“We Can Not Take Your Call For Fire Right Now” – Does the Global War on Terrorism Signal the Demise of the Field Artillery?

A Monograph

by

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14. ABSTRACT

The United States Army began transformation to meet the needs of the Global War on Terrorism (GWOT). This transformation initiative demonstrated that change could be rapid. For some in the Field Artillery (FA), the concern was the change was too rapid and reduced the artillery available to support maneuver units. To make the necessary changes to support a Modular, brigade-based Army, the Army embraced Joint interdependence. The primary research question for this monograph is: "does the reduction of FA batteries within a heavy brigade combat team (HBCT) reduce the effectiveness of fire support for full spectrum operations?" The literature used for this research included documents on national strategy, speeches, service and Joint publications, and military journals. These resources provided a background on what the Army expects of the Modular Fires battalion. The publications also provided an understanding of the threat the United States is facing today and the threats expected in the future. The Army directed changes to the structure of FA battalions within an HBCT are a positive step in the right direction for the Army in becoming Joint interdependent. The GWOT is not the demise of the Field Artillery, just an opportunity for the Field Artillery to evolve.

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Abstract

"WE CAN NOT TAKE YOUR CALL FOR FIRE RIGHT NOW" – DOES THE GLOBAL WAR ON TERRORISM SIGNAL THE DEMISE OF THE FIELD ARTILLERY? by MAJ Mark E. Brock, U.S. Army, 71 pages.

The United States Army began transformation to meet the needs of the Global War on Terrorism (GWOT). Senior leaders within the military initiated the transformation from a division-based organization to one built around brigades. This transformation initiative demonstrated that change could be rapid. For some in the Field Artillery (FA), the concern was the change was too rapid and reduced the artillery available to support maneuver units. To make the necessary changes to support a Modular, brigade-based Army, the Army embraced Joint interdependence. Army and Joint doctrine has evolved to meet the needs of interdependence.

The primary research question for this monograph is: "does the reduction of FA batteries within a heavy brigade combat team (HBCT) reduce the effectiveness of fire support for full spectrum operations?" The literature used for this research included documents on national strategy, speeches, service and Joint publications, and military journals. These resources provided a background on what the Army expects of the Modular Fires battalion. The publications also provided an understanding of the threat the United States is facing today and the threats expected in the future. To answer the primary research question, this monograph used a modification of DOTMLPF as the framework to analyze the issue of transforming the Fires battalion within an HBCT. The areas not addressed in this monograph were Leadership and Education and Facilities.

First, doctrine provided an overview of Joint and Army doctrine. This overview included the efforts of the Department of Defense to update doctrine for the GWOT and the efforts to achieve Joint interdependence. Second, Organization discussed the impacts of the 2x8 arrangement for the Fires battalion. The change to 2x8 from the Army of Excellence reduced the firing battery strength from three to two in the Fires battalion. However, the change to two batteries increased the howitzer strength in each battery from six to eight. Third, Training addressed issues associated with restructuring the Fires battalion within the HBCT. The FA faces many challenges in training for fire support in the GWOT as well as training to be a maneuver unit owning land and coordinating patrols and security issues. Fourth, the Materiel section examined some of the developments in FA precision weapons. Developments in integrating global positioning system technology increased the accuracy and range of Paladin fired munitions. The fifth and final area, Personnel, studied some of the effects of transformation on Soldiers in the Fires battalion and the HBCT. For FA leaders, the manning of the Fires battalion with the skill sets to deliver lethal fires and be able to conduct tasks ordinarily associated with other military occupational specialties will provide challenges for the future.

The Army directed changes to the structure of FA battalions within an HBCT are a positive step in the right direction for the Army in becoming Joint interdependent. Developments in weapon capabilities and proliferation in global positioning equipment increased the abilities of maneuver units. For the future, FA leaders can expect continued improvements in weapon systems and precision munitions. The challenge for field artillerymen is to remain technically proficient in their fire support tasks while providing the needed manpower for the GWOT. The GWOT is not the demise of the Field Artillery, just an opportunity for the Field Artillery to evolve.

TABLE OF CONTENTS

> Numbers still count. New technologies, Network Centric Warfare, and effects-based operations do not remove "mass" from the military equation, but may reduce the mass of the military power needed to produce a given result.
>
> E.A Smith, Jr, Captain (Ret)[1]

INTRODUCTION

The Army moved rapidly in its transformation efforts to meet the current threat. The promise of new technology, future weapon systems and the Global War on Terrorism created the environment for transformation. For the Field Artillery (FA), the transformation from three to two batteries did not create a capability gap within the heavy brigade combat teams (HBCT). This transformation is not premature because the emerging technology and weapons systems required to offset this reduced battery strength are available for the Modular Force. As a result, the reduction of FA battery strength is not detrimental to Army operations and does not force a greater reliance on Joint fires nor significantly reduce options or flexibility for fire support to the maneuver commander.

The Army moved forward with transformation and restructuring of combat units after the terrorist attacks of 9/11. The change to the Modular Force was the result of the end of the Cold War, the new strategic and operational environment, and "the need to accommodate constant technical developments."[2] The Army intends to use the brigade as the basic building block for all future operations compared to the Army of Excellence using the division as the basic unit. For the fire support community and the maneuver commander, this transformation has resulted in the reduction of available FA batteries within the HBCT. To compensate for this reduced unit density of three batteries of six howitzers each to two batteries of eight howitzers each, the Army

[1] Edward R. Smith, *Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis, and War* (Washington, DC: DoD Command and Control Research Program, 2002), xxxiv.

