

TACTICAL AND OPERATIONAL IMPACT ON THE BRIGADE COMBAT TEAMS'
ABILITY TO DEFEND AGAINST NEAR-PEER ADVERSARIES AFTER
RESTRUCTURING OF FIELD ARTILLERY ASSETS

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General Studies

by

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ABSTRACT

TACTICAL AND OPERATIONAL IMPACT ON THE BRIGADE COMBAT TEAMS' ABILITY TO DEFEND AGAINST A NEAR-PEER ADVERSARY AFTER RESTRUCTURING OF FIELD ARTILLERY ASSETS, by MAJ Anthony J. Varela, 102 pages.

As the United States Army emerges from nearly two-decades of operations in Afghanistan and over fifteen years of operations in Iraq, dramatic efforts are necessary to position US military for the intense challenges anticipated if we were to engage near-peer adversaries such as China and Russia in combat. We will not enjoy the same technological superiority that we have grown accustomed to during Operation's Enduring and Iraqi Freedom. The Secretary of the Army has outlined his vision for how the Army must evolve over the next decade to meet this challenge. To be ready to deploy, fight, and win against US adversaries, the US Army must emphasize manning, training, and equipping US forces to operate in joint environments, across all domains, while maintaining the ability to conduct operations across the entire range of military operations. This paper concludes, that to achieve this vision, the US Army will need to increase the Field Artillery assets available in each Brigade Combat Team, and train to employ unguided munitions to mass effects against US adversaries. It is also concluded that the use of Precision-Guided Munitions will remain vital to overall mission accomplishment with the understanding that they have limited effects against a highly mobile enemy conducting offensive operations.

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ACRONYMS

ABCT	Armored Brigade Combat Team
AWG	Asymmetric Warfare Group
BCT	Brigade Combat Team
BN	Battalion
BTG	Battalion Tactical Group
DOTMLPF-P	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy
DPICM	Dual-Purpose Improved Conventional Munitions
FA	Field Artillery
GWOT	Global War on Terror
LSCO	Large-Scale Combat Operations
MAJ	Major
NATO	North Atlantic Treaty Organization
PGM	Precision-Guided Munition
UAS	Unmanned Aerial Systems
US	United States
USAFA	United States Army Field Artillery
USSR	Union of Soviet Socialist Republics

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CHAPTER 1

INTRODUCTION

The purpose of this thesis is to conduct an analysis of tactical and operational impacts to the Field Artillery (FA) branch as the United States Army emerges from seventeen years of constant combat. Specifically, if the FA battalion can effectively support maneuver commanders in large scale combat operations (LSCO) in the defense after restructuring. The United States military is still engaged in operations in Afghanistan, Iraq, and Syria at the time of this writing while also facing the daunting challenge of having to pivot from counterinsurgency to addressing the threat of near-peer competitors who have worked to close capability gaps. The National Defense Strategy specifically addresses China and Russia as the most likely competitors globally, with these potential adversaries challenging US allies in Europe, the Indo-Pacific, and the Middle East. Russia in particular has exported its advanced equipment and technology to globally destabilizing nations such as North Korea and Iran with non-state actors like the Islamic State of Iraq and Syria potentially acquiring some of these systems.

Secretary of the Army Mark T. Esper described these challenges in the Army vision by focusing on the need to “deploy, fight, win our nation’s wars by providing ready, prompt, and sustained land dominance by Army forces across the full spectrum of conflict as part of the Joint Force.”¹ Key to this vision is the US Army’s ability to defeat

¹ Mark T. Esper and Mark A. Miley, Official memorandum, Subject: The Army Vision, 2018, U.S. Army, accessed 2 May 2019, https://www.army.mil/e2/downloads/rv7/vision/the_army_vision.pdf.

enemy ground forces and indefinitely seize or control the terrain and resources that exist in that area.² Simply stated, the US Army must deny the enemy what it seeks to gain.

Achieving this vision will require the active duty Army to grow to approximately 500,000 soldiers.³ Structuring of brigades, divisions, and corps must ensure that there are adequate infantry, field artillery, armor, engineer, and air defense assets to meet national objectives and the needs of US allies globally.⁴ Training must focus on high-intensity conflict with an emphasis on operating in densely populated urban terrain, under degraded conditions, while the enemy maintains constant surveillance on US forces.⁵ Equipment must also be modernized through an improved acquisition process that allows enhanced capabilities to reach the soldier rapidly so they can attain a level of proficiency to incorporate these systems into combat formations and allow the US Army to return to a position of relative superiority across all domains.⁶

Since 11 September 2001, the United States Army Field Artillery (USAFA) has served in various rolls to support commanders at all levels in an ever-increasing range of operations. Inherent in the role of FA is the ability to support maneuver to allow commanders on the ground to dominate the enemy. Supporting maneuvers as they close with and destroy the enemy is a central tenant of employing lethal and non-lethal fires

² Esper and Milley, The Army Vision.

³ Ibid.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

and effects. As the role of the maneuver commanders have evolved during the Global War on Terror (GWOT), so has the manner of employment of FA. Moreover, FA has shifted focus from area munitions and massing, to employment of precision-guided munitions (PGMs) to meet the commander's intent and remain within the rules of engagement during operations. Although massing of PGMs can provide the desired effects for the maneuver commander in an urban environment, their ability to provide similar massing effects in LSCO are severely limited, as this study will address.

This change has been in response to Operation's Enduring and Iraqi Freedom, where the US faced an enemy with little to no artillery or armored vehicles. These operations required a significant reliance on PGMs to limit collateral damage and support host nation governments and local populations. Based on evolving rules of engagement and the need to limit collateral damage in combat, it has been necessary to transition from a branch that can mass lethal fires against large forces to a branch that has scaled down the employment of fires to support maneuver in densely populated urban environments and areas where US artillery assets have decreased numerically from the complete Military Table of Organizational Equipment of cannons usually assigned to support brigade combat teams (BCT).

Soldiers assigned to FA units have adapted to changes in warfighting and have spent the last seventeen years focused employing PGMs as well as filling roles that traditionally fell to maneuver units. During National Training Center rotations early in 2005, firing batteries received evaluations on standard fire missions expected of artillery units in conjunction with their proficiency in stability and support operations, fixed site security, counter-improvised explosive device operations, and combat patrolling.

Observers noted that FA units experienced task-saturation and lacked the ability to excel at maneuver-centric tasks assigned while retaining proficiency in the employment of lethal fires.⁷

As the Army refocuses on large-scale ground combat operations, the FA, as a branch, must work rapidly to update its doctrine, training, and equipment to meet this challenge. The requirement to support units that are potentially overmatched and out-ranged by US adversaries will prove to be a pivotal capability gap. Expenditure of funds across all the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy (DOTMLPF-P) domains reestablish FA as a branch that will significantly impact the battlefield in the close and deep fights.

This thesis will focus on addressing how the restructuring of FA units and changes to Army doctrine have potentially limited a BCT's ability to defend against offensives operation from a near-peer adversary like Russia. Russia serves as a point of comparison for several reasons in this thesis. Historically, the United States has seen Russia as a competitor posing a great threat militarily based on system capabilities and US competing global interests. Russia has sought to counter US military technology by fielding military equipment that can overmatch US capabilities. Multiple nations have also adopted portions of Russian doctrine, to include threat nations such as China and North Korea. The National Defense Strategy identifies both China and North Korea as posing a threat to the United States and US allies. Finally, Russia will serve as the point

⁷ Center for Army Lessons Learned (CALL), CALL Newsletter 05-1, *NTC WOLF TEAM* (Fort Leavenworth, KS: United States Army Combined Arms Center, 2005), 18.

of comparison-based offensive operations conducted in Ukraine that would pose a significant challenge to a BCT tasked with defending NATO allies in the Baltic Region.

Limitations, Delimitations, and Assumptions

This primary limitation of this thesis is solely how a US BCT would defend against a Russian offensive operation, understanding that the US Army, and in particular FA, will never fight entirely alone. A planning assumption is that joint and multinational assets will not be immediately available to defend against a large-scale Russian offensive in the Baltic region or elsewhere around the world that would be comprised of a brigade-sized force or larger. Joint and multinational assets will most likely not be readily available due to the fact that they are low-density and the US and its allies will not immediately possess air superiority over the enemy.

A US BCT would not doctrinally seek to defend independently against a significantly larger force; however, based on doctrine, Russia will seek to achieve numerical overmatch as quickly as possible to keep the defending force isolated from units or assets that might reinforce their positions. Russian doctrine highlights the need to maintain a high tempo of operations to exploit weaknesses to rapidly achieve objectives by integrating air defense assets and electronic warfare down to company level.

Open sources provide all the information in this thesis. The ranges for cannon and rocket munitions, certification requirements, and organizational structures are all provided at the unclassified level. This thesis utilizes the US BCT structure that most closely approximates those formations expected to provide defense against a Russian brigade-sized element initially in the Baltic Region. Russian military reforms after

reintroducing the division on their western border with NATO with the battalion tactical group (BTG) serves as the foundation for power projection in this thesis.

Significance of this Thesis

This study is significant for three reasons. First, as the US Army continues efforts to modernize, increasing the size and composition of FA assets organic to a BCT may become necessary if brigades remain the principal size organization for combat in the close fight. Secondly, as funding remains a limiting factor, the US Army must determine where to expend funds to provide units with training, personnel, and equipment needed to fight the battles of the future. Well-reasoned decisions are necessary regarding the tradeoff between fielding costly PGMs versus more cost-effective, but less accurate conventional munitions. Finally, senior leaders at all levels must work to return FA to a battlefield asset that can mass large quantities of rounds against targets without the time-consuming procedures necessary for collateral damage estimates.

Chapter Summary

This chapter introduced the challenges faced by USAFA during LSCO in the defense. The US Army is currently in a period similar the post-Vietnam War era as it prepares to face the next potential adversary. Russian FA is their primary asset in the offense with infantry utilized to consolidate gains made by employing massed artillery, posing a significant challenge to a defending US BCT. USAFA primarily supports ground forces in offensive and defensive operations through the employment of scalable fires. As the requirement to employ PGMs gained prominence in the GWOT, a reduction in artillery formations was possible by achieving the desired effects with fewer rounds

and assets than with conventional munitions alone. The following chapter discusses relevant doctrine, journals, white papers, and trend analysis to provide the baseline material to draw appropriate conclusions.

CHAPTER 2

LITERATURE REVIEW

There is no shortage of material available on the US Army structure and how it conducts operations at every level. There also exists a vast array of material available in regards to the importance of FA supporting maneuver commander's operations at the tactical, operational, and even the strategic level. The literature for this thesis focused on addressing the key question of a whether or not a BCT possesses the ability to conduct a defensive operation solely with organic FA battalion (BN) assets against a near-peer threat without the assistance of joint or multinational assets, and if so, for how long. The selected literature answers the primary question and supplemental questions posed in this thesis by examining the relevant doctrine that lead the transformation of the US Army under Airland Battle, the corresponding Soviet doctrine, journals, and professional articles that captured the evolution of the USAFA during counterinsurgency operations, Center for Army Lesson Learned trend analysis (2001-2018), and the US Army Vision for the next decade.

This literature review will specifically seek to address the primary question and two supplemental questions listed below:

1. (P) What are the tactical and operational impacts on the brigade combat teams' ability to defend against a near-peer adversary after restructuring of Field Artillery assets?

2. (S) Has the reliance on precision-guided munitions over the past seventeen years in support of the GWOT also limited the USAFA's ability to mass surface fires effectively against a near-peer adversary?

3. (S) Is the USAFA trained and equipped to mass fires effectively against an enemy conducting large-scale offensive operations with forces of a brigade-size or larger?

These questions will serve to examine the FA's current capability to support defensive operations against a near-peer adversary, and how long a defense may be possible without the support of joint and multinational attack aviation, bombers, or low-density or high-demand assets like armed unmanned aerial systems (UAS). The above-stated questions will also ensure that the scope of this thesis remains focused on the specific problem identified by recent changes to doctrine which have placed a renewed emphasis on LSCO. It is important to note that these questions will also seek to limit the amount of material used to examine the problem at hand, as there is a plethora of resources that may have only a tangential relationship to the core challenges that will face a FA BN in such an operation.

Comparing and contrasting United States and Soviet (Russian) doctrine and capabilities over specific periods of time derives answers for the primary and supplemental questions posed in this thesis. Initially this thesis focuses on the period from 1981 through 1988 in the US Army that began with US Army Training and Doctrine Command Pamphlet 525-5, *US Army Operations Concepts, AirLand Battle and the Corps 86*, Field Manual (FM) 100-5, *Operations*, and subsequently FM 6-20, *Fire Support in the AirLand Battle* (defense focus). Contrasting this timeframe is the period from 1978 through 1984 in the Union of Soviet Socialist Republics (USSR) doctrine (offense focus). Next, this thesis will compare current US defensive and Russian offensive doctrine as it pertains to the tactics relating to FA employment to achieve

mission success. Finally, this thesis will examine the US Army Vision 2028, contrasting it with Russian actions in Ukraine to provide a preliminary assessment on the current direction of the US Army, and determine if the focus is adequate to meet the military requirements of LSCO.

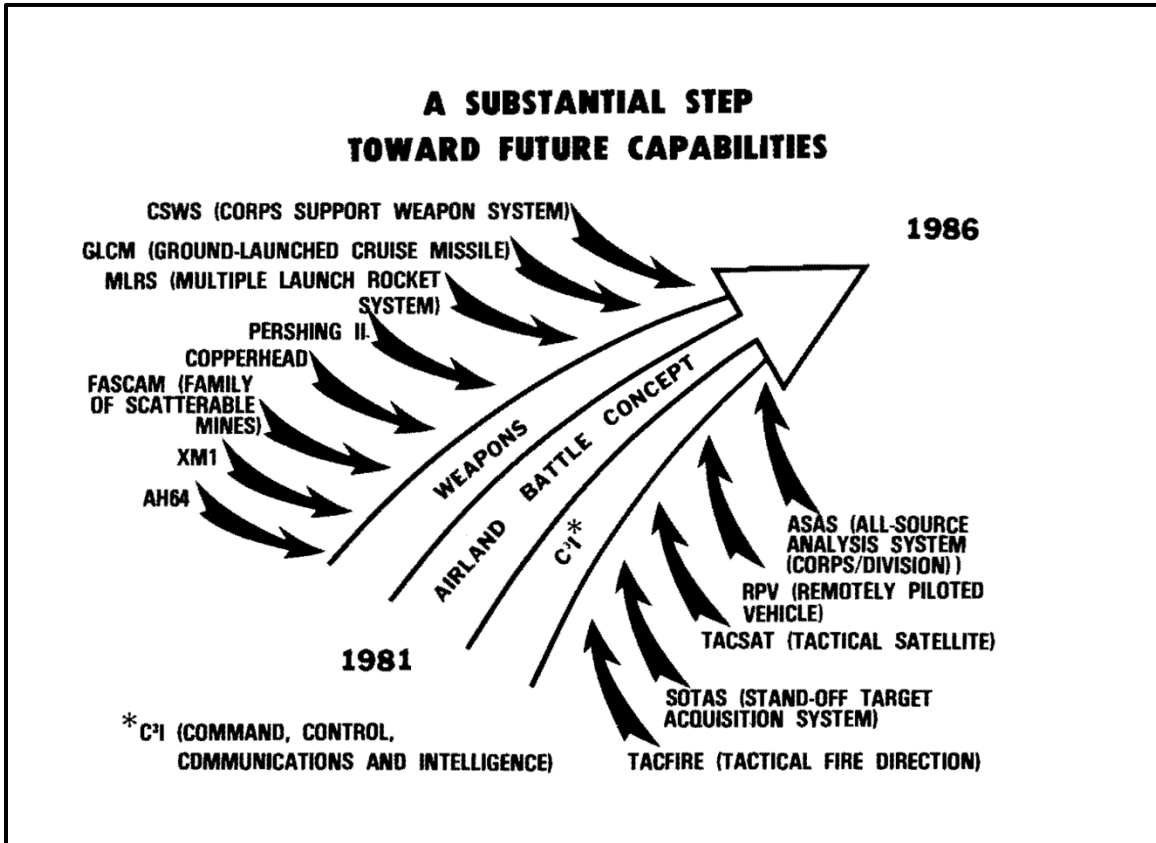


Figure 1. AirLand Battle Concept

Source: U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-5, *The AirLand Battle and Corps 86* (Fort Eustis, VA: TRADOC, 1981), iii.

