opinion of a South African artilleryman the composite structure did not increase responsiveness. The employment of rockets caused a reduction in responsiveness. The South African Valkiri MRL required a greater amount of time to adjust than did the G5 or G6 howitzers. The Valkiri firing signature also made the Valkiri units easier to identify and thus vulnerable to air attack.¹²⁵ Admittedly, there are differences between MRL systems and MLRS systems based on employment and munitions, but the point remains

¹²²Smith, 24.

¹²³Snodgrass, Electronic correspondence.

¹²⁴Wilsworth, Electronic correspondence.

¹²⁵Ibid.

that a composite battalion formed in an ad-hoc manner did not increase responsiveness to the South African BCT.

Within a composite structure, a direct support battalion has the capability to respond to multiple battlefield scenarios. There is a difference of opinion regarding the potential responsiveness of a composite battalion. The South African example provides evidence that composite battalions do not improve responsiveness. However, American artillerymen viewed a composite structure as a positive factor contributing to responsiveness. A composite battalion could be more responsive regarding counterfire missions and executing deep shaping fires.¹²⁶ Rocket units, now doctrinally controlled at the corps level, normally execute these missions.

One reason behind the differences of opinion regarding responsiveness may be training. As stated, the South Africans formed their composite battalion on an ad-hoc basis. Due to the manning policies of the South African Army, the artillery battalion used during the Cuito Cuanavale campaign could not be formed and train together prior to employment. Training could be a challenge due to the differing systems within a composite battalion. Multiple crew-level and staff level certifications may be required.¹²⁷ American officers identified the need for training within a composite structure and that through training an increase in responsiveness would naturally follow. Another training benefit of a composite structure is that the result would be a more rounded field artilleryman.¹²⁸

¹²⁶LTC Kevin Capra, Electronic correspondence with author, 6 March 2014.

¹²⁷Ibid.

¹²⁸Snodgrass, Electronic correspondence.

A composite field artillery structure allows training on the multiple fire support systems. Internal to the Field Artillery BN, several years may be required to grow and develop leaders who possess familiarity with the multiple systems now assigned to each battalion.¹²⁹ A field artillery battalion's responsiveness would increase as the entire BCT executes training. Responsiveness would increase as units train together, lessons are learned, and procedures internalized through repetition.¹³⁰

Another aspect of training that requires consideration is the space required to execute training. Rocket units require larger training ranges compared to a cannon unit because of the increased ranges associated with rockets. This reality limits the installations where a composite battalion comprised of rocket units could be located. If training ranges are not available, rocket units will need to deploy to other locations to conduct live fire certifications.¹³¹

Therefore, based on the evidence, the establishment of a composite battalion will not initially increase responsiveness. The establishment of a composite Field Artillery BN requires careful consideration and methodical planning to integrate systems, personnel, and training. However, after a composite Field Artillery BN is established and a training program instituted, the organization may witness enhanced capability and over time, increased responsiveness is probable. Therefore, the principle of responsiveness is achievable, but it will likely require more than a simple reorganization of a Field Artillery BN.

¹²⁹LTC Roy Walker, Electronic correspondence with author, 13 March 2014.

¹³⁰Capra, Electronic correspondence.

¹³¹Walker, Electronic correspondence.

Networked

Communications facilitates and links the multiple components of the field artillery system.¹³² The communications architecture employed by the South Africans contributed greatly to the artillery's effectiveness. The distances between the forward observers and the firing units required a robust communications network and also presented command and control challenges.¹³³

American artillerymen also noted that a composite battalion requires robust and networked communications. There are several potential challenges regarding networked fires that exist both inside and outside a Field Artillery BN. Within a composite Field Artillery BN, forward observers must have the proper communications systems to compensate for the increased cannon and rocket ranges. Additionally, the firing batteries also must employ proper communications systems and Mission Command systems. This becomes crucial when firing units conduct decentralized operations over a large geographical area.¹³⁴

Outside a composite Field Artillery BN, there also exist possible networking challenges. One challenge involves the Air Defense Airspace Management/Brigade Aviation Element (ADAM/BAE) located in the BCT HQ. The ADAM/BAE requirement to clear and control airspace requires evaluation and validation.¹³⁵ This evaluation and validation is necessary because a composite Field Artillery BN firing rockets will use

¹³²Watson, 20.

¹³³Wilsworth, Electronic correspondence.

¹³⁴Marshall, Electronic correspondence.

¹³⁵Ibid.

more airspace than a traditional Field Artillery BN and the simultaneous employment of aircraft requires synchronization.

Networked systems are also a crucial consideration outside of the BCT. Due to the increasing reliance on joint operations, a networked Field Artillery BN requires an ability to communicate with joint partners and leverage joint sensors. For example, a rocket equipped composite Field Artillery BN increases the ability of a BCT to provide Suppression of Enemy Air Defense fires to supporting joint aircraft.

Currently, field artillery battalions possess a robust communications structure. field artilleryman routinely coordinate, plan, and communicate across significant distances during both training and combat operations. Therefore, the technology already exists to support the establishment of composite field artillery battalions. However, a technical analysis is required to ensure that the proper systems are in place to support field artillery operations over greater distances than a battalion traditionally operates.¹³⁶

Other Considerations

The Principles of Fires provided the analytical framework for this study. However, other factors affecting the employment of composite field artillery battalions and their effectiveness requires analysis outside the framework provided by the Principles of Fires. Factors requiring additional thought and analysis include the advantage of organic field artillery capability within a BCT as opposed to enhancing fire support through command and support relationships. Two other factors include sustainment and parochialism.

¹³⁶Marshall, Electronic correspondence.

One argument against the establishment of a composite Field Artillery BN and providing more organic field artillery to a BCT is to leverage command and support relationships through task organization changes. Following this argument, field artillery weights the main effort for only as long as these fires are required. Therefore, a BCT receives the fire support it needs during a finite combat operation and the fire support assets remain the responsibility of another unit. Ultimately, this argument represents the status quo within the field artillery.

While this argument has merits and the system proved its utility across multiple campaigns, the reality of modern combat operations warrants a change. Currently, a BCT may operate over a large geographical area. During operations in both Iraq and Afghanistan, BCTs routinely operated across entire provinces or in some cases multiple provinces. In these examples, many maneuver units went without field artillery support. Although the Army is reestablishing focus on Combined Arms Maneuver, Wide Area Security remains part of Unified Land Operations. In addition, at the time of this writing, BCTs are fielding a fourth maneuver battalion. The addition of this maneuver battalion illustrates that a BCT will soon have the ability to operate over a wider and deeper area, particularly within the combined arms maneuver framework. As a result, a Field Artillery BN will also have additional responsibilities to provide organic fire support over a larger geographical area. As field artillery units disperse to provide organic fire support, their ability to mass effective fires diminishes.

Doctrine provides the clearest example of the need to create and employ composite field artillery battalions. ADRP 3-09 discusses field artillery employment. Within this doctrinal framework, there exists a compelling case that composite field

artillery battalions are required. First, doctrine requires that adequate levels of fire support be committed to a unit. Doctrine highlights that organic field artillery battalions provide the minimum essential fire support.¹³⁷ However, as BCTs grow in size and responsibility, an organic Field Artillery BN arguably faces challenges to provide fires including Suppression of Enemy Air Defense, counterbattery, and direct supporting fires to three maneuver battalions and a cavalry squadron.

Doctrine also demands that the main effort is weighted. However, as noted, a division currently has no organic fire support assets to weight their main effort BCT. Next, doctrine recommends that commanders maintain a portion of their organic artillery on-call to deal with unforeseen circumstances.¹³⁸ Thus, doctrine recommends that a commander not commit all of his field artillery, which violates the tenant of there being no artillery in reserve.

Most importantly, doctrine states that field artillery should support future operations.¹³⁹ However, in an Army designed to fight as BCTs and where commanders are advised not to commit all of their artillery, there seems little room to shape future operations. BCTs therefore, are partially dependent either on its joint partners or on a Field Artillery BDE to shape the battlefield deep for subsequent operations. Ideally, these organizations and assets will be available when needed.

It seems questionable that the field artillery can practically meet all of its doctrinal requirements. Field Artillery employment doctrine requires the deployment of Field

¹³⁷Department of the Army, ADRP 3-09, 1-14.

¹³⁸Ibid.

¹³⁹Ibid.