[2] Headquarters, United States Army Training and Doctrine Command, *Army Comprehensive Guide to Modularity, Version 1.0* (Fort Monroe, Virginia: Unpublished, 2004): vii.

anticipates a greater reliance on precision weapons and support from external fixed and rotary wing aircraft. For the Army, can this reduction of FA batteries adequately support HBCTs conducting full spectrum operations in today's environment?

The purpose of this monograph is to answer the question: Does the reduction of FA batteries within a heavy brigade combat team reduce the effectiveness of fire support for full spectrum operations? There are four secondary questions for this monograph. First, can ground based precision fires provide maneuver units adequate support versus reliance on close air support? Second, what are the arguments to support transformation of the FA battalion in the HBCT? Third, are the reasons for HBCT Fires battalion transformation valid? Fourth, what are the future implications for FA leaders in meeting the emerging threat?

To answer the primary and secondary research questions and develop recommendations, this monograph required information from a variety of sources. These information requirements include the history of FA and Close Air Support (CAS), the future threat as defined by the National Security Strategy (NSS), the National Defense Strategy (NDS), the National Military Strategy (NMS), and the Joint Operational Environment (JOE), and the organization of the HBCT (organic capabilities and limitations) and expected area coverage / depth of battlespace. Other information for the monograph includes examples from foreign militaries, FA capabilities and limitations (current and anticipated future) and precision weapons, and finally, the definition of CAS and its capabilities and limitations (current and anticipated future). The analysis of the information that supported the decision to reduce the batteries as well as the information from these areas will provide a wide range of information to provide an unbiased answer to the research questions.

FRAMEWORK

> The more important the subject and the closer it cuts to the bone of our hope and needs, the more we are likely to err in establishing a framework for analysis.
>
> Stephen J. Gould[3]

To identify the issues of FA transformation and provide an analysis of the problems, this monograph used portions of DOTMLPF. DOTMLPF is the acronym for Doctrine, Organization, Training, Materiel, Leadership and education, Personnel, and Facilities. This DOTMLPF framework is the basis the Army and the Department of Defense (DOD) use for development and integration of new systems and concepts. Each area of DOTMLPF addresses a particular aspect of a piece of equipment or weapon system. This method of materiel analysis provides force developers a framework for properly planning the integration of all pieces of new materiel fielding.

The structure of the monograph is a literature review, identification of expectations, and an examination of doctrine, organization, training, materiel, and personnel. The literature review section provided the overall background on the literature available and identified themes of the literature. The identification of expectations established a basis for Army transformation, the types of challenges DOD expects to face, and what the Army desires in FA support to the HBCT. The examination of doctrine revealed how the Army operates and the interaction with other services. The monograph does not limit itself to Army publications but also uses Joint doctrine and emerging Tactics, Techniques, and Procedures (TTPs). For organization, the monograph examined the physical arrangement of the Fires battalion. For the FA, organization is the physical "means" to accomplish assigned tasks. The monograph looked at Army of Excellence (AOE) organization looked as well as the new Modular Force. The monograph selected training for the framework because of the challenges to field new formations, use emerging doctrine, and

[3] Stephen J. Gould, *Full House* (New York, New York: Harmony Books, 1996), 30.

conduct non-traditional FA tasks while transforming. Training is significant for Army to integrate the people with the equipment and doctrine. The materiel aspect has a significant impact on what "means" are available for operations. The Army cannot field materiel rapidly or make changes to systems without an impact on other areas of Army operations. Finally, this monograph made a brief examination of Soldiers and the impact of transformation in a section on personnel. The personnel section is significant to the Army because Soldiers posse skills that are unique to the military and therefore, not readily available for recruiting and immediate deployment. This study of the FA culminates with a chapter on conclusions and recommendations. Based on the information discovered during this research, this section provided the findings that are important for leaders throughout the Army.

To avoid any misunderstanding, this monograph purposely excluded two elements of DOTMLPF. Due to the data available and the detail required for analysis, this monograph will not examine Leadership and Education and Facilities. The scope and resources available for this monograph do not allow a proper analysis of these two elements of DOTMLPF. The new technology, doctrine and rapid change make an analysis of Leadership and education difficult at this time. For those interested, there is historical information on Leadership, both U.S. and foreign military, available for study. The Facilities arena involves the physical structures that support the Fires battalion. These structures are the barracks, motor-pools, offices, repair shops, and associated infrastructure. There are four reasons this monograph will not discuss facilities in detail. First, the current facilities have not changed much in the last twenty years. Second, during the 1990s, most FA units consisted of units with the same numbers (or more) of equipment and Soldiers. Third, designs for future systems specify equipment that is similar in size and shape to the current systems. Fourth, the restructuring of Army installations requires a fort specific analysis to identify unit needs. With this establishment of the framework for the monograph and an explanation of why parts of DOTMLPF were not included, the next section of the monograph will be a literature review.

LITERATURE REVIEW

> Transforming the military is not an event; it is an ongoing process. There will be no point at which we can declare that U.S. forces have been "transformed."
>
> Donald H. Rumsfeld, Secretary of Defense[4]

This quote by Secretary Rumsfeld is very applicable in today's military. Change is not a new process to the Army or the U.S. military. This section will discuss the literature that is available on FA, CAS, and Army transformation. For this monograph, the arrangement of the literature review into seven areas should facilitate understanding and reference of the material. The seven are: 1) U.S. history, 2) future threat, 3) foreign military, 4) HBCT capabilities, 5) close air support 6) field artillery, and 7) transformation documents. The first area for the literature is history.