USAFA Employment and Structure in AirLand Battle (1981-1988)

The first step towards modernization of the US Army after the Vietnam conflict was the introduction of Training and Doctrine Pamphlet 525-5, *The AirLand Battle and the Corps 86*. As the United States ended combat operations in Vietnam and withdrew the last United States forces on 30 April 1975, the military went through a period of intense self-reflection and restructuring. Over the following years, the military focused internally on how to rebuild capabilities and how best to prepare for future challenges. To address the changing battlefield of the 1980s, the US Army developed the AirLand Battle Concept (figure 1) to leverage the full potential of the forces available and chart a course for future development. Combining conventional forces, nuclear, chemical, and electronic capabilities enabled the US military to attack the enemy across the full depth of the battlefield.⁸ Clearly identified within in AirLand Battle doctrine are concepts for the execution of combat, combat support, and combat services. Specifically, this doctrine describes the manner in which Army corps accomplished their mission.⁹

To prepare for potential war in geographic areas of the world that contained large, modern, well-equipped forces, the US Army had to counter Soviet-style formations employing these capabilities and tactics. Warsaw Pact nations, growing tensions in the Middle East, and North Korea were of greatest concern to strategic planners. US strategists assessed conflict as highly likely and deterrence alone insufficient to avert

⁸ U.S. Army Training and Doctrine Command (TRADOC), TRADOC Pamphlet 525-5, *The AirLand Battle and Corps 86* (Fort Eustis, VA: TRADOC, 1981), 2-1.

⁹ *Ibid.*, 2-3.

disaster.¹⁰ As a result, refinement to doctrine ensured the US military was capable of exploiting all possible advantages to defeat potential adversaries.

Although not a new concept, extending the battlefield through improved target acquisition capabilities and extended range weapon systems was easier to achieve. Extending the battlefield occurred through three primary means: engaging enemy units not already decisively engaged; engaging follow-on echelons before they could influence the battlefield; and lastly, driving the development of a wider range of assets and munitions with which to attack the enemy. Previous doctrine did not adequately address the need to neutralize the enemy's capability to fight beyond the frontlines. AirLand Battle sought to unify the employment of systems and services at the corps and division levels to achieve decisive victories over the enemy.

At the core of AirLand Battle doctrine is the focus on deep attack. No longer were close and deep attack viewed as separate actions. Exploitation of vulnerabilities created by the introduction of modern weapon systems with increased range and lethality provided an opportunity for maneuver commanders to seize the initiative over their adversary. AirLand Battle combined technological advances, doctrinal changes, and the realities of the evolving world into a unifying concept to ensure the US military fought as a cohesive unit and leveraged all capabilities in combat.

Ultimately the outcome of AirLand Battle was the destruction of enemy assault forces, the restoration of freedom of maneuver, and seizure of the initiative by US or allied forces. Interdiction prevented the enemy from mounting follow-on attacks by

¹⁰ TRADOC Pamphlet 525-5, 2-4.

defeating their first echelon forces and targeting reserves not already committed.¹¹

AirLand Battle sought to create opportunities for defending forces to aggressively exploit vulnerabilities created through coordinated interdiction.

Considering the factors above, it was clear that at the central thrust of AirLand Battle doctrine was the need to attack deep in order to win against a Soviet-style enemy. Coordination of the close and deep fight linked planning for the employment of conventional munitions in conjunction with nuclear, chemical, and electronic weapons to integrate capabilities throughout the battlefield. AirLand Battle doctrine blended a mix of new thinking with time tested concepts to advance the US Army to a point where it could fight and win against a numerically superior adversary like the Soviet Union. Perfect implementation was not possible, and the only way to truly modernize the US Army was to start executing change at every level early to solve problems that might exist with the systems or tactics presented in this new doctrine.

Prolonged battle favored the Soviet formations since they would overwhelm defenders and inflict staggering casualties. Denying adversaries the seizure of objectives would be the first step in successful defensive operations. Secondly, preventing enemy forces from reinforcing their attacks through deep attack would decrease the likelihood of a penetration occurring. Finally, by arraying defensive forces effectively, they would possess the ability to counterattack to seize the initiative, forcing attacking units to abandon their attack to take up defensive operations.¹² Failure to execute the

¹¹ TRADOC Pamphlet 525-5, 6-25.

¹² Ibid., 5-7.

counterattack as soon as a viable opportunity presents itself would likely result in a numerically superior force rebuilding combat power.

FM 100-5, *Operations* (1986) outlined the manner in which the US Army operated during the late 1980s through AirLand Battle doctrine.¹³ It described how the US Army planned for and conducted engagements, battles, operations, and campaigns. FM 100-5 outlined how US Army forces operated globally with additional detail for each theater and was compatible with the North Atlantic Treaty Organization (NATO) Allied Tactical Publication 35A, integrating multinational forces into offensive and defensive planning.

AirLand Battle doctrine represented an evolutionary progression in military thinking that built upon the assessment that the dynamics of warfare were essentially unchanged. What AirLand Battle doctrine recognized was that the complexity and lethality of war had increased, but that a skilled commander could employ his assets to their maximum capability against the enemy through thoughtful synchronization.

At its core, AirLand Battle doctrine identified that modern warfare was not linear and necessitated commanders viewing the battlefield in broader terms.¹⁴ This required detailed integration of air, ground, and sea operations between all services and allied nations. Synchronizing such a wide array of assets needed to occur from the tactical level of warfare up through major operations and the planning of campaigns. Specific to this

¹³ Headquarters, Department of the Army (HQDA), Field Manual (FM) 100-5, *Operations* (Washington, D.C: Government Printing Office, 1986), I.

¹⁴ *Ibid.*, 5-31.

planning is FA, which provided conventional, nuclear, or chemical fires employed by cannon, rocket, and missile systems.¹⁵

One of the fundamental principles of AirLand Battle doctrine was the need to integrate assets from all branches of service with allied military forces into three-dimensional combined arms operations.¹⁶ AirLand Battle doctrine highlighted the need to fight as part of a joint team, integrating Air Force, Navy, Marine, and civilian agencies into a more lethal force through complementary capabilities. Capability integration was the primary method of achieving victory over a numerically superior force with modern equipment. Ground actions at the company-level and above needed heavy augmentation with air assets to overcome the numerical superiority that potential adversaries like Russia and China possessed. FA alone was insufficient for this task.

The US Army's AirLand Battle doctrine in the late 1980s classified the mission of the FA as "destroy, neutralize, or suppress the enemy by cannon, rocket, and missile fire and to help integrate all fire support assets into combined arms operations."¹⁷ FA assets were uniquely capable of limiting the enemy's ability to acquire friendly assets as well as destroying enemy targets deep in the enemy rear area through the use of long-range rockets and missile fires.

Each FA unit organized for combat had an assigned tactical mission to ensure adequate artillery support was committed to combat units. For the United States to defeat

¹⁵ HQDA, FM 100-5, 8-41.

¹⁶ Headquarters, Department of the Army (HQDA), Field Manual (FM) 6-20, *Fire Support in the AirLand Battle* (Washington, DC: Government Printing Office, 1988), 2-9.

¹⁷ *Ibid.*

a numerically superior enemy, deep operations facilitated by the immediate availability of FA assets enabled the commander to leverage these capabilities at the time and place of their choosing.

A typical FA organization for combat within a division artillery placed one FA BN in direct support of each committed maneuver brigade.¹⁸ Additional FA units could reinforce FA BNs while remaining positioned to provide fires in general support of the division. Six corps FA BNs were under the control of the FA brigade. Organization in this manner increased combat power and supported the corps commander with rapidly responsive fires through general support or general support-reinforcing relationships.¹⁹

The US Army ultimately achieved success in combat through four core tenets of AirLand Battle: initiative, agility, depth, and synchronization.²⁰ Specific to FA, extending operations occurred in space, time, and resources through the use of depth. Fires effects provided depth by creating the space and time needed to maneuver forces to react quickly to the changing operational environment.

Synchronization of time, space, and purpose allowed commanders on the battlefield to maximize relative combat power at decisive points against the enemy. Concentrating forces alone was insufficient to achieve synchronization on the battlefield.²¹ Synchronizing maneuver with fires increased the ability of a force to

¹⁸ HQDA, FM 6-20, 2-12.

¹⁹ Ibid.

²⁰ Ibid., 2-17.

²¹ Ibid., 3-6.

reposition on the battlefield. Synchronization produces a maximum economy of forces through unity of purpose working against an enemy's capabilities and vulnerabilities in such a way the enemy could no longer continue operations. The introduction of precision munitions allowed for the close coordination of fires and synchronicity by concentrating lethality at decisive points on the battlefield. To leverage the capability of these precision munitions, sensors and communications equipment underwent improvements, especially target acquisition sensors.

FM 100-5 addressed the purpose of nuclear weapons to deter aggressors from potentially escalating warfare between nations, in particular, the Soviet Union.²² The National Command Authority retained the power to authorize the use of nuclear weapons through clear directives for their employment.²³ Tactical nuclear weapon employment from USAFA assets was the primary method to destroy advancing Soviet armored formations moving rapidly westward into NATO territory.

AirLand Battle doctrine sought to address the deep, close, and rear operation requirements to meet the threat posed by Soviet troops, with FM 6-20 specifically detailing employment of nuclear and chemical munitions across a corps front.²⁴ Deterrence did not preclude the first use of nuclear munitions, although their use would

²² HQDA, FM 6-20, 1-8.

²³ *Ibid.*, 1-9.

²⁴ *Ibid.*

be limited by the directives of the President of the United States through the National Command Authority and based on the advice of his senior advisors and allied leaders.²⁵

Within the construct of AirLand Battle doctrine, nuclear weapons could have been employed to interdict enemy forces in-depth, destroy enemy forces when integrated with other fire support means, tip the balance of power when smaller forces engaged a larger forces, achieve surprise, or enhance the ability to maneuver through the application of fires.²⁶ Nuclear munition delivered via cannons would permit a higher degree of flexibility by allowing for the use of lower yield munitions as well as ensuring greater survivability through dispersion of assets. Dispersion in this thesis refers solely to the physical location of firing assets arrayed on the battlefield and does not refer to the manner in which munitions impact a target area. Nuclear munitions delivered via missile allowed for employment at longer ranges with larger payloads, however, there were fewer launchers in the inventory during this period limiting battlefield distribution.²⁷

Ultimately, US advancements sought to counteract the Soviet technological achievements from the early 1970s through the late 1980s since the Soviet Union demonstrated great qualitative improvements in their weaponry while also increasing their quantitative advantage.²⁸ Soviet strategists understood that massing forces alone would not guarantee success, considering the advancements in United States military

²⁵ HQDA, FM 6-20, 2-22.

²⁶ Ibid.

²⁷ Ibid., 2-24.

²⁸ Ibid., 1-7, 1-8.

tactics and technology throughout the post-Vietnam era. United States target acquisition, in particular, was seen as a significant obstacle to Soviet success because of its ability to enhance the employment fire support against a massed force.

The following section discusses the core Soviet organization and doctrine applicable to the central questions of this thesis.

Soviet Military Structure (1978-1984)

Lenin stated, “a firm and strong military is needed for defense.” By founding the USSR in December of 1922, conditions were set for a permanent army focused on defending the economic and cultural integrity of Russia. Understanding the Soviet Army of the Cold War-era requires a brief analysis of the genesis of their organization and structure. It is important to avoid simply interpreting Soviet doctrine as the inverse of US doctrine. Key differences in this section provide clarity to the distinctions between doctrine and how each nation applied it.

When Soviet Forces entered World War II, their structure proved to be formidable. Emphasis was placed on ground forces and a proper balance of infantry, armor, and field artillery. Maneuverability and firepower saw increases over time but there still existed significant shortfalls due to the lack of industrial capacity and access to materials.²⁹ Increasing the number of personnel and equipment in Soviet formations afforded their military a distinct advantage over potential adversaries even without the most modern equipment.

²⁹ S. A. Tyushkevich, *The Soviet Armed Forces: A History of Their Organizational Development* (Ottawa, Canada: All-Union Copyright Agency, 1978), 276-372.

Post-World War II Soviet military reorganization built upon the principle that all branches must work in combined operations to maximize their potential at the operational and strategic levels. NATO expansions, to include the admittance of Germany in 1955, furthered the view that these acts sought to isolate the USSR, increasing the perception that only through strong military forces and a growing arsenal of nuclear weapons could they defend against Western aggression.

Russia seized an opportunity to challenge America's sole position as a superpower by successfully testing atomic bombs in 1949.³⁰ Russia continuously worked on a hydrogen bomb and conducted their first successful test in August 1953.³¹ Russia was simultaneously working to improve rocket and missile technology to increase the ability to deliver these munitions at increased ranges. The USSR viewed these weapons as deterrents towards Western advances on its borders as well as enhancing its military prestige globally, placing them on near equal footing with the US. Soviet leaders viewed nuclear weapons of various yields as their greatest deterrent, issuing them to the Army and Navy starting in 1954 with associated doctrine developed for the employment of such munitions in combat. The USSR categorized the various yields as small (a few kilotons), medium (several dozen kilotons), and large (over one hundred kilotons).

³⁰ Tyushkevich, *The Soviet Armed Forces*, 379.

³¹ Ibid.

Offensively the USSR utilized the principles of violent, sustained, and deep operations to achieve their desired objectives.³² The Soviets controlled actions through the theaters of military operations and fronts (army groups) for combat operations. Fronts were the largest field wartime formations. Fronts were approximately the same size as US-NATO army groups, with a front containing three to five armies with organic artillery, missiles, air defense, engineers, signals, intelligence, reconnaissance, services, aviation, air assault, and special purpose forces. Soviets used a combined arms army concept for their field army. Flexibility in structuring these forces afforded the Soviets the ability to tailor units to offensive or defensive operations in various geographic locations.

During the late 1970s and early 1980s Soviet ground forces numbered approximately 1,825,000 men. There were 191 maneuver divisions: 134 motorized rifle divisions, fifty tank divisions, and seven airborne divisions. Of these maneuver divisions, thirty occupied locations in Eastern Europe (East Germany, Poland, Czechoslovakia, and Hungary), eighty divisions in the European portion of the USSR, twenty-nine divisions in the Central Asian portion and Afghanistan, and fifty-two divisions in Siberia, the Far East, and Mongolia. The Soviets deployed the largest formations with the best equipment and training against NATO forces.³³

³² Headquarters, Department of the Army (HQDA), Field Manual (FM) 100-2-1, *Soviet Tactics and Organization* (Washington, DC: Government Printing Office, 1986), 1-1, 1-2.

³³ *Ibid.*, 1-3.

Fronts were wartime organizations comprised of several units, depending on their assigned mission. At lower echelons divisions and smaller organizations operated at the tactical level.³⁴ The division had a fixed organization and served as the “building block” for the maneuver element of armies.³⁵ The motorized rifle and tank divisions balanced power and mobile organizations capable of operating in a nonnuclear and nuclear environment. At this level, the Soviets emphasized both sustainability and mobility. Organic logistic assets could sustain the division for several days of high-intensity, high-speed combat and were as mobile as maneuver units.

Deploying brigades as units or subunits enhanced the ability to seize, disrupt, or destroy nuclear weapons, airfields, command, control and communication centers, logistics facilities, and key terrain such as river crossing sites and road junctions.³⁶ The overriding aim in a Soviet front offensive was to delay or prevent the war from turning nuclear by the swift, early destruction or neutralization of enemy nuclear weapons by nonnuclear means.³⁷

FM 100-2-1 identified Russian Military Principles as mobility and high rates of combat operations, concentration of main efforts and creation of superiority in forces and means over the enemy at the decisive place and time, surprise and security, combat activeness, preservation of the combat effectiveness of friendly forces, and conformity of

³⁴ HQDA, FM 100-2-1, 4-1.

³⁵ *Ibid.*

³⁶ *Ibid.*, 4-3.

³⁷ *Ibid.*

the goal to the actual situation.³⁸ It was also important that fire support assets be as mobile as the maneuver forces to support operations with massed fires (nuclear or nonnuclear) instead of massing maneuver forces to achieve tactical and operational goals. These principals served as the basis for understanding how the Soviets organized to employ their forces in large scale operations.

