

# Closing the Gap: How to Defeat Integrated Fires Commands

A Monograph

by

MAJ Thomas J. Guglielmi  
US Army



School of Advanced Military Studies  
US Army Command and General Staff College  
Fort Leavenworth, KS

2019

Approved for public release; distribution is unlimited

**REPORT DOCUMENTATION PAGE**Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

<b>1. REPORT DATE (DD-MM-YYYY)</b> 23 05 2019		<b>2. REPORT TYPE</b> MASTER'S THESIS		<b>3. DATES COVERED (From - To)</b> JUNE 18-MAY 19	
<b>4. TITLE AND SUBTITLE</b> Closing the Gap: How to Defeat Integrated Fires Commands				<b>5a. CONTRACT NUMBER</b>	
				<b>5b. GRANT NUMBER</b>	
				<b>5c. PROGRAM ELEMENT NUMBER</b>	
<b>6. AUTHOR(S)</b> MAJ Thomas J. Guglielmi				<b>5d. PROJECT NUMBER</b>	
				<b>5e. TASK NUMBER</b>	
				<b>5f. WORK UNIT NUMBER</b>	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, KS 66027-2301				<b>8. PERFORMING ORG REPORT NUMBER</b>	
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> ADVANCED MILITARY STUDIES PROGRAM				<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b>	
				<b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b>	
<b>12. DISTRIBUTION / AVAILABILITY STATEMENT</b> Approved for Public Release; Distribution is Unlimited					
<b>13. SUPPLEMENTARY NOTES</b>					
<b>14. ABSTRACT</b> During the last eighteen years of persistent conflict in the Global War on Terrorism (GWOT), the primary duties for the US Army's Field Artillery units changed from providing fires to conducting nonstandard missions. While necessary to assist during multiple deployments to Iraq and Afghanistan, this led to the atrophy of core competencies, and Field Artillery units ability to provide indirect fires. In the intervening period since 2001 adversaries studied the way US forces deploy, operate, adapt, and modernize. As the US Army shifts its focus to large-scale combat operations, the lessons available from the Russian-Ukrainian War provide examples of how potential peer adversaries developed their fires and Field Artillery capability. This research intends to identify capability gaps the US Army could exploit in future conflicts and mitigate weaknesses with changes to doctrine, organization, or training. Each section of this monograph compares the doctrine, organization, and training of Integrated Fires Commands (IFC) and US Army divisions and division artillery (DIVARTYs) while recommending solutions to mitigate the gap between them. To mitigate gaps the US Army will need to complete proposed long-range precision fires modernization and implementation of the Division Fires Command (DFC). Implementation of the Division Fires Command will optimize fires for large-scale operations and ensure that the US Army is prepared for future conflicts.					
<b>15. SUBJECT TERMS</b> Field Artillery; Large-Scale Combat Operations; Russian-Ukrainian War; DIVARTY; Division Fires Command; Doctrine; Organization; Training					
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b>	<b>18. NUMBER OF PAGES</b>	<b>19a. NAME OF RESPONSIBLE PERSON</b>
<b>a. REPORT</b>	<b>b. ABSTRACT</b>	<b>c. THIS PAGE</b>			MAJ Thomas J. Guglielmi
(U)	(U)	(U)	(U)	48	<b>19b. PHONE NUMBER (include area code)</b> 913 758-3300

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

## Monograph Approval Page

Name of Candidate: MAJ Thomas J. Guglielmi

Monograph Title: Closing the Gap: How to Defeat Integrated Fires Commands

Approved by:

\_\_\_\_\_, Monograph Director  
John M. Curatola, PhD

\_\_\_\_\_, Seminar Leader  
Glen E. Clubb, COL

\_\_\_\_\_, Director, School of Advanced Military Studies  
Kirk C. Dorr, COL

Accepted this 23rd day of May 2019 by:

\_\_\_\_\_, Director, Graduate Degree Programs  
Robert F. Baumann, PhD

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

Fair use determination or copyright permission has been obtained for the inclusion of pictures, maps, graphics, and any other works incorporated into this manuscript. A work of the US government is not subject to copyright, however further publication or sale of copyrighted images is not permissible.

## Abstract

Closing the Gap: How to Defeat Integrated Fires Commands, by MAJ Thomas J. Guglielmi, US Army, 48 pages.

During the last eighteen years of persistent conflict in the Global War on Terrorism (GWOT), the primary duties for the US Army's Field Artillery units changed from providing fires to conducting nonstandard missions. While necessary to assist during multiple deployments to Iraq and Afghanistan, this led to the atrophy of core competencies, and Field Artillery units ability to provide indirect fires. In the intervening period since 2001 adversaries studied the way US forces deploy, operate, adapt, and modernize. As the US Army shifts its focus to large-scale combat operations, the lessons available from the Russian-Ukrainian War provide examples of how potential peer adversaries developed their fires and Field Artillery capability. This research intends to identify capability gaps the US Army could exploit in future conflicts and mitigate weaknesses with changes to doctrine, organization, or training. Each section of this monograph compares the doctrine, organization, and training of Integrated Fires Commands (IFC) and US Army divisions and division artillery (DIVARTYs) while recommending solutions to mitigate the gap between them. To mitigate gaps the US Army will need to complete proposed long-range precision fires modernization and implementation of the Division Fires Command (DFC). Implementation of the Division Fires Command will optimize fires for large-scale operations and ensure that the US Army is prepared for future conflicts.

## Table of Contents

Abstract .....	iii
Acknowledgements .....	v
Acronyms .....	vi
Illustrations .....	vii
Introduction .....	1
Doctrine .....	6
Enemy Doctrine.....	6
US Doctrine .....	9
Employment and Organization.....	12
Enemy Employment and Organization.....	12
US Army Employment and Organization .....	16
Training .....	25
Enemy Training.....	25
US Army Training.....	27
Capabilities/Exploitation .....	31
Conclusion.....	36
Bibliography .....	39

## Acknowledgements

I must thank my wife, Ciara and my sons John and Nicholas for their understanding and support over the past year. I could not have done this without them. I would also like to thank my monograph director Dr. Curatola and Seminar Leader COL Clubb for the countless hours spent reviewing and guiding my monograph. I also must thank Ms. Venita Kruger for her editing assistance.

## Acronyms

A2/AD	Anti-Access/Area Denial
ADA	Air Defense Artillery
ABCT	Armor Brigade Combat Team
BCT	Brigade Combat Team
C2	Command and Control
COIN	Counter-Insurgency Operations
DIVARTY	Division Artillery
DFC	Division Fires Command
DOTMLPF-P	Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities, and Policy
FAB	Field Artillery Brigade
FFA	Force Field Artillery
GWOT	Global War on Terrorism
HIMARS	High Mobility Artillery Rocket
HQ	Headquarters
IFC	Integrated Fires Command
JAGIC	Joint Air Ground Integration Center
MLRS	Multiple Launch Rocket System
RISTA	Reconnaissance, Intelligence, Surveillance, and Target Acquisition
RSOI	Reception, Staging, Onward Movement, and Integration
UAV	Unmanned Aerial Vehicle
WFF	Warfighting Function
WFX	Warfighter Exercise

## Illustrations

Figure 1.	Range Ring of 9K720 SS-26 Iskander .....	8
Figure 2.	Comparison of US Army ABCT to Russian Motorized Rifle Brigade .....	17
Figure 3.	Example of Mechanized Division 86 with MLRS/8 (GS BN).....	21
Figure 4.	Example of Army of Excellence Armored Division with MLRS (GS BN).....	21
Figure 5.	Example of a Division Fires Command. ....	24



## Introduction

Artillery and rockets provide the greatest firepower and sear a path for infantry, mechanized forces and armor both physically and spiritually. Throughout the centuries, no army has understood this better than the Russians.

— Chris Bellamy, *Red God of War*

Beginning with World War I and continuing since, the percentage of casualties resulting from indirect fires during large-scale combat operations skyrocketed.<sup>1</sup> In 2014 following the Russian annexation of Crimea, and the expansion of the conflict in Donbass, Russian supported separatists used a combination of unmanned aerial vehicles (UAVs) conducting targeting in real time while engaging tactical assembly areas with massed fire missions. A battalion of 9A51 (truck mounted rocket tube system), upgraded BM-21s with forty mounted 122mm rockets per system, destroyed two Ukrainian mechanized battalions in a matter of minutes.<sup>2</sup> This decisive moment came with little regard to collateral damage. The combination of artillery and tactical drones caused the quick engagement of targets. This equipment is not superior to US Army equipment, but when utilized together as a system, it can cause devastating effects. The battle of Zelenopillya has tremendous implications of what a US Army division or corps could face as it prepares to enter a theater of operations. The range advantage of adversaries, combined with the use of multiple inexpensive UAVs to acquire targets, present numerous challenges to the US Army.

During the last eighteen years of persistent conflict in the Global War on Terrorism (GWOT), the primary duties for the US Army's Field Artillery units went from providing fires to conducting nonstandard missions. These nonstandard missions including patrolling as

---

<sup>1</sup> Peter J. Schifferle, *Americas School for War: Fort Leavenworth, Officer Education, and Victory in World War II* (Lawrence, KS: University Press of Kansas, 2017), 40.

<sup>2</sup> Phillip A Karber, *Lessons Learned from the Russian-Ukrainian War* (Washington, DC: The Potomac Foundation, 2015), 37.

supplementary infantry formations or performing convoy security. While necessary to assist during multiple deployments to Iraq and Afghanistan, this led to the atrophy of core competencies of Field Artillery.<sup>3</sup> In the intervening period since 2001 adversaries studied the way US forces deploy, operate, adapt, and modernized in an effort to counter US advantages across all the domains.<sup>4</sup> For the US Army to compete in a changing and complex world will require a force capable of executing operations across the range of military operations against a peer threat. Specifically, and most concerning, is the US Army's capability to conduct large-scale combat operations as compared to counter-insurgency operations (COIN). As the wars in Afghanistan and Iraq drawdown, the Army began to shift focus to large-scale combat operations with the 2017 publication of *Field Manual 3-0, Operations*. The US Army must examine and address the operational requirements facing its forces. It will also require a study on operational fires in the future. Unlike recent US Army operations in support of GWOT, operational fires will be the application of firepower to achieve a decisive impact on the outcome of a campaign or major operation.<sup>5</sup>

The 2018 *National Defense Strategy (NDS)* states, "inter-state strategic competition, not terrorism is now the primary concern in US National Security."<sup>6</sup> This fundamental shift in focus from fighting terrorism is a direct result of an increasingly complex global security environment. During the US engagement in the GWOT, other nations used this opportunity to prepare for large scale combat operations.<sup>7</sup> The world has seen recent examples of "revisionist" powers attempting

---

<sup>3</sup> Boyd L. Dastrup, *Artillery Strong: Modernizing the Field Artillery for the 21st Century* (Fort Leavenworth, KS: Combat Studies Institute Press, 2018), 176.