Artillery BDEs or the activation, mobilization, and deployment of National Guard field artillery battalions to meet the requirement of supporting future operations. This dependency on external field artillery organizations does not seem practical because of the limited numbers of field artillery brigades and the time National Guard units require to prepare and deploy. The limited numbers of field artillery brigades also manifests itself because these brigades, organized to support a corps, will provide fire support over a large geographical area. Thus, a Field Artillery BDE faces challenges massing its fires in support of BCTs.

The adoption of a composite Field Artillery BN structure provides solutions to these challenges while simultaneously increasing effectiveness. As noted, a composite battalion possesses the ability to internally synchronize and scale fires from different fire support systems. This ability reduces the dependency on external artillery organizations and support relationships to provide shaping fires for a BCT.

Most importantly, a FSCOORD gains the ability to respond efficiently to fluid tactical situations. An organic composite structure allows a FSCOORD to plan and execute a wider range of fire support operations. In a battalion including rockets, a FSCOORD can prioritize and execute counterbattery fires independently from a Corps-Centric Artillery Brigade. A FSCOORD can plan and execute Suppression of Enemy Air Defense fires supporting Air Interdiction missions thus enabling the use of joint firepower shaping a BCT's operations. Effectiveness and efficiency increases because a FSCOORD is not dependent on coordination with and through a higher headquarters.

During the Cuito Cuanavale campaign, ammunition resupply and ammunition management proved challenging. Sustainment may be the single greatest challenge

regarding a composite Field Artillery BN.¹⁴⁰ Identified by many professionals, ammunition management requires thought and consideration. Ammunition management could become difficult if the composite battalion required more than two different calibers of ammunition.¹⁴¹ Different weights and ammunition types would affect haul requirements.¹⁴² Additionally, differing ammunition requirements could affect the Brigade Support Battalion in each BCT.¹⁴³ However, the possibility exists to reduce ammunition requirements if a unit employs precision munitions. The more accurate the munition fired then fewer rounds are required.¹⁴⁴

A second concern regarding sustainment involves personnel manning. Since ammunition management is a concern, the different types of ammunition may necessitate increased numbers of logisticians assigned to the battalion.¹⁴⁵ Specialty MOS skilled Soldiers may become a requirement.¹⁴⁶ Examples of these skilled low-density Soldiers include mechanics.¹⁴⁷ Therefore, the adoption of a composite structure requires detailed integration of personnel to find efficiencies and to increase responsiveness.

¹⁴⁰Capra, Electronic correspondence.

¹⁴¹Ibid.

¹⁴²Marshall, Electronic correspondence.

¹⁴³Capra, Electronic correspondence.

¹⁴⁴Smith, 19.

¹⁴⁵Wilsworth, Electronic correspondence.

¹⁴⁶Capra, Electronic correspondence.

¹⁴⁷Walker, Electronic correspondence.

A third factor that could affect the creation and employment of a composite battalion is parochialism. Maneuver leaders would abhor losing control over their mortars, if mortars were included into a composite structure. Additionally, parochialism exists within the field artillery community as well. Proponents of cannons and proponents of rockets have different interests and backgrounds that could challenge the growth of composite structures.¹⁴⁸ Currently, rocket units only exist within the confines of a Field Artillery BDE and provide fire support to a corps headquarters. Rocket batteries do not exist within a BCT, therefore different cultures exist that could contribute to friction initially.

Conclusion

Composite field artillery battalions possess advantages that improve the effectiveness of the field artillery. Engaged in combat with a hybrid threat, the South African Army displayed the combat effectiveness of a composite battalion. When analyzed using the Principles of Fires, the strengths of the composite structure become clear. Specifically, a networked Field Artillery BN HQ provides a FSCOORD the ability to scale and synchronize multiple types of indirect fires. Although the adoption of a composite structure presents challenges, particularly regarding sustainment, these challenges are surmountable. Today, the field artillery possesses the ability to enhance its effectiveness by adopting a composite structure that proved effective when analyzed through both doctrine and through the study of a combat operation.

¹⁴⁸Snodgrass, Electronic correspondence.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

The evidence from both the case study and from the interviews conducted provides a conclusion that a composite Field Artillery BN would provide greater utility to the field artillery. Surprisingly, the interview subjects reached the same general conclusions regarding structure. This is surprising because none of the American officers interviewed had read any of the case study or indicated familiarity with the subject of the case study at the time of their interviews. The study's conclusions align with the analytical framework provided by the Principles of Fires.

Precision

The creation of a composite Field Artillery BN had no effect on the principle of precision. As currently organized, all field artillery battalions include a weapon system capable of firing a GPS munition. Therefore, the adoption of a composite structure neither improves nor degrades the capability of a Field Artillery BN to employ precision fires in support of a BCT.

Scalable

This study concludes that the adoption of a composite Field Artillery BN structure would improve the ability of a single headquarters to scale indirect fires on behalf of its BCT. A Field Artillery BN Commander would have the ability to follow the Principle of Scalability by employing fires that are both versatile and adaptable to a given tactical situation. Also, scalable fires also provides a Field Artillery BN Commander the ability to

both shape and support the BCT's fight from a single headquarters and therefore reduce external coordination.

Synchronized

The ability to synchronize fires within a single headquarters provides utility to a Field Artillery BN Commander and a BCT Commander. As scalability increases within a Field Artillery BN HQ, a composite structure allows synchronization of these scaled indirect fires. Synchronization represents an important principle because BCTs populate airspace with multiple assets. Indirect fires from both artillery and mortars compete with rotary wing aircraft and unmanned aerial systems for areas to operate. Joint aircraft also use airspace over a BCT's area of operations. One BN HQ synchronizing artillery fires and effects in coordination with the ADAM/BAE would increase the ability to harmonize multiple platforms for the entire BCT.

Responsive

While a composite structure could provide increased utility to the field artillery, this study focused on increased responsiveness. The evidence is inconclusive regarding responsiveness. In 1987, the South African artillery experienced flexibility, but as noted no increase in responsiveness. American officers believe that responsiveness is possible, but that significant training is required. Due to the current BCT organizational model, training would be required across multiple organizations to include the Field Artillery BN, the Brigade Support BN, and the BCT staff. This training would naturally center on the new capabilities and responsibilities associated with the composite Field Artillery

BN. However, this study cannot definitively conclude that a Field Artillery BN reorganization into a composite structure will increase responsiveness.

Networked

The American Army possesses the technology to network its operations and its units. Combat proven communications systems and information sharing systems exist that can support the increased range associated with a composite Field Artillery BN. While the technology exists, some systems may require reallocation or software upgrades to support the enhanced capabilities of a composite Field Artillery BN.

Sustainment

Although not a Principle of Fires, sustainment is an important consideration. The development of a composite Field Artillery BN requires attention be paid to sustainment. A composite Field Artillery BN requires additional logistical support because new vehicles, fire support systems and munitions will be required. These new systems will lead to updated manning requirements within the BSB because, due to modularity, the majority of sustainers reside within the BSB. These challenges can be solved, but the point remains that sustainment will affect more than just the BCTs Field Artillery BN. Summarized below are the findings of this study:

Table 1. Advantages vs Disadvantages of a Composite Field Artillery Battalion

Principles of Fires	Advantages	Disadvantages
Precision	No advantage or disadvantage	
Scalable	Scale fires inside one headquarters.	
Synchronized	Synchronize multiple field artillery systems inside one headquarters.	
Responsive	Assessment is that training may improve responsiveness over time.	The formation of a composite Field Artillery BN will not, by itself, increase responsiveness.
Networked	Technology already exists to support increased range capabilities associated with a composite Field Artillery BN.	
Sustainment		Requires additional logistical support and additional personnel; may require change to BSB manning.

Source: Created by author.

In conclusion, a composite Field Artillery BN could provide increased effectiveness to a BCT if organized with three cannon batteries and one rocket battery. A South African artillery veteran of the Battle of Cuito Cuanavale concludes that three howitzer batteries and one rocket battery would be ideal for the fighting in Angola.¹⁴⁹ American cannon battalions would benefit from the inclusion of HIMARS or MLRS systems.¹⁵⁰ An MLRS battery or platoon would enhance the effectiveness of an ABCT

¹⁴⁹Wilsworth, Electronic correspondence.

¹⁵⁰Watson, 132.