The initial phase of the operation required the penetration of enemy forward defenses and neutralization or destruction of enemy in the area, defined as “tactical depth.”³⁹ This depth included the reserves of the forward enemy divisions. The subsequent phase called for neutralizing or destroying enemy units in the area encompassed by the “immediate operational depth,” where enemy corps reserves may be located. The final phase of the offensive was the accomplishment of the front final objectives: the capture of logistical, political, and economic centers and the neutralization of remaining enemy forces.

As weapons and lethality increased, the need to operate under a combined arms concept grew in parallel. Successfully attacking in depth resulted directly from advances in field artillery, missile, and aviation capabilities.⁴⁰ Soviet leadership determined that simultaneous artillery attack and airstrikes through the entire depth of enemy defenses combined with tank and infantry formations to break through tactical defensive positions

³⁸ HQDA, FM 100-2-1, 2-3.

³⁹ *Ibid.*, 4-2.

⁴⁰ *Ibid.*, 2-6.

to drive rapidly and forcefully into the depth of his opponent's operational rear would best attain success in combat.⁴¹

Typically, the first (assault) echelon attacked and penetrated the enemy's tactical defenses, and the second (exploitation) echelon drove through the penetration deep into the enemy's operational rear. A single echelon was successful when the defender had the preponderance of their force on the defensive lines along an entire front, or when command and control was difficult or impossible for multiple units. Missions of first echelon forces were to penetrate or defeat enemy forward defenses, continue the attack, under nuclear conditions, and employ nuclear strikes on enemy defenses.⁴²

Even when they did not employ echelon divisions (tactical echeloning), the Soviets would form an operational second echelon (within armies and fronts). The composition, size, and specific employment of the second echelon force was determined largely by the enemy's strength, tactics, and disposition.⁴³ Second echelon forces primarily bypassed enemy forces and penetrated to attack in a new direction, destroying enemy reserves, or advance rapidly towards the objective and seize it through speed and force.

Soviet leaders trained their formations to effectively apply attack doctrine principles against an enemy in the defense. Key concepts of the attack were aggressive reconnaissance, breach defenses at weak points, bypass strongpoints, rapidly maneuver

⁴¹ HQDA, FM 100-2-1, 2-9.

⁴² Ibid., 2-7, 2-10.

⁴³ Ibid.

forces and fires, mass fires, and prioritization of the destruction of enemy nuclear weapons. Attack from the march was seen as most advantageous, as it increased surprise, decreased vulnerability, and allowed greater flexibility when deploying forces.⁴⁴

With the introduction of tactical (low-yield) nuclear weapons, battlefield dynamics changed rapidly, increasing the need for speed and combined arms operations throughout the depth of the enemy formations. Massing forces in similar fashion to World War I and II, and the Korean War failed to remain viable options, as this provided the potential to suffer casualties with a single nuclear strike that could completely alter the outcome of war. Soviet doctrine accounted for this new reality by concentrating at key locations or using air, artillery, and weapons of mass destruction to compensate for the loss of larger maneuver forces massed to achieve success.⁴⁵ In a nuclear, biological, and chemical environment, the need for mobility increased exponentially as well as the need to equip personnel and vehicles with protection from these threats to allow them to continue operations for as long as possible.

Calculations for dispersion of Soviet Forces on the nuclear threatened battlefield were such that destruction of two equivalent subunits (battalion or smaller) by a single tactical nuclear weapon was not possible.⁴⁶ Dispersion provided the greatest defense against nuclear threat. The need to increase dispersion to provide survivability drove the development of longer ranges for field artillery assets allowing commanders to maintain

⁴⁴ HQDA, FM 100-2-1, 5-13.

⁴⁵ *Ibid.*, 2-8.

⁴⁶ *Ibid.*, 2-10.

the ability to mass fires. Under nonnuclear conditions artillery and fire support systems could closely approximate the effects of nuclear munitions by providing devastating casualties against the enemy and tip the correlation of forces in favor of the Soviets.

Soviet writings during this period indicate that an aggregate ratio of combat power of approximately 3:1 was sufficient in conducting an offensive operation or an attack against a defending enemy.⁴⁷ This 3:1 ratio referred to more than just cumulative numbers of first echelon troops and weapons relative to enemy troops and weapons in a given sector. It was, instead, a more sophisticated calculation of the total force, to include all maneuver units and combat support that a commander can utilize relative to the total force with which the enemy can oppose him. Overwhelming artillery and air strikes would seek to attrite enemy defensive positions by massing fires before maneuver forces engaged directly to achieve desired force ratios.

The greater range and increased mobility of modernized artillery weapons enabled Soviet artillerymen to mass fires against a target without concentrating the weapons themselves.⁴⁸ Integration of combat helicopters and close air support fixed-wing aircraft into their overall fire planning enhanced the ability to focus a great deal of firepower without putting masses of troops at risk to an enemy nuclear strike or counterbattery

⁴⁷ HQDA, FM 100-2-1, 2-11.

⁴⁸ Ibid., 4-5.

fires.⁴⁹ This tactic reduced Soviet vulnerability to a nuclear strike and made it more difficult for the enemy to determine where a main attack might be made.⁵⁰

Fire support in the Soviet ground forces fell to the branch of rocket troops and artillery. They were responsible for the planning and employment of surface-to-surface guided missiles and free flight rockets for fronts, armies, and divisions; field artillery (multiple rocket launchers, field guns, howitzer, and mortars over 120mm); and antitank artillery. Incorporation of organic field artillery from the battalion up to division for motorized rifle units placed a FA regiment in support of a division; FA BN to a regiment; and a mortar battery to a BN.⁵¹ Organization for surface-to-surface guided missile brigades and multiple rocket launcher regiments in the combined arms army placed FA divisions in support of the front, comprised of several long-range gun BNs and a howitzer BNs.⁵² Although variations existed throughout formations, this was the basic structure for support.

Soviet division commanders assigned artillery units to their first echelon regiments to form regimental artillery groups (RAG) and retained the rest in division artillery groups.⁵³ The chief of rocket troops and artillery at division level provided division commanders information on allocated nuclear fires, fires meant to create

⁴⁹ HQDA, FM 100-2-1, 4-7.

⁵⁰ Ibid.

⁵¹ Ibid., 9-1.

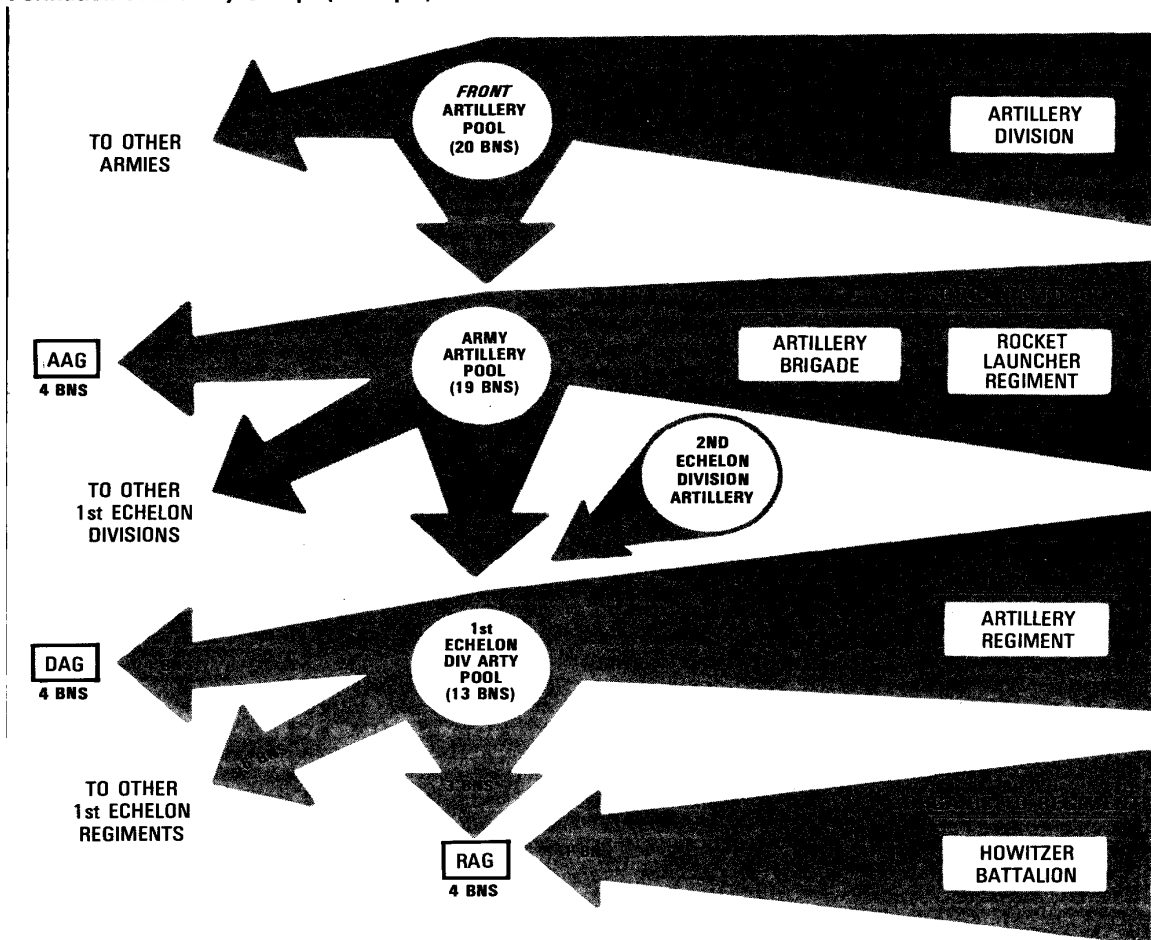
⁵² Ibid.

⁵³ Ibid., 5-16, 5-17.

passages through obstacles, prioritized for the neutralization of defensive areas, and how decentralization might better support the mission. The chief of rocket troops and artillery integrated all planned fires of the RAGs and division artillery group division artillery groups into the division fires plan. RAGs were typically located one to four kilometers from the FEBA, and multiple launch rocket systems and division artillery groups were three to six kilometers from the FEBA.⁵⁴ These ranges allowed fires to range deep into the defender's area, targeting logistics and reserve forces if possible.

⁵⁴ HQDA, FM 100-2-1, 5-21, 5-29.

Formation of Artillery Groups (Example)



NOTES:

1. The artillery division has 20 battalions of field guns, howitzers, and multiple rocket launchers.
2. In addition to its organic artillery division, the *front* may be allocated a heavy artillery brigade from the Reserve of the Supreme High Command, but these assets are not likely to be suballocated to armies.
3. A first echelon division may receive artillery battalions from a second echelon division.
4. Antitank and SSM battalions are not normally included in artillery groups.
5. The regimental howitzer battalion is part of the RAG.
6. An artillery battalion or battery assigned to a RAG may be further allocated to a motorized rifle or tank battalion.

Figure 2. Soviet Artillery Group Organization

Source: Headquarters Department of the Army, Field Manual 100-2-1, *Soviet Tactics and Organization* (Washington, DC: Government Printing Office, 1986), 6-5.

RAG's often directed an artillery battalion or battery to support a maneuver battalion. The release from centralized control would permit the artillery subunit to carry out missions in support of a maneuver battalion while remaining subordinate to the RAG.

Soviets utilized command relationships to support the maneuver commanders by attaching artillery BNs or batteries under the operational control of the maneuver CDR, while supporting artillery BNs or batteries remained under the control of their parent unit. Attached artillery BNs were under the control of the maneuver commander who could then assign a FA battery to support a maneuver company.⁵⁵

Soviets divided artillery into field guns, howitzers, mortars, and multiple rocket launchers. Field guns killed troops in the open, destroyed buildings above ground level, engaged rapidly moving targets, bombarded distant targets such as artillery batteries, headquarters, and columns moving in the rear areas, or tactical nuclear delivery means.⁵⁶ Howitzers hit indirect targets, destroying or neutralizing enemy defenses, and maneuvering with ground forces to provide continuous support. Multiple rocket launchers were meant to deliver decisive strikes at key points in the battle, providing area coverage or delivery of chemical weapons.⁵⁷ FA pieces (152-mm and smaller) had antitank capabilities, and about 10 percent of their combat load was armor-defeating ammunition. The density of artillery fire support assets in combined arms formations greatly increased with the establishment of the artillery BN as the basic artillery tactical firing unit.

Soviet artillery employed formations that varied the interval between guns and dispersed them in depth with the aid of electronic field artillery computers. Soviet

⁵⁵ HQDA, FM 100-2-1, 9-4.

⁵⁶ *Ibid.*, 9-7.

⁵⁷ *Ibid.* 9-10.

artillerymen trained to fire from emergency positions without registering their guns, increasing their speed of support. multiple rocket launcher units were meant to place heavy fire on important targets at decisive points, fire, then moved to covered or concealed locations to avoid counterbattery fire.⁵⁸

Offensive fires employed surprise and high density of fire on selected targets. All (or at least the larger part of) the artillery of a division or army carried out these assaults simultaneously on a large group of targets. A fire assault of a given duration typically begins with rapid fire (two to four rounds per minute per weapon) and continued with fire sustained at a rate that employed the allocated ammunition in the time allotted for the mission.

Calculations based upon the dimensions of the target area provided the needed data for the execution of massed fire against an important enemy objective by all or most of a given formation's artillery. If it did not exceed eight hundred by eight hundred meters, all participating artillery groups (regiments, battalions) would fire simultaneously on the center of the target area, applying the principles used for fire concentrations. Subdivision of targets larger than eight hundred by eight hundred meters established numbered targets or target sectors. Calculations of fire coverage in numbers of rounds per hectare (ten thousand square meters, equivalent to 2.47 acres) provided planning and logistics guidance. Soviet offensive doctrine called for intense artillery preparations of

⁵⁸ HQDA, FM 100-2-1, 9-11, 9-13.

short duration that required a certain number of rounds by type delivered to achieve destruction.⁵⁹

Soviet doctrine emphasized the need to drastically reduce the time required for fire missions. Among the reasons given, the most important were target mobility, increased effectiveness of fire, and increased survivability.⁶⁰ Based on these factors, Soviets trained to conduct fire missions in under four minutes. When the enemy was defending and the Soviets had overwhelming fire superiority, they assessed reduction in their vulnerability to enemy counterbattery fire. Soviets viewed a high density of artillery as vital in suppressing enemy defenses and anti-tank guided missiles and destroying armored vehicles on the move by saturating the area with fires.

In the offensive, an artillery battalion bounded its batteries forward individually in bounds of three to four kilometers. The 152-mm SP howitzer required only one-fifth of the time required by an equivalent towed battery to move from one position to another and be ready to fire. The battery or platoon fired a mission of three to four minutes duration and then moved to an alternate position to avoid the threat of US counterfire. Average times for an artillery BN to fire their first round was two-three minutes, multiple rocket launcher battery was four minutes, four minutes for a RAG, and five minutes for a division artillery group. The only similarity between a US and Soviet firing battery was

⁵⁹ HQDA, FM 100-2-1, 9-16, 9-20.

⁶⁰ Ibid., 9-27.

that each had six guns, although the Soviet battery was organized into two platoons containing three guns each.⁶¹

The following section of this chapter discusses the progression of USAFA from 2001-2018, focusing on the distinctions between AirLand Battle doctrine and post 9-11 era doctrine.

United States Army Field Artillery Structure (2001-2018)

Following the comprehensive updates to Army doctrine under AirLand Battle, few changes to FA manuals occurred until 2011 with the publication of Field Manual (FM) 3-09 (2011).⁶² Through the 1990s, small changes did occur to update particular field manuals to adjust for improved technology, equipment, and organizational changes. The majority of these changes focused on accounting for the specific methods of integrating new communications systems and improved artillery munitions as well as removing references to cancelled programs such as the Copperhead precision-smart munition.

It was not until the release of FM 3-09, *Fire Support*, dated November 2011, that the FA saw a major change to its foundational doctrine. In the twenty-three years between the publication of FM 6-20 (1988) and FM 3-09 (2011), the FA branch conducted operations for a decade of combat in Afghanistan and nearly a decade in Iraq that placed different requirements on field artillerymen. Many of the soldiers who served

⁶¹ HQDA, FM 100-2-1, 9-17.