<sup>4</sup> US Department of the Army, *Field Manual (FM) 3-0, Operations* (Washington, DC: Government Printing Office, 2017), IX.

<sup>5</sup> Milan N. Vego, *Operational Warfare* (Newport, RI: Naval War College, 2000), 239.

<sup>6</sup> James N. Mattis, *Summary of the 2018 National Defense Strategy (NDS) of the United States of America* (Washington, DC: Government Printing Office, 2018), 1.

<sup>7</sup> LTG Michael Lundy, "Foreword," *Military Review* 98, no. 5 (September-October 2018), 1.

to expand influence throughout the globe. Russia specifically has shown a willingness to flaunt international norms that could lead to regional conflict possibly involving the US. During an era of persistent conflict, the US military has experienced various levels of combat and gained significant experience. However, other vital capacities such as Field Artillery and Air Defense Artillery have atrophied. Apart from the initial invasions into Afghanistan, or Iraq in the past few decades, there has never been a serious challenge to forcible entry operations or US air or fire support superiority. From these experiences and as a result of ongoing combat operations, one of the areas where the US has lost capabilities is the ability to conduct operational fires.

As the US Army shifts its focus to large-scale combat operations, the lessons available from the Russian-Ukrainian War show how potential peer adversaries developed their fires and Field Artillery capability to achieve significant effects. This research intends to identify capability gaps the US Army could exploit in future conflicts and mitigate our weaknesses from changes to doctrine, organization, or training. By comparing US Army organizations with peer adversaries, the US can close the gap between them. Focusing specifically on the doctrine, organization, and training differences to examine critical areas, the US Army can overcome the overmatch in fires of peer competitors. Each of these sections are from the framework of Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities, and Policy (DOTMLPF-P). This monograph focuses specifically on the first three elements. The organization of each corresponding section in this monograph examines the enemy perspective followed by the US. Each section will also provide specific solutions and recommendations. While the US Army is unable to quickly fix the range or artillery tube number disparity between the US and other adversaries, other solutions could help to achieve parity in a future conflict.

How do US forces defeat a peer adversary's Integrated Fires Command (IFC)? To answer this question, it is imperative that the Field Artillery community determine "what problem it is trying to solve?" Answering the question will lead clear priorities for the fires community while ensuring overmatch in large scale combat operations. What choices should US forces make to

prepare to fight IFCs in the future? US forces will need to develop and resource the right capabilities and conduct the appropriate training with correct doctrine. Appropriate training such as combined live fires, with large scale exercises will stress US Army formations and prepare them for the rigors and challenges of future operations. The US Army in its current configuration is at a disadvantage regarding fires in large-scale combat operations. Current structure is deficient, with shortfalls in both range capability and in the total number of Field Artillery systems. The shortcomings are not only an issue for large-scale combat operations, but as seen in recent conflicts, fires capability will be critical in smaller, regional conflicts. Russia is the most probably US adversary, and will employ its fire support systems across a range of military operations using the full breadth of its capabilities. The US must address these shortfalls by identifying ways to increase its fires capability in order to match and defeat any advantage held by competing nations.

Understanding the gaps in adversaries' capabilities will ensure that US forces are utilizing their resources appropriately and developing organizations and systems that overmatch those of other countries. Combat operations in Ukraine and Syria show the ability to mass fires on a large scale is still relevant and necessary. The potential effects from mass fire missions will require units to rethink how they configure and conduct reception, staging, onward movement, and integration (RSOI) for initial phases of operations. Enemy artillery range can severely limit security of seaport and aerial ports of debarkation. Unlike previous conflicts, the tyranny of geography alone will not be able to stop enemy artillery from targeting and destroying US units as they prepare for combat operations or conduct forcible entry. For example, when US forces staged for Operation Iraqi Freedom, they built combat power with a low risk of air or rocket

attack in Kuwait.<sup>8</sup> Comparatively, responding to a crisis or military action in Eastern Europe may not afford that luxury.

Providing operational fires to defeat peer adversaries will require the Field Artillery community to alter its doctrine and training. Similarly, the use of artillery and fires changed drastically to match the needs of maneuver formations. This transformation will require similar changes in the configuration and equipping of US Army brigade combat teams (BCTs) and field artillery brigades (FABs). The 2003 transformation of US Army divisions and BCTs for modularity changed the availability and placement of enablers the operational level commander will require to dominate the fires Warfighting Function (WFF). Throughout its history, the US Army has continuously reshaped the organization of divisions and corps, especially in the fires WFF. Currently, the US Army is examining the suitability and feasibility of establishing operational fires command (OFC at corps level) and division fires commands (DFCs). These proposed commands are in some ways like previous organizations such as the corps artillery or division artillery (DIVARTY), but now they have a focus on multi-domain battle. The OFC and DFC would place organic long-range Artillery directly within the corps and divisions. Additionally, it would centralize the planning and execution of all lethal and non-lethal effects within those commands.

Crucial to determining how the US Army should change its fires WFF is an examination on how peer adversaries employ and utilize their IFCs. The results of investigating peer adversaries' fires capabilities, and what the IFC provides in a large-scale combat operation, will assist in identifying capabilities the US needs in its divisions and corps. Due to mission requirements to support COIN, the US Army modularized its brigades and divisions. Modularization shifted enablers (such as fires, information operations, electronic warfare, etc.)

---

<sup>8</sup> Robert H. Scales, *Certain Victory: The US Army in the Gulf War* (Washington, DC: Brassey's, 1997), 181.

and other functions from where they had historically been and re-located to meet new requirements in BCTs. The publication of *FM 3-0 Operations* re-asserted the division as a tactical Headquarters (HQ) shifting the operational HQ upwards depending on the situation. As such, there is not a comparable organization in the US Army that directly aligns with an IFC that has organic cannon and rocket assets at the division and corps level.

It is essential to identify the origin of the term “integrated fires commands.” Examining the organization and configuration of adversary’s militaries does not reveal a unit designated as an IFC per se. The term and concept, when put in US Army doctrine and training circulars, is to represent the best operational and tactical practices of enemy artillery formations.<sup>9</sup> In terms of peer adversaries, the Russian Artillery Group best exemplifies the organization of the IFCs that US Army divisions and corps fight in digital warfighter exercises (WFXs).<sup>10</sup> Though the US Army trains against a pretend enemy in its WFXs, it must be prepared to fight a real enemy in a future large-scale combat operation. The US Army must model its training and organizations to successfully defeat any adversary.<sup>11</sup>

## Doctrine

### Enemy Doctrine

Essential to the foundation of IFCs is the use of systems warfare to provide the best possible advantage to target enemy systems. In this structure, the centrally run Russian strike complex (*разведывательно-ударный комплекс* (RYK)), is the operational level organization, with the reconnaissance fires complex (*разведывательно-огновой комплекс* (ROK)) held at the

---

<sup>9</sup> Walter L. Williams, “Integrated Fires Commands: A Flexible and Adaptable Organization Part II,” *OEE Red Diamond Threats Newsletter* 8, no. 02 (February 2017), 6.

<sup>10</sup> The WFX is the training venue in which US Army divisions and corps practice and rehearse conducting large-scale combat operation.

<sup>11</sup> MAJ Charles K. Bartles, “Recommendations for Intelligence Staffs Concerning Russian New Generation Warfare,” *Military Intelligence Professional Bulletin* 43, no. 4 (October-December 2017), 12.

tactical level.<sup>12</sup> With recent modernization efforts, the new centrally run reconnaissance-strike system includes both tactical and operational level capabilities.<sup>13</sup> Other advances in technology enable the Russian ground force to fully realize its goal of integrating the reconnaissance-strike system digitally.<sup>14</sup> Centrally run by the artillery group commander, the Russian reconnaissance strike system, allows the Field Artillery units inside these formations to develop their own targeting priorities. The targeting priority relies heavily on organic intelligence, surveillance, and reconnaissance capabilities to identify potential targets. The reconnaissance system uses overlaps of multiple UAVs to seek and destroy enemy formations in both the close and deep areas. Relying on doctrine that is trying to exploit enemy vulnerabilities requires IFCs to have deep strike capability. To be able to exploit this, all fire support systems are available to the artillery group commander including surface-to-surface missiles, aviation, and long-range rockets. Which is essential to prevent an enemy force from entering the theater of operations.<sup>15</sup> This concentration of fire support assets at the operational level is advantageous for denying enemy freedom of maneuver. Long-range systems have the ability to strike at assembling forces as they come into a theater. One of these assets is the 9K720 SS-26 “Iskander” system which is an intra-theater ballistic missile launcher and has a range of 400 kilometers. This range exceeds that of the US Army as well as any allied Army.<sup>16</sup>

---

<sup>12</sup> Lester Grau and Charles Bartles, *The Russian Reconnaissance Fires Complex Comes of Age* (Oxford: University of Oxford, 2018), 1.

<sup>13</sup> Ibid.

<sup>14</sup> Grau and Bartles, *The Russian Reconnaissance Fires Complex Comes of Age*, 15.

<sup>15</sup> US Department of the Army, *Training Circular (TC) 7-100.2, Opposing Force Tactics* (Washington, DC: Government Printing Office, 2011), 9-2.

<sup>16</sup> James Anderson, “Russian Artillery: Adapting Ancient Principles to Modern Paradigms,” *OEE Red Diamond Threats Newsletter* 8, no. 10 (November 2017): 28.

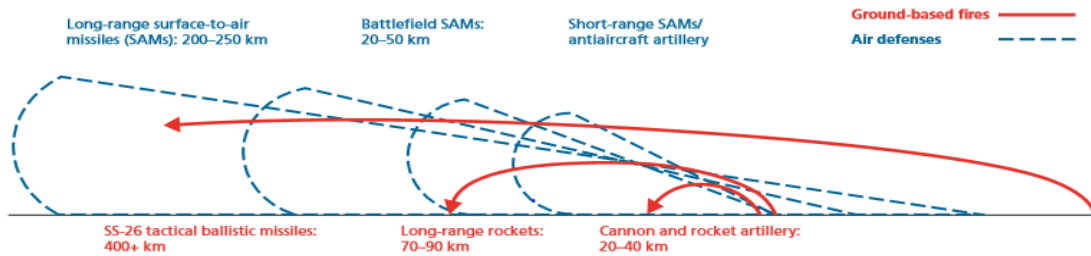


Figure 1. Range Ring of 9K720 SS-26 Iskander. Scott Boston and Dara Massicot, *The Russian Way of Warfare: A Primer* (Santa Monica: RAND Corporation, 2017), 10.