U.S. history provided a look to where its military has been and can be useful in predicting the future. There are many historical examples of the use of FA and close air support. For the purposes of this monograph, historical research will be limited to World War II until the present. The following selections from history should provide a foundation for evaluation of further research:

- "The Evolution of US Army Tactical Doctrine, 1946-76" by Robert Doughty examined the development of doctrine and the change that occurred to force structure.[5] His review included FA systems, the brigade and division structures, and the logic for the reorganizations. A shortcoming of this source was the limitation to the thirty years immediately following World War II. In his study, Doughty examined doctrine for weapon systems that are no longer in the U.S. Army inventory.

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[4] Donald H. Rumsfeld, "Transforming the Military," *Foreign Affairs* 81, no.3 (May-June 2002), 26-27.

[5] Robert A. Doughty, "The Evolution of US Army Tactical Doctrine, 1946-76," *Leavenworth Papers no.1* (Fort Leavenworth, Kansas: Combat Studies Institute Press, 1979), 1.

- Jack Gifford detailed the influence of the natural environment in his work, "The Influence of Weather on Combined Arms Operations in Korea, 1950."[6] This source provided examples of the use of artillery and close air support in the same battle. What makes this example different is the extremely harsh weather conditions the Soldiers had to operate in.

- For logistics, Martin Van Creveld presented *Supplying War, Logistics from Wallenstein to Patton*. This book provided examples of the difficulty in providing resources for military operations.[7] This source provided historical examples of the requirements for proper logistics planning. This resource can provide weight to the argument for decreasing the number of howitzers and the resultant decrease in logistic support.

- In another book by Van Creveld, *Technology and War From 2000 B.C. to the Present*, he provided general historical information on various weapons systems.[8] This source will provide information that is not specific to any country. This source provided information that established baseline capabilities and expectations for weapons used in conventional combat.

- *On Artillery* by Bruce Gundmundsson is in this history category because it is not limited to one country.[9] This book provided a history of the FA in the twentieth century. This history is not limited to United State history, but looks at the developments of the major actors in the century. In the final chapter, Gundmundsson made some predictions on the future of FA. Gundmundsson predicted the future of FA included the use of precision missiles with the ability to transmit data and images back to the unit.[10]

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[6] Jack J. Gifford, "The Influence of Weather on Combined Arms Operations in Korea, 1950," *Combined Arms in Battle Since 1939* (Washington DC: GPO, 1992): 291-300.

[7] Martin Van Creveld, *Supplying War, Logistics from Wallenstein to Patton* (Cambridge, United Kingdom: Cambridge University Press, 1977), 1-3.

[8] Martin Van Creveld, *Technology and War from 2000 B.C. to the Present* (New York, New York: The Free Press, 1989), 1-6.

[9] Bruce I. Gundmundsson, *On Artillery*, (Westport, Connecticut: Praeger Publishers, 1993), 163-164.

[10] Ibid., 164.

- Two books on Desert Storm provided useful information. *Gulf War Air Power Survey Summary Report* by Thomas Kearney and Eliot Cohen examined the coalition efforts with air to defeat Iraq in 1991.[11] It provided examples of the use of aircraft and cruise missiles and the number of sorties flown. Richard Swain presented another perspective on Desert Storm in *"Lucky War" Third Army in Desert Storm.*[12] This book provided a look at the decisions concerning air power made for the ground war in 1991. It discussed the inter-service rivalries that existed and the differing views on how to employ the air force.

- The final book for history is Ivo Daalder and Michael O'Hanlon's book, *Winning Ugly, NATO's War to Save Kosovo*. This book provided an example of modern air power in action against a conventional adversary using some unfamiliar tactics at camouflage and dispersion of ground forces.[13] This source documented the difficulty in using airpower alone to target armored vehicles.

The second area for literature review is the future threat. This monograph will define the future threat using official government documents. Defining the future threat is necessary to properly frame the research and develop reasonable recommendations. The driving document for determining the future threat is the *National Security Strategy of the United States* by President George W. Bush.[14] It established the priorities for the government and established a common document for all agencies to reference. For the military, *The National Defense Strategy*[15] by Donald Rumsfeld and the *National Military Strategy*[16] by the Chairman of the Joint Chiefs of

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[11] Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington DC: GPO, 1993), 181-206.

[12] Richard M. Swain, *"Lucky War" Third Army in Desert Storm* (Fort Leavenworth, KS: U.S. Army Command and General Staff College Press, 1994), 175-224.

[13] Ivo H. Daalder and Michael E. O'Hanlon, *Winning Ugly, NATO's War to Save Kosovo*, (Washington, DC: Brookings Institute Press, 2000), 153-155.

[14] George W. Bush, *National Security Strategy of the United States* (Washington, DC: GPO, 2002).

[15] Donald H. Rumsfeld, *National Defense Strategy* (Washington, DC: GPO, 2005), iii.

[16] Chairman of the Joint Chiefs of Staff, *National Military Strategy* (Washington, DC: GPO, 2004), iv-v.

Staff translated the guidance from the President for the military to develop plans and doctrine. For additional guidance to the military, *The Joint Operational Environment – Into the Future* provided information on factors affecting future operations.[17] Some of the issues facing future military operations are social, economic, science, technology and trans-national actors. This document identified key assumptions for long-range planning. This source will help identify the future threat to the United States.

The third area for literature is foreign military. The collection of articles of foreign military provided additional examples of artillery and air support operations. For this monograph, the examination of actions by other countries allowed a look at how others have evaluated a threat and overcame an adversary. The first of these foreign actions for study involved the French and Vietnamese. "Assessing the Adversary at Dien Bien Phu." by James McLean looked at the ability of a technologically inferior adversary to defeat a more advanced military.[18] The use of anti-aircraft artillery and FA gave the Vietminh a distinct advantage over the French.