Field Artillery BN and an IBCT Field Artillery BN would profit from the inclusion of HIMARS.¹⁵¹ Additionally, an IBCT Field Artillery BN would see increased flexibility and effectiveness with the addition of a HIMARS platoon.¹⁵²

Recommendations

The Army should establish a composite battalion that can test and determine the feasibility of employment. 4-27 Field Artillery seems like the logical candidate. 4-27 Field Artillery is currently the Army's test Field Artillery BN and it is already composited with both towed and self-propelled systems. Therefore adding a rocket battery would provide a battalion commander with the full complement of artillery systems under one command. As a result, multiple tests could be conducted that could serve to validate the conclusions of this study. Throughout these tests, leaders and Soldiers training within a composite structure will provide evidence concerning the effectiveness of a composite Field Artillery BN. More importantly, a composite battalion could develop and refine both doctrine and tactics, techniques, and procedures necessary for employing a composite battalion composed of cannons and rockets. These tactics, techniques, and procedures, and lessons learned would drive publication of best practices and drive doctrinal development for furthering the concept of composite field artillery battalions. Ultimately, the entire composite structure would require a DOTMLPF analysis.¹⁵³

¹⁵¹Capra, Electronic correspondence.

¹⁵²Marshall, Electronic correspondence.

¹⁵³Capra, Electronic correspondence.

One of the most valuable lessons provided by the South African artillery is that they formed composite battalions on an ad-hoc basis. The training, professionalism, and combat experience of their officers, and men allowed this flexibility. However, prudence dictates that an army prepares for future contingencies and not wait to reform during combat operations. As a result, American Soldiers also formed composite battalions when needed. Now that the American Army is embracing composite formations as part of our IBCT MTOEs, it is also the time to enhance our fire support efficiency and effectiveness and embrace the concept across the force. By instituting testing and development, and then exporting the concept to other units, the field artillery can continue the evolutionary process to become more effective when supporting maneuver units.

ILLUSTRATIONS

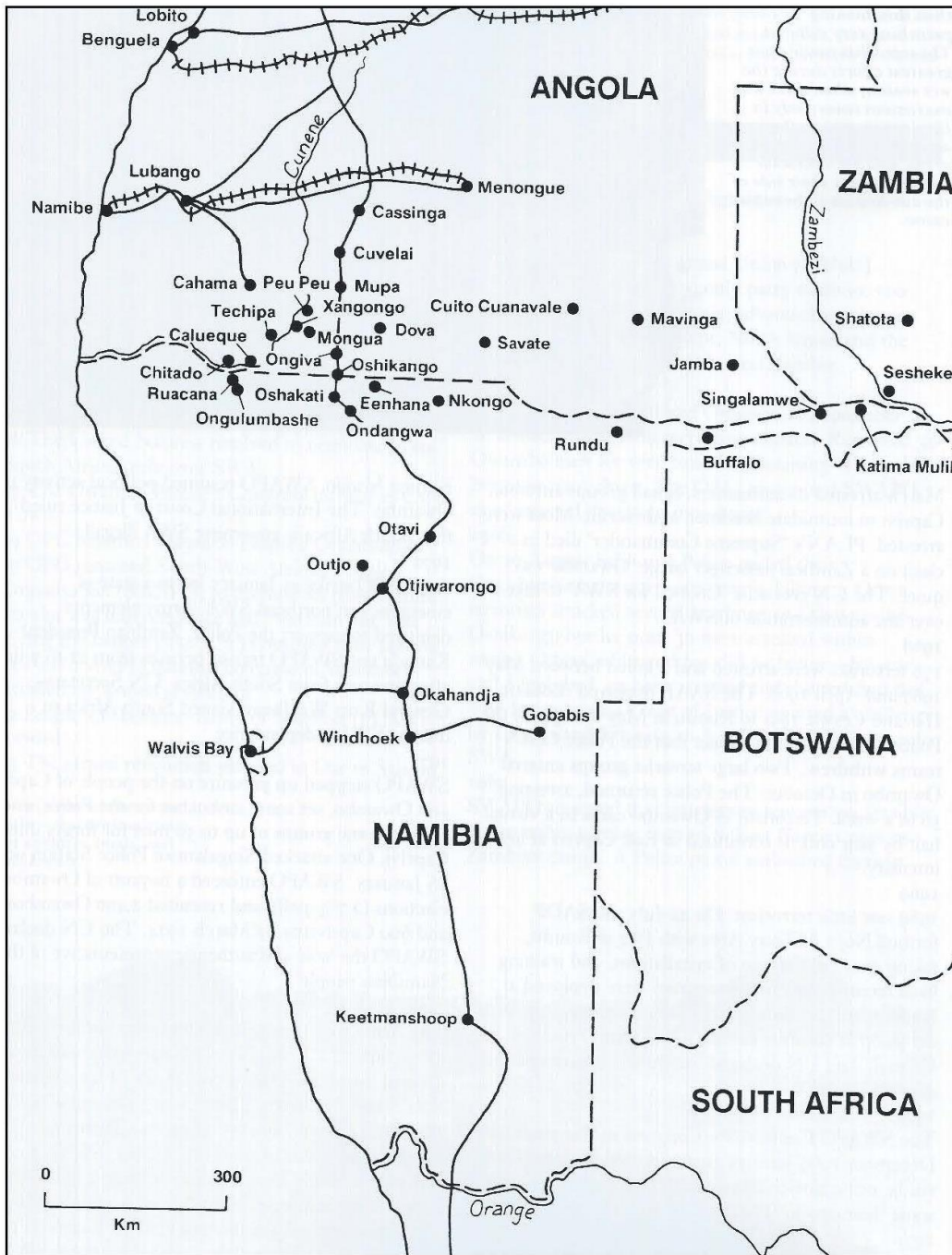


Figure 1. South African Border War Area of Operations:
Namibia-Angola Border

Source: Helmoed-Romer Heitman, *Modern African Wars (3): South-West Africa* (Oxford: Osprey Publishing, 1991), 6.

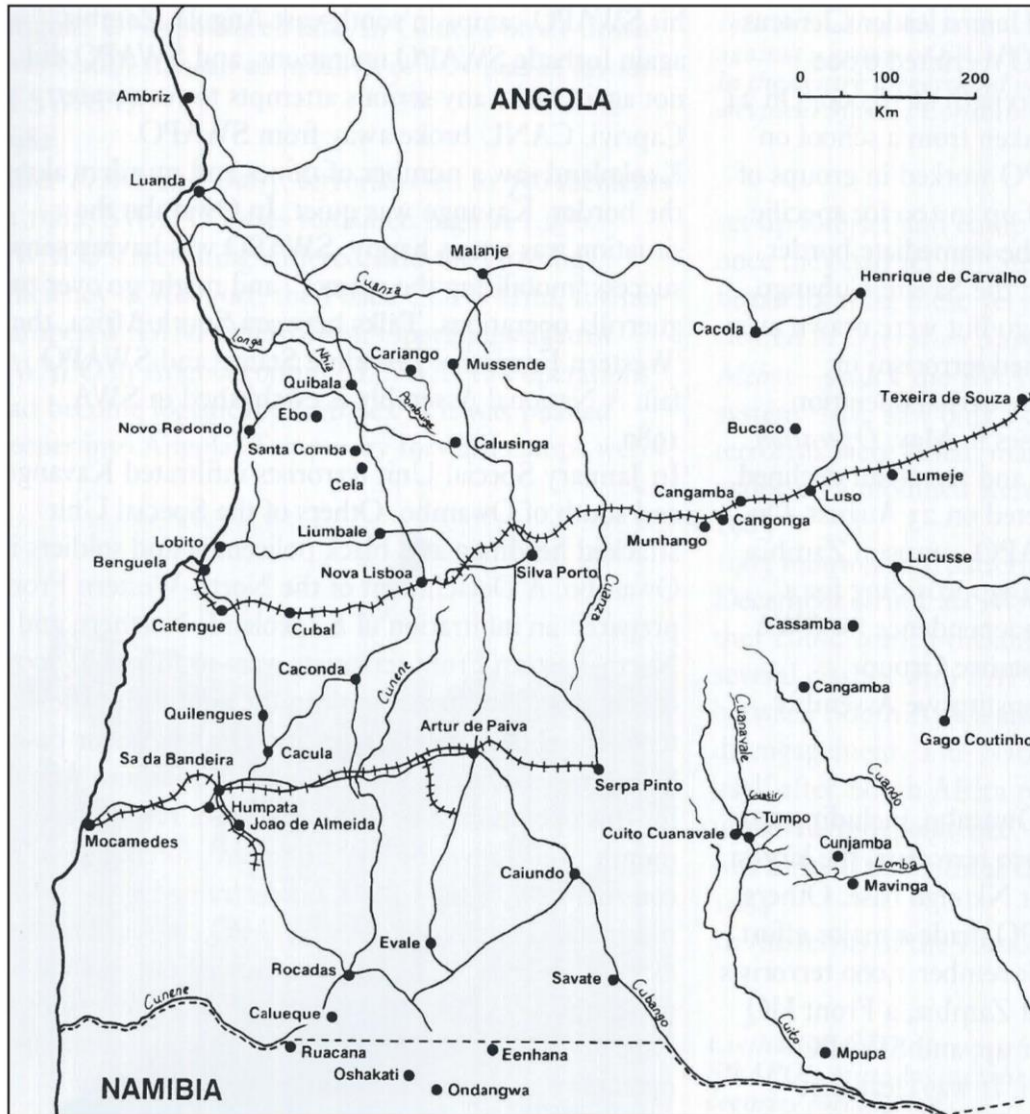


Figure 2. Southern Angola

Source: Helmoed-Romer Heitman, *Modern African Wars (3): South-West Africa* (Oxford: Osprey Publishing, 1991), 6.