The use of fires in large-scale combat operations will be crucial. Recent conflicts illustrate how Russia uses their fire support systems to achieve victory. Past “hybrid wars” in Eastern Europe show how foreign militaries use artillery and fires. The US Army Training and Doctrine Command describes hybrid warfare as “the use of political, social, criminal, and other non-kinetic means employed to overcome military limitations.”<sup>17</sup> In both the Ukraine and Georgia (2008) hybrid type conflicts, Russia employed its artillery to devastate enemy formations and overwhelm opponents.<sup>18</sup> Destroying critical nodes and lines of communication with artillery underscores how quickly fire support systems can alter the battlefield and leave subordinate tactical units without command and control.<sup>19</sup> While hybrid warfare is different from large-scale ground combat operations, it is part of the conflict continuum. The use of artillery in Ukraine demonstrates that employment of indirect fires at the tactical level is one of the signature characteristics of Russian forces. IFCs having a significant number of assets and targeting systems available enabling them to target enemy forces at longer ranges and exploit vulnerabilities of friendly forces.

<sup>17</sup> TRADOC G-2, *Threat Tactics Report Compendium: ISIL, North Korea, Russia, and China* (Fort Leavenworth, KS: Combat Studies Institute, 2015), 94.

<sup>18</sup> Lionel Beecher, et al., *Analyzing the Russian Way of War: Evidence from the 2008 Conflict with Georgia* (West Point, NY: Modern War Institute, 2018), 43.

<sup>19</sup> Colby Howard and Ruslan Pukhov, *Brothers Armed: Military Aspects of the Crisis in Ukraine* (Minneapolis, MN: East View Press, 2015), 219.



This doctrine intends to capitalize on allowing the numerical system advantage while using the totality of the systems to mass effects without having to concentrate in targetable formations. Peer adversaries use a variety of methods to organize artillery formations down at the battery level to prevent destruction. Additionally, being able to mass fires on enemy formations effectively enables the combined-arms action of the maneuver forces to achieve quick, decisive results and reduces any technological advantage of the enemy. Fighting with a different doctrine is not the only difference between IFCs and the US Army. Russian artillery uses an entirely different organizational structure, and equipment to support its operations.

## US Doctrine

The role of Field Artillery forces in the US Army continues to evolve as technology and capabilities develop. The shift in doctrinal focus to large-scale combat operations will drive a corresponding need for change in Field Artillery doctrine and tactics. The changing character of war will mean shifting mission requirements such as the need to mass fires at the battalion and higher level. Increased challenges with enemy anti-access/area denial (A2/AD) capability coupled with a robust counter-battery threat will change how artillery fights. The potential of operating in a degraded environment (communications/GPS limited) will challenge US technological advantages and capability. However, this is not the first-time Field Artillery units have changed to match shifts in overarching doctrine.

Following the US involvement in Vietnam, the change to the current *FM 3-0 Operations* came after an era of persistent conflict. In most of the previous large-scale combat operations, the shift in Field Artillery units was in tactics and equipment. The development of indirect fire during World War I forever altered the role of Field Artillery. During the war, Field Artillery units together with aviation, provided mass effects on the battlefield and became a critical feature of

breaking the stalemate front of 1918.<sup>20</sup> Throughout its history, the US Army published capstone doctrine under various titles such as *Field Service Regulations* and *FM 100-5*. Published at different intervals from 1923 to 1993, each publication outlined the specific role of each branch. Beginning in 1923, the Field Artillery's "principal mission is to support the infantry by fire" which represents the lessons learned from World War I.<sup>21</sup> In the subsequent publications of the capstone doctrine, the role of Field Artillery remained steady to support infantry and cavalry units by fire and by providing depth on the battlefield. However, recent combat experiences did not align with this mission.

Field Artillery units have continuously deployed in combat operations in both theaters of GWOT. The resulting lost training opportunities and operational experience from deployments in executing fires on a large scale left an impact on the ability of Field Artillery units to provide operational level fires.<sup>22</sup> To provide operational level fires will require the Field Artillery community to look at how it prepares, trains, and equips the force for combat in the future. In response to the atrophy of Field Artillery skills, and as part of the shift to prepare for large-scale combat operations, in 2015 the US Army re-activated DIVARTY's at each operational division.<sup>23</sup> Additionally, in 2017, the US Army published the first DIVARTY specific doctrine *Army Training Publication 3-09.9, Division Artillery Operations and Fire Support for the Division*.

Similar to the issues that arose following an era of persistent conflict in Vietnam, the US Army finds itself with the need to revamp its doctrine. Likewise, the Field Artillery community

---

<sup>20</sup> Schifferle, *Americas School for War*, 40.

<sup>21</sup> US War Department, *Field Service Regulation FM 100-5, Operations* (Washington, DC: Government Printing Office, 1923), 14.

<sup>22</sup> COL Sean MacFarland, COL Michael Shields, and COL Jeffrey Snow, White Paper, *The King and I: The Impending Crisis in Field Artillery's ability to provide Fire Support to Maneuver Commanders* (Washington, DC: Government Printing Office, 2008), 3.

<sup>23</sup> William A. Turner, "From the Commandant's Desk: Update on the Fires Targeting Center and DIVARTYs," *The United States Army Field Artillery Branch Newsletter* no. 51 (November-December 2015): 4.

needs to focus on assisting joint force entry and to compensate for issues with targeting and range. *FM 3-0 Operations* tasks the fires War Fighting Function (WFF) with creating “windows of opportunity” for maneuver forces.<sup>24</sup> An essential part of creating windows of opportunity is the use of fire support preparation to improve the friendly forces chances of success. For generations of the previous doctrine, the critical component of creating chances of success has been the massing of fires at the battalion level or higher.

Per *FM 3-0 Operations* a central function of the Fires WFF will be to counter the enemy’s forces capability to mass at moments of penetration. Focusing on counterfire is one of the best ways that US Army divisions and corps can mitigate the IFCs overarching range and volume capacity. Organizations such as IFCs, or the Russian Artillery Group possess an overwhelming numerical strength in the number of fire support systems. In their current configuration, US Army BCTs and divisions are unable to match system to system numerically, forcing these units to over-rely on joint fires to defeat enemy units and systems.

When considering if US Army divisions and corps can create windows of opportunity is to examine if these formations have adequate amounts of fire support to accomplish the task. Comparing IFCs to US Army Field Artillery units end to end reveals that the IFC possesses a considerable numerical advantage. One of the crucial factors in ensuring a higher chance of success is the ability to deter, and defeat adversary IFCs in the “deep area.” Per *Army Technique Publication 3-09.9, Division Artillery Operations and Fires Support for the Division* the deep area is “the portion of the commander's area of operations not assigned to subordinate units.”<sup>25</sup> US Army divisions without an organic long-range shooter lack the ability to shape the deep area and have an over-reliance on joint fires. As divisions lack long-range artillery assets, the only

---

<sup>24</sup> US Army, *FM 3-0* (2017), 2-45.

<sup>25</sup> US Department of the Army, *Army Technique Publication 3-09.90, Division Artillery Operations and Fire Support for the Division* (Washington, DC: Government Printing Office, 2017), 1-3.

doctrinally supported solution is to use the organic Combat Aviation Brigade with joint fires (such as the US Air Force) at critical moments to ensure that US Forces can achieve success. The current structure of the US Army does not allow it to have an impact at the operational level that it has had in the past.

The publication of specific DIVARTY and division fire support doctrine in 2017 helped to bridge the gap between the activation of DIVARTYs and prior doctrine. While *Army Technique Publication 3-09.9, Division Artillery Operations and Fires Support for the Division* identifies the role, function, and organization of DIVARTYs, it does not align with *FM 3-0 Operations*. *ATP 3-09.9* addresses counterfire operations, delivering fires in mass, and the Joint Air Ground Operations Center (JAGIC) but does not address utilizing them together in large-scale combat operations. Specifically, the US Army needs to update its fire support doctrine to align with *FM 3-0 Operations* for large-scale combat operations and strengthen the role of delivering fires in mass, and counterfire for DIVARTYs. Additionally, the new doctrine should focus on delivering fires at echelons above brigade, and coordinating all lethal and non-lethal effects across the division.

## Employment and Organization

### Enemy Employment and Organization

IFCs are scalable and adaptable organizations that are changeable to meet the commander's intent or situation. Generally, they contain multiple cannon artillery battalions with appropriate support elements, ground reconnaissance, and target acquisition radars. Each IFC also contains multiple launch rocket battalions with various systems capable of engaging short-range targets to larger intra-theater ballistic missiles that can range hundreds of kilometers. Numerically, system to system an IFC contains more howitzers and multiple launch rocket launchers than US Army BCTs, and FABs.

Typecasting what an ideal IFC would look and operate like requires an examination of an artillery centric army such as the Russian Ground Force. The Russian Ground Force is an army that utilizes fires as the primary means of execution. The Russians use ground maneuver forces in support of fires in contrast to how most western nations and the US operate. Known as the “God of War,” Russian artillery has a strong tradition of excellence throughout its history.<sup>26</sup> This Russian tradition arose from fighting multiple invaders throughout their history. Examples such as the 1812 Napoleon Bonaparte campaign and Operation Barbarossa in 1941 reinforce this tradition. Having a strong military with extensive long-range offensive capabilities is essential to maintaining its national sovereignty.<sup>27</sup> One of the Russian military’s primary characteristics of warfare is to defend its homeland using layered air defenses and fires to trade space for time.<sup>28</sup> Russia built a force around long-range fires and missile defense with the ability to provide overwhelming fire superiority.

The ability of IFCs to conduct long-range fires and mass on an overwhelming scale is the principle objective and primary advantage they provide. Paramount to the numerical advantage is the manner in how the fire support systems are controlled and utilized to ensure dominance. Moreover, IFCs also integrate other joint fires under one centralized headquarters to control all lethal and non-lethal effects. Placing lethal and non-lethal effects under one command HQs enables the IFC to affect the entire battlefield from one command.

Comparatively, a US Army BCT contains one organic artillery battalion, however a Russian combined arms brigade with a smaller maneuver forces, possesses more fire support systems. A motorized rifle brigade consisting of three motorized rifle battalions and a tank

---

<sup>26</sup> Lester Grau and Charles Bartles, *The Russian Way of War: Force Structure, Tactics, and Modernization of the Russian Ground Forces* (Fort Leavenworth, KS: Foreign Military Studies Office, 2016), 260.

<sup>27</sup> Bettina Renz, *Russia’s Military Revival* (Medford, MA: Polity Press, 2018), 33.

<sup>28</sup> Scott Boston and Dara Massicot, *The Russian Way of Warfare: A Primer* (Santa Monica: RAND Corporation, 2017), 2.

battalion will frequently deploy with two self-propelled artillery battalions, a multiple launch rocket battalion, and an anti-tank artillery battalion.<sup>29</sup> This not only gives the brigade commander an advantage in number of systems, but also in range with the integration of multiple weapons capabilities. With a range differential that generally favors the Russians, its fire superiority is greatest while operating from sanctuary positions. These positions of relative advantage owe to the fact that the long-range systems can operate within areas that US or coalition forces would be unwilling or unable to attack. Able to utilize what *FM 3-0 Operations* describes as “sanctuary,” Russia protects its forces by using a threat method of putting forces beyond the reach of friendly troops.<sup>30</sup> These methods can use physical or non-physical means such as complex terrain, international boundaries, information warfare, and long-range fires.<sup>31</sup> Peer adversaries possess long-range fires capabilities to conduct counter-fire or strike targets at extreme ranges and will require US forces to attrite them in the early phases of large-scale combat operations.