Another action that occurred in 1973 provided a view of air operations working against a well-prepared air defense system. *On the Banks of the Suez* by Avraham Adan provided information from the Israeli perspective.[19] The author served as a division commander in the Israeli army during the 1973 Arab-Israeli War. This book provided an Israeli view into the success and failure of their military against the Egyptians. The author covered what he considered their tactical and operational mistakes in the fighting. Chaim Herzog presented the adversary point of view in *The Arab-Israeli Wars, War and Peace in the Middle East*.[20] This

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[17] Headqarters, Joint Forces Command, *The Joint Operational Environment – Into the Future* (Norfolk, VA: Unpublished, 2005), 6-7.

[18] James R. McLean, "Assessing the Adversary at Dien Bien Phu," *Combined Arms in Battle Since 1939* (Washington, DC: GPO, 1992): 121-130.

[19] Avraham Adan, *On the Banks of the Suez* (Jerusalem, Israel: Edanim Publishers, 1980), vii-ix.

[20] Chaim Herzog, *The Arab-Israeli Wars, War and Peace in the Middle East* (New York, NY: Random House, 1984), 9-10.

book provided information on the Egyptian and Syrian use of surface to air missiles to defeat the Israeli air force in 1973. Saad el Shazly's book, *The Crossing of the Suez,* was the memoir of an Egyptian officer. This source provided another view of the benefit of surface to air missiles in the 1973 war.[21] A final article on foreign military is by Heinrich Fischer entitled "The German Field Artillery in the *Neues Heer* Structure."[22] This article provided information on events in German artillery development. This article provided information on how countries other than the United States are equipping artillery units and expect to employ them.

The fourth area of interest for literature concerns HBCT capabilities. The organization of the HBCT, organic capabilities, limitations, and expected area coverage / depth of battlespace are required to study the research question. In COL Kevin Benson's article, "Thoughts on Restructuring Army Brigades," he provided information on why restructuring occurred.[23] The article proposed a way to restructure a brigade combat team and the rationale behind that structure. Robert Brown and Douglas Sims authored "Transforming in Peace and War" in which they discussed the training of officers within a Stryker brigade.[24] This article provided insight into the challenges of training with new systems and integrating developing technology into the way the Army has trained. In addition to these articles, the *Army Comprehensive Guide to Modularity* and recently updated Field Manuals (FM) and draft FMs provided information on the future HBCT capabilities. The *Army Comprehensive Guide to Modularity* also detailed some of the reasons for why modularity for the HBCTs occurred. Specifically, the Chief of Staff of the Army desired to: 1) increase the number of available brigade-sized combat units; 2) create

[21] Saad el Shazly, *The Crossing of the Suez* (San Francisco, CA: American Mideast Research, 1980), 1 & 14.

[22] Heinrich Fischer, "The German Field Artillery in the *Neues Heer* Structure," *Field Artillery Journal* X, no. 3 (May-June 200): 35-40.

[23] Kevin C. Benson, "Thoughts on Restructuring Army Brigades," *Armor* CXIII, no. 3 (May-June 2004): 20-23.

[24] Robert B. Brown and Douglas A. Sims, II, "Transforming in Peace and War," *Military Review* 85, no.3 (May-June 2005): 22-26.

smaller, standardized modules for regional combatant commanders; and 3) redesign brigades to perform as an integral part of a Joint team.[25]

Close Air Support (CAS) is the fifth area for literature review. The history of United States CAS capabilities and limitations (current and anticipated future) provide a look at what air power can and cannot do for the maneuver commander. Developing TTPs is important for effective Joint operations. In David Brown's article, "JTAC MOA vs. JTTP," he discussed the need for Joint Terminal Attack Controllers (JTAC).[26] The JTACs and the agreement for training and qualifications bring improved capabilities to the ground force but still have some work to do to achieve true jointness. Another article about JTACs is "Army JTAC Training – The Way Ahead" by Steven P. Milliron.[27] This article discussed the training and standards that Army JTACs must possess to effectively use air assets. "The Role of "Show-of-Presence" Aircraft in the First Democratic Elections" by Joseph Katz provided examples of how aircraft can facilitate an information operation plan better than FA.[28] For the elections in Afghanistan, the author provided examples of how air power contributed to success of the elections. The article also provided response times for CAS during operations in Afghanistan.

In "JCAS and the Defense of Duffer's Wadi" by D. Matthew Neuenswander and D. Wayne Andrews used a hypothetical situation to describe Joint fires.[29] COL Matthews served as the Commander of the United States Air Force's Air-Ground Operations School (AGOS) and brings credibility to this article. His perspective as an Air Force officer provided some insight

[25] Headquarters, United States Army Training and Doctrine Command, 6-1.

[26] David R. Brown, "JTAC MOA vs. JTTP," *Field Artillery Journal* X, no. 4 (January-February 2005): 18-21.

[27] Steven P. Milliron, "Army JTAC Training – The Way Ahead," *Field Artillery Journal* IX, no. 2 (March – June 2004): 50-54.

[28] Joseph A. Katz, "Afghanistan - The Role of "Show-of-Presence" Aircraft in the First Democratic Elections," *Field Artillery Journal* IX, no.4 (January-February 2005): 15-17.

[29] D. Matthew Neuenswander and D. Wayne Andrews, "JCAS and the Defense of Duffer's Wadi," *Field Artillery Journal* IX, no. 4 (September-October 2004): 5-13.

into how the ground commander can integrate close air support into conventional maneuver operations.