⁶² Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-09, *Fire Support* (Washington, DC: Government Printing Office, 2011), 1-3.

during this period filled roles outside of their primary Military Operational Specialty. FA units trained to support counter-insurgency operations, augment security details, or conduct non-standard missions to support mission accomplishment.

FM 3-09, dated 2011, was the Army's first real attempt to refocus the FA branch on its core competencies and return FA to its primary role of dominating the battlefield through the application of fire support. FM 3-09 served to shift the mindset of the field artilleryman from the Forward Operating Base to the challenges that would lay ahead in engaging larger threats in combined arms maneuver warfare. FM 3-09 was not a complete shift from what the FA had learned collectively as a branch during Operation Enduring Freedom and Operation Iraqi Freedom, but it did seek to synthesize what artillery provided to commanders in AirLand Battle and what the branch learned in the conflicts.

Building from FM 6-20, FM 3-09 accounted for new technologies and advances in system capabilities while also removing reference to capabilities that would no longer reside with the artillerymen, such as tactical nuclear weapons. FM 3-09 proved to be an excellent manual that allowed for an understanding of how FA fights as part of a joint and multinational force, benefiting from over ten years of real-world lessons learned during the GWOT.

Simplification was vital to understanding the core fire support principles and implementing them in support of commanders on the ground. To accomplish this, FM 3-09 utilized three chapters and two appendices, allowing for a precise method to deliver the required updates, and providing a concise manual that was instantly usable down to the platoon-level. The first chapter simply updates terms, describes how fires serve as

part of the joint team, and defines the mission of the FA to reflect that: “The mission of the Field Artillery is to deliver fires and integrate those fires and scalable capabilities to enable commanders to dominate their operational environment in unified land operations.”

Chapter 2 provides the details for how FA supports the Fires warfighting function, lays out the four components of fire support’s structure (control automation; surveillance, reconnaissance, and target acquisition; attack resources; and sustainment). This chapter also addressed the updates to key roles within FA, explicitly focusing on the Chief of Fires, Brigade Fire Support Officer, and Fire Support Coordinator. Most importantly, chapter 2 addresses the changed or updated terminology as it pertained to specific munitions, FA as a whole, and scalable capabilities (lethal or non-lethal).

Chapter 3 breaks down the elements of operations process for planning, preparation, execution, and assessment. Appendix A is of vital importance, as it explains the current fire support coordination and control measures. These measures reflected the improved capabilities that were now present on the battlefield and the measures that would allow for more detail integration of fires into the joint fight. Finally, Appendix B is a brief discussion on the command and support relationships that enhanced a maneuver commander’s ability to utilize FA to dominate their adversary in unified land operations. Appendix B also, addresses how these support relationships operate with NATO allies and sister-services.

Fires battalions in a Heavy Brigade Combat Team contained 2x 8-gun batteries of M109A6 Paladins. Stryker Brigade Combat Teams were structured with 3x 6-gun batteries of M777 towed 155mm howitzers and infantry brigade combat teams were

organized with 2x 8-gun batteries of M119 towed 105mm howitzers with the ability to be task organized with a battery of M777 to support the maneuver commander's mission.⁶³

Defensive operations in FM 3-09 are described as those operations in combat that defeat an enemy attack, gain time, economize forces, develop conditions favorable for the transition to offensive operations, and those actions that support stability operations.⁶⁴

Defensive fires were characterized by proper preparation of the defended terrain or by positioning assets to maintain sufficient flexibility and mobility to disrupt the enemy or mass effects in support of the BCT commanders mission.

Massing effects were seen as vital to overwhelming an adversary through the proper application of combat power.⁶⁵ Massing fires assist the defending unit by engaging the enemy in depth, creating gaps in their formations, or degrading the enemy through attrition to such a degree that they either cease their attack or do not have the combat ratios needed to continue the offense.⁶⁶ Imperative to a FA BNs ability to mass fires is the ability to detect enemy formations throughout the depth of the battlefield, communicate that targeting data to the firing batteries, and employ the proper munitions at the greatest range possible to achieve the desired effects.

Cannon munitions available to provide effects (lethal or non-lethal) for maneuver commanders include high-explosive rounds, dual-purpose improved conventional

⁶³ HQDA, FM 3-09, 2-3.

⁶⁴ Ibid., 3-12.

⁶⁵ Ibid., 3-14.

⁶⁶ Ibid.

munitions (DPICM), scatterable mines, smoke, illumination, and precision munitions that correct for ballistic conditions utilizing guidance to deliver effects on the aimpoint.⁶⁷ The Excalibur 155mm projectile was the only munition available to cannon artillery designed from inception to be a PGM. The M712 Copperhead projectile was the US only cannon fire round that utilized a seeker to detect electromagnetic energy reflected from a target by a laser designator. Precision smart munitions could autonomously search for, detect, and engage targets. The M898 Sense and Destroy Armor round was the only projectile fired from a 155mm howitzer that provided this capability to the force. Both the M712 and M898 are no longer in production.

The various munitions in the inventory afford the maneuver commander scalable capabilities, allowing for the proper effect to achieve the commanders desired endstate.⁶⁸ Specifically for the FA BN, scalable capabilities organic to their organization could integrate with capabilities from across the joint force to give the commander numerous options to complete the mission. Once the commander provides guidance on the effects desired, the Fire Support Coordinator can work to determine the best asset to destroy, disrupt, interdict, degrade, neutralize, or suppress the enemy.⁶⁹

⁶⁷ HQDA, FM 3-09, 2-17.

⁶⁸ Ibid., 2-16.

⁶⁹ Ibid., 2-14.

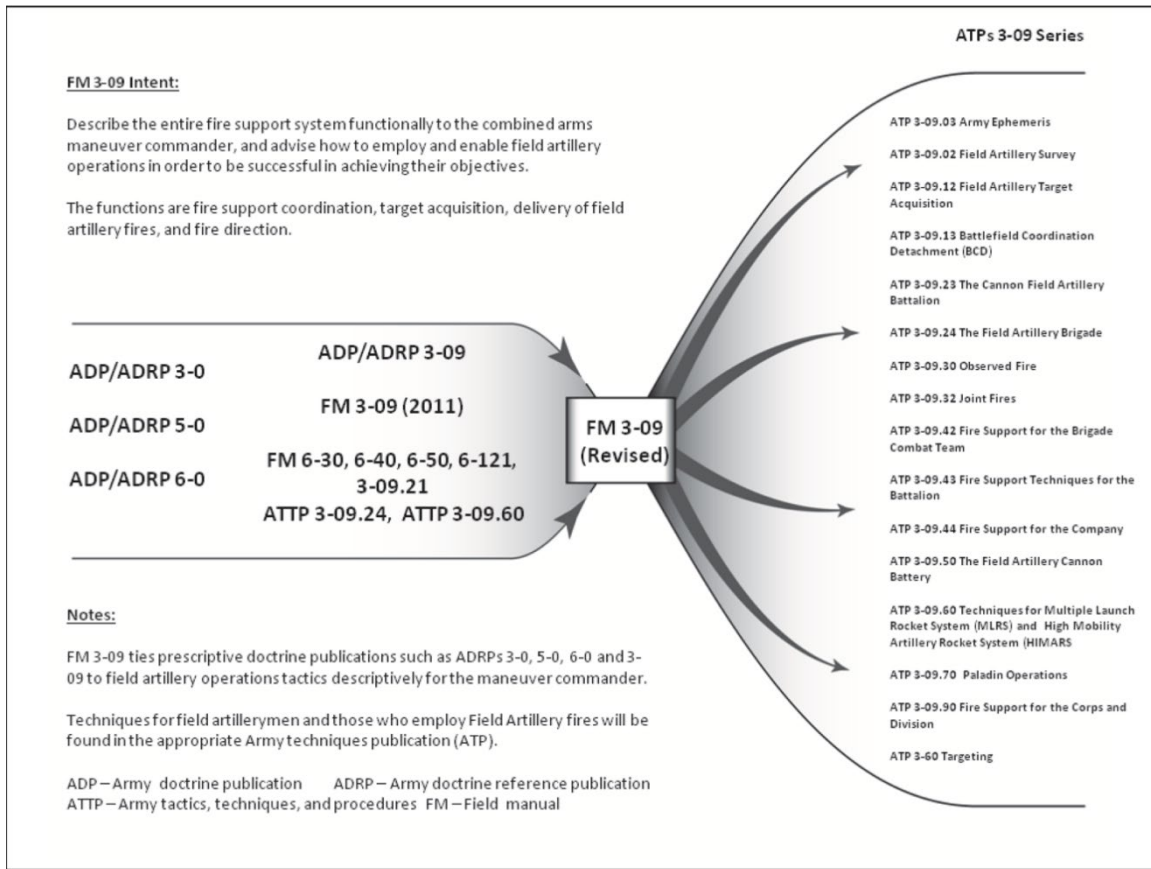


Figure 3. Field Manual 3-09 Revision Diagram

Source: Headquarters Department of the Army, Field Manual 3-09, *Fire Support* (Washington, DC: Government Printing Office, 2014) vi.

Army doctrine—and in particular, FA manuals—could not keep pace with the changing operational environment. The next major effort to realign FA doctrine with what the Army and Joint Force were doing in combat globally occurred in 2014. As depicted above, FM 3-09, published in 2014, served as a focal point for the synthesis of previous Army doctrine publications; Army tactics, techniques, and procedures publications, Army doctrine reference publications; and FMs for the coordination of FA functions in support of LSCO (although the term used in this publication is unified land

operations).⁷⁰ By providing a revised field manual, the USAFA demonstrated that the function of FA had evolved, and each ATP that followed served as detailed guidance for how the FA would support the Army and Joint Force. The changes in FM 3-09 released in 2014 were primarily to terminology, updating tactics and techniques for artillery to best support their maneuver commander's intent, and providing a more direct link as to the role played by FA in unified land operations.

A revision to the mission of the FA also occurred and stated that: the mission of the Field Artillery was "to destroy, defeat, or disrupt the enemy with integrated fires to enable maneuver commanders to dominate in Unified Land Operations." Although a minor change semantically, the updated mission statement more clearly reflected the shifting mindset as to how FA was to support their maneuver commander.

FM 3-09 (2014) removes all discussion on the use of tactical nuclear munitions for the FA. This FM then explains how each system type (cannon, multiple launch rocket system-high-mobility artillery rocket system) and organizational structure supports defensive operations.⁷¹ Since an ABCT contained self-propelled 155mm Paladins in support, the need to reposition laterally and rearward quickly was vital to any defensive operation, until the friendly maneuver units can blunt the enemy offensive and regain the initiative. Prioritization of the defense engages enemy forces at the farthest range possible with FA assets, hardens positions to increase survivability, and plans the proper

⁷⁰ HQDA, FM 3-09, iv.

⁷¹ Ibid., vii.

integration of fires and obstacles to prevent the enemy from overrunning friendly positions.

Structural changes also occurred from previous publications and FA BNs assigned to ABCT's now-contained three, six-gun batteries of Paladins, with each battery capable of supporting three to four firing platoons. This increase from the heavy brigade combat team structure of two batteries of eight-guns (16x total) to the new ABCT structure of three batteries of six-guns (18x total) afforded commanders a slight increase in firepower as well as flexibility and survivability, especially as it pertains to the defense.⁷² Logistics would still be the lynchpin to support the needed movements of these systems to firing positions, but commanders could now disperse their guns more effectively in their area of operations.

Massing effects would still prove to be a challenge as the range for the systems did not increase above the thirty kilometers distance that existed for decades. This stagnation in range was a result of operations in Afghanistan and Iraq that saw artillery pieces stationary on forward operating bases with targets at greater ranges engaged with UAS, Army Attack Aviation, or joint assets that could essentially support with minimal threat to their operations. This potential for increased dispersion and increased difficulty in massing effects on targets had several root causes. First was the lack of training in this particular skill, second was a lack of real-world necessity to mass an entire battalion against a single target (precision munitions could offer the desired effects with far fewer rounds), and finally artillery battalions being task organized to support an area of

⁷² HQDA, FM 3-09, 1-22.

operations that made it physically impossible for rounds to impact a singular point based on the distance between forward operating bases.

Funding shifted from longer-range artillery munitions to other programs as the defense budget saw continually adjustments to address the challenges the nation faced during the GWOT. As the National Defense Strategy identifies key threats to national security, money has started to return to programs designed to dramatically increase the range of FA munitions and performance of the platforms from which they are employed.

Fires Journal Articles

Having reviewed fires journals, white papers, and “Red Book” articles dating back to 2005, a distinct trend emerged. FA core proficiencies have declined due to mission assignments that varied as Operation Enduring Freedom-Operation Iraqi Freedom placed a greater emphasis on counterinsurgency operations. The initial phase of Operation Iraqi Freedom was perhaps the last time FA employed traditional Combined Arms Maneuver tactics. National Training Center observer controllers teams in 2005 noted that FA units lacked proficiency in the nonstandard maneuver missions assigned when they deployed and became owners of their battlespace. One evaluation highlighted that FA units were still focusing on their core competencies in lieu of training for the missions that they would have to accomplish in theater, for example stability and support operations, react-to contact drills, urban operations, room clearing, traffic control point operations, or detainee operations.

Observers in 2005 assessed unit rotations for eighteen months and discovered that FA units assigned maneuver missions frequently failed to plan for and incorporate fires into operations altogether. As FA units increased training for their maneuver mission,

personnel often filled roles they were not qualified for while the critical position of Fire Support Officer remained vacant. Fires and effects cells were non-existent, and FA headquarters could only provide a single firing battery to maneuver at any given time. National Training Center recommendations during this period emphasized a need for deploying FA units to dedicate more time while at home station to Military Operations in Urban Terrain, stability and support operations, traffic control points, and detainee operation training.

As FA units began to train for these nonstandard missions, commanders had to determine how best to utilize limited time and resources to accomplish their assigned missions. Core fires competencies required to support the BCT suffered greatly during this era. With the degradation in FA core competencies Brigade Commanders took notice, as detailed in *The King and I: The Impending Crisis in Field Artillery's Ability to Provide Fire Support to Maneuver Commanders*. This white paper, published in 2007, identified a deterioration in the FA's ability to provide fires to maneuver commanders in BCTs specifically. The authors analyzed the Combat Training Center observations and highlighted several areas where fires were failing to support maneuver commanders effectively. Fundamental among these observations were failure to produce a Fires Annex 80 percent of the time; 90 percent of field artillerymen were serving outside of their branch; 90 percent+ of artillery sections were uncertified; infrequent conduct of counterfire missions; and broken sensor to shooter chains.⁷³

⁷³ Sean MacFarland, Michael Shields, and Jeffrey Snow, *The King and I: The Impending Crisis in Field Artillery's Ability to Provide Fire Support to Maneuver Commanders* (White paper sent to the Army Chief of Staff, 2007), 5.

Most concerning to the authors were the long-term impacts of the loss of resident fires knowledge as FA officers, non-commissioned officers, and soldiers were departing in record numbers due to the increased requirement to serve in roles outside of their branch. The authors identified large gaps forming between the retiring artillerymen that possessed the expertise to guide the branch into the future and the new artillerymen who had little-to-no experience executing their mission. Provided in their assessment were six recommendations to potentially help rebuild the branch, with training and resourcing being the second most crucial area identified.⁷⁴

The Fires Redbook 2010 article entitled “Return of the King” demonstrated how the implementation of several of the observations from *The King and I* enhanced FA core competencies. Although not directly cited, 4-319th FA incorporated several key recommendations from the aforementioned white paper before their deployment to Afghanistan. Upon arrival into theater, the 4-319th FA was task-organized as a maneuver and fires battalion, diluting the unit’s firing capabilities.⁷⁵ Prioritizing training for gunnery and fire support, to include digital and manual procedures, helped overcome this challenge. Pre-deployment training increased in complexity, focusing on providing experience in the employment of fire support for the BCT. Training for non-commissioned officers provided expertise on their assigned weapons systems, while officers learned to be experts in applying those weapon system capabilities to support the maneuver commander’s mission.

⁷⁴ MacFarland, Shields, and Snow, *The King and I*.

⁷⁵ David Sink and Dennis Woods, “Return of the King,” *Fires: Red Book 2010* (November-December 2010): 63.