The IFC HQ “forms the framework for the command and control (C2) of indirect fires in the division or DTG (Division Tactical Group).”<sup>32</sup> Without additional task organization, the IFC at the divisional level can engage operational and strategic targets. Built specifically to provide the appropriate level of C2 to any additional assets. Particularly critical is the logistical support assets available to the IFC commander. This support allows for adding subordinate batteries and battalions. With a framework prepared to engage targets at either the strategic or operational level, IFCs provide multiple options for striking targets in the initial phases of any operation.

One of the critical components of the IFC is its ability to conduct reconnaissance fires to destroy targets in the initial phases of operations. Reconnaissance fires is defined as the

---

<sup>29</sup> Grau and Bartles, *The Russian Way of War*, 235.

<sup>30</sup> US Army, *FM 3-0* (2017), 1-11.

<sup>31</sup> *Ibid.*, 1-11.

<sup>32</sup> US Army, *TC 7-100.2* (2011), 9-4.

“integration of RISTA [Reconnaissance, Intelligence, Surveillance, and Target Acquisition], fire control, and weapon systems into a closed-loop, the automated fire support system that detects, identifies, and destroys critical targets in minutes.”<sup>33</sup> In the Russian-Ukrainian War, reconnaissance fires provided devastating effects. The IFC uses systems and networks between formations to shorten the time of fire mission processing after a identifying a target. Reconnaissance fires utilizes multiple radar sensors in conjunction with UAVs controlled centrally under one HQ. Accelerating the entire targeting process, this system results in the increase of fires volume executed in a short amount of time.

One of the critical aspects of IFCs structure is the incorporation of other lethal and non-lethal effects. These additional components include Army aviation, missile (surface to surface missile), and long-range reconnaissance. Additionally, built within the RISTA section is dedicated information warfare element that seeks to deceive, and degrade enemy forces decision-making abilities. Coupling fire support with information warfare provides nonlethal alternative to confuse, deceive, delay, disrupt, disable, and disorganize the enemy at all levels.<sup>34</sup> Information warfare is an essential element of enemy doctrine and assists the command in hampering the enemy commander’s ability to maintain situational awareness. The combination of lethal and non-lethal together under one central commander makes it easier to synchronizes efforts. These efforts such as electronic warfare, information attack, and deception work to both protect IFC assets and assist in the destruction of the enemy.

Artillery and non-lethal effects are an essential requirement for large-scale combat operations. As the framework for the C2 of indirect fire in the division, IFCs exploit the combat power inherent in the division.<sup>35</sup> Scalable and adaptable to respond to any mission requirements,

---

<sup>33</sup> US Army, *TC 7-100.2* (2011), 9-18.

<sup>34</sup> *Ibid.*, 9-1.

<sup>35</sup> US Army, *TC 7-100.2* (2011), 9-6.

the IFC allows the enemy operational level commander maximum flexibility to command and control all lethal and non-lethal effects. In principle, the IFC HQ is capable of controlling fires across multiple artillery battalions and regiments while also managing its independent targeting processes to strike deep high-value targets. While US Army artillery systems have made technical and mechanical upgrades since the 1990s, they remain fundamentally the same. The recent modernization enhancements are focusing on implementing digital systems and controls. During this same period the Russians developed new systems and sought to reintroduce older ones back into the formation. The Russian Ground Force recently reactivated large caliber and additional long-range systems such as the 2S7 Pion (203mm).<sup>36</sup> Comparatively, the US Army only recently started modernization efforts for the fires WFF and organization structure changes for large-scale combat operations.

## US Army Employment and Organization

Currently on active duty, the US Army has thirty-one BCTs split between three different configurations, Infantry (Light, Airborne, and Air Assault), Stryker (Mechanized), and Armor (Heavy Mechanized). In the total army force, including the National Guard, the number of BCTs increases to fifty-eight. While the total number of BCTs may seem high, to put the total numbers in perspective, there were more artillery battalions in Vietnam in 1966 (sixty-four), than are currently on active duty today (forty-two).<sup>37</sup> Organic to each type of BCT is a Field Artillery battalion consisting of three firing batteries with six howitzers. In infantry BCTs, these composite Field Artillery battalions are “mixed” with two M119A3 (105mm FA system) and one M777A2 (155mm FA system) firing batteries. In the Stryker Brigade Combat Team, the Field Artillery

---

<sup>36</sup> COL Liam Collins and CPT Harrison Morgan, “King of Battle: Russia Breaks Out the Big Guns,” Association of the United States Army, January 22, 2019, accessed February 26, 2019, <https://www.ausa.org/articles/king-battle-russia-breaks-out-big-guns>.

<sup>37</sup> David E. Ott, *Vietnam Series: Field Artillery, 1954-1973* (Washington, DC: Government Printing Office, 1995), 171.



battalion comprises three M777A2 batteries. The Armor Brigade Combat Teams (ABCTs) contain three M109A6 (Paladin) firing batteries. Typically, when considering operational level fires, the specific configuration of the tactical BCTs would not be as important. However, with the US Army's current configuration, this is the entirety of the Field Artillery assets organic to the division. Apart from the 2nd Infantry Division in the Republic of Korea, which has operational control of 210th FAB (M270A1 Multiple Launch Rocket System (MLRS)), no division contains any asset that extends beyond 30 km (unguided) and 40 km (guided). Outside of divisions, the US Army currently has three additional FABs comprised with a mixture of M270A1 (MLRS) and M142 (High Mobility Artillery Rocket System (HIMARS)) launchers that align with each of its three active corps HQ.

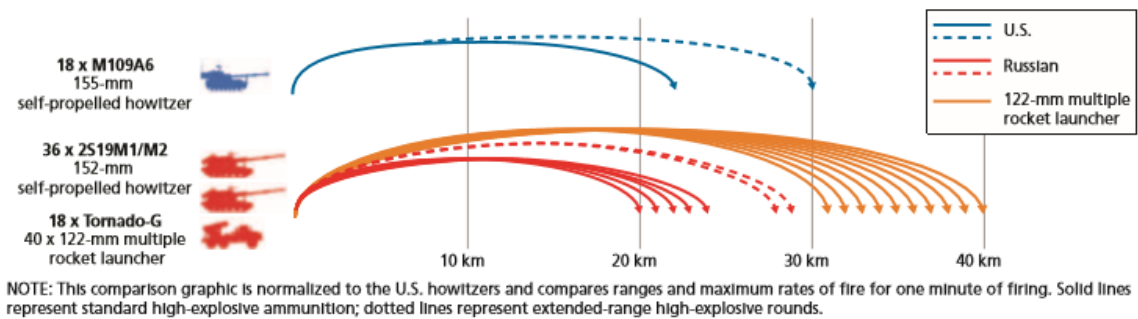


Figure 2. Comparison of US Army ABCT to Russian Motorized Rifle Brigade. Scott Boston and Dara Massicot, *The Russian Way of Warfare: A Primer* (Santa Monica: RAND Corporation 2017), 10.

Generally, when a division HQs conducts a digital WFX, additional Field Artillery support comes either from the National Guard or the single FAB that is from the corps HQ. During modularity, the division HQ was not the only level to “lose.” Each of the corps deactivated their artillery HQ, further reducing the amount of artillery specific HQs. In a large-scale combat operation environment, the lack of long-range assets would severely limit the ability of the subordinate division HQs to create “windows of opportunity.” In response to the lack of overwhelming fire support assets in divisions, the US Army with the Fires Center of Excellence (FCoE) developed a future Force Design Update to establish a Division Fires Command (DFC).

Which among other impacts, would provide additional assets to each division. However, this is not the first time that the US Army has examined adding additional assets to increase the firepower and fire support range of divisions.

With the modular transformation of US Army divisions and brigades, the new BCT became the principal tactical HQ in the US Army. With modularity in place, the need to have a consolidated Field Artillery HQ to serve as the Force Field Artillery (FFA) HQ at the divisional level became unnecessary for operations. *ADRP 3-09 Fire Support* defines the role of the FFA HQ “as the senior Field Artillery headquarters organic, attached, or placed under the operational control of that command.”<sup>38</sup> The types of operations that US Army divisions and corps conducted in Iraq and Afghanistan did not require a specific Field Artillery HQ. However, after multiple deployments, Field Artillery battalions identified a persistent negative trend in their capability and training.<sup>39</sup> To alleviate this negative trend and develop capacity and capability for future requirements, starting in 2014, the US Army re-activated DIVARTYs with two principal requirements and responsibilities. The first requirement was to provide each divisional HQs with their own FFA HQ. The second requirement was to provide “effective mission command” of the fires WFF, highlighting the atrophy of Field Artillery units due to a lack of oversight in training. This was a significant improvement especially regarding training and readiness of attached FA units in the division.<sup>40</sup>

However, in 2016, shortly before the final DIVARTY activation, US Forces Command issued a fragmentary order that delayed the transfer of the Field Artillery battalions from the BCTs to the DIVARTY. Two years later US Forces Command ordered the Field Artillery

---

<sup>38</sup> US Department of the Army, *Army Doctrine Reference Publication (ADRP) 3-09, Fire Support* (Washington, DC: Government Printing Office, 2012), 2-8.

<sup>39</sup> Dastrup, *Artillery Strong*, 234.

<sup>40</sup> US Army Field Artillery School, “DIVARTY: A Force Multiplier for the BCT and Division,” *The United States Army Field Artillery Branch Newsletter* (April 2014): 3.

battalions to return to the BCTs. Without the assignment of the Field Artillery battalions, the DIVARTY HQs entire mission focus was on the “FFA HQ” role with only training and readiness “oversight” of the Field Artillery battalions. Previously the DIVARTY HQ was the center point of all fires within a division with the Field Artillery battalions assigned to the DIVARTY and attached to brigades as required.

The structure of US Army divisions continues to change and evolve to meet operational requirements. Over time it has made additions and reductions to DIVARTYs to match the needs of the parent division. During modularity, the movement of the tactical headquarters went from the corps HQ to the division HQ, then further down to the BCT HQ. With multiple “division level assets” shifting down to the BCT. These shifts enabled BCTs to be more self-sufficient and able to deploy under any divisional HQ in a theater of operations as required. With the current publication of *FM 3-0 Operations*, divisions are the tactical unit of execution of corps with its primary role as a tactical HQ commanding brigades in decisive action.<sup>41</sup> *FM 3-0 Operations* also identifies critical requirements and responsibilities for each tactical HQs.

In a previous era following the end of combat operations in Vietnam, the US Army doctrine made a shift in 1976 to “Active Defense” which overemphasized firepower in the defense. Following testing and review, the US Army doctrinal shift led from Active Defense to the creation of “AirLand Battle.”<sup>42</sup> The doctrinal shift the US Army is making today is not quite as severe as Active Defense to AirLand Battle, but is similar to what the US Army is going through now with *FM 3-0 Operations*.