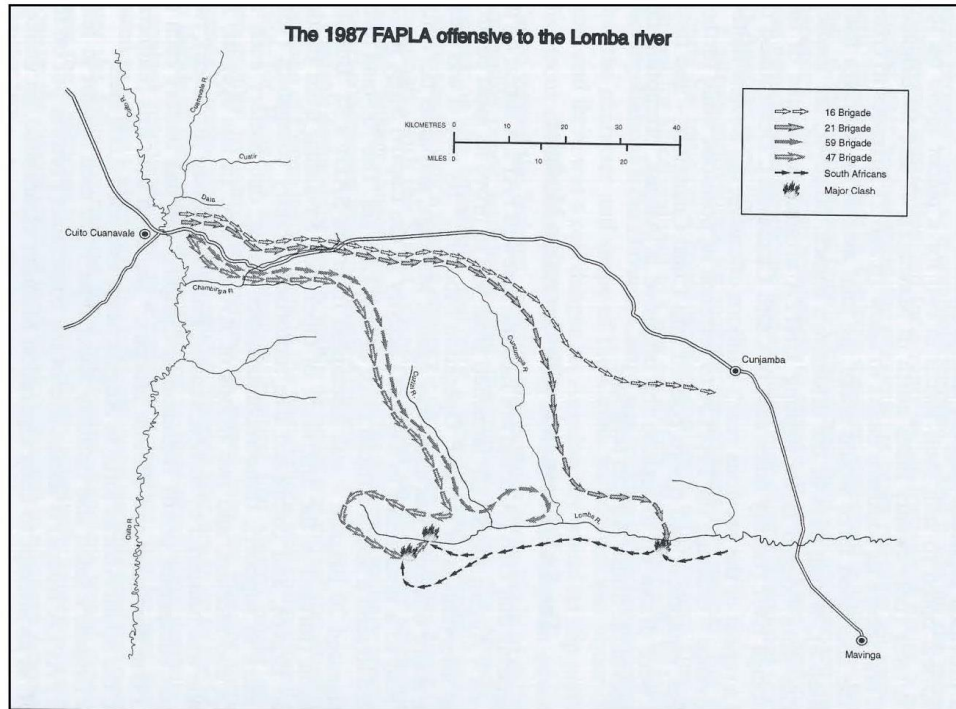


Figure 3. The 1987 FAPLA Offensive to the Lomba River

Source: Edward George, *The Cuban Intervention in Angola, 1965-1991: From Che Guevara to Cuito Cuanavale* (New York: Routledge, 2005), 204.

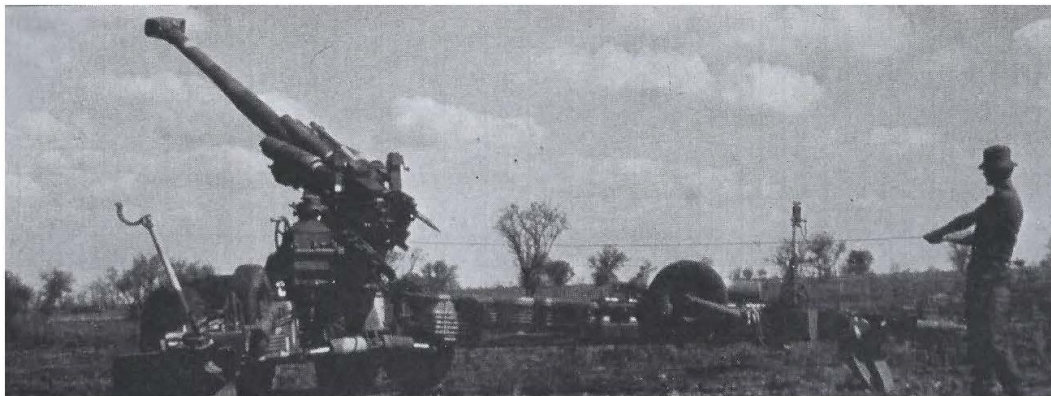


Figure 4. G5 155mm Howitzer

Source: Helmoed-Romer Heitman, *South African War Machine* (New York: Gallery Books, 1986), 45.



Figure 5. G6 SP 155mm Howitzer

Source: Helmoed-Romer Heitman, Modern African Wars (3): South-West Africa (Oxford: Osprey Publishing, 1991), 22.



Figure 6. Valkiri 127mm MRL

Source: Helmoed-Romer Heitman, *South African War Machine* (New York: Gallery Books, 1986), 43.

APPENDIX A
BACKGROUND TO THE BATTLE
OF CUITO CUANAVALÉ

Introduction

South Africa conducted a 23 year border war in southern Angola and Namibia from 1966 to 1989. SA fought Namibian insurgents that received support from Communist backers in Angola. Due to this Angolan support, SA regularly intervened in Angola to destroy insurgent bases. Additionally, SA allied itself with the National Union for the Liberation of Angola (UNITA). UNITA was an Angolan insurgent group opposed to the Communist rulers of Angola. Opposed to SA in Namibia was the South West African People's Organization (SWAPO). The South African Army conducted COIN operations aimed at defeating SWAPO while also conducting conventional operations in Angola. In Angola, SA and UNITA fought the Soviet and Cuban backed Popular Movement for the Liberation of Angola who ruled the country. Over time, the Communists sought a decisive victory to unite Angola. The quest for this victory led directly to the Battle of Cuito Cuanavale beginning in 1987. The Battle of Cuito Cuanavale involved the heaviest fighting of the 23 year South African Border War. The South African Army prevailed during this battle, in no small part, because of its field artillery. This annex explores the background to the border war, opposing forces, doctrine, and equipment to gain an understanding why the South African Army developed and employed this capability.

Strategic Background

The South African Border War began in South-West Africa. SA captured South-West Africa from Imperial Germany during the First World War. SA ruled South-West Africa, modern-day Namibia, as a postwar mandate awarded by the League of Nations. In 1966, the SWAPO began an insurgency to seek independence from SA. For years, this insurgency was contained, ineffective, and the South African Police maintained order.

Beginning in 1961, Portugal fought an insurgency in her African possessions. After a coup in 1974, Portuguese military leaders granted independence to Portugal's remaining African colonies. Their decision to grant independence to Angola had direct effects on the South African effort in Namibia and led to South African intervention in Angola.¹⁵⁴

Prior to Angolan independence, SWAPO's insurgency was unsuccessful. After Angolan independence, SWAPO sought secure basecamps in southern Angola to operate more effectively against South African forces in Namibia. These basecamps also provided access to Namibia's primary ethnic group, the Owambos, who were the focus of the insurgency.¹⁵⁵ Due to the establishment of these new basecamps, SWAPO increased the tempo of their operations.

South Africa had a significant challenge. They had to confront an insurgency with a sanctuary in a neighboring country along a 500 mile long porous international border

¹⁵⁴Morris, 8.

¹⁵⁵Helmoed-Romer Heitman, *Modern African Wars (3): South-West Africa* (Oxford: Osprey Publishing, 1991), 33.

that was marked by “no more than a dilapidated fence.”¹⁵⁶ SWAPO usually conducted operations in Namibia at night and retreated into Angola by first light. Additionally, the majority of the Namibian populace was vulnerable to SWAPO operations because the populace lived close to the Angolan border. Due to these considerations, population-centric COIN was not practicable.¹⁵⁷ The South Africans decided to strike SWAPO insurgents inside their Angolan basecamps sanctuaries.