An interview conducted by Patrecia Hollis further discussed controllers. In "Fires and Effects for the 1st Armored Division in Iraq," she interviewed Major General (MG) Martin E. Dempsey who commanded 1st Armored Division and led the division in Iraq for 15 months.[30] This interview provided details into what a maneuver commander expected of Air Force Enlisted Terminal Attack Controllers and fire support. Finally, he provided advice for field artillerymen fighting the Global War on Terrorism.

A final article for CAS is "A Change-Challenge/ The Fire-Support Coordination Box" by Mick Quintrall.[31] This article described the challenges for conducting fire support and preventing fratricide. As the use of Joint fires within urban areas, make the development of a rapid, effective method of coordination essential for the military.

The next to last area for literature review is the Field Artillery. The literature currently available demonstrated the capabilities and limitations of the current weapon systems. COL Robert Barry made an argument for artillery in "Why Organic Fires?"[32] COL Barry argued for continued fielding of organic fire support assets. He made use of historical examples of the use of FA to provide support to maneuver commanders. He recommended that as the Army moves forward with transformation, we must remember the lessons of the past. Another article that argued for FA is "It's a DUMB idea" by COL(R) Daniel Whiteside.[33] Whiteside argued for maintaining the FA and to maximize the effects created using both air and ground fires.

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[30] MG Martin E. Dempsey, "Fires and Effects for the 1st Armored Division in Iraq" interviewed by Patreica S. Hollis, *Field Artillery Journal* X, no. 1 (January-February 2005): 5-9.

[31] Mick Quintrall, "A Change-Challenge / The Fire-Support Coordination Box," *Air & Space Power Journal* 16, no. 3 (Fall 2002): 7-16.

[32] Robert Barry, "Why Organic Fires?" *Field Artillery Journal* IX, no. 2 (March-June 2004): 13-18.

[33] Daniel L. Whiteside, "It's A DUMB Idea," *Armed Forces Journal International* 141, no. 5 (December 2003): 46-47.

For integration of current technologies, Norman Denny provided information on the use of Sense and Destroy Armor Munition (SADARM) and UAVs in "True Battlefield Visibility."[34] The author made an argument for a modified SADARM round to improve intelligence gathering and targeting capabilities. As the technologies mature, new weapons will emerge. J.R. Wilson provided additional information on new weapons in "Precision STRIKE."[35] This article described the need for greater range and accuracy of some FA weapons.

For the future of non-line of sight (NLOS) fires, the article "NLOS Battalion: Fires and Effects in the UA of 2015" by COLs Brian Boyle and William Raymond provided a vision of how a Future Combat System (FCS) artillery battalion will operate in the future.[36] The article compared the capabilities of today's direct support FA battalion to the capabilities for a FCS equipped battalion. This article also provided information on envisioned manning strength.

Another article for the future is "NLOS Systems for the Modular Future Forces" by Charles Emerson, Mark Laflamme, and James Cunningham.[37] The authors of this article described the future indirect weapon systems for the United States military. They provided some basic characteristics of these future weapons and suggested some ways in which to employ them. Dennis Jarosz and Raymond Bingham addressed personnel in "FA Branch: Manning a Force in Transition."[38] They were officers responsible for FA branch management at Human Resources Command when they wrote this article. They detailed the challenges of manning the force as the Army undergoes transformation during a time of war.

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[34] Norman R. Denny, "True Battlefield Visibility," *Military Review* LXXXIV, no. 4 (July-August 2004): 20-21.

[35] J.R. Wilson, "Precision STRIKE," *Armed Forces Journal International* 141, no. 7 (February 2004): 34-36.

[36] Brian T. Boyle and William M. Raymond, Jr., "NLOS Battalion: Fires and Effects in the UA of 2015," *Field Artillery Journal* (May-June 2003): 32-38.

[37] Charles J. Emerson, Mark H. Laflamme, and James E. Cunningham, "NLOS Systems for the Modular Forces," *Field Artillery Journal* 9 no. 5 (November-December 2004): 7-11.

[38] Dennis J. Jarosz and Raymond L. Bingham, "FA Branch: Manning the Force in Transition," *Field Artillery Journal* IX, no. 3 (July-August 2004): 38-43.

Meeting full spectrum operation challenges and the training needs is an issue for the FA. Mark Waters addressed this in "From SOSO to High-Intensity Conflict, Training Challenges for FA Battalions."[39] The author was a recent FA battalion commander and outlined the challenges a unit faced in restoring proficiency in delivery of fires. After conducting a stability and reconstruction operation, the author argued the training requirements for the battalion "radically different." The article examined various areas in the battalion for training needs such as ammunition management, medical evacuation, and logistic support.

Another interview conducted by Hollis discussed commander expectations. In "Task Force Danger in OIF II," she interviewed another division commander who also commanded in Iraq.[40] This interview with MG John R. Batiste, commander of 1st Infantry Division, provided details into what a maneuver commander expected of fire support and his advice for the FA community. This article offered insight into the challenges of defeating rocket and mortar attacks maneuver units faced in Iraq and some of the methods used by U.S. artillery to defeat those enemy indirect attacks.

The final area for literature review is transformation documents. These documents provided the information that influenced the decision to reduce the batteries in the BCT. As the military examined operations, new ideas emerged on how to conduct operations. One of these new ideas is effects based operations. In *Thinking Effects, Effects-Based Methodology for Joint Operations* by Edward Mann, Gary Endersby, and Thomas Searle, the authors outlined a new way of planning and executing military operations.[41] Rather than plan actions, the authors proposed military actions should achieve effects.