Results from the debate and formulation of AirLand Battle together with the lessons observed from the 1973 Yom Kippur War, made the US Army realize it would need to rapidly

---

<sup>41</sup> US Army, *FM 3-0* (2017), 2-13.

<sup>42</sup> James L. Romjue, *American Army Doctrine for the Post-Cold War* (Fort Monroe, VA: Military History Office, US Army Training and Doctrine Command, 1996), 16.

modernize to ensure it had parity on the modern battlefield. Though most of the “Big-Five” modernization programs were in development prior to the war, the lessons learned impacted the programs and led a requirement to redesign how divisions fought since the 1960s.<sup>43</sup> Recognizing the need to provide additional capabilities to division HQs to enable them to fight Airland Battle, the US Army designed and tested multiple division structures including the “Division 86” concept.<sup>44</sup> This new concept gave additional Field Artillery systems to the DIVARTY and sought to ensure that divisions would be able to engage targets in the deep area. When testing the concept, the US Army shifted the design of the future to another formation concept entitled the “Army of Excellence.” Certain aspects of the Division 86 concept remained in the new formation with each DIVARTY task organized with a “general-support” FA battalion to provide additional fires assets. This other battalion was a multi-role unit capable to either supplement the division's brigades, provide for counterfire missions, or service targets specifically to shape the division area of operations. In today’s design of divisions and DIVARTYs, the US Army is reliant on corps HQs to provide additional enablers or to execute targets in the division deep area.

---

<sup>43</sup> James L. Romjue, *A History of Army 86, Volume I, Division 86: The Development of the Heavy Division September 1978–October 1979* (Fort Monroe, VA: Historical Office, US Army Training and Doctrine Command, 1982), 1.

<sup>44</sup> *Ibid.*, 2.

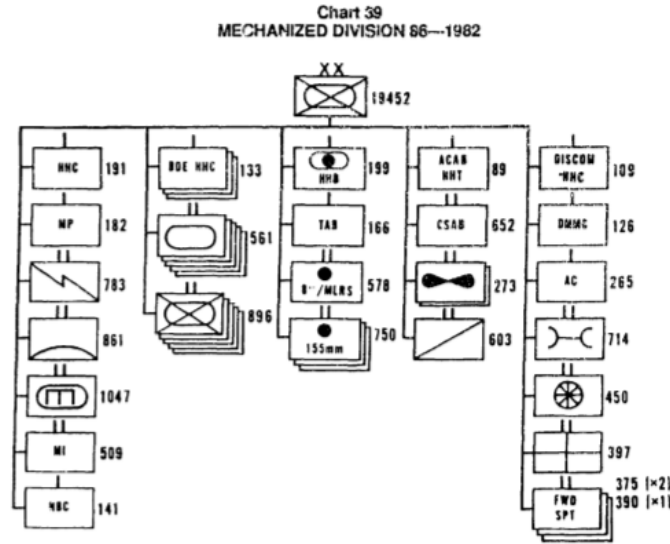


Figure 3. Example of Mechanized Division 86 with MLRS/8 (GS BN). James L. Romjue, *The Army of Excellence: The Development of the 1980s Army* (Fort Monroe, VA: Office of the Command Historian, US Training and Doctrine Command, 1993), 172.

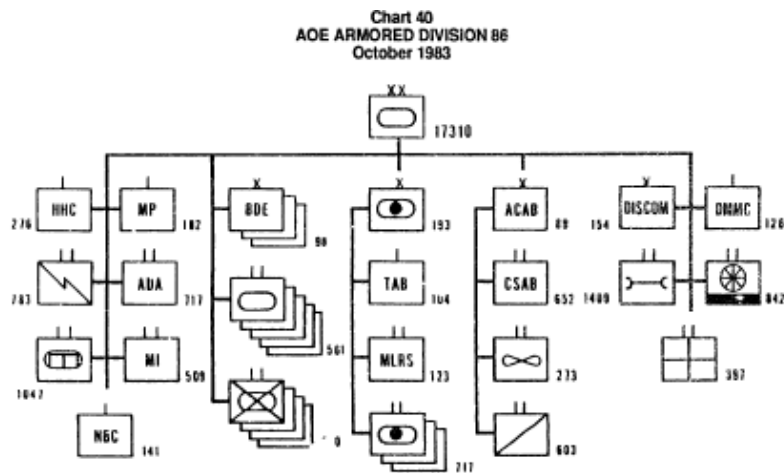


Figure 4. Example of Army of Excellence Armored Division with MLRS (GS BN). James L. Romjue, *The Development of the 1980s Army* (Fort Monroe, VA: Office of the Command Historian, US Training and Doctrine Command, 1993), 173.

Division HQs will “set the conditions” for the operational environment in large-scale combat operations requiring it to strike targets in the deep area. The ability to strike targets in the deep area will be critical for enabling success in the close area fight for the division’s BCTs. However, with the corps HQs responsible for a wide linear front with multiple subordinate divisions, it would limit the long-range, and joint fires resources available. Each subordinate

division and BCT would be relying on joint fires to service targets long of the division's coordinated fire line (CFL) but short of the fire support coordination line (FSCL).<sup>45</sup> Per *FM 3-0 Operations*, divisions are to focus on "information collection, fires, and maneuver on enemy organizations and capabilities beyond the range of the BCTs engaged in close operations."<sup>46</sup> This deep area fight will be beyond the range of organic assets inside the division and its BCTs. Providing each DIVARTY, as proposed in the DFC concept, with a long-range asset such as MLRS or HIMARS battalion, would enable divisions with the ability to shape their deep area without relying on corps or joint fires assets.

To counter the numerical advantage of enemy systems the US Army relies on joint fires, namely US Air Force and US Navy assets to execute targets identified during the ninety-six-hour targeting cycle. The JAGIC facilitates near real-time selecting and servicing of targets. The JAGIC incorporates an Air Support Operations Center and US Air Force Tactical Air Control Parties with division fires, airspace, air, and missile defense, intelligence, and aviation personnel. Additionally, the JAGIC works to enable the simultaneous execution of surface to surface fires, aerial-delivered fires, and aviation maneuver. This central point serves as the primary asset manager to handle shifting conditions and to help manage the vast scale and scope of large-scale ground combat operations. Unlike the IFC, the JAGIC in conjunction with the DIVARTY, assists in managing sensors (radars, UAVs, etc.) across the entire division. The evolution of sensors and collection assets increases the range and scope of the Combined Operations Integration Center and allows for faster processing of information. However, in the current configuration

---

<sup>45</sup> A Coordinated Fire Line (CFL), is a line beyond which conventional surface-to-surface direct fire and indirect surface fire support means may fire at any time within the boundaries of the establishing headquarters without additional coordination. A Fire Support Coordination Line (FSCL) is a fire support coordination measure established by the land force commander to support common objectives within an area of operation; beyond which all fires must be coordinated with affected commanders prior to engagement, and short of the line, all fires must be coordinated with the establishing commander prior to engagement.

<sup>46</sup> US Army, *FM 3-0* (2017), 1-34.

DIVARTYs and FABs do not contain any organic UAV asset beyond small portable systems. Which are not suitable for long-range fires. Currently the only and primary detection assets within the organization is multiple radar assets.

Currently, as part of an ongoing modernization strategy, the US Army has two different fires related priorities, long-range precision fires, and air and missile defense capabilities. Both seek to reduce the deficit between the US and foreign systems and in-turn upgrade what the US Army fields today. The long-range precision fires program is modernizing MLRS ammunition and will increase the range of HIMARS and MLRS to over 499 km.<sup>47</sup> Additionally, the US Army is conducting tests of the extended range cannon artillery system for both the M109A7 and the M777 to increase range capability. These two systems would “fill out” the division and operational fires commands and enable division and corps commanders to shape the deep fight with fires. Fully implementing these systems and new munitions would alleviate the range disparity between the US and foreign systems. Further, it would give the US a technological advantage in the fires domain.

The current structure of the fires WFF in US Army division and corps is unable to meet the requirements of large-scale combat operations unless supported by joint fires and other fire support assets. Configured to meet the oversight needs of modular BCTs, divisions and corps lack the long-range capability and staff function to adequately fight the deep area. The proposed future force structure concept, the DFC, provides the appropriate level of command and control, and organic firepower to enable a division to combat an adversary's integrated air defense systems and IFCs. The DFC gives the fires community an integrated command post that is the central point for all lethal and non-lethal effects more than the current structure of DIVARTYs. If implemented in each division would posture the US Army to be able to fight in multi-domains

---

<sup>47</sup> Fires Center of Excellence, “Long-Range Precision Fires,” Stand-To! The Official Focus of the US Army, January 17, 2018, accessed March 13, 2019, <https://www.army.mil/standto/2018-01-17>.

operations in the future.<sup>48</sup> The DFC would return previously held organic long-range firepower to divisions.

To best facilitate fires for large-scale combat and multi-domain operations in the future, the US Army Fires Center of Excellence (FCoE) developed a fires HQ to mitigate the current gaps in US Army divisions. The DFC is task organized with long-range cannon and rocket systems that would be capable of striking at the enemy's long-range assets.<sup>49</sup> These long-range assets are organic to and serve in the DFC as compared to the current DIVARTY which does not have subordinate units. These additional battalions will fill the role of the general-support battalion that existed prior to modularity.<sup>50</sup> The DFC would see the wholesale integration of lethal and non-lethal effects under one central HQ. It will also maintain critical components of the division fires cell, and further develop the capabilities to integrate other enablers in the electronic warfare, and cyber domains. Resolving issues with observation and ISR, each DFC will contain multiple radar systems, and an organic UAV platoon which extends its targeting ability.

Unlike the current DIVARTY structure, the DFC will contain the logistical capability of supporting its own formation, with the ability to supply and support its organic elements and provide support to any additional asset. The DFC fully addresses one of the biggest weakness that US Army divisions face for large-scale combat operations. It provides the division commander with “a force fires headquarters capable of integrating the employment of cross-domain fires between the division's coordinated fire line and the fire support coordination line (FSCL), setting conditions for successful brigade combat operations.”<sup>51</sup> Providing a sufficiently robust fires

---

<sup>48</sup> Chris Compton and Lewis Boothe, “The Fires Complex: Organizing to Win in Large-Scale Combat Operations,” *Fires Magazine* (May-June 2018): 4.

<sup>49</sup> Compton and Boothe, “The Fires Complex,” 4.

<sup>50</sup> A Field Artillery unit assigned in general support of a force has all of its fires under the immediate control of the supported commander or his designated force fires headquarters.

<sup>51</sup> *Ibid.*, 5.



command that is capable of executing deep fires will enable the division to capitalize on windows of opportunity. Previous large-scale combat examples demonstrate what future combat could entail, and how to prepare for challenges from the IFC.