South Africa also decided to support the efforts of UNITA in Angola. UNITA had been one of three insurgent groups that fought the Portuguese for independence. However, the Portuguese ceded control of Angola to the Popular Movement for the Liberation of Angola at the expense of the other insurgent groups. SA sought to undermine the Angolan government that was providing sanctuary and support to the SWAPO insurgency. Additionally, the Popular Movement for the Liberation of Angola Angolan government supported anti-Apartheid groups, including the African National Congress (ANC).¹⁵⁸ In 1961, the ANC established an armed faction, Umkhonto we Sizwe also known as Spear of the Nation (MK). MK initiated armed opposition to Apartheid.¹⁵⁹ Angola also provided sanctuary and support to MK.¹⁶⁰ South Africa’s neighbors also

¹⁵⁶Ibid.

¹⁵⁷Ibid., 34.

¹⁵⁸John W. Turner, *Continent Ablaze: The Insurgency Wars in Africa 1960 to the Present* (London: Arms and Armour, 1998), 101.

¹⁵⁹Shubin, 109.

¹⁶⁰Michael H. H. Warren, *In the Name of God: Defending Apartheid* (Lexington: Clockwork Books, 2012), 318.

supported South African intervention in Angola as a way to deal with the deteriorating situation.¹⁶¹ South African intervention began in 1975.

UNITA

Partnered with the South African Army throughout much of the Border War, UNITA maintained an army of between 30,000 and 40,000 soldiers throughout the late 1980s. UNITA's army included regular battalions, semi-regular battalions, artillery battalions, and support units including engineers, air defense, and reconnaissance organizations. An estimated 5,000 to 10,000 UNITA soldiers participated in the fighting around Cuito Cuanavale organized into six regular, 10 semi-regular battalions and various support units. During the campaign, UNITA units fought alongside the South African Army and maintained control of the lines of communication between Angola and South African bases in Namibia allowing SA to move unescorted convoys throughout the area. UNITA also brought armor to the campaign and additional fire support assets including 81mm and 120mm mortars, 122mm howitzers, and 107mm rockets.¹⁶²

UNITA's political and organizational heartland centered itself around the cities of Mavinga and Jamba. UNITA maintained fourteen military training camps producing 8,000 soldiers annually. Additionally, military maintenance facilities, a propaganda radio station, and three hospitals augmented with SADF doctors operated within this area. Outside the sphere of military operations, UNITA ran primary schools, a postal service, orphanages, and old-age homes. Not limiting itself to SA, UNITA enjoyed western

¹⁶¹Heitman, *South African War Machine*, 170.

¹⁶²Polack, 75-78.

diplomatic recognition from the United States, United Kingdom, Portugal, France, Germany, and the United Nations.¹⁶³

FAPLA and Cuba

The South Africans and their UNITA allies fought a conventionally organized Popular Movement for the Liberation of Angola Army. Originally a guerilla force, The People's Armed Forces for the Liberation of Angola (FAPLA) received both Soviet and Cuban assistance and reorganized itself along Warsaw Pact lines.¹⁶⁴ FAPLA maintained an army of over 90,000 soldiers organized into 70 brigades. FAPLA received roughly \$1 billion of Soviet equipment annually that included T-55 tanks, BTR armored personnel carriers, BMP infantry fighting vehicles, BM-21 MRLs, D30 howitzers, SA-8 Surface to Air Missiles, and Strella MANPADs. Training FAPLA to use and employ this equipment was a cadre of advisors from the Soviet Union, East Germany, Cuba, North Korea, and Vietnam.¹⁶⁵

The FAPLA BDEs involved in the fighting around Cuito Cuanavale had a standard organization. Each BDE contained three infantry battalions and two motorized infantry battalions supported by organic engineer and artillery units. The Air Force's Mi-24s provided rotary wing air support.¹⁶⁶ A Cuban fighter wing, composed of MIG-23s and flying as part of the Angolan Air Force, provided close air support (CAS).¹⁶⁷ Angola

¹⁶³Ibid.

¹⁶⁴Turner, 100.

¹⁶⁵Polack, 68-69.

¹⁶⁶Ibid., 68-70.

¹⁶⁷Ibid., 38-39.

also possessed a riverine navy that arguably could support river crossing operations, but the navy limited itself to providing logistical support.¹⁶⁸

Cuba's intervention in Angola began in 1975 initially and consisted of defending strategic Angolan infrastructure, supporting the developing communist government, and training the FAPLA.¹⁶⁹ During the 1987 campaign, besides advising FAPLA and providing CAS, Cuba deployed ground forces to support their communist Angolan allies. Cuba maintained 55,000 soldiers in Angola and staged 40,000 soldiers around Cuito Cuanavale during the 1987 campaign. The mechanized Cuban units had over 600 tanks, armored vehicles, and artillery.¹⁷⁰

South African Doctrine

South African strategic thought influenced its military doctrine. South African strategy followed a policy of preemption.¹⁷¹ The South African Army was composed of about 20 percent active duty forces called the Permanent Force and reserve forces called the Citizen Force. Therefore, the majority of South African combat power was only available when fully mobilized.¹⁷²

South African Army doctrine evolved over time from multiple sources. Doctrinal influences included both the British Army and the Israeli Defense Force.¹⁷³ Over the

¹⁶⁸Ibid., 71.

¹⁶⁹Ibid., 27.

¹⁷⁰Ibid., 38.

¹⁷¹Heitman, *South African War Machine*, 24.

¹⁷²Ibid.

¹⁷³Wilsworth, *First In Last Out*, 22.

course of the Border War, South African desired a mobile war¹⁷⁴ that was “expressed in a doctrine of fast-moving, flexible, wide ranging, and violent joint operations.”¹⁷⁵ This version of mobile warfare called for the use of initiative and combined arms maneuver operations leading to a decisive battle.¹⁷⁶

The Border War itself also influenced the South African Army’s doctrine. South African COIN operations provided experience and lessons learned that refined doctrine. The decision to counter the SWAPO insurgency by conducting raids into Angola provided the South African Army with experience in conventional operations. The South African Army refined its training and its organizational construct through its operations. This experience served to validate that South African doctrine was operationally sound.¹⁷⁷

The South African Army updated its doctrine prior to operations around Cuito Cuanavale. Colonel Roland De Vries, destined to become the Deputy Brigade Commander during the Cuito Cuanavale fighting, codified the new doctrine. As part of his update, De Vries focused on three areas. These areas included mobility, guerilla warfare, and night operations. Specifically, De Vries sought to combine these three elements in order to maximize the capabilities of the South African Army. The South Africans used all three elements during the battles around Cuito Cuanavale.¹⁷⁸

¹⁷⁴Heitman, *South African War Machine*, 43.

¹⁷⁵*Ibid.*, 26.

¹⁷⁶*Ibid.*, 47.

¹⁷⁷*Ibid.*, 30.

¹⁷⁸Polack, 42.

After the Battle

While the fighting continued in 1988, American sponsored negotiations began in an effort to end the conflict. During the negotiations, the South Africans withdrew all their forces from Angola at the end of August 1988. After the signing of the peace agreement, Cuba began the process of withdrawing its Angolan based forces.

Additionally, Namibia held elections as a precursor to full independence from SA.

Unresolved, the civil war in Angola continued as UNITA continued to battle communist forces.¹⁷⁹

¹⁷⁹Morris, 33.