Center for Army Lessons Learned Trend Analysis

Analysis of National Training Center and Joint Readiness Training Center trends from 2001 through 2018 revealed several perpetual weaknesses in the employment of FA. The inability to plan for and integrate fires into maneuver operations from the company up to the brigade level, inability to conduct counterfire, inability to mass fires (failure to synchronize with maneuvers plan), poor ammunition planning and resourcing, and failure to plan fires through the depth of the battlefield were habitual deficiencies.

Presented in this thesis are trends from Combat Training Center FY2018 due to its relevance to the primary question of a FA BNs ability to support a BCT in the defense. With the transition from counterinsurgency to near-peer replicated combat training, Combat Training Centers allow the brigades and battalions to assess their ability to execute the missions likely in LSCO. The FY2018 trend analysis noted eight observations for the Army Tactical Task of Provide Fire Support, two of which were significant for the employment of fires. Identified challenges ranged from a failure to conduct detailed fire support planning to the inability to mass fires on high-payoff targets.

Additionally, units lacked an understanding of employment of DPICM to shape the battlefield and engage armored vehicles. FA units routinely failed to plan and rehearse observations plans, which resulted in unobserved enemy formations, planned targets not executed on time, and failure to engage high payoff targets altogether. Maneuver commanders identified that the munitions potentially high dud-rate informed their guidance to limit the employment of DPICM.

Employment of DPICM during the Joint Multinational Readiness Center's Combined Resolve X exercise enhanced unit's tactical success, but planning and

employment were rare. During the defensive phase, the brigade fires defeated company-sized armor and mechanized formations, and partially destroyed 2S19 self-propelled artillery by employing approximately eighty rounds of DPICM, demonstrating the value of this munition against moving armored targets.

The Center for Army Lessons Learned Newsletter 95-6, published in May 1995, noted that units participating in NTC rotations struggled with a similar issue when employing effective fires, especially as it pertained to planning shaping fires. What this newsletter demonstrates is a historical trend in the FA community identifying that company or battery-level tasks became such an intense focus that the integration of fires into the battalion, and higher-level plans rarely occurred.⁷⁶

MMAS Theses

Published in 2014, a Master of Military Art and Science thesis entitled *United States Army Field Artillery and the Hybrid Threat*, analyzed the FA's capability against a hybrid threat when employing doctrinal tactics, techniques, and procedures.⁷⁷ Major (MAJ) Jeffrey Fuller examined this central problem statement through the domains of doctrine, organization, and materiel, concluding that several capability gaps currently exist. MAJ Fuller assessed that PGMs would potentially provide a doctrinal and materiel solution to the challenge of ensuring FA units remained prepared for future conflicts. His

⁷⁶ Center for Army Lessons Learned (CALL), CALL Newsletter 95-6, *Fighting with Fires* (Fort Leavenworth, KS: United States Army Combined Arms Center, 1995), 21.

⁷⁷ Jeffrey Fuller, "United States Army Field Artillery and the Hybrid Threat: Is It Time to Get Smart?" (Master's thesis, US Army Command and General Staff College, Fort Leavenworth, KS, 2014), 83.

research offers valuable insight into the utility of PGMs in LSCO and the FA's ability to mass fires and effects with these munitions. A capability gap MAJ Fuller extrapolated was the limited ability to mass fires against moving armored targets. He additionally concluded that PGMs would offer little in the way of effects against such targets and filling this capability gap was only possible with the development of new materiel solutions.

Another thesis that adds clarity to the central question regarding a FA BNs ability to support the defense is *Fires Readiness: The State of US Army Fires in Support of Combined Arms Maneuver at the Division Level*, published in 2016. MAJ Johnson concluded that fifteen years of conducting nonstandard missions and the transition to modularity resulted in a significant loss of USAFA core competencies at the division level. In particular, he found that division level FA staffs lacked the proficiency to integrate fires into high intensity conflicts effectively.⁷⁸ The complexity and pace of operations at the division level hindered effective fires integration. Of greatest concern was the staff's inability to plan for and execute counterfire operations and linking sensors with the proper shooter.

MAJ Johnson assessed that with the return of division artillery, FA BNs could better support the BCTs, as there was placed a renewed emphasis on core competencies and greater control of fires specific training that improved integration from the battalion up through the division level and beyond. MAJ Johnson's thesis did not specifically

⁷⁸ Ryan Johnson, "Fires Readiness: The State of US Army Fires in Support of Combined Arms Maneuver at the Division Level" (Master's thesis, US Army Command and General Staff College, Fort Leavenworth, KS 2016), 92.

address the reliance on PGMs during Operation Enduring Freedom-Operation Iraqi Freedom or the ability to mass fires against a near-peer adversary. However, his thesis does provide a comprehensive capabilities-based analysis of how the division artillery supports at the tactical and operational levels and the benefits provided to subordinate organizations.

Current Russian Military Structure (2012-2018)

Russia and the rest of the world benefited from observing how the United States operated in the GWOT for nearly two decades. Adversaries used this opportunity to examine how the US Army and the USAFA employed assets in combat and how doctrine evolved. Learning from the actions of the United States and US allies in Afghanistan, Iraq, and most recently, Syria, Russia implemented critical changes to their military structure and equipment to pull their military out of the Cold War malaise, leaping headlong into the twenty-first century.⁷⁹

Reforms started in the Russian military in 2008, focused on modernization, professionalizing the service with higher pay and less conscription, and downsizing to reduce wasted spending. Maintaining an army of five million+ personnel during the Cold War was more tenable before the reforms of 2008. Reforms sought to transition from a massive force primarily constituted of conscripts, staffing skeleton organizations awaiting direct conflict with the US or NATO allies to a leaner force that could project power more readily. Reductions in command structures from the sixteen military districts in the

⁷⁹ Asymmetric Warfare Group (AWG), *Russian New Generation Warfare Handbook Version 1* (Fort Meade, MD: Asymmetric Warfare Group, 2016) 2.

Soviet-era responsible for garrisoning, training, and equipping forces to six military districts after the reform provided far more effective command and control of units and personnel.

Most directly, this reform provided a structure that facilitated a transition to a Brigade-centric model with between 3,000 and 4,500 personnel organized to support and conduct operations independently. Estimates have indicated the Russian military downsized from nearly 1,900 large units to just under two hundred while increasing overall combat effectiveness.

Achieving strategic objectives through military action was enabled through the regular use of Battalion Tactical Groups (BTGs) that integrated tank companies, motorized infantry companies, and artillery batteries. Enhanced coordination amongst the elements of the BTGs results in a combined arms combat philosophy driven down from the strategic level to the operational and tactical levels.

Deploying entire divisions across the vast expanse of Russia is a logistically demanding. Employing BTGs are an ideal method to project a brigade's combat power to accomplish the intended mission with the proper mix of forces. Russia views BTGs as a tactical element in their doctrine; however, their actions in support of a brigade could have strategic implications, and their size is not a determining factor in their application at each level of war.⁸⁰ Brigades could win wars based on their organization for combat.

Brigades typically have a brigade artillery group assigned, comprised of 2x battalions of self-propelled artillery pieces (18x guns each) consisting mostly of 2S19s,

⁸⁰ AWG, *Russian New Generation Warfare Handbook*, 29.

and 1x high-mobility artillery rocket system battalion (18x systems) primarily composed of BM-21s. Russian doctrine also allows for the attachment of artillery down to the company-level to support offensive operations, providing for immediate fires to rapidly overwhelm their adversary.

Russian artillery continued improving following the military reform of 2008 with systems capable of firing a wide range of munitions to include DPICM, thermobaric, mine-laying rounds, nuclear, chemical, and conventional rounds.⁸¹ Additionally, Russia employs the 2K25 Krasnopol round that is a base-bleed, laser-guided munition terminally guided to a target by a ground-based designation system. Attaching self-propelled artillery pieces such as the 2S1 and 2S3 down to maneuver companies provides direct fire capability that can engage armored vehicles with high-explosive anti-tank rounds. Although the underlying Soviet-era artillery tactics did not change significantly, improved munitions and ranges allowed for increased tactical and operational flexibility for Russian military leaders.

Russian FA employs five primary methods of fire: single target, concentrated, fixed protective curtain, moving curtain, and accompanying fires. Target effects also demonstrate a contrast between Russian and USAFA. Russia categorizes target effects as annihilation (70-90 percent destruction), demolition, suppression (30 percent destruction), and harassing fire. FM 3-09 classifies a destruction mission as achieving 30 percent effects against their intended target. Differentiating between the terminology used in US doctrine and Russian doctrine may seem merely semantic at first, but it reveals

⁸¹ AWG, *Russian New Generation Warfare Handbook*, 33.

what the role of FA plays in support of each nations approach to achieving their objectives.

The ability to mass conventional munitions has a secondary benefit of being able to effect moving targets through the sheer volume of fires employed in a given area on the battlefield. Russian BTGs can easily mass fires against an area of more than one-square kilometer with an ability to rapidly adjust those fires with less requirement to receive accurate targeting data required for precision munition employment.

Russian organizational structure focuses on brigades with the division utilized along main avenues of approach. Characterizing the offense is decisive attack designed to rapidly destroy enemy formations and move quickly to reach their objectives. Offensive actions directed at prepared defensive positions seek to overwhelm defenders with artillery and direct fire creating gaps that allow for rapid movements through the depth of the defending formations.⁸² Achieving a breakthrough is pivotal to permitting Russian forces to achieve their tactical and operational objective, with massed fires playing a crucial role in facilitating this tactical advantage. Generally, offensive tasks fall into two broad categories: first-echelon and second-echelon forces. First-echelon forces have an immediate objective with a specific direction of attack focused on the destruction of platoon defensive positions. Second-echelon forces focus on the destruction of bypassed or isolated forces, controlling forward positions, and supporting higher echelons in achieving subsequent objectives.

⁸² HQDA, FM 100-2-1, 5-13.

Organizing forces for operations utilizes a Correlation of Forces and Means which is a mathematical method to analyze the required combat force ratios for a given mission set. Correlation of Forces and Means calculations drive the organization for combat, avenues of approach, and even the tempo of an operation that has the highest probability of achieving the commanders assigned mission. Computerization of the Correlation of Forces and Means process provides a rapid answer to critical questions regarding ammunition requirements, fuel consumption, and personnel casualty rates. Correlation of Forces and Means outputs allow Russia to tailor formations with increased potential for mission success with reductions in squandered combat power by progressing from a “one-size fits all” mentality in force structure.

Ultimately the reforms in the Russia military centered around a transition to a Brigade-centric organizational model, the improvements in technology and procurement of modernized systems, and the increased ability to tailor forces to specific missions has proven to be a significant advancement over the Soviet-era military. The above changes, enacted during Russian actions in Ukraine’s Crimea, had a devastating effect. Analysis of combat between Russia and Ukraine provided valuable intelligence on how those changes increased the lethality of Russian military forces with lessons learned that apply directly to how they are likely to fight in LSCO.

Army Vision 2028 (2018)

The Army’s mission, as stated in the Army strategy, is to “deploy, fight, and win our Nation’s wars by providing ready, prompt, and sustained land dominance by Army forces across the full spectrum of conflict as part of the Joint Force.” To achieve the stated vision by 2028, the Army must address all areas of the stated strategy with the

same vigor and drive that drove the reforms implemented in AirLand Battle doctrine. Building a more lethal and effective fighting force will require renewed focus on training and fighting as part of a joint and multinational force to be successful in high-intensity conflicts. What the Army strategy identifies is a need to deter conflict by presenting potential adversaries with scenarios where the US possesses significant overmatch. When US forces and US allies do not possess an overmatch, it is necessary to rapidly augment units with combat power essential to regaining the initiative.

Underpinning this strategy is an understanding that force modernization must occur and new weapon systems, platforms, and upgradable capabilities must be fielded by 2028. While working to modernize, capability improvements must occur to existing systems to return the US Army to a position of dominance across all domains. Multi-domain operations serve as the focal point for allowing the Army to fight the wars of the twenty-first century and operate effectively in a LSCO environment. Implementation of the Army Strategy in the coming decade must address every aspect of the DOTMLPF-P framework as the only comprehensive method to realize the Army Vision.

Doctrine must reflect the new realities of multi-domain operations, leveraging new equipment and technologies introduced into the force. Lines of effort in the Army strategy will drive structural changes to organizations, more realistic training emphasizing combat in high-intensity conflict, and modern materiel acquisitions. During this phased approach, manning and readiness take priority through 2022, with increases to unit end strength and deployability. Beyond that horizon are the six modernization priorities that address the need for long range precision fires, new combat vehicles,

vertical lift capabilities, Army network improvements, air and missile defense enhancements, and soldier lethality.

Of the six modernization priorities, improvements to long range precision fires most expressly fall within the scope of the research of this thesis. New platforms, munitions, mobility, range, target acquisition, and changes to the organization of those systems for combat play the most direct role in addressing the challenge for a FA BN defending against a near-peer threat.

Russian Actions in Ukraine (2014)

When Ukraine experienced its Euromaidan Revolution in 2014, Russia feared the overthrow of a friendly government on its border. In March of 2014, Russia began to occupy Ukraine's Crimea with SPETzNAZ units in an asymmetric operation. Ukrainian military forces gradually pushed back separatists supported by Russian covert special forces.⁸³ Russian conventional forces then attacked across the border, encircling several Ukrainian units and killing hundreds through overwhelming firepower.

Operations in Ukraine allowed Russia to test new technology, equipment, and organizational structures to achieve their objectives. Although brigades had inherent weaknesses, tailoring forces for specific missions provided greater flexibility. Russia is returning to a division-centric organizational structure; however, the lessons learned from actions in Ukraine have shown that a brigade can be successful when properly organized and equipped for combat. Currently, Russia organizes brigades around three main units: infantry, armor, and artillery. Adding units and capabilities help achieve the desired

⁸³ AWG, *Russian New Generation Warfare Handbook*, 36.

effects against the templated enemy. For example, attaching an electronic warfare unit to a brigade degrades enemy command, control, and communications capabilities.⁸⁴

Offensive electronic warfare proved to be indispensable in Ukraine, as Russia invested heavily in this capability after monitoring the GWOT and understanding the role communications played in US military operations. Russia also fielded systems capable of jamming UAS platforms, a capability the US relies upon extensively to conduct information, surveillance, and reconnaissance and employ PGMs.

One advancement that proved to be devastating to Ukrainian military forces was Russia's improved ability to employ UAS to gather intelligence and use these platforms to call for and adjust massed artillery strikes. The sensor to shooter chain for the entire process was often less than ten minutes. This capability allows for the employment of massive volumes of fire on a defending force with a moderate level of accuracy for the initial volley and adjustments subsequently made via the UAS-shooter link. Coupled with the large quantity of field artillery pieces in a single Russian field artillery battalion (36x total), UAS proved to be a significant technological leap forward for Russian forces. Russian UAS platforms successfully employed incendiary and fragmentation grenades on bunkers and Ukrainian military formations.⁸⁵ If targeting fuel, ammunition stores, fire direction centers, or personnel in assembly areas, Russian UAS would have a significant impact on a US FA BN's ability to support in a defensive operation.

⁸⁴ AWG, *Russian New Generation Warfare Handbook*, 30.

⁸⁵ *Ibid.*, 48.

Currently Russia is working to modernize its force and relying heavily upon increased technology and advanced weaponry to offset the limited training for personnel conscripted into service. Drafting of conscripts for one year is still part of how Russia fills their ranks, and they serve only between six and eight months in their assigned roles after the required training. Russian conscripts spend limited time doing their primary jobs, which leads to a lack of proficiency at lower echelons. Overcoming this vulnerability through improved technology and increased automation removes the requirement for soldiers to master basic tasks. Soldiers can then focus on accomplishing tasks that require less technical proficiency. Increased reliance on overwhelming firepower affords Russian the ability to further compensate for lack of skilled soldiers at the tactical level.

Russian offensive actions in Ukraine demonstrated that BTGs provide a level of force projection, rapid tempo and intensity, and an ability to tailor forces to achieve specific objective that improved Cold War-era Soviet doctrine. The exercise of disciplined initiative within the BTG proved formidable when paired with advanced weaponry and a willingness to employ overwhelming firepower against Ukrainian Military Forces.⁸⁶ Russian actions confirmed that massing fires remained a cornerstone of their doctrine, and the technological improvements to targeting and weapon systems allowed them to achieve military overmatch with relative ease. Russian actions in Ukraine made clear that although PGMs have value in conflict, there is no substitute for the devastating effects of unrelenting FA targeting a defending formation.