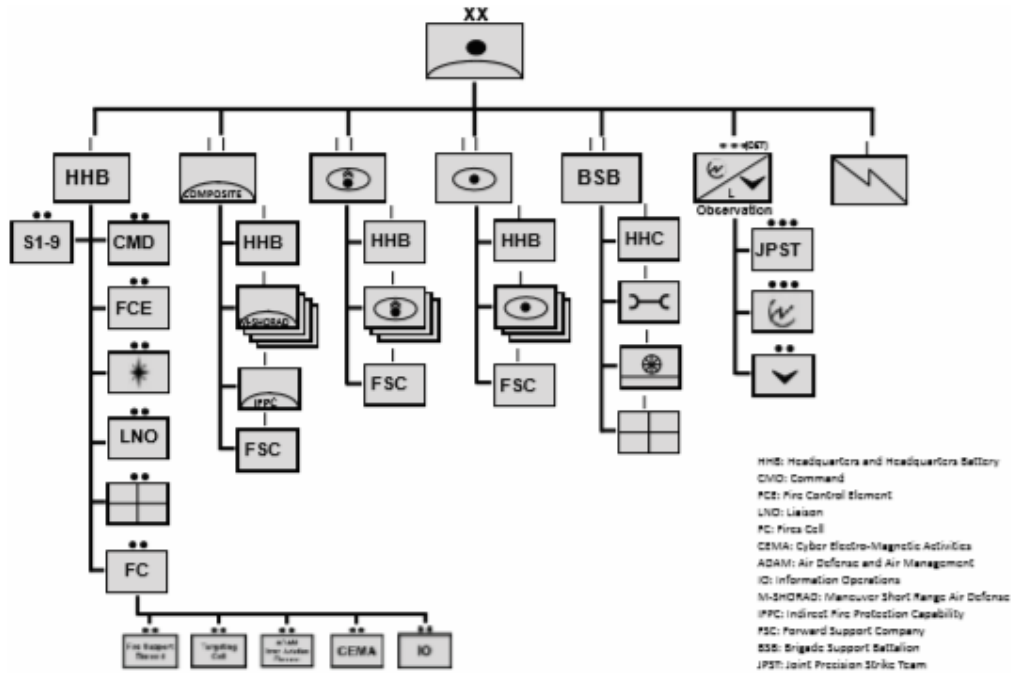


Figure 5. Example of a Division Fires Command. Chris Compton and Lewis Boothe, “The Fires Complex: Organizing to Win in Large-scale Combat Operations,” *Fires Magazine* (May-June 2018): 4.

## Training

### Enemy Training

Over the last eighteen years, the nations with near-peer capabilities such as Russia and China began to modernize and train with a focus on conducting large-scale combat operations. Comparatively, neither Russia nor China have the recent combat experience of the US and NATO. Historically, nations who prided themselves on having more combat experience than potential adversaries have not seen that “advantage” in combat experience preventing

catastrophic losses.<sup>52</sup> Leading into World War I, both French and the British Armies had more combat experience, and experience conducting expeditionary operations than Germany. However, neither nation was prepared or trained to fight in the conditions found in the initial stages of the war. Comparatively the US Army could be in a similar situation in a future large-scale combat operation as France and the United Kingdom in 1914 without proper preparation and modernization.

Notable examples from Russia and China show militaries that continue to modernize. The goal of this modernization is to prepare for the realities of combat in the twenty-first century. This modernization gives Russia a chance to return as a dominate military power capable of conducting operations around the world. Russia, assessing the results of NATO excursions in Serbia and Gulf War I, determined its military should not have a singular focus on regional conflicts. Following the end of the Cold War however, Russia's military became limited in capacity and capability. Unable to project force, Russia focused on regional conflicts. However, these limited conflicts may not be enough to protect Russian interests. To promulgate its larger goals, Russia requires a military capable of global reach.<sup>53</sup> To meet these goals, in recent large military exercises conducted by Russians, the training emphasis stressed readiness systems.

In 2018 the Vostok exercise was able to simulate mass mobilization while stressing strategic and operational level commands while providing command and control over vast distances. This exercise also comprised over three hundred thousand troops with thousands of combat vehicles and aircraft.<sup>54</sup> While these training exercises do not simulate combat operations to the level of US Army Combat Training Centers, adversaries are not shifting the training focus

---

<sup>52</sup> Eliot A. Cohen, *The Big Stick: The Limits of Soft Power and the Necessity of Military Force* (New York: Basic Books, 2018), 197.

<sup>53</sup> Renz, *Russia's Military Revival*, 60.

<sup>54</sup> Charles Bartles, "Reasoning for the Vostok-2018 Strategic Exercise," *OE Watch: Foreign News and Perspective of the Operational Environment* 8, no. 20 (October 2018): 3.

from other types of warfare to large-scale combat operations. This means adversaries training while not as dynamic as US Army CTC rotations, are useful for preparing for combat operations. Whereas these exercises and modernization do not directly replicate US Army training, they are building capacity and capability in combined arms operations.

Some of the massive mobilization exercises exhibited training missions of specific artillery capabilities, focusing primarily on rocket units. Russia has been conducting inter-service exercises with the training focus for the armed services gain experience in joint and combined operations.<sup>55</sup> While modernization continues with improved training, Russian military operation in Ukraine and Syria demonstrate increased capability. Reflecting the impact of enhanced training and combat operations. This is evident when comparing Russia's previous major operations in the Republic of Georgia which while ultimately successful, struggled in execution. Additionally, Russia made a shift towards battalion-sized formations as part of its efforts to train on combined-arms.<sup>56</sup>

Russia the most probably peer adversary has undergone periods of modernization and seeks technical parity with the United States. In some categories, Russia can match or even best US Army capabilities. While what is fought in WFXs and at Combat Training Center rotations shows high levels of enemy performance, it does not mean that a US Army division or corps would not be able to compete in large-scale combat operations.

## US Army Training

As Major General J. B. A. Bailey (British Army) wrote: "artillery training in peacetime has all too often proved inadequate in war." The intensity, scope, and scale of large-scale combat

---

<sup>55</sup> Renz, *Russia's Military Revival*, 66.

<sup>56</sup> Boston and Massicot, *The Russian Way of Warfare*, 5.

operations are beyond what most have seen in combat in Iraq and Afghanistan.<sup>57</sup> Except for the initial invasions of both countries, and the 100-hour campaign in the Gulf War, most of the combat experience in the US Army centers on COIN. In the 1991 Gulf War, the Iraqi Army held a significant numerical and range advantage in artillery systems over US forces. However, the Iraqis could not match the well-trained US Army artillery formations which made up for the disadvantage in range and Field Artillery pieces.<sup>58</sup> This example highlights the tremendous advantage of training. The challenges presented in a future great power conflict will test the US Army at each level of war. For US Army corps and divisions to have desired effects, they will need frequency of training to match the change in scale. *FM 3-0 Operations* specifies training considerations per WFF to focus on at the unit level.<sup>59</sup> If the primary mission for the fires WFF is to create windows of opportunity, it will have to adapt its training from individual sections up to the DIVARTY or DFC level. The ability to provide overwhelming massing of fires against enemy high payoff targets and replicate what Russia has done in Ukraine will require frequent practice and repetition to get the entire fire support system operating effectively and efficiently.

Currently, artillery training primarily focuses at the battalion level, which is the highest echelon that generally conducts field maneuvers to certify (dry fire training) and qualify (live-fire training). Mostly, these training events include Field Artillery gunnery tables and require battalions and BCTs to conduct rigid, stepped training progression, ensuring each level is complete before moving onto the next firing table.<sup>60</sup> These help certify that the entire fire support system from a sensor to the shooter is capable and prepared to execute fire missions. However, at

---

<sup>57</sup> J. B. A. Bailey, *Field Artillery and Firepower* (Annapolis MD: Naval Institute Press, 2004), 40.

<sup>58</sup> Janice E. McKenney, *The Organizational History of Field Artillery 1775-2003* (Washington, DC: Government Printing Office, 2007), 312.

<sup>59</sup> US Army, *FM 3-0* (2017), 2-55.

<sup>60</sup> US Department of the Army, *Training Circular (TC) 3-09.8-2013 with C1, Field Artillery Gunnery* (Washington, DC: Government Printing Office, 2016), 8-24.

a higher level, from DIVARTY to division, this progression focuses primarily on virtual training rather than live-fire. New requirements place a greater emphasis on collective live firing training throughout the battalion and BCT level. Requiring divisional oversight to be present for BCT training events to meet readiness requirements. Unlike BCTs, the primary training event for a division HQ is to execute a certifying WFX. This is the only time in which a division or corps can work on the entire sensor to shooter system which is critical for the clearance of fire and airspace management.

As discussed in the organization section, the ability of an FFA HQ to conduct clearance of fires, and manage airspace throughout the battlespace is a critical responsibility and essential to success in combat. Facing a potentially hostile A2/AD environment could limit the ability of joint fires assets to operate freely though-out a theater of operations, and limit the support that divisions and corps receive. Most peer adversaries have significant amounts of Air Defense Artillery (ADA) and tend to integrate them in a combined manner to provide the broadest “bubbles” of protection.<sup>61</sup> With modern state of the art air defense systems, such as the S-400, coupled with other ADA platforms restricting air space and protecting enemy critical infrastructure poses a significant problem.<sup>62</sup> Operating in and around these integrated air defense systems will challenge the air supremacy of US forces, and will make already crowded airspace even busier if US or partner assets are forced to operate in strict air corridors.

Airspace management is critical to avoid potential conflicts with the scheme of fires in support of maneuver forces. Clearance of fires is the process by which supported commanders

---

<sup>61</sup> Robert Dalsjo, Michael Jonsson, and Christofer Berglund, “Don’t Believe the Russian Hype,” *Foreign Policy*, January 22, 2019, accessed March 8, 2019, <https://foreignpolicy.com/2019/03/07/dont-believe-the-russian-hype-a2-ad-missiles-sweden-kaliningrad-baltic-states-annexation-nato/>.

<sup>62</sup> John Gordon IV and John Matsumura, *The Army’s Role in Overcoming Anti-Access, and Area Denial Challenges* (Santa Monica, CA: RAND Corporation, 2013), 15.

ensure that fires or their effects will have no unintended consequences.<sup>63</sup> Unit training in clearance of fires and airspace management must be rigorous to stress the entire system. This requires the permanent integration of joint enablers who support ground forces. The ability of divisions (with DIVARTYs and JAGICs) to dynamically manage both airspace and clearance of fires correlates with its training level. If the clearance of fires process is too slow, it will reduce the timeliness and responsiveness of fires. Replicating these actions in only virtual periodic training events will not ensure adequacy to make the system responsive. Filling the essential billets in the JAGIC and the DIVARTY air defense airspace management and brigade aviation element is critical to conducting effective training. These teams must train both in the virtual and real-world environments together. Digital training is important in the training progression but cannot match the challenges of managing and controlling sensors, aircraft, and fire support systems in live format in real time.