APPENDIX B

INTERVIEWS

Mr. Clive Wilsworth, author of First In Last Out The South African Field Artillery in Action 1975-1988 and a Field Artillery Veteran of the Battle of Cuito Cuanavale

Relating to Operations around Cuito Cuanavale:

1. Why did the South African artillery decide to use a composite formation?

a. Although South African forces were in combat in Angola, there was no declared war against the state of Angola. This situation developed out of the Counter Insurgency war being fought in Namibia as well as the requests by UNITA for assistance to prevent the Cuban/Angolan conventional forces from advancing southwards to eventually take over UNITA's HQ at Jamba (and therefore destroy UNITA—the only political opposition to the Marxist Popular Movement for the Liberation of Angola).

b. Because of this situation the SADF decided to use the permanent, or standing, forces for conventional operations. This force was in fact little more than a reinforced brigade comprising units (battalions) spread around SA. Briefly, there were three mechanized infantry battalions, one armored car regiment (battalion), one tank regiment, one composite artillery regiment, one Air Defense Artillery Regiment, one engineer regiment plus all the supporting units such as signals, Electronic Warfare, Supply etc.

c. The government was explicit in their instruction given to the SADF to keep casualties to the absolute minimum—in particular possible POWs and the ensuing embarrassment that would cause. At the same time it should be noted that the bulk of the SA Army's conventional forces (3 Divisions and one Airborne BDE) were part-time

(citizen force). The full-time, or permanent units were structured to train the national servicemen who, after two years conscription service, entered the citizen force for another eight years part-time service. In the artillery specifically 10 Artillery BDE was just such a training formation. It comprised two regiments (4 and 14 Field Regiments) each identically organized and rotating annually between training and operations. That is, train the national servicemen in the first year and deploy operationally in the second year. All the other arms in the army did the same thing.

d. By using the full-time forces the SADF did not have to call up the Citizen force thus creating panic or too many questions. Of course this emanated from the political masters as it does all over the world.

e. The strategy regarding the conventional threat was that the full-time forces would deploy first and hold until the part-time formations could relieve them in the line. This is the way it happened right from 1975 until the cessation in 1988.

f. To answer the question—all the South African artillery had for those early battles between the Lomba River and Cuito Cuanivale was the full-time batteries available at the time. Having said that it was also a bit of an experiment to see if such a composite organization would work. It is also true that we used all of our Permanent Force personnel during that period to give them as much combat experience as possible.

2. In your professional opinion, did this composite organization improve the effectiveness of fire support provided to maneuver formations?

a. In short, no. Although we had flexibility through the various weapons systems deployed there were some serious limitations. These were:

i. The 120mm mortar: With standard ammunition the maximum range was 6400m. This meant deploying artillery fire support very close to the Front Line Own Troops and therefore vulnerable to enemy infiltration. However using the rocket assisted ammunition (Only available in HE) the range extended to 11 000m thus more in line with conventional artillery deployment.

ii. The 127mm MRL: This system was designed for delivering artillery fire strikes, that is, high volume, intense, concentrated fire over a very short period of time. We occasionally tried to use them like guns/howitzers where we would adjust fire on a target and then deliver fire-for-effect. The problem was that time between adjusting rounds was slow and the give-away dust cloud and white flame from the rocket motor during daylight fire missions made them vulnerable to air attack. The ideal fire mission for MRLs is:

1. Fix the target accurately during the day.
2. Load the tube packs late afternoon in a hide or loading area.
3. Survey the firing position just before last light.
4. Occupy the firing position after last light and wait for the order to fire (or Time-on Target).
5. Prepare the battery to withdraw immediately after the end-of-mission (pack up everything including aiming posts, theodolites and the like).
6. Fire and automatically withdraw to a rendezvous. Away from the firing position.

The deployment time for the MRL was relatively long because of the design of the equipment. The launchers had to come into action at an angle of about 60 degrees to

the line of fire. The tube pack would be traversed to the right into the line of fire/centre of arc. Therefore the battery and troop theodolites would have to be to the left of the launchers. You can imagine doing all this at night without lights.

Rockets, unlike shells, weathercock into the prevailing wind during the burn phase of the rocket motor (about 1.5 seconds). Therefore an additional calculation has to be made as close to firing as possible. This was done by measuring “active wind” using a mast-mounted anemometer and wind indicator as well as a mortar-like device known as a wind gun. This wind gun was set up in the firing position and fired five 32mm wind-indicating projectiles. It fired vertically and the mean point of impact of the projectiles was then measured in terms of bearing (Azimuth) and range from the wind gun. This provided the data for the final active wind calculation which was applied to the sights before firing.

The launcher crew of two fired the launcher from inside the cab so like Self-Propelled guns all fire orders were transmitted by radio.

At night the intense white light from the 192 rockets from a battery could be seen for miles around thus exposing the firing position, hence the reason for departing as soon as the fire mission was complete.

iii. The 155mm G5: Very flexible with a high degree of mobility during firing or when in action. Mobility in this case was the ability to switch from target to target quickly and over a huge area because of the traverse and range. It's only real limitation was the speed at which it could be towed in that thick bush and soft sand, therefore movement planning was essential, especially at night without lights and in radio silence.

The number of fire missions using Charge 3 was high and resulted in recoil systems having to be replaced and barrels changed.

iv. The 155mm G6: As for G5 but far more mobile in that terrain. The limitation in this case was that there were only three guns available. The G6 troop started with four Engineering Development models but one developed a gearbox problem and had to be left in Rundu. Limitations? The GPS-driven gun laying system relied on availability of satellites. At that time there weren't that many and some had been switched off by the U.S. DoD. All it did was to slow down deployment slightly.

b. The SA Artillery deployed a regimental tactical HQ right next to the brigade tac HQ as is normal. Communications between the regimental commander, his fire support co-ordination officer, and the supported Brigade Commander was excellent. Like wise the comms between brigade intelligence and the aforementioned. The limitation however was the VHF communications between tac HQ and batteries, and, more importantly between tac HQ and forward observers. The distances were vast with observers sometimes as much as 30 kilometers away from the batteries. The limitation in radio communications had the effect of slowing down reaction time when observers called for fire.

3. In your professional opinion, did this composite organization improve the responsiveness of fire support provided to maneuver formations?

a. The responsiveness was not a result of the composite organization but of the communications network.

b. Having said that I would say that the composite organization tended to reduce responsiveness, especially the MRL fires.

4. During operations around Cuito Cuanavle, did the South African artillery ever mass on a particular target?

a. Yes, particularly during the attacks of 47th brigade at the Lomba River and later the attacks on the defended locality (16th BDE—I think) at Tumpo in February 1988.

5. During operations around Cuito Cuanavale, what challenges did the artillery experience?

a. C2. The main challenge in this area was the limitations on, firstly VHF radio communications as mentioned above. Secondly the only alternative was to use HF communications. Thus, observers deploying by infiltration on foot would have to carry the extra radio equipment—batteries especially. HF antennae are cumbersome and difficult to deploy accurately under tactical conditions.

b. Employment. South African infantry commanders often did not appreciate the difficulties the terrain threw at the gunners. This would often be the cause of slow deployment. The employment of the composite unit was sensibly planned because of the relationship between the supported brigade and the artillery tac HQ.

c. Logistics. The biggest challenge here was the supply of ordnance and vehicle spare parts. There were a number of factors that influenced this:

i. The lack of roads from Rundu to the BDE Admin Area at Mavinga—a distance of 300 kilometers. This meant flying in almost all logistics requirements by C130.

ii. Enemy air superiority. Logistics support by the SAAF was only done at night to avoid FAPA aircraft.

iii. Ordnance (guns, mortars and MRLs) spares were not always readily available as the systems were relatively new in service and the Integrated Logistic Support programs during development and commissioning were still relatively immature.

iv. Vehicle spares were reasonably available but the high attrition of radiators, clutches and tires owing to the soft sand and the constant 'bundu bashing' at night did result in excessive vehicle casualties.

v. Artillery Ammunition. This was a high priority for the logistics planners and usually took precedence over all other supply support. However the supply of 127mm rockets and proximity fuzes did fall short occasionally owing the sheer number fired.

6. Is there anything that you would like to add concerning South African use of composite field artillery organizations?

a. The composite organization is not the ideal, primarily from a logistics point of view—the variety of ammunition moving through the artillery's B and A Echelons forward tends to require more logistics personnel and separate dumping/stacking.

b. I would say that the ideal organization in that theatre would have been three 155mm G5 batteries (i.e. a regiment) with a rocket battery attached. The only disadvantage of this is the inability to of the ordnance to provide 'intimate' fire support to the mechanized infantry. Intimate fire support? A hell of a lot closer than close fire support!

c. The above organization would have resulted in a smoother flow of common ammunition, for example where one battery started running low on ammo the adjacent battery could supply quickly.

d. Whether composite or organic the command and control would have been the same. The artillery tac HQ assigned fire units to the observers' calls for fire during ad hoc fire missions and of course did fire planning for deliberate maneuvers by the teeth arms (such as deliberate pre-planned attacks). Fire control was then assigned to the battery commander supporting such maneuvers.

LTC Kevin Capra, CDR 1-10 FA 3-3ID

1. As a FSCOORD, what tasks is your battalion expected to perform relating to employment of indirect fire? DS Fires, counterfire, etc?