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[39] Mark L. Waters, "From SOSO to High-Intensity Conflict, Training Challenges for FA Battalions," *Field Artillery Journal* IX, no. 3 (July-August 2004): 30-37.

[40] MG John R. Batiste, "Task Force Danger in OIF II" interviewed by Patreica S. Hollis, *Field Artillery Journal* X, no. 4 (July-August 2005): 4-8.

[41] Edward C. Mann, Gary Endersby and Thomas R. Searle, *Thinking Effects, Effects-Based Methodology for Joint Operations* (Maxwell Air Force Base, AL: Air University Press, 2002), vii.

In "What is Joint Interdependence Anyway?" by Christopher Paparone further emphasized the need for effects.[42] This article discussed the United States armed services growing reliance on mutual support. The authored used the example of a greater use of close air support to compensate for FA. The concluding remarks addressed the issues of effectiveness and efficiency and the associated benefits and risks involved. A final argument for change of the FA was by Major General (Retired) Robert Scales in "Artillery's Failings in the Iraq War."[43] MG(R) Scales argued that the FA must develop more reliable and accurate weapons in order to support the maneuver commander. He provided examples of the use of precision weapons and their effects on the enemy in OIF. Unless the military-industrial complex develops better weapons, the ability of FA to support the commander will not match the ability of the Air Force.

These articles, interviews, and books provided a base for research. As the research continued, this monograph evaluated more sources for relevance. This monograph evaluated open source material in an effort to produce a document for publishing in professional journals with the widest possible dissemination. The initial review of the material indicated the authors fell into a particular category in their views on fire support.

Analysis of these initial sources identified three broad areas within the military on what the Army should do with FA and fire support. These authors and their writings fell into one of three categories: a traditional view, a Joint view, and an air power view.

1) The traditional view – some artillery is good but more is better. These authors want things to remain the same for the FA, or bring a change that incorporates more firing units. Some advocate the Army has gone too far with FA reorganization and reduction of FA strength and use

[42] Christopher R. Paparone, "What is Joint Interdependence Anyway," *Military Review* LXXXIV, no. 4 (July-August 2004): 39-41.

[43] Robert Scales, "Artillery's Failings in the Iraq War," *Armed Forces Journal* 141, no. 4 (November 2003): 44-48.

history of massive FA barrages to support their argument. At times, this argument plays to the ground commander's desire to "own" his own fire support.

2) The Joint view – together the services bring more to the fight. Using new technologies and leadership allow leaders to use a mix of Joint fires and FA. This Joint view is a more balanced approach to FA, CAS, and Joint fires. This argument generally uses a combination of recent events and technological innovation to support this view. From a DOD perspective, this is the general view of where fire support should go.

3) The air power view – FA is antiquated and air power can provide better fire support. This view portrays the FA as an outdated source of fire support that does not meet the needs of the GWOT and address the future threat. For the ground commander, this may be the least desirable view. The air power view emphasizes the ability of air platforms over indirect systems to accomplish fire support. This initial analysis of the authors' views and their works provided a system of classification for the monograph for use in developing conclusions and recommendations.

EXPECTATIONS

> I would tell you we need to move away from single-event athletes and single-event formations to more of a pentathlete or decathlete model for formations and individuals.
>
> GEN Peter Schoomaker[44]

GEN Schoomaker's quote sums up the expectations of many for the Modular Force. The United States requires the Army to meet many challenges, simultaneously. However, what are those challenges? The answer is not black and white nor does the answer lie in one document. To uncover the answers and identify the expectations for the HBCT, this monograph must identify the threat to the current and future force as well as what the Army specifically expects of a Fires battalion in an HBCT. For the threat, the *National Security Strategy of the United States* (NSS)[45] provided a general overview for preventing terrorism, use of weapons of mass destruction against the United States, and defusing regional conflicts. The NSS provided leaders with information for the future but did not specify how the military should organize for meeting the national security needs.

The *National Defense Strategy* (NDS), with guidance from the NSS, specified the guidelines for strategic planning .[46] For the HBCT, three of these specified guidelines are important considerations. First, the United States will perform continuous transformation. For military leaders this indicates the current transformation process will not end with a specific event or establishment of a particular type of combat organization. Second, the United States will take a capabilities-based approach to "address mature and emerging challenges."[47] Third, the DOD

[44] Interview with Peter Schoomaker, "Changing and Fighting, Simultaneously," *The National Journal* (Accessed 11 January, 2006, available at http://www.army.mil/leaders/leaders/csa/articles /2004Oct30.html).

[45] Bush, 1-2.

[46] Rumsfeld, iv.

[47] Ibid.

will manage risks. These three guidelines for strategic planning flow into the same planning considerations for developing the HBCTs and modularity. In addition, the NDS identified the challenges to U.S. interests as: 1) traditional, 2) irregular, 3) catastrophic, and 4) disruptive.[48] These challenges each have an impact on Fires battalion design an function. Finally, the NDS identified eight operational capabilities for transformation.[49] Two of these, improving intelligence and network centric operations, have immediate impact on BCT transformation. Improving intelligence and conducting network centric operations are two areas that will facilitate future HBCT operations and the transition to the FCS.

The *National Military Strategy* (NMS)[50] and the *Joint Operational Environment* (*JOE*) identified various changes to the world that will influence United States operations in the future. In deciding what threat to focus on for the future, the *JOE* does not identify any one area or country, but sees the United States "challenged on multiple fronts over the next 20 years."[51] No longer can the United States organize to fight only a large Cold-War aggressor such as the Soviet Union or equip and man itself for something limited to peacekeeping or border security. For the future, the United States requires a force capable of dealing with a broad range of state and non-state actors armed with a wide array of weapons and techniques.