Some of the toughest issues facing a corps or division HQ will be the span of control of subordinate units. Targeting enemy artillery and ADA systems will require the integration of all available sensors in the division.<sup>64</sup> The ability to manage the collective sensors of the entire division and additional assets will be critical to providing windows to target enemy formations. The synchronization of enablers across the division requires extensive preparation and training.

Since DIVARTY's do not contain any subordinate Field Artillery battalions, the only time it can test its command and control abilities is during exercises. Realistic training throughout the entire fire support system from a sensor to shooter will be essential to meet the speed, accuracy, and trust required to be successful in large-scale combat operations. Additional training opportunities must occur to test and stress the ability of the DIVARTY to command and control

---

<sup>63</sup> US Department of the Army, *Army Technique Publication (ATP) 3-09.90, Division Artillery Operations and Fire Support for the Division* (Washington, DC: Government Printing Office, 2017), 2-34.

<sup>64</sup> US Army, *ATP 3-09.90* (2017), 1-3.

and synchronize effects. Division HQs and DIVARTYs should have to meet similar requirements to those of the live fire qualification of Field Artillery battalions prior to conducting a digital WFXs. Training is the most important operations the Army does to prepare for combat/war and is the “cornerstone of combat readiness.”<sup>65</sup>

The value of practical training is essential to avoid failure in future operations. Divisions must train in the real world as they fight in WFXs and must get the repetitions necessary to operate effectively. The challenges of large-scale combat operation are not only in A2/AD or countering enemy long-range artillery systems, but lie in scale and scope of the future battlefield. For DIVARTYs to manage the fires WFF effectively, they will need to match the intensity of training of the subordinate battalions. Likewise, the training repetitions must follow a progression like the gunnery tables of the subordinate battalions which build upon itself and grows in complexity. This training must replicate the intensity of WFXs but place it in a physical training environment to fully stress the system. Training in a physical environment increases the reality of the event. Which requires managing the entire system in real time, controlling live aircraft, deconflicting airspace, and Field Artillery units to fully realize the complexities involved. Managing and controlling all lethal and non-lethal effects and airspace will habitually frustrate the division unless the entire system trains properly. These can only be accomplished through actual real time execution.

## Capabilities/Exploitation

In the face of the numerical system and general range advantage of peer adversaries, there are capability gaps and areas that US forces can exploit. Looking at specific examples of modern conflicts such as the Gulf War I and the Russian-Ukrainian War demonstrate that artillery and operational fires are critical components of large-scale combat operations. Comparing the

---

<sup>65</sup> US Army, *FM 3-0* (2017), 2-52.

doctrine, organization, and training of US Army division against IFCs provide an area where the US can gain and ensure superiority. The United States can directly target specific aspects of IFCs to reduce, and defeat their effects. First by utilizing the centralized command and control that DIVARTYs, FABs and future DFCs provide in sensor management. Secondly the full integration of precision strike capability. Finally, by providing echelons above brigade general support fires to target the deep area.

The Russian-Ukrainian War demonstrates the outside impact that artillery will have in future conflicts. During the conflict, all sides including the Ukrainians, separatist, and Russians used artillery in both direct and indirect fires. The nations on both sides used counter-battery radar systems to assist in targeting each other and further enable deep strikes. Unlike the experience of US Army Field Artillery battalions in Iraq and Afghanistan, the Russians/separatist and Ukrainians fired a substantial number of artillery rounds. At times during the conflict upwards to three hundred to four hundred rounds per day.<sup>66</sup> The high volume of firing from static positions makes Field Artillery units susceptible to counter-battery fire. This illustrates how Russia and other adversaries would utilize their artillery formations in large-scale combat operations and provides one of the best opportunities to target IFCs.

Similarly, the high usage of artillery in the Russian-Ukrainian War is closer to previous large-scale conflicts such as the world wars or the Korean War. Unlike Iraq or Afghanistan, there was not a general restriction on the extensive use of artillery. Only in recent operations in Syria has the US Army and US Marine Corps Artillery units routinely fire a substantial number of rounds, often in the hundreds or thousands per day. These conflicts emphasized the use of artillery as an area fire weapon system rather than just a precision-strike capability. The critical difference between a precision strike and area fire is the volume of fires and the consideration of collateral damage.

---

<sup>66</sup> Karber, *Lessons Learned from the Russian-Ukrainian War*, 16.



The use of precision-guided artillery munitions was a force requirement in Iraq and Afghanistan to assist in mitigating civilian casualties and collateral damage. Comparatively, the lethality and heavy use of artillery drove the Russian-Ukrainian War into a defensive battle with each side digging entrenchments which is an aspect of combat the US Army is inexperienced.<sup>67</sup> To counter the use of entrenchments the US Army has extensive experience in preparing and effectively using precision-guided munitions to strike targets. Using precision-guided munitions enable BCT and division commanders another capability to mitigate risk to strike a specific target. Precision-guided munitions expand the range and strike ability of a BCT and DFCs. The US Army, when fielded with long-range precision fires, and extended range cannon artillery to reduce the gap between US and enemy formations.

The long-range capabilities of foreign artillery systems are not something that the US can match quickly. As exhibited in the Russian-Ukrainian War, the volume of fire makes the firing units susceptible to counter-fire radars. Each US Army DIVARTY, FAB, and BCT possesses a Q-53 radar system with a range of sixty kilometers in a ninety-degree range fan. This system sees further than any adversary's radar and gives a targeting advantage to the US. Crucially the centralized command and control of sensor management of all radar systems within the division allow US Army formations to overlap coverage and ensure deep area target identification. The DIVARTY synchronizes radar employment throughout the division and with adjacent units. It also ensures integration of all radars both FA and ADA to provide a full sensor to shooter lineage. This gives US Army divisions the best opportunity to utilize long-range assets, either attached or from its organic DFC similar to what occurred in the Gulf War.

The 1991 Gulf War is one of the most recent large-scale combat operations and serves as an example of how the US Army and joint services will have to collaborate in future conflicts. With years of past experiences during the GWOT, the potential challenges of large-scale combat

---

<sup>67</sup> Karber, *Lessons Learned from the Russian-Ukrainian War*, 21.

operations will require more direct collaboration and inter-service cooperation. The Iraqi Army possessed a large and robust artillery and rocket inventory with years of combat experience. In the lead up to the ground campaign during Operation Desert Storm the risk of the Iraqi's regime use of Soviet-made Scud missiles to target critical coalition infrastructure forced the US to target the Scuds over other high-priority targets. Though Iraq only fired eighty-six Scuds during the lead up to Operation Desert Storm over 40 percent of all air sorties flown hunted for Scuds.<sup>68</sup> This significantly reduced the overall effectiveness of the air campaign to prepare the battlefield and meant that US Army Central Command targeting goals could not be reached prior to the start of the ground campaign. In Operation Desert Storm the deficit between the air campaign goals and targets were fired by long-range fires assets organic to the US Army divisions and corps.

Just like Gulf War I, future large-scale combat operations could require joint force assets to prioritize other targets than the land component (or the US Army) need to have an advantage in offensive operations. Unlike Iraq in 1991, current peer adversaries have kept pace with technological advances in precision fires and air defense capabilities. As Desert Shield demonstrated, when US forces conduct reception, staging, onward movement, and integration (RSOI), the US could have to commit extensive amounts of air sorties to target critical enemy weapon systems. Long-range weapons such as the 9K720 Iskander, or the S-400 (SA-21) ADA system will effectively give the opposing force a primary advantage unless they can be systemically targeted.<sup>69</sup> While the capability of the S-400 is debatable, it remains a potent A2/AD threat that will challenge US forces ability to do joint force entry.<sup>70</sup> Critical to supporting the current organization of the US Army division and corps is the US Air Force's ability to provide air support with enough sorties and capability to reduce the enemy in the deep area.

---

<sup>68</sup> Scales, *Certain Victory*, 184.

<sup>69</sup> Gordon and Matsumura, *The Army's Role in Overcoming Anti-Access and Area Denial Challenges*, 15.

<sup>70</sup> Dalsjo, Jonsson, and Berglund, "Don't Believe the Russian Hype."

To defeat a peer adversary in the future will require a systems approach to mitigate the adversary's technological advantage in rocket systems and ADA. However, for these integrated advantages to be effective against US forces, they must link together. Which provides US forces a targetable system. Having a centralized command and control system in the division and corps HQs allows US forces to target adversary fires commands by integrating the components of the various WFFs. Specifically, by utilizing the sensor to shooter system within the BCTs and Divisions to directly target enemy recon-strike formations. IFCs rely on their organic UAVs to observe targets in their deep area and are capable of rapidly responding after identifying targets. Using counter-UAV tactics to destroy their ability to engage targets would reduce the long-range advantage. Divisions will need to use such tactics as frequency jamming, and use of counter-UAV weapons (such as short-range ADA systems) to neutralize the systems. This allows US Joint fires the time to seek out and destroy enemy fires systems. Also, directly targeting enemy radars and sensors would prevent counter-battery missions after US fire missions.

In US Army training scenarios and guidance such as digital WFXs and US Army training circulars, IFCs are successful at integrating with air defenses to prevent aviation assets from reducing their capabilities. However, there are no real-world examples of producing this level of systemic integration in the current operational environment. Additionally, any adversary would have to deal with the same operating environment and conditions as US forces. Training to a higher level in WFXs makes sense and is critical for preparation for future conflicts. However, this does not mean that the US Army should not field the DFC. Fielding the DFC would ensure the US Army maintains dominance in the fires domain.

Currently, the Russian reconnaissance strike complex, can leverage multiple artillery systems across the depth of the formation. Each echelon uses its own UAV to report back to its command post, with IFCs executing fire missions quickly as possible. Unlike the consolidated targeting approach in US Army division and corps, there is not a centralized system to ensure that multiple weapon systems deconflict target servicing. The lack of redundancy creates numerous

dilemmas that US Army Division and Corps can exploit to stress the fires complex of an adversary without necessarily placing units at risk.

## Conclusion

The challenges of future conflicts are unpredictable. However, lessons gleaned from past conflicts demonstrate that fires will play a crucial role. US Army corps and divisions will have to fight through multiple contested domains, often at the same time, to be successful.<sup>71</sup> The ability to dominate specific domains and create windows of opportunity will require a fires formation that can synchronize effects across the division. Most pressing is the lack of long-range organic fire support systems and assets within the division which limit the division's ability to shape the deep fight.

Emerging from eighteen years of persistent conflict in Iraq and Afghanistan the US Army pivoted back to focusing on large-scale operations. With this transition, the need for operational fires in the future will grow in demand. Providing operational fires for matching and defeating the capabilities of peer adversaries will require the Field Artillery community to alter its doctrine, organization, and training. Massing fires at the battalion and higher level will become a requirement in future conflicts. Division commanders will require the ability to shape the deep area and the doctrine and training of Field Artillery battalions and DIVARTYs must be able to meet the requirement. The publication of *ATP 3-09.90, Division Artillery Operations and Fire Support for the Division* is a start to ensuring that divisions can conduct fires in pursuit of tactical and operational objectives.<sup>72</sup> However, fielding DFCs will require additional changes to ensure US Army formations are adequately able to execute the mission.