As FSCOORD I am joined at the hip with the BDE CDR for the most part with anything dealing with fires. Mine is a very traditional FSCOORD responsibility and definition: plan, coordinate and synchronize lethal and nonlethal fires for the BCT. Along with the BCT FSO, S2, Targeting and Counterfire Cell, we are to ensure we are capable of delivering the right effects at the right time and place.

He and I will have conversation and walk the ground because me and my actions should enable him to "own the art" of integrating fires. The hardest part for me means that I will spend a significant time away from the Field Artillery BN during DA operations. I suspect, it is about 70-30 in terms of time and energy spent tactically weighted toward FS, integration of maneuver and fires and building relationships and coaching/training TF FSOs.

I believe the BCs, 1SGs, S3, MG, CSM and XO all own the science (AFATDS, gunnery, crew drills, class V management, etc). If they cannot someone needs to be fired!

Bottom line—Me and my team must be able to look the BDE Commander in the eye and state that you can deliver precise, timely fires ISO his maneuver plan! That is what I hang my professional hat on.

2. Based on your assigned tasks, are there any identified challenges with executing these tasks?

Yes—There is a number of challenges associated with this as it pertains to training and money in the current environment. Over the past 12 years we have moved away from the ability to mass artillery at the battalion level or in combination with Reinforcing or General Support fires, and relied much more on other joint and combined fires (CAS and Army Aviation) for immediate effects.

In the past (prior to 2003-OIF) our BCTs had tremendous tactical and operational success in synchronizing lethal fires and maneuver. The key contributors to this warfighting proficiency were arduous preparation sessions while at home station that culminated in rotations at one of the combat training centers. Although, prior to 9/11 we operated in a resourced constrained environment, Artillery BNs and BCTs paid significant attention to continuous and repetitive unit training on the ability to mass and synchronize fires.

After modularity and the fire support personnel departing the field artillery battalions, we have lost much of the ability to operate effectively as a BCT synchronizing fires and operations at the BCT level. Much of this is due to the way we operated in the wars in Iraq and Afghanistan. We rarely massed more than a platoon of artillery and relied primarily on CAS and Army Attack Aviation. Additionally, the requirement/need for precision munitions, limited the need to mass Artillery BN fires.

Some of the challenges I face today center around financial constraints of the Army. Our BCT lost our NTC rotation (14-08) for July 2014 due to funding. This in turn has had a significant impact on our budget and the level of training we will be funded for. With our budget shrunk by nearly 75 percent, we are only able to fire through Artillery Table VI (Section level). In the past, we were able to shoot through Artillery Table XVIII (BN). Without funding through AT XVIII the battalion cannot rehearse missions critical to the effectively conduct a combined arms maneuver breach or other significant events that take considerable time and effort to

Bottom Line: The loss of NTC 14-08 rotation is done at tremendous leader development and readiness cost to the battalion and fire supporters across the BCT. The lack of an NTC rotation limits our ability, across the Fires Warfighting Function, to train agile and adaptive leaders who have actually provided timely, accurate and synchronized in support of a BCT. This training would also be valuable to the battalion staff in providing Mission Command for these operations and support staff and leader development.

I can explain a lot more of this over the phone if you want to talk about it, but may take too long to write an entire answer.

3. As a FSCOORD, would it improve the effectiveness of your battalion to have multiple systems under your command?

This a tough question to answer as there are instances where I could imagine having multiple systems under my command improving effectiveness. I can also see where having multiple systems could cause significant problems. I think if we maintained the ability to have at least two cannon batteries in a DS fires BN and added an MLRS

platoon or battery to the DS BN that would offer a great capability. It would certainly make the counter-fire and deep fight more efficient. This would offer the BCT Commander the ability to shape the battlefield with greater fidelity.

I think this could be the same if done in the IBCTs with a HIMARS Platoon or Battery at the DS Artillery BN level. The challenge here would be that the IBCT BN is already becoming a composite organization with a mix of M119A3s and M777s. To add another battery to this organization could be problematic, but would at again add a significant capability to the BCT Commander to shape the battlefield, especially in a DA environment.

4. As a FSCOORD, would it improve the responsiveness of your battalion to have multiple systems under your command?

For some of the same reasons stated above, this could improve the responsiveness of the DS BN to respond to a multitude of scenarios. By owning both a cannon and rocket capability, it would allow the BCT to be more responsive to counterfire as well as in the deep fight. By having the capability assigned to the BN, it would allow the BCT to train and rehearse with the same unit. Working with the same units inside the battalion and brigade would clearly allow the brigade to be more responsive based on the repetition and training together over time.

5. As a FSCOORD, would it improve the flexibility of your battalion to have multiple systems under your command?

I would say see the previous two answers as I think all three of these go together.

6. If you believe that a composite structure would improve your ability to execute missions, what system(s) would enhance your effectiveness, responsiveness, and flexibility?

I believe the fires battalions in the ABCTs would do well with an MLRS platoon or battery added to their MTOE. These systems would go well together as the MLRS chassis already has some of the similar parts to the Bradley. Additionally, I believe the IBCTs should add the HIMARS system to either the M777 batteries of the M119s. The challenge with this option would be the addition of a third type of system to one battalion which could cause significant sustainment issues for an IBCT with the limited number of vehicles.

7. What challenges do you see from a composite FA organization? C2? Training? Employment? Logistics?

The challenges I see with the composite battalions are primarily in sustainment. The ability to sustain an additional MLRS battery in an HBCT could be problematic with the need for additional space in the SSA, the ability to carry the additional parts as well as for the additional MOS specialties required for either sustaining or manning the organization. The same could be said for the IBCT and these challenges may actually be more difficult based on the capability of the BSB in the IBCT to haul additional parts and ammunition associated with a HIMARS battery.

Some challenges in training may be associated with the need to certify multiple crews on multiple weapons systems for the battalion staff. Additionally, I think the distance the battalion would span could become problematic as well. Based on doctrinal distances and from the front, the Artillery BN with both cannons and rockets could

become very difficult to command. This could also I would need to do a lot more of an in depth analysis on this using the DOTMLPF.

I think the mixing more than two systems would become very problematic when it comes to managing ammunition requirements. If you try to mix 105mm, 155mm ammunition and rocket ammunition, this could cause significant challenges in haul capabilities. It could also cause challenges in massing fires. This would really need to be looked at fully again using the DOTMLPF analysis.

I would be more than willing to discuss some of this with you if you would prefer or if you want to discuss some of your additional ideas for any designs for a composite organization.

LTC Robert Marshall, CDR 4-25 FA 3-10MTN

1. As a FSCOORD, what tasks is your battalion expected to perform relating to employment of indirect fire? DS Fires, counterfire, etc?

We are expected to execute close supporting fires, counterfire, pre-assault and preparation fires. In Afghanistan our role has expanded to precision and near precision fires as well.

2. Based on your assigned tasks, are there any identified challenges with executing these tasks?

Range and mobility are always challenges for towed systems. Increased range mitigates the mobility problem to some extent. Additionally, traditional artillery systems require greater emplacement times due to legacy laying methods. The digitized M119A3

will reduce this friction point for Light Infantry BCT Fires Battalions. By MTOE, a Light Infantry BCT Fires BN cannot provide precision or near precision fires.

3. As a FSCOORD, would it improve the effectiveness of your battalion to have multiple systems under your command?

I believe it would greatly enhance the battalion's effectiveness. Increased range and the addition of a precision capability would improve flexibility and therefore overall effectiveness.

4. As a FSCOORD, would it improve the responsiveness of your battalion to have multiple systems under your command?

Once again the range advantage and the precision capability would have the potential to greatly enhance responsiveness.

5. As a FSCOORD, would it improve the flexibility of your battalion to have multiple systems under your command?

See above, number 3

6. If you believe that a composite structure would improve your ability to execute missions, what system(s) would enhance your effectiveness, responsiveness, and flexibility?

Without a commiserate increase on the logistic tail of the BCT, I think a M119 and M777 composite would provide a significant improvement. To maximize effectiveness and flexibility, a HIMARS platoon would cover all the bases. However, the addition of a rocket element has a significant logistical footprint.