Finally, what does the Army expect of a Fires battalion in a HBCT? This monograph used *FM 3-90.6* to establish a baseline expectation. *FM 3-90.6* stated, "The fires battalion (lethal and suppressive effects) is responsible for all lethal and suppressive support to battalions in priority of weighting, and shaping missions assigned by the brigade commander to the depth of

[48] Ibid., 2.

[49] Ibid., 12. The Eight Operational Capabilities are: Strengthen Intelligence, Protecting Critical Bases of Operation, Operating from the Global Commons, Projecting and Sustaining Forces in Distant Anti-Access Environments, Denying Enemies Sanctuary, Conducting Network-Centric Operations, Improving Proficiency Against Irregular Challenges, Increasing Capabilities of Partners – International and Domestic.

[50] Chairman of the Joint Chiefs of Staff, *National Military Strategy*.

[51] Headquarters, United States Joint Forces Command, *The Joint Operational Environment*, 41.

the brigade objective or deployment of the brigade's enemy counterpart and counterfire with cannon and attached missile range."[52]

For the HBCT and the transformation to a Modular Force, the *Army Comprehensive Guide to Modularity* provided the Army perspective on why the change and what was expected. As previously discussed, the Army changed to a Modular Force for reasons such as the end of the Cold War, the new strategic and operational environment, and constant technical developments. By changing to a brigade based Army, the Army is better able to meet the needs of the Regional Combatant Commander, provide forces that can be employed by other services, and achieve Joint synergy.[53]

[52] Headquarters, Department of the Army, *Field Manual-Interim 3-90.6, Heavy Brigade Combat Team (Expires March 2007)* (Washington, DC: Unpublished, 2005): 2-18.

[53] Headquarters, United States Army Training and Doctrine Command, vii,1-2, 1-5, and 1-12.

DOCTRINE

Joint Doctrine is in a catch-up mode with modern war-fighting tactics.

LTC Mick Quintrall, U.S. Air Force[54]

The way the United States conducts warfare has changed since 9/11. Operations in Afghanistan and Iraq showed the U.S. military fights an adversary in a new way compared to the Cold War. To conduct these operations, the military used an extensive amount of doctrine to develop and execute the plans for OEF and OIF. Doctrine, as defined by *FM 3-0, Operations,* "is the concise expression of how Army forces contribute to unified action in campaigns, major operations, battles and engagements."[55] However, what drives doctrine? This question is not easy to answer because of the different viewpoints by many people. For example, do doctrine developers base doctrine only on history or technology? Alternatively, is doctrine more holistic in that it evolves because of a combination of technology, current TTPs that become widely accepted principles? These questions are part of what has put Joint Doctrine in a "catch-up" mode.

Today, the U.S. doctrine cannot keep pace with the new technologies, information systems, and the people fighting the war on terrorism. These developments and the GWOT are forcing a change to the way the U.S. Army conducts operations. In this regard, U.S. Army doctrine is functioning well. It is functioning well because a key aspect of United States doctrine is it allows flexibility. Soldiers may modify operations as needed and use doctrine as guide, not the rule.

This flexibility is essential for the Army to develop a new, Modular Force during a time of conflict. A look at United States Army doctrine since World War II demonstrates the Army is capable of changing the way it operates. After the use of the atomic bomb, the Army made

[54] Quintrall, "A Change-Challenge / The Fire Support Coordination Box,"7.

[55] Headquarters, Department of the Army, *Field Manual 3-0, Operations* (Washington, DC: GPO, 2001): 1-14.

changes to doctrine and developed formations in preparation for fighting on the atomic battlefield.[56] After World War II, the United States Army faced a new threat – a nuclear armed Soviet Union. For 50 years, the Cold War nuclear threat shaped the way the Army prepared for combat. The Army built doctrine to survive a nuclear attack and defeat a Soviet conventional ground attack in Europe. Events such as Korea and Vietnam caused further changes to the doctrine. The military involvement in Vietnam saw the cooperation of the Air Force and the Army in ground operations. At the same time, new technologies such as the helicopter forced doctrine writers to rethink existing ideas. What Vietnam also demonstrated was that U.S. firepower was overwhelming against guerrilla forces. The doctrine of the second half of the 20th Century does not mesh with the GWOT. For the U.S. Army, a new doctrine that allows for a capability based approach is the new model – no longer is the United States focused on a Soviet threat-based approach.

As one analyzes the emerging doctrine of U.S. Army operations, it is important to remember the seven areas of literature previously introduced.[57] These seven areas provided a wide range of perspectives on historical Army doctrine, current Army doctrine and where the Army is taking doctrine. Using the cornerstone document of Army operations, readers can see the Army is looking forward. *FM 3-0* in 2001 noted "The Impact of Technology" on offensive and defensive operations and explained to readers that technology is changing the way the Army operates. [58]

To meet the needs of the future, the Army's goal is to surpass Joint operations and become Joint interdependent.[59] In the words of the Chief of Staff of the Army, "The Army does

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[56] Doughty, "The Evolution of US Army Tactical Doctrine, 1946-1976," 7.

[57] The seven are: 1) history, 2) future threat, 3) foreign military, 4) BCT capabilities, 5) close air support 6) field artillery, and 7) transformation documents.

[58] Headquarters, Department of the Army, *Field Manual 3-0, Operations*, 7-28.