⁸⁶ AWG, *Russian New Generation Warfare Handbook*, 53.

Chapter Summary

This chapter identified the doctrinal references, professional journals, white papers, training center trend analysis reports, and theses that provide a foundational analysis of the challenges a US FA BN face in the defense. This chapter focused on the doctrine that laid the ground work for the US Army and USAFA during the 1980s and contrasted it with Soviet doctrine of that same era. Next, USAFA doctrine from 2001 to 2018 addresses the principle changes from AirLand Battle doctrine and defensive tactics against current Russian offensive tactics and doctrine. Finally, an analysis of the Army Vision identifies the planned direction for the US Army in preparation for LSCO and utilizes Russian actions in Ukraine to provide a framework for determining if the modernization prioritizes set forth are suitable.

The subsequent chapter discusses the methodology utilized to determine logical answers to the primary and secondary questions posed in this thesis. It identifies which aspects of the DOTMLPF-P framework facilitate conclusions and recognition of capability gaps arose.

CHAPTER 3

RESEARCH METHODOLOGY

This thesis structure utilizes the qualitative research methodology. To address the problem of determining if a BCT can defend against a large-scale ground offensive, a content analysis will look at current and historical US Army doctrine. The doctrine reviewed addresses explicitly how the FA operates from the tactical (battery) to operational level (brigade focused). To address how the US Army has employed FA over the past twenty years, organization of data demonstrates how artillery has delivered effects in various operations in multiple theaters. Although the mission of the FA has not changed significantly over the past two decades, the manner in which artillery has been employed to support Operations Enduring and Iraqi Freedom has varied. Historically, artillery was employed to provide overwhelming force on the battlefield. It has since evolved into a surgical tool that commanders have relied upon to effect targets primarily in urban or populated environments against an enemy primarily employing small arms, rocket-propelled grenades, and mortars.

The introduction to this thesis establishes the framework and intent for this research topic. Ultimately, the purpose of this thesis is to identify if the current structure of FA supporting an ABCT has the organic capability to mass fires to support a defensive operation against a large-scale offensive operation from a near-peer adversary employing combat ratios of 3:1 or greater.

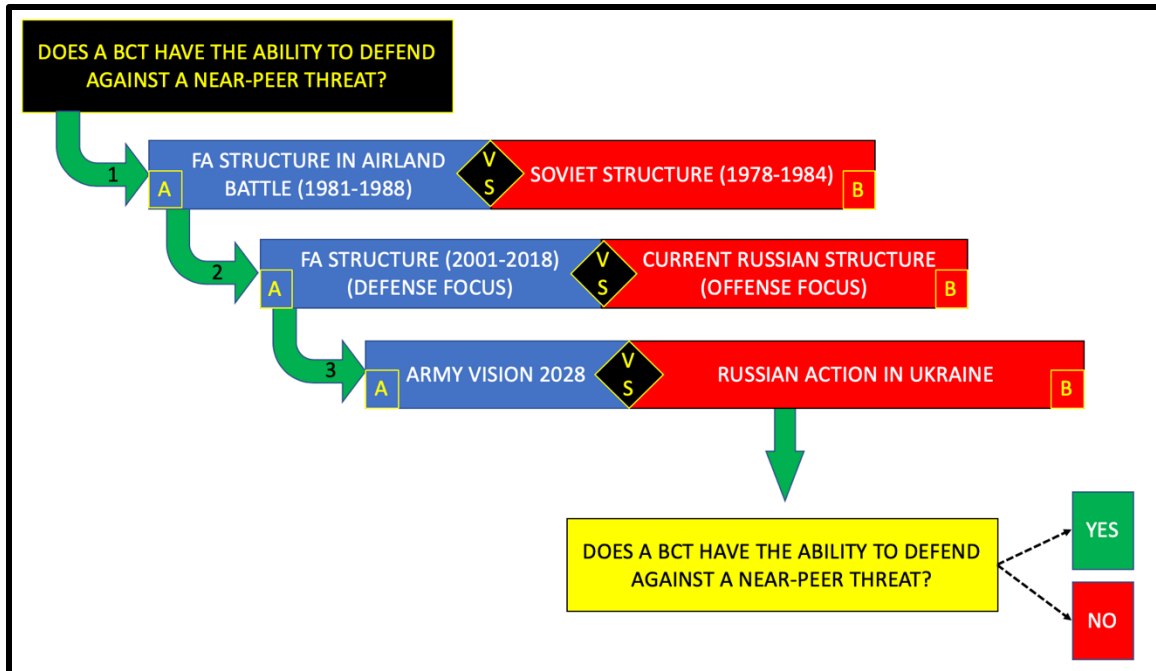


Figure 4. Research Methodology

Source: Created by author.

Figure 4 graphically depicts the organization of information used to arrive at a logical conclusion in determining if an ABCT can defend against a near-peer adversary. First, a discussion of the US Army structure and doctrine will examine how FA was intended to be employed during the late 1980s under AirLand Battle doctrine. That will lead to the evolution of the USAFA after 2001 through the most current doctrine for the employment of fires on the battlefield. Within this section, an examination of how employment of FA has changed with the increased focus on collateral damage prevention and precision targeting. This thesis will cover the organization of a FA BN in an ABCT and how it supports operations. The training and certification that field artillerymen

receive in these brigades will also determine if they can execute the missions that would best serve in LSCO.

A comparison between current and historical doctrine will underpin this thesis and a comparison between currently deployed FA assets in the United States and Russia establishes an accurate metric. The purpose of this comparison will be to conclude if the current organization is sufficient to properly support BCTs, as well as to determine if the reorganization of FA closed capability gaps or if it has potentially exacerbated the problem. There will also be a focus on addressing if the doctrinal shift from having a BCT plan artillery for the deep fight to moving this requirement to the division will negatively impact friendly operations in the period between the start of hostilities until joint and multinational assets are employed against the aggressor nation.

Shifting to Soviet doctrine in the late 1970s-1980s will benefit this thesis by examining its development, organization, and structure as it planned to engage the United States and US allies at the height of their power before the collapse of the Soviet Union. Next, a brief analysis of how the Russian military operated when they engaged forces in Ukraine in 2014 highlights the advancements made, specifically as it pertains to offensive operations and the integration of FA. An analysis of the current Russian military structure and how they utilize their artillery to conduct operations follows. As this is the most likely employment the US and NATO are likely to face, it will serve to provide a better reference point for the BCTs challenges in the defense.

Next, the data will converge to provide an estimate to determine if an ABCT can defend against a near-peer threat without immediate support from joint and multinational assets. This analysis will seek to determine how long an ABCT may be able to defend

without the support of additional assets based on the likelihood that it may take several days or more for these assets to become available to reinforce defensive operations in preparation for the transition to the offense. An estimate of how long an ABCT would be able to defend is based on current staging, logistics support, and the sustainment required for a FA BN operating independently. Finally, a summary of the Army vision assesses if the direction that the US Army is currently moving in would be adequate for the threats identified in the National Defense Strategy.

Evaluation Matrix Description

To assess the validity of the analyzed material, an evaluation matrix will serve to provide clear answers to the key points of research for the topic central to this thesis. A side-by-side comparison provides a visual representation of which nation has the advantage in particular areas of the DOTMLPF-P framework so an assessment of which nation would potentially emerge victorious during combat based on the parameters of this thesis is possible. This comparison matrix focuses exclusively on current doctrine, organization, training, and materiel.

Table 1. Evaluation Matrix

COMPARISON MATRIX		
DOCTRINE		
US	VS	SOVIET/ RUSSIA
	PRIMACY OF ARTILLERY IN SUPPORT OF MANEUVER	
	READILY AVAILABLE MASSES FIRES TO SUPPORT BRIGADE-LEVEL MANEUVER	
	IMPORTANCE OF COLLATERAL DAMAGE MITIGATION (PGM-EMPLOYMENT)	
ORGANIZATION		
US	VS	SOVIET/ RUSSIA
	NUMBER OF ARTILLERY PIECES SUPPORTING A BRIGADE	
	ABILITY TO ATTACH ARTILLERY DOWN TO THE COMPANY LEVEL	
TRAINING		
US	VS	SOVIET/ RUSSIA
	EXTENSIVE TRAINING TO MASS FIRES	
	EXTENSIVE TRAINING TO EMPLOY PRECISION MUNITIONS	
	RELIANCE ON PRECISION MUNITIONS	
MATERIEL		
US	VS	SOVIET/ RUSSIA
	RANGE OF SELF-PROPELLED CANNON MUNITIONS	
	RANGE OF ROCKET MUNITIONS SUPPORTING THE BRIGADE	
	ROCKET LAUNCHERS ASSIGNED TO A MANEUVER BRIGADE	
EVALUATION LEGEND		
	DISADVANTAGE	
	EQUAL	
	ADVANTAGE	

Source: Created by author.

Chapter Summary

This chapter focused on providing the methodology used to arrive at a logical conclusion as it pertains to an ABCT's organic FA BN's ability to defend against a near-peer threat without the immediate support of joint and multinational assets. Analysis of historical manuals provides a point of comparison for the type of threats that we face moving forward in the twenty-first century and how doctrine has evolved to address these threats (Doctrine). Historic manuals and current doctrine provide an understanding of FA organization to defend against an adversary in a large-scale combat scenario (Organization). This thesis provides an assessment of how FA units in an ABCT conduct training, and an analysis of the relevance of training helps determine if it is adequate to prepare a FA BN to defend against a near-peer threat equipped with comparable, if not superior, assets (Training). Each step of this methodology discusses the assets physically employed on the battlefield or templated for use to gain a better understanding of how the US Army plans to achieve victory over US adversaries in combat (Materiel).

CHAPTER 4

ANALYSIS

The thesis seeks to address the ability of a FA BN to support a BCT during defensive operations against a near-peer adversary. More specifically, this thesis focuses on the FA BN's potential to provide support without the assistance from division, joint, or multinational assets. Utilization of these parameters are predicated on the understanding that the number of targets that will present themselves on the battlefield during LSCO will require the employment of all available assets across a broad front. Brigades may need to defend for significant periods before division, joint, or multinational assets can assist against attacking forces. These periods could range from twelve hours to several days.

Doctrine Analysis

An examination of US Army doctrine and relevant FA field manuals serves as the basis for understanding how we would fight a near-peer adversary in LSCO. FM 3-0 updated the Army's strategic method to conduct operations across the range of military operations and the conflict continuum.⁸⁷ LSCO identifies that challenges facing the army in the twenty-first century are more complex than previously experienced with a level of lethality and brutality that may outpace preceding conflicts.⁸⁸ The Army will have to fight as part of a joint and multinational force to be successful in LSCO, placing a greater

⁸⁷ Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-0, *Operations* (Washington, DC: Government Printing Office, 2017), 1-1.

⁸⁸ *Ibid.*, 1-2.

emphasis on the interoperability of forces and an increased requirement to leverage external assets (armed-UAVs, rotary assets, and fixed-wing aviation) to conduct an effective offensive or defensive operation. The US Army is almost entirely dependent upon the fires and reconnaissance assets of these joint and multinational forces in LSCO.

Units defending in LSCO are highly likely to find themselves in austere environments facing an enemy with numerical superiority and asset capabilities that can match or outrange the US FA. Defending forces must maximize the advantages of the terrain where they are located, mitigate the enemy's strengths, and find ways to tactically and operationally disrupt the enemy's attack to allow a build-up of friendly combat power to seize the initiative to transition to the offense. Potential employment of weapons of mass destruction by enemy forces increases during LSCO due to the requirement to effect command nodes, massed formations, and infrastructure critical to the friendly commander's potential plan. The fast tempo of operations in LSCO place increased weight on a unit's ability to adapt to the operational environment as events on the battlefield unfold.⁸⁹

Specific to defense in LSCO, FA plays a vital role in disrupting enemy formations before they enter the close area and degrading enemy capabilities to a sufficient degree, allowing defending units to achieve the needed combat ratios to be successful.⁹⁰ Enemy forces would seek to exploit rapid movement to penetrate defenses, degrade or destroy

⁸⁹ HQDA, FM 3-0, 1-3 -1-5.

⁹⁰ Ibid., 6-1.

friendly command nodes and battle positions to overwhelm defending units.⁹¹ FM 3-0 identifies that enemy forces would integrate fires with their maneuver forces to bypass heavily defended areas to reach their objectives.⁹² FM 3-0 explains area defense, mobile defense, and retrograde operations; however, it is understood that Corps and Division will shape the battlefield in the deep area for brigades.

FM 3-0 would better serve leaders at all echelons by to addressing how a FA BN could best defend against such an attack without the employment of external assets. It would not be practical to provide explicit detail on how this challenge should be addressed, but future revisions of FM 3-0 should identify where leaders and planners must draw from specific doctrinal manuals for each warfighting function for greater detail. This is especially valuable when focusing on targeting moving armored assets.

Based on the update to FM 3-0, brigades no longer have deep areas, so they are entirely dependent upon assets from division and higher to engage targets outside of their area of operations. This change places a greater burden upon the FA BN to track the battle as it unfolds to ensure that positioning of fires assets cover enemy avenues of approach and are flexible enough to displace as required to support the BCT commander's plan. Limitations inherently exist in the BCT commander's options based on the number of rounds a M109A6 Paladin can hold internally (39x total), the number of rounds the field artillery ammunition support vehicle can transport (92x total), and the

⁹¹ HQDA, FM 3-0, 6-4.

⁹² Ibid., 6-6.

number of rounds moved by trailer via the support battalion (dependent upon availability of assets).

Defending a single position would require 203x rounds for the first day of operations in heavy combat.⁹³ Those totals rise to 207x rounds for successive days of operations. Looking at these requirements, a Paladin would expend their entire store of Class V within 24 hours. Ammunition expenditures would place a greater strain on logistics assets to stock position areas for artillery with multiple days of supply ahead of anticipated conflict. As noted in FM 3-0, FA must displace to subsequent positions to increase survivability and adjust to where the enemy has weighted their main efforts. Moving several days of supply between positions while in heavy conflict would prove extremely challenging for a FA BN.

FM 3-09.21, *Tactics, Techniques, and Procedures for the Field Artillery Battalion*, published in 2001, lays out how targets should be engaged on the battlefield, in particular, armored formations. To do so, DPICM plays a major role in providing the needed effects against these threats. A key shortfall of FA identified is the inability to engage moving armored targets effectively. With the cancellation of the Copperhead round, the FA has no internal precision-smart terminally guided munition that can be employed to degrade or destroy tanks and heavily armored systems effectively. Russian cannon artillery systems have ranges greater than the M109A6, which means that they

⁹³ Headquarters, Department of the Army (HQDA), Army Techniques Publication (ATP) 3-09.23 (Field Manual 3-09.21), *Field Artillery Cannon Battalion* (Washington, DC: Government Printing Office, 24 September 2015), Table 7-1.

would be out of range of the FA BN and must be engaged by systems supporting at echelons above brigade, further limiting a BCT's ability to defend with its organic assets.

As identified in FM 3-09, FA has a limited capability to engage moving targets. This FM does not provide methods to compensate for this capability gap internal to a BCT. FM 3-09 does nest itself heavily with FM 3-0 and, as a result, relies upon assets from the joint and multinational force to address these threats. Despite possessing a wide range of scalable munitions and capabilities, current publications do not effectively address how FA counters this threat.

FM 3-09.42, *Fire Support for the Brigade Combat Team*, published in 2016, does little in the way of providing any clarification on how to engage armored moving targets. It does, however, provide some guidance on how artillery in an ABCT can mass effects. These effects are based on what munitions are available, desired effects, and how wide the frontage is that the brigade is defending. One readily apparent limitation of increased dispersion is that massing becomes more complicated when FA batteries are near the outer limits of their range capabilities. Platoons and batteries that are potentially twenty to thirty kilometers apart would not have the ability to mass against specific targets if those enemy assets were to present themselves at certain locations in the BCT area of operations. Russia, in particular, would use extensive recon to determine where these gaps exist and would maneuver to exploit these weaknesses to reach their objectives.