---

<sup>71</sup> Headquarters, United States Army Training and Doctrine Command, *US Army Concept for Multi-Domain Combined Arms Operations at Echelons Above Brigade 2025-2045* (Fort Eustis, VA: Government Printing Office, 2018), 6.

<sup>72</sup> US Army, *ATP 3-09.90* (2017), 2-1.

The publication of *FM 3-0 Operations* refocused US Army doctrine squarely on large-scale combat operations. It also prepares the US Army for conducting multi-domain operations in the future. As the capstone doctrine of the US Army, *FM 3-0 Operations* changes the way the US Army will fight with impacts throughout the entire organization. In the future corps and divisions will need to operate from displaced postures and utilize all domain resources available to maintain continuous pressure on both integrated air defense systems and IDF networks, so they are disrupted, and collapse as forward enemy forces attempt to reposition rearward.<sup>73</sup>

Since 2008, Russia commenced an ongoing modernization program for their military seeking to increase capacity and capability. Since 2008 the Russians followed a modernization process that advanced their doctrine and equipment. Some of which is superior or unmatched in the US inventory. The Russians also invested heavily in air defense artillery, possessing a myriad of systems to include the S-400 and continue to develop newer systems. The Russians conducted exercises with the intention to stress the mobilization and readiness of its forces. Additionally, these exercises work combined arms operations and are larger than standard US exercises. Even without this modernization and restructuring, the Russians possess a tremendous number of cannon and rocket artillery pieces and systems.

This monograph focus was on the doctrine, organization, and training differences between IFCs and US Army divisions and DIVARTYs. DOTMLPF-P is a model useful for providing operational solutions by examining Doctrine, Organization, Training, Material, Leadership, Personnel, Facilities, and Policy. Avenues to continue studying and critically examining operational fires in large-scale combat operations should consider the remaining elements of DOTMLPF-P. With the advances in technology and the proposed fielding of the extended range cannon artillery, and long-range precision fires, the future material solutions will

---

<sup>73</sup> Headquarters US Army Training and Doctrine Command, *US Army Concept for Multi-Domain Combined Arms Operations at Echelons Above Brigade 2025-2045*, 40.

be vastly different in US Army formations than today. Additionally, the complexity of future combat will require changes to US Army leadership training to properly prepare leaders. As the US Army continues to adapt and prepare for future conflict, it will need to study its formations and abilities to ensure success.

The challenge of large-scale combat operations will stress the US Army across the depth and breadth of its formations. Despite years of experience conducting combat operations in Iraq and Afghanistan the complexity and scale of large-scale combat operations are unlike anything the US Army has faced in recent operations. The modernization efforts of other nations have rapidly caught and in some cases eclipsed the capabilities of the US Army. Years of deployments have degraded core competencies and worn-down equipment. The GWOT hindered the development of equipment and capabilities as the US Army's focus was on COIN. The pivot to large-scale combat operations with the publication of *FM 3-0 Operations* is a needed step towards ensuring the United States is prepared to be "globally engaged and regionally postured."<sup>74</sup>

Implementing the DFC is not the only factor that will allow US Army divisions and corps to win in the future. Unlike the current fires structure in a division, the DFC will optimize fires for large-scale operations.<sup>75</sup> The genesis behind the DFC and Operational Fires Command is not that fires and fires alone can win any war. Rather that the ability these commands will provide in synchronizing all lethal and non-lethal effects in space and time together will enable the US Army to succeed. Partnering these commands with upgraded fire support systems and munitions coupled with rigorous training in the entire sensor to shooter system will position the US Army for the future.

---

<sup>74</sup> US Army, *FM 3-0* (2017), 1-38.

<sup>75</sup> Compton and Boothe, "The Fires Complex," 5.

## Bibliography

- Anderson, James. "Russian Artillery: Adapting Ancient Principles to Modern Paradigms." *OEE Red Diamond Threats Newsletter* 8, no. 10 (November 2017): 18-31.
- Bailey, J. B. A. *Field Artillery and Firepower*. Annapolis, MD: Naval Institute Press, 2004.
- Bartles, Charles. "Reasoning for the Vostok-2018 Strategic Exercise." *OE Watch: Foreign News and Perspective of the Operational Environment* 8, no. 20 (October 2018): 3.
- . "Recommendations for Intelligence Staffs Concerning Russian New Generation Warfare." *Military Intelligence Professional Bulletin* 43, no. 4 (October-December 2017): 10-17.
- Beecher, Lionel, Liam Collins, Steve Ferenzi, Robert Person, and Aaron Brantly. *Analyzing the Russian Way of War: Evidence from the 2008 Conflict with Georgia*. West Point, NY: Modern War Institute, 2018.
- Boston, Scott, and Dara Massicot. *The Russian Way of Warfare: A Primer*. Santa Monica, CA: RAND Corporation, 2017.
- Cohen, Eliot A. *The Big Stick: The Limits of Soft Power and the Necessity of Military Force*. New York: Basic Books, 2018.
- Collins, COL Liam, and CPT Harrison Morgan. "King of Battle: Russia Breaks Out the Big Guns." Association of the United States Army, January 22, 2019. Accessed February 26, 2019. <https://www.USA.org/articles/king-battle-russia-breaks-out-big-guns>.
- Compton, Chris, and Lewis Boothe. "The Fires Complex: Organizing to Win in Large-Scale Combat Operations." *Fires Magazine* (May-June 2018): 3-7.
- Dalsjo, Robert, Michael Jonsson, and Christofer Berglund. "Don't Believe the Russian Hype." *Foreign Policy*, January 22, 2019. Accessed March 8, 2019. <https://foreignpolicy.com/2019/03/07/dont-believe-the-russian-hype-a2-ad-missiles-sweden-kaliningrad-baltic-states-annexation-nato/>.
- Dastrup, Boyd L. *Artillery Strong: Modernizing the Field Artillery for the 21st Century*. Fort Leavenworth, KS: Combat Studies Institute Press, 2018.
- Fires Center of Excellence. "Long-Range Precision Fires." Stand-To! The Official Focus of the US Army. January 17, 2018. Accessed March 13, 2019. <https://www.army.mil/standto/2018-01-17>.
- Gordon IV, John, and John Matsumura. *The Army's Role in Overcoming Anti-Access and Area Denial Challenges*. Santa Monica, CA: RAND Corporation, 2013.
- Grau, Lester, and Charles Bartles. *The Russian Way of War: Force Structure, Tactics, and Modernization of the Russian Ground Forces*. Fort Leavenworth, KS: Foreign Military Studies Office, 2016.

- . *The Russian Reconnaissance Fires Complex Comes of Age*. Oxford: University of Oxford, 2018.
- Headquarters, US Training and Doctrine Command. *US Army Concept for Multi-Domain Combined Arms Operations at Echelons Above Brigade 2025-2045*. Fort Eustis, VA: Government Printing Office, 2018.
- Howard, Colby, and Ruslan Pukhov. *Brothers Armed: Military Aspects of the Crisis in Ukraine*. Minneapolis, MN: East View Press, 2015.
- Lundy, LTG Michael. "Foreword." *Military Review* 98, no. 5 (September-October 2018): 1.
- Karber, Phillip A. *Lessons Learned from the Russian-Ukrainian War*. Washington, DC: The Potomac Foundation, 2015.
- MacFarland, COL Sean, COL Michael Shields, and COL Jeffrey Snow. White Paper, *The King and I: The Impending Crisis in Field Artillery's Ability to Provide Fire Support to Maneuver Commanders*. Washington, DC: Government Printing Office, 2008.
- Mattis, James N. *Summary of the 2018 National Defense Strategy (NDS) of the United States of America*. Washington, DC: Government Printing Office, 2018.
- McKenny, Janice E. *The Organizational History of Field Artillery 1775-2003*. Washington, DC: Government Printing Office, 2007.
- Ott, David E. *Vietnam Studies: Field Artillery, 1954-1973*. Washington, DC: Government Printing Office, 1995.
- Renz, Bettina. *Russia's Military Revival*. Medford, MA: Polity Press, 2018.
- Romjue, James L. *A History of Army 86, Volume I, Division 86: The Development of the Heavy Division September 1978–October 1979*. Fort Monroe, VA: Historical Office, US Army Training and Doctrine Command, 1982.
- . *American Army Doctrine for the Post-Cold War*. Fort Monroe, VA: Military History Office, US Army Training and Doctrine Command, 1996.
- . *The Army of Excellence: The Development of the 1980s Army*. Fort Monroe, VA: Office of the Command Historian, US Training and Doctrine Command, 1993.
- Scales, Robert H. *Certain Victory: The US Army in the Gulf War*. Washington, DC: Brassey's, 1997.
- Schifferle, Peter J., *Americas School for War: Fort Leavenworth, Officer Education, and Victory in World War II*. Lawrence, KS: University Press of Kansas, 2017.
- TRADOC G-2. *Threat Tactics Report Compendium: ISIL, North Korea, Russia, and China*. Fort Leavenworth, KS: Combat Studies Institute, 2015.
- Turner, William A. "From the Commandant's Desk: Update on the Fires Targeting Center and DIVARTYs." *The United States Army Field Artillery Branch Newsletter*, no. 51 (November-December 2015): 3-4.



- US Army Field Artillery School. "DIVARTY: A Force Multiplier for the BCT and Division." *The United States Army Field Artillery Branch Newsletter* (April 2014): 3-6.
- US Department of the Army. *Army Doctrine Publication (ADP) 6-0, Mission Command*. Washington, DC: Government Printing Office, 2012.
- . *Army Doctrine Reference Publication (ADRP) 3-09, Fire Support*. Washington, DC: Government Printing Office, 2012.
- . *Army Technique Publication (ATP) 3-09.90, Division Artillery Operations and Fire Support for the Division*. Washington, DC: Government Printing Office, 2017.
- . *Field Manual (FM) 3-0, Operations*. Washington, DC: Government Printing Office, 2017.
- . *Training Circular (TC) 3-09.8, Field Artillery Gunnery—2013 with CI*. Washington, DC: Government Printing Office, 2016.
- . *Training Circular (TC) 7-100.2, Opposing Force Tactics*. Washington, DC: Government Printing Office, 2011.
- US War Department. *Field Service Regulation FM 100-5, Operations*. Washington, DC: Government Printing Office, 1923.
- Williams, Walter L. "Integrated Fires Commands: A Flexible and Adaptable Organization Part II." *OEE Red Diamond Threats Newsletter* 8, no. 02 (February 2017): 6-9.
- Vego, Milan N. *Operational Warfare*. Newport, RI: Naval War College, 2000.