7. What challenges do you see from a composite FA organization? C2? Training? Employment? Logistics?

C2 could become a challenge depending on the size of the AO that requires fires coverage. In the recent past, IBCT AOs have grown exponentially and with the requirement for fires coverage. Communications systems at the battalion level are well on their way to the right place and capability, but the battery is lagging behind. Long range radio and non LOS data systems are required at the battery level to fully realize the potential of composite battalions. AFATDS would need an upgrade allowing widely dispersed platoons/batteries and the ability to simultaneously compute 155mm, 105mm, and HIMARS data on the same box. Logistics would also be an area of concern. Weight and cube are significantly different for 105mm and 155mm systems. Also separate loading ammunition has a greater haul requirement and increased weight that will need to be considered.

8. Is there anything that you would like to add concerning the employment of composite field artillery organizations?

In order for the composite BN to work the entire system should be evaluated and optimized for the desired capabilities. Are FOs/FSOs restricted to relatively short range LOS communications equipment? Do they have a realistic means of determining accurate target location? . . . in the dark? . . . with a full combat load? Do the firing units have communications gear and MC systems that support decentralized operations over wider areas? Can their MC systems support continuity of operations from one delivery system to another? Can the BCT clear/control the airspace that a composite BN would/could occupy? Coming changes in FA organization may provide the divisional units more flexibility in the future. However, most “bolt-on” solutions will fail or never reach their full potential. It is a disturbing truth that a division commander has no all-weather fire

support system capable of shaping the AO or weighting the main effort for his subordinate BCTs.

LTC Roy Walker, former BCT FSO 1-10MTN, former S-3/XO 3-6 FA 1-10MTN

1. As a FSO/S-3/XO, what fire support tasks is your battalion expected to perform? DS Fires, counterfire, etc?

Based on my experience as a BDE FSO in Iraq the DS FA BN had a limited counterfire mission that was directly tied to the Q36 radar. The FA BN had a maneuver area to run operations in and the CF mission required minimal manpower.

In Afghanistan as a BN S3/XO the FA unit I served in did not have a traditional FA mission; the battalion was provisional infantry and had control of a maneuver area and partnered with the Afghan Police. We did not even deploy our howitzers.

2. Based on your assigned tasks, were there any identified challenges with executing these tasks?

In Iraq the limited range of the 105mm M119 Howitzer did not lend to effective DS fires in the large area the BCT was operating in at the time in northern Iraq.

3. As a FSO/S-3/BN XO, would it have improved the effectiveness of your battalion to have multiple systems?

I believe multiple systems would have been a great asset in Iraq and Afghanistan. In Iraq the DS FA BN could have covered a large majority of the BCT AO with extended range 155 munitions (to the best of my memory) or with a rocket system such as the HIMARS. In Afghanistan we did not have the DS mission.

4. As a FSO/S-3/XO, would it have improved the responsiveness of your battalion to have multiple systems?

In Iraq with 155mm and rocket systems the DS FA could have covered the entire BCT AO and the responsiveness would have been much increased. The unit would not have to move firing units to be within range of maneuver missions if they could range those areas from their normal firing positions.

5. As a FSO/S-3/XO, would it have improved the flexibility of your battalion to have multiple systems?

Without a doubt I think the BCT would have been better served with a multiple system unit. The “tailorability “of this type of unit would make the DS FA a much more attractive unit to a maneuver BCT commander. Specifically in a 105mm unit, there is limited range and limited munitions. The added capability of 155mm and a rocket system provides a much larger suite of munitions and a third greater range from the 155mm and ten times the range increase for rockets. These systems also provide greater accuracy with GPS guided munitions.

6. If you believe that a composite structure would improve your ability to execute missions, what system(s) would enhance your effectiveness, responsiveness, and flexibility?

I would choose the HIMARS system to form composite units. The HIMARS provide firepower with range that even special operations forces have learned provide a powerful punch with a great range. There is no question of the effectiveness of the HIMARS system effectiveness given the fact it fires the same suite of munitions as the M270 MLRS system. Responsiveness would be hard to match given the effective range

and that the system can be moved on a C130. Flexibility would be provided with the munitions and can provide all FA missions and arguably to include danger close support to troops with the precision munitions.

7. What challenges do you see from a composite FA organization? C2? Training? Employment? Logistics?

C2 challenges for a composite unit could be challenging in that the BN CDR, BN CSM and other key leaders such as the XO or S3 may have limited or no experience with multiple systems. This issue would be remedied after composite units have existed for a number of years as the leaders growing up in the FA community would learn about each system beyond a cursory knowledge. At the battery level the BC could be assigned to the specific unit based on prior experience on the battery weapon system.

Training challenges such as a firing range for the rocket systems could be significant based on the required ranges needed for a simple training rocket. The tube artillery would still be able to do home station training but the rocket units would have to deploy to larger training areas to live fire. Again the limited experience by key leaders may impact the effectiveness of training especially at the BCT level if DIVARTYs do not return.

Employment of these multiple assets would seem to me to be a relief to the normal question of “where do I place my firing units?” Multiple system units could provide a very large range fan with the rocket system, and the 155 mm tube units could be placed in the BCT AO to pick up slack where the rockets are limited and if a composite unit has three systems (105mm, 155mm, HIMARS/MLRS) then the 105mm

guns could be used for out of sector raids, air assault raids or other special missions that would normally tie up the other assets.

Logistics challenges could be the lynch pin to the whole thought of creating such units but the impact of logistics could be minimized. If the composite unit is a light unit; that could consist of 105mm and—or 155mm and the HIMARS; the HIMARS chassis is a MTV chassis and has commonality with other MTV family vehicles and limits the impact within the BCT resupply chain. The only specialty MOS to add to the light composite BN would be a HIMARS launcher specific mechanic. In heavy units the M270 MLRS has commonality with the Bradley family of vehicles for parts and would limit the impact within the BCT in supporting a composite unit. I believe the biggest impact would be the resupply of ammunition. The addition of rocket units to a light unit would grow the Forward Support CO (F CO) exponentially to keep ammo available for two/three systems if in a heavy conflict.

8. Is there anything that you would like to add concerning the employment of composite field artillery organizations?

I did have the opportunity to conduct a Reciprocal Unit Exchange (RUE) with a French Airborne artillery unit while serving as an AS-3 in 1-321 FA (ABN, 155mm) at Fort Bragg. The French unit would conduct entry operations by jumping into the drop zone with mortars to establish themselves and then their tube artillery would join them in follow-on aircraft. The system seemed to work for them but the gun crews had to be trained on to different weapon systems efficiently, and they had never done it in combat as of that time in 2000.

1. In your professional opinion, what is the biggest challenge concerning the integration of artillery and maneuver operations?

Answer: In a word: training. Throughout my military career, despite working for some great trainers, I have seldom seen artillery gunnery and maneuver exercises integrated. Artillery gunnery/qualifications need to be done in conjunction with call for fire certification of maneuver leaders. We need to do more maneuver live fires with actual artillery integrated into the exercise rather than simulators and spotters. While this training would be high risk, there are plenty of mitigation factors that could be employed. We need to do a better job of creating a demand on the part of maneuver officers for precision fires. We need to find reasons to train together rather than look for reasons to train separately.

To address these concerns, we've integrated combined arms instructors at the Maneuver Center. We will soon provide JFO training to Infantry and Armor lieutenants. We are looking to integrate "walk and shoot" live fires in the future. We need to train maneuver officers to always ask the question, "How can I integrate artillery, engineers, and aviation into my home station training?"

2. Would a composite battalion structure improve the responsiveness of artillery within a BCT?

Answer: It would, in my view. In a deliberate attack, the echelonment of fires would be more effective if rockets, howitzers, and mortars all worked for the same commander and had the same Fire Direction Center. However, my concern would not be

responsiveness, but ability to mass fires. By having a little bit of everything, the ability to put a lot of something on a target when required would be much more difficult. Any serious proposal that recommends a composite structure would have to address the concern of the ability—or lack thereof—to mass a particular munition to achieve a desired effect.

3. What challenges do you see regarding a composite Field Artillery BN structure?

Answer: Parochialism would be a major obstacle. Infantry commanders will be loath to give up their mortars, for many good reasons. They like the responsive of their mortars and they like having an indirect fire asset that they own. There is also parochialism internal to the FA community, where rockets and howitzers have their own communities and vested interests. Breaking down these tribal linkages would be a challenge. One need only look at the historical example of both Eisenhower and Patton being reprimanded by their branches for advocating the training and implementation of combined maneuver arms.

Another concern would be the building of training packages to train three different types of systems in the same battalion. While this is a challenge, it would also present some opportunities for cross training and would potentially produce more well rounded artillerymen, who would be conversant in all types of indirect fire systems.

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