Organizational Analysis

Organizationally, the USAFA has undergone several changes over the past decade, increasing from two 8-gun batteries in the Heavy Brigade Combat Team to what

currently exists in the ABCT with three 6-gun batteries.⁹⁴ The increases in communications capabilities and ability to logistically support this additional battery affords the BCT commander the additional flexibility needed to defend across a broader front. The FA BN could potentially disperse in as many as nine platoons, each with 2x M109A6s.

This increase allows for greater scalability, but can limit a FA BNs ability to effectively mass against enemy formations, particularly mobile assets. The inherent latency with the transmission of targeting data and the ability for multiple fire direction centers to process fire missions may all but preclude the potential to mass fires. Commanders must have a clear understanding of the operational environment and what the enemy courses of action may be, striking a balance between dispersing asset for survivability and flexibility, and the need to have artillery assets positioned to provide overwhelming firepower to neutralize, degrade, or destroy enemy formations.

Training Analysis

Training for a 155m Paladin FA BN closely resembles that of a towed 155mm M777 unit and a 105mm M119 battalion. Cannon artillery systems have a detailed process in Training Circular 3-09.8 (2016) to evaluate individuals and crews on how well they emplace, prepare, fire, and displace their assigned platform. A gradual increase in difficulty is built into each gate to provide commanders an accurate assessment of their

⁹⁴ HQDA, FM 3-09, 1-2.

personnel's proficiency and their ability to execute specific tasks and fire missions.⁹⁵ The tables are designed to mirror maneuver tables 1-6 so that as a brigade, fire support and maneuver progress in parallel.⁹⁶ Training outlined in Training Circular 3-09.8 adheres to the concepts and guidance addressed in FM 7-0, *Train to Win in a Complex World and the Field Artillery Training Strategy* to enhance realism.⁹⁷

Training gates certify personnel before conducting section training. Once all personnel are certified and sections complete training, dry-fire certifications are conducted and evaluated, culminating in live-fire qualifications. Collective training tables for a platoon, battery, and battalion are only conducted once the crew, section, or team are qualified. Conduct of evaluated live-fire qualifications at each echelon occur during Artillery Tables VI, XII, XV, and XVIII.⁹⁸ Maintaining qualification is based on six months from the execution of Table VI qualification with the key personnel for that section/ team remaining. If the chief of section or gunner depart, that section or team loses their qualification. Maintaining currency on the essential fire mission proficiency becomes exceedingly difficult for any unit with limited time to execute special missions, such as battalion massing, employment of special munitions, or engaging moving targets.

⁹⁵ Headquarters, Department of the Army (HQDA), Training Circular (TC) 3-09.8, *Fire Support and Field Artillery Certification and Qualification* (Washington, DC: Government Printing Office, 2019), 1-1.

⁹⁶ *Ibid.*, iii.

⁹⁷ *Ibid.*, iii.

⁹⁸ HQDA, TC 3-09.8, 1-6; Headquarters, Department of the Army (HQDA), Field Manual (FM) 7-0, *Train to Win in a Complex World and the Field Artillery Training Strategy* (Washington, DC: Government Printing Office, 2016).

In the entirety of the gated training strategy, there is no requirement to conduct live-fire training against moving targets. The massing of FA assets at the battalion-level is an annual requirement occurring only during Artillery Table XVIII.⁹⁹ With the number of permanent changes of station that occur throughout the year, it is nearly impossible to have an entire FA BN qualified on battalion massing fire missions. The training that a FA BN conducts throughout the fiscal year is invaluable; however, there is no substitute for a fully qualified section or team that has conducted live-fire missions as a unit.

Training to mass fires or engage moving targets is also limited by home station range restrictions. As multiple batteries train on a shared range the ability to replicate massing effects or simulate engagement of moving targets is reduced based on range safety restrictions. This limitation impacts a FA BNs ability to execute collective training during NTC/ CTC rotations. The training that a FA BN conducts throughout the fiscal year is invaluable; however, there is no substitute for a fully qualified section/ team that has conducted live-fire missions as a unit replicating complex fire missions.

Materiel Analysis

Materiel currently available to the FA BN in the ABCT is relatively limited. There are smoke, illumination, high-explosive, DPICM, and field artillery scatterable munitions rounds. The M982-series Excalibur guided projectile is the only precision munition available to a FA BN, but it lacks the ability to engage a moving target because it requires a target location accuracy of less than six meters before it can be employed. An individual Excalibur round costs approximately \$70,000 and massing with this round

⁹⁹ HQDA, TC 3-09.8, 3-5.

is cost-prohibitive. Contrasting the cost of an Excalibur round with a traditional high explosive round priced at approximately \$300 provides a quick assessment as to the financial implications of massing effects with PGMs versus conventional munitions.

With the end of production for the M712 Copperhead 155mm artillery round, the FA BN lacks a munition with terminal-guidance capability to engage targets. FA's ability to destroy moving armored targets on the battlefield is severely limited. Sense and Destroy Armor M898 rounds provided some capability against armored moving targets, but this munition is no longer in production with current stocks dwindling. Based on this capability gap, the reliance on joint and multinational forces to engage armored moving targets increases significantly.

Multiple Russian systems currently out-range USAFA munitions, to include self-propelled and towed pieces from various countries. The ability to employ fires against a defending ABCT before organic FA can respond puts the defender at a distinct disadvantage, and precludes the ability to conduct one of the primary artillery missions of counter-battery fires. Figure 6 provides unclassified ranges that closely approximates the capabilities of various artillery systems likely to be employed during LSCO. The ability to employ fires against an enemy before they can respond provides a clear advantage and can have an initial degrading effect on their opponent.

Engaging armored moving targets at the farthest possible range before they can organize into battle formations is a core defensive task that a FA BN must conduct to support a BCT commander.¹⁰⁰ Currently, the only method for a FA BN to achieve this is

¹⁰⁰ HQDA, FM 3-09, 6-3.

through close battlefield tracking with intelligence, surveillance, and reconnaissance assets from the brigade or higher and by employing DPICM on predicted target locations. This process is incredibly complex and requires intense coordination between the sensor and shooter for a successful target prosecution. Since DPICM has no ability to guide to a target once fired, their employment against moving targets places a great deal of strain on the logistical support elements within a FA BN and BCT to support resupply.

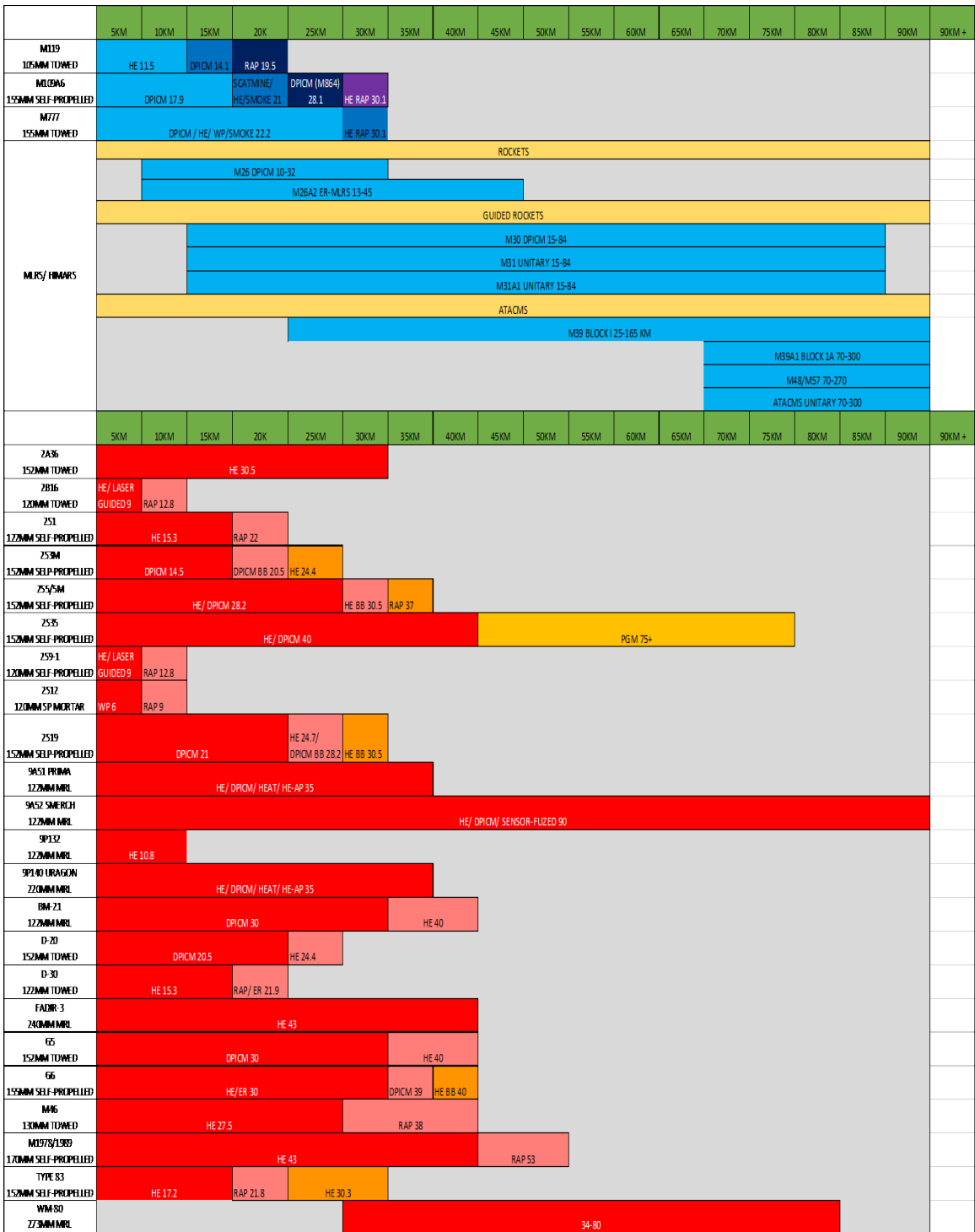


Figure 5. Cannon-Multiple Rocket Launch System Ranges

Source: Modified by author using 1st Cavalry Division Artillery, *1st DIVARTY Fires Smartbook* (Fort Hood, TX: 1st Cavalry Division Artillery, 2018).

During heavy combat operations, Class V expenditure rises dramatically. Class IIIb consumption is also a significant factor in how an ABCT executes defensive operations. An M109A6's fuel capacity is approximately 130 gallons and it burns upwards of fifty-gallons per hour during heavy combat, requiring platform refueling every three hours.¹⁰¹ Fuel sections in a brigade support battalion distribution company are organized with 18x fuelers and 18x tank rack modules with the ability to haul five thousand gallons combined for the truck-trailer but must also support the M1A1 Abrams assigned to the ABCT. Based on what the brigade support battalion can store and the estimated fuel burn rates for the supported combat vehicles, Class IIIb would last thirty hours or less.

Calculating Class V expenditure is far more complicated with variations in ammunition expended tied to where the enemy presents themselves on the battlefield and with what types of equipment they are utilizing. Limiting the firing capability of the M109A6 is Class V availability. Organic support companies have physical limitations on the number of short tons they can carry at any given time with additional requirements to haul all Classes of material to support the ABCT. Ammunition distribution does provide the necessary flexibility to push supplies to units that are decisively engaged but enemy forces would seek to interdict lines of communication, severing resupply.

Multiple runs are necessary to support Class V ammunition resupply to the firing batteries supporting the ABCT. Based on the maximum (8 rounds per min) and sustained

¹⁰¹ Combined Arms Support Command, "Quick Logistics Estimation Tool 2018 v2," 1 March 2019, accessed 2 May 2019, https://cascom.army.mil/g_staff/cdi/fdd/mld/planning_data_branch.htm.

(3 rounds per min) rates of fire for the M109A6, it would take less than ninety minutes to expend all ammunition for each platform and field artillery ammunition support vehicle. Although proper fire planning and attack guidance seek to prevent firing units from expending their entire supply of ammo prematurely, conditions on the battlefield may require the employment of all available rounds to support the defense.

Supporting each ABCT FA BN is a field support company from the brigade support battalion that has a distribution platoon equipped with six- Palletized Load System (M1075) prime movers and up to 15x Palletized Load System trailers.¹⁰² Both the prime mover and trailer can each carry approximately fifteen short tons of equipment and ammunition.¹⁰³ Supporting a FA BN in the defense firing their entire combat load would require the distribution platoon to conduct several resupply missions daily, calculating for approximately sixty tons of Class V per move.¹⁰⁴ Logisticians calculate sixty tons of Class V as the planning factor for movements of supply based on platform capacities. Although technically possible, this would assume movement of no other classes of material by the distribution platoon.

¹⁰² Headquarters, Department of the Army (HQDA), Army Techniques Publication (ATP) 3-09.42, *Fire Support for the Brigade Combat Team* (Washington, DC: Government Printing Office, 2016), 1-4.

¹⁰³ Force Management Support Agency, “Armored Brigade Combat Team Field Artillery Battalion, Distribution Section,” accessed 4 April, 2019, https://fmsweb.fms.army.mil/protected/WebTAADS/UIC_Frame.asp?Update=GETSQL&DOCST=A&UIC=WGLMAA&EDATE=10/16/2019/.

¹⁰⁴ Department of Logistics and Resource Operations, Student Text ST, 4-1, *Application Methods, Planning Factors, Organizations, and Tools* (Fort Leavenworth, KS: US Army Command and General Staff College, 2018), 3-8.

Based on the consumption rates for Class IIIb/V, the number of logistical platforms organic to a FA BN and ABCT, and the ranges that these materials must be moved during the defense, it is assessed that there would be significant shortfalls without logistical support from echelons above brigade.

Chapter Summary

This chapter analyzed the challenges a FA BN would face against near-peer adversaries while conducting a defense in LSCO through the lens of DOTMLPF-P. Due to the limited scope of this thesis, the only aspects of the DOTMLPF-P framework used were Doctrine, Organization, Training, and Materiel. Selection of these four portions of the DOTMLPF-P framework are relevant because they are where commanders could potentially have immediate impacts addressing capability gaps identified in this thesis.

Doctrinally, the US Army has identified that LSCO will require leveraging assets from across the joint and multinational force. Assuming that these assets will be readily available is a mistake as they are high-demand, low-density. Updating FA doctrine addresses the likely threats faced in LSCO, but current doctrine does little in the way of providing clear tactics, techniques, or procedures for engaging moving targets or massing at the battalion-level, especially when dispersed across a broad frontage.

Organizationally, FA has restructured to increase the firing capability of each cannon artillery battalion. With an increase of only 2x additional M109A6s, the organic firing capability has not increased to a point of parity with Russia. Command and support relationships can augment units with significant capabilities enhancing the combat power provided to the maneuver commander at the brigade-level.

FA training is well structured and supports progressive increases in unit collective capability. However, one of the greatest drawbacks is the lack of training specifically against armored moving targets. DPICM does afford some capacity in this area, but only if the fire direction center is proficient at processing targeting data and predicted intercept points. Severely limiting training is the allocation of rounds that a unit receives annually which sets an upper limit on the amount of live-fire missions that a section conducts each fiscal year.

Materiel is the one area of the framework utilized where battery and battalion commanders have the least impact, as they cannot directly influence the procurement of new munitions or firing platforms. Where they can have an effect is by ensuring units conduct training to standard and soldiers understand the capabilities of firing platforms and available munitions, maximizing employment to achieve effects on the battlefield. For example, by understanding the dispersal pattern of DPICM and how the M109A6 employ them, effects are possible against armored moving targets that might not destroy that system, but could degrade them to a point where they are no longer effective against friendly units. Logistical limitations also play a significant role in how a FA BN can support a defending maneuver commander. A finite quantity of Palletized Load Systems and trailers in the field support company restrict the amount of Class V transported to firing batteries engaging the enemy.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The sole purpose of this thesis was to determine if a FA BN could support a BCT conducting a defensive operation against a near-peer threat with only those firing assets organic to that organization. This thesis analyzed the central doctrine under AirLand Battle of the 1980s and the related FA doctrine that supported it. This thesis also examined Soviet-era doctrine captured in FM 100-2-3, *The Soviet Army*, and FM 100-2-1, *Soviet Tactics and Organization*. By analyzing how the US Army planned to fight a conventional force with more personnel, equipment, and longer-range artillery, arrival at a logical assessment is possible regarding the validity of current doctrine in LSCO against near-peer competitors, as outlined in the National Defense Strategy.

An analysis of current doctrine, organization, training, and materiel identified capability gaps that exist for a FA BN supporting a defending BCT. A brief analysis of how Russia fought in Ukraine provides a reality-based point of comparison. This chapter will draw a logical conclusion to the central questions posed in this thesis.

1. (P) What are the Tactical and Operational impacts on the Brigade Combat Teams' ability to defend against a near-peer adversary after the restructuring of Field Artillery assets? The effects have been minimal with the addition of only two M109A6 firing platforms in the FA BN.

2. (S) Has the reliance on precision-guided munition over the past seventeen years in support of the GWOT also limited the USAFA's ability to mass surface fires against a near-peer adversary? Yes. With the increased training and employment of PGMs the requisite knowledge to mass fires effectively against an enemy has been reduced.

Massing has always been a challenge for artillerymen but with increased emphasis on precision the ability to plan and integrate massed fires is severely limited.

3. (S) Is the Artillery trained and equipped to mass fires against an enemy conducting large-scale offensive operations with forces of a Brigade-size or larger? No, training is inadequate to conduct effective massing missions in a LSCO environment and logistics issues may preclude massing altogether.

Conclusion

After analyzing the material relevant to the questions posed, it is concluded that a FA BN does not have the necessary capability or capacity to defend against a near-peer adversary conducting an offensive operation with a force equal to or larger than a brigade. Russia places a greater emphasis on their artillery assets than almost any other nation. As a result, it possesses significant overmatch in terms of the number of artillery pieces (cannon, rocket, and missile) in their inventory, as well as maintaining the ability to out-range US systems to the point where they can fire before the US can engage its forces. The research presented leads to the logical conclusion that overcoming the capability gaps that exist when massing fires or engaging armored moving targets the FA BN must rely almost exclusively upon external assets.

FM 3-0 does an exceptional job of detailing how the US Army must fight as part of a joint and multinational force to overcome the existing capability gaps in terms of leveraging assets to address the challenges LSCO would present. Since the US Army no longer maintains tactical nuclear munitions employed by cannon artillery platforms, a greater reliance upon external assets exists to degrade and destroy enemy formations in the deep area before their arrival into the brigade's area of operations. Failure to

significantly attrite enemy forces in the division and corps deep areas will result in combat ratios that favor the aggressor.

A scenario like the one presented in this thesis, although unlikely against the US and NATO, is one that played out in Ukraine. What actions in Ukraine revealed, was an understanding that intense reconnaissance, overwhelming firepower, and a rapid tempo would allow the aggressor to seize and maintain the initiative, almost guaranteeing mission success. Even when well prepared, a defending unit can withstand a Russian-style artillery barrage for only so long. Units will need to plan extensively, harden positions, and pre-stage ammunition to defend long enough for the maneuver brigade to seize the initiative and transition to the offense.

Analyzing the points of discussion across the DOTMLPF-P framework utilized in this thesis demonstrates that a FA BN supporting an ABCT in the defense does not have the requisite capability to conduct a successful defense against a Russian-style offensive operation. Current Russian doctrine places a much heavier emphasis on massing fires across a larger area of the defender's frontage to achieve a breakthrough, facilitating advancement of first echelon forces into the defender's rear area, while simultaneously allowing second echelon forces to fix or destroy bypassed defenders. Russia has specifically traded precision for overwhelming firepower to attrite defenders to the point where they are near culmination before maneuver arrives to. Russian doctrine treats artillery as a maneuver force, assessing that through the proper application of artillery effects to similar employing a traditional maneuver force are possible. Although not an exhaustive analysis, this thesis has identified key capability gaps that US adversaries could exploit in LSCO.

Table 2. Completed Evaluation Matrix

COMPARISON MATRIX		
DOCTRINE		
US	VS	SOVIET/ RUSSIA
FA SUPPORTS MANX	PRIMACY OF ARTILLERY IN SUPPORT OF MANEUVER	MANX SUPPORTS FA
NO	READILY AVAILABLE MASSED FIRES TO SUPPORT BRIGADE-LEVEL MANEUVER	YES
HEAVY	IMPORTANCE OF COLLATERAL DAMAGE MITIGATION (PGM-EMPLOYMENT)	LOW
ORGANIZATION		
US	VS	SOVIET/ RUSSIA
18	NUMBER OF ARTILLERY PIECES SUPPORTING A BRIGADE	36+
NO	ABILITY TO ATTACH ARTILLERY DOWN TO THE COMPANY LEVEL	YES
TRAINING		
US	VS	SOVIET/ RUSSIA
NO	EXTENSIVE TRAINING TO MASS FIRES	YES
YES	EXTENSIVE TRAINING TO EMPLOY PRECISION MUNITIONS	NO
YES	RELIANCE ON PRECISION MUNITIONS	NO
MATERIEL		
US	VS	SOVIET/ RUSSIA
30+ KM	RANGE OF SELF-PROPELLED CANNON MUNITIONS	37+ KM
84+KM	RANGE OF ROCKET MUNITIONS SUPPORTING THE BRIGADE	90KM
0	ROCKET LAUNCHERS ASSIGNED TO A MANEUVER BRIGADE	18+
EVALUATION LEGEND		
	DISADVANTAGE	
	EQUAL	
	ADVANTAGE	

Source: Created by author.

Recommendations

As the US Army transitions from nearly two-decades of counterinsurgency operations, it is imperative that the USAFA devotes the time and funding necessary to execute core competencies in support of LSCO. Achieving such a change will require fundamental shifts across the FA branch and the Army Force Management Model. Allocations of funds to develop new equipment with increased range, munitions with increased effectiveness against armored threats, and automation capabilities that improve the ability to mass fires as units become increasingly dispersed to defend across broader frontages are necessary must occur.

Procuring munitions in substantial quantities for the M109/M777-series platforms with greater ranges than currently available must be a focus moving forward. Range alone does not fill the capability gaps that exist, but it does afford maneuver commanders the ability to influence the enemy before they can engage friendly units. Greater ranges also allow adjacent units to augment combat power through command and support relationship that work to provide mutually supportive fires where weaknesses may exist.

Upgrades to the platforms themselves also must be a primary focus of future procurement. Although improved several times, the M109-series 155mm self-propelled artillery piece is a technology that is over thirty years old. Efforts such as the Paladin Integration Management program are working to improve the onboard power available to the M109 and also improves the tube and digital displays. The extended range cannon artillery program focuses on doubling the range of munitions fired from the M109A6 and

M777 platforms.¹⁰⁵ The increases in range would be a tremendous improvement over what currently exists in the US inventory, but this would not solve the problem of engaging armored moving targets since there are currently no 155mm munitions adapted to these specific targets. There have been significant improvements in the accuracy and range of Guided Missiles fired from the M270 Multiple Launch Rocket System and the M142 High-Mobility Artillery Rocket Systems. Continuous improvements to these systems must occur to the point where they can fill any capability gaps left by a reduction in 155mm PGMs.

A similar effort is necessary to introduce enhanced terminally-guided precision munitions that possess an anti-armor capability. Copperhead was the Army's last such effort to engage armored moving targets, but limitations in range, battlefield geometry, and environmental factors limited its effectiveness. Reintroduction of a 155mm artillery munition that could employ terminal-guidance via laser-designation from UAS-rotary-fixed wing platforms at ranges nearing sixty kilometers would work to address armored moving targets. If introduced, realistic training on the effective employment of these munitions must integrate into the field artillery gated training strategy. It serves no purpose to have advanced munitions with specific capabilities that are not properly employed to achieve the desired effects for the defending commander.

¹⁰⁵ Todd South, "Here's How the Army Is Trying to Catch up to Russia and China on Missiles, Artillery," *Army Times*, 12 April 2018, accessed 23 February 2019, <https://www.armytimes.com/news/your-army/2018/04/12/heres-how-the-army-is-trying-to-catch-up-to-russia-and-china-on-missiles-artillery/>.

Suggested Future Research

FA serves as a nexus for nearly every other branch of the Army, Department of Defense, and multinational partners. As such, there are nearly limitless areas where future research can work to identify capability gaps that may exist when determining how best to prepare for LSCO. An area of research that may prove most promising is the field artillery gated training strategy and its applicability in LSCO. Based on the scope of the research in this thesis, all aspects were not completely exhausted. More specifically, are the number of live-fire training events and rounds allocated sufficient to provide the commander with fully competent field artillerymen who can conduct the fire missions that a LSCO environment requires.

An additional area of future research that may prove promising is an analysis of the proper quantity of precision-munitions for cannon systems. With the rise in UAS systems and the transition to supporting LSCO, it may prove more cost effective to purchase fewer cannon-fired PGMs and increase the number of munitions specifically designed to engage armored targets, such as an updated M898 sense and destroy armor munition.

With the requirement to employ assets from outside of the brigade, it may be necessary to integrate additional air defense artillery assets at lower levels to support localized air supremacy. Research in this area should focus on the proper organization of air defense artillery assets for platoons, batteries, and battalions. air defense artillery assets would also defend firing assets from fixed and rotary wing attack, increasing survivability.

A final area of future research identified would be the logistics dedicated to the FA BN and the areas where support may benefit from improvement. Capability gaps exist in the ability to transport the necessary Class V to multiple position areas for artillery, especially if enemy forces have worked to sever lines of communication. Researching new systems or tactics may prove exceedingly beneficial to solving the problems a FA BN would encounter in support of a defending BCT.

FA as a branch is endlessly adaptable. The soldiers who serve as field artillerymen demonstrate a relentless dedication to supporting their commanders, whenever called upon to do so. With the proper equipment and training the USAFA will have the capability to deploy, fight, and win in any future combat scenario, but only if efforts focus on preparing soldiers for those eventualities.

GLOSSARY

- Deep Area. The portion of the commander's area of operations not assigned to subordinate units.¹⁰⁶
- Defeat. A tactical mission task that occurs when an enemy force has temporarily or permanently lost the physical means or the will to fight. The defeated force's commander is unwilling or unable to pursue that individual's adopted course of action, thereby yielding to the friendly commander's will and can no longer interfere to a significant degree with the actions of friendly forces. Defeat can result from the use of force or the threat of its use.¹⁰⁷
- Degrade. Adversely impact an enemy formation or capability to such a degree that their combat power of function is severely hindered.¹⁰⁸
- Destroy. A tactical mission task that physically renders an enemy force combat-ineffective until it is reconstituted. Alternatively, to destroy a combat system is to damage it so badly that it cannot perform any function or be restored to a usable condition without being entirely rebuilt.¹⁰⁹
- Direct Support. (Army) A support relationship requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance.¹¹⁰
- Disrupt. 1) A tactical mission task in which a commander integrates direct and indirect fires, terrain, and obstacles to upset an enemy's formation or tempo, interrupt his timetable, or cause enemy forces to commit prematurely or attack in a piecemeal fashion. 2) An obstacle effect that focuses fire planning and obstacle effort to cause the enemy force to break up its formation and tempo, interrupt its timetable, commit breaching assets prematurely, and attack in a piecemeal effort.¹¹¹

¹⁰⁶ HQDA, FM 3-0, Glossary 2.

¹⁰⁷ Headquarters, Department of the Army (HQDA), Field Manual (FM) 3-90-1, *Offense and Defense, VI* (Washington, DC: Government Printing Office, 2013), Glossary 2.

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

¹¹⁰ HQDA, FM 3-09, Glossary 4.

¹¹¹ HQDA, FM 3-90-1, Glossary 4.

Fire Support. (Joint) Fires that directly support land, maritime, amphibious, and special operations forces to engage enemy forces, combat formations, and facilities in pursuit of tactical and operational objectives.¹¹²

Fires. (Joint) The use of weapon systems to create a specific lethal or nonlethal effect on a target.¹¹³

Massed Fire. 1) The fire of the batteries of two or more ships directed against a single target. 2) Fire from a number of weapons directed at a single point or small area.¹¹⁴

Neutralization. In the context of the computed effects of field artillery fires renders a target ineffective for a short period of time, producing at least 10-percent casualties or materiel damage.¹¹⁵

Neutralize. A tactical mission task that results in rendering enemy personnel or materiel incapable of interfering with a particular operation.¹¹⁶

Nuclear Yield. The energy released in the detonation of a nuclear weapon, measured in terms of the kilotons or megatons of trinitrotoluene required to produce the same energy release.¹¹⁷

Operational Framework. A cognitive tool used to assist commanders and staffs in clearly visualizing and describing the application of combat power in time, space, purpose, and resources in the concept of operations.¹¹⁸

¹¹² HQDA, FM 3-90-1, Glossary 4.

¹¹³ Joint Chiefs of Staff (JCS), Joint Publication (JP) 3-09, *Joint Fires* (Washington, DC: Office of the Secretary of Defense, 2014), GL 6.

¹¹⁴ *Ibid.*

¹¹⁵ HQDA, FM 3-09, Glossary 7.

¹¹⁶ HQDA, FM 3-90-1.

¹¹⁷ U.S. Arms Control and Disarmament Agency, "Nuclear Weapons Yield," Atomic Archives, 1975, accessed 8 December 2019, http://www.atomicarchive.com/Docs/Effects/wenw_note1.shtml.

¹¹⁸ Headquarters, Department of the Army (HQDA), Army Doctrine Publication (ADP) 1-01, *Doctrine Primer* (Washington, DC: Government Printing Office, 2014), Glossary 3.

Operational Level of Warfare. The operational level of warfare links tactical employment of forces to national strategic objectives.¹¹⁹

Organic. (Joint) Assigned to and forming an essential part of a military organization as listed in its table of organization for the Army, Air Force, and Marine Corps, and are assigned to the operating forces for the Navy.¹²⁰

Precision Munition. A munition that corrects for ballistic conditions using guidance and control up to the aimpoint or submunitions dispense with terminal accuracy less than the lethal radius of effects.¹²¹

Precision Smart Munition. A munition or submunition that autonomously searches for, detects, classifies, selects, and engages a target or targets. A precision smart munition has limited target discrimination capability.¹²²

Precision-Guided Munition. (Joint) a guided weapon intended to destroy a point target or minimize collateral damage.¹²³

Strategic Level of Warfare. In the context of national interests, strategy develops an idea of set of ideas of the ways to employ the instruments of national power in a synchronized and integrated fashion to achieve national, multinational, and theater objectives.¹²⁴

Strategic Nuclear Weapons. Those nuclear weapons intended for use against targets of national strategic value. Not specific to yield of the munition.¹²⁵

¹¹⁹ Joint Chiefs of Staff (JCS), Joint Publication (JP) 3-0, *Operations* (Washington, DC: Office of the Secretary of Defense, 2017), GL 5.

¹²⁰ Joint Chiefs of Staff (JCS), Joint Publication (JP) 1, *Doctrine for the Armed Forces of the United States* (Washington, DC: Office of the Secretary of Defense, 2013), GL 6.

¹²¹ Ibid.

¹²² HQDA, FM 3-90-1, Glossary 7.

¹²³ Joint Chiefs of Staff (JCS), Joint Publication (JP) 3-03, *Joint Interdiction* (Washington, DC: Office of the Secretary of Defense, 2016), GL 7.

¹²⁴ JCS, JP 3-0, GL 7.

¹²⁵ U.S. Arms Control and Disarmament Agency, "Nuclear Weapons Yield."

Suppress. A tactical mission task that results in temporary degradation of the performance of a force or weapons system below the level needed to accomplish the mission.¹²⁶

Tactical Level of Warfare. The level of warfare at which battles and engagements are planned and executed to achieve military objectives assigned to tactical units or task forces.¹²⁷

Tactical Nuclear Weapons. Nuclear weapons intended for use against military targets on the battlefield, primarily those with immediate military value (i.e., enemy formations).¹²⁸

Terminal Guidance Operations. (Joint) Those actions that provide electronic, mechanical, voice or visual communications that provide approaching aircraft and-or weapons additional information regarding a specific target location.¹²⁹

¹²⁶ HQDA, FM 3-09, Glossary 4.

¹²⁷ Ibid.

¹²⁸ Ibid.

¹²⁹ JCS, JP 3-09, GL 7.

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