[59] Headquarters, Department of the Army, *Serving a Nation at War – A Campaign Quality Army with Joint and Expeditionary Capabilties*, (Available at http://www.army.mil/jec/ Internet, Accessed 19 December 2005): 5.

not fight alone, and achieving Joint interdependence must dominate all future aspects of the Army's culture, structure, and operations."[60] The Secretary of Defense, a proponent of "jointness" within DOD, reinforces this message. Secretary Rumsfeld envisions a military that works as a Joint military and not as individual services acting independently. Early in his second tour as the Secretary of Defense, Mr. Rumsfeld witnessed the ability of Special Forces to operate with aircraft from all branches of the military. This ability of Special Forces to operate with all branches of the military re-enforced his belief that the military must fight jointly.[61]

To illustrate the importance of interdependence to the U.S. Army, a person only needs to look at the Army's plan for change. In the 2003 Army Transformation Roadmap, the word (or a variation of) "interdepend" appeared 53 times.[62] The Secretary of the Army and the Chief of Staff of the Army produced this document. Their guidance incorporated that of DOD to build a force that is interdependent. It should be clear to readers; the Army leadership embraced the concept of Joint interdependence, a concept that will not disappear from the U.S. military lexicon.

For the DOD to achieve Joint interdependence requires the services to decide on what type of interdependence to achieve. There are three potential methods of interdependence for the military, all focus on achieving the stated objective. These methods can pool the resources, apply the resources sequentially, or integrate into a reciprocal interdependence. The challenge for the military is to identify the method to use and not allow service rivalries to undermine the efforts to achieve better efficiency and effectiveness.[63]

A way to achieve this Joint interdependence is through an Effects Based Approach

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[60] Peter Schoomaker, *CSA Remarks (As Prepared): AUSA Eisenhower Luncheon Speech Washington, D.C. October 7, 2003*, (Available at http://www.army.mil/leaders/leaders/csa/speeches/20031007.html, Internet, Accessed 12 January 2006).

[61] Donald H. Rumsfeld, "Transforming the Military," *Foreign Affairs* 81, no. 3 (May-June 2002).

[62] Headquarters, Department of the Army, *2003 United States Army Transformation Roadmap* (http://www.army.mil/2003TransformationRoadmap/, Internet, Accessed 12 January 2006).

[63] Christopher R. Paparone, COL, and James A. Crupi, Ph.D., "What is Joint Interdependence Anyway?" *Military Review* LXXXIV, no. 4 (July-August 2004): 39-41.

(EBA) to operations. EBA is not a new concept for the DOD. Historians can cite examples of the Allied Air Forces using EBA during World War II. The air campaign against Nazi Germany targeted what we know refer to as key nodes in an attempt to cripple Germany's aircraft production.[64] What is relatively new is the United States Army incorporating EBA into military operations.

The current writings on EBA are moving from theoretical to operational. Doctrine, both Army and Joint, is beginning to incorporate achieving desired effects into operations. To function as a Joint force, the Joint Warfighting Center developed an Effects Based Operationis (EBO) Pamphlet for use in promoting change to Joint doctrine.[65] This pamphlet recognized that how the military conducted operations changed faster than doctrine could change. The pamphlet attempted to identify emerging concepts as well as methods and outcomes that the military had not yet realized.

The JTAC MOA emerged because of the November 2004, Army-Air Force Warfighter Conference. This conference addressed the need to provide trained JTACs for all the services. The JTAC MOA provided a good starting point for DOD to develop JTACs and implement another aspect of Joint interdependence. However, there are some shortfalls associated with this MOA.[66] First, MOA does not address rotary wing aircraft and the training required for use in danger close situations. Second, the MOA does not properly address training of JTACs to use CAS in urban settings. Third, the services struggle to provide adequate training resources to certify JTACs. Fourth, the MOA identifies required tasks but does not fully provide "conditions and standards for each task."[67] The final shortcoming of the MOA is the focus only on

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[64] Edward C Mann, Gary Endersby and Thomas R. Searle. *Thinking Effects, Effects-Based Methodology for Joint Operations*. (Maxwell Air Force Base, AL: Air University Press, 2002), 19.

[65] Headquarters, Joint Warfighting Center, *JWFC Pam Operational Implications of Effects-based Operations (EBO), 17 November 2004* (Available at http://www.dtic.mil/doctrine/jwfc_pam.htm, Internet, Accessed 12 January 2006): preface.

[66] Brown, "JTAC MOA vs. JTTP," 19.

[67] Ibid., 20.

controlling fixed wing aircraft. An argument made by COL Brown is the need for the JTAC to posses the ability to control a variety of fire support assets in order to maximize the use of CAS.

Joint Publications address fire support and methods for targeting. Although the current version of JP 3-09 is seven years old, it "establishes doctrine and procedures for planning, coordinating, and executing Joint fire support…"[68] that are valid today. A common theme throughout the publication is synchronization. This synchronization is for all forces and operations occurring within the theater of operations. What JP 3-09 requires are some modifications based on the new approaches to warfare, the new technologies, and the contemporary threat. This JP does not address the current realities of asymmetric threats in urban environments. The examples throughout the JP use conventional fire support coordination measures involving traditional linear, contiguous battlespaces. Meeting the realities of an asymmetric threat is what LTC Quintrall addressed in his article when he proposed "The Grid Box" method.[69]

The most recent Joint Publication for CAS, *JP 3-09.3 (CH1)* includes discussion on urban CAS.[70] This inclusion of considerations for urban operations reflects current operations the military is conducting. As a guide for operational commanders, this Joint Publication provided guidance on integrating CAS with surface fires. This publication is another example at how doctrine changes. This version of *JP 3-09.3 (CH1)* is only a few months old and the military published it less than two years after the original document. For doctrine to change in less than two years is a rather rapid event.

To bring together the different methods for achieving effects, the Joint Staff issued *Joint Publication 3-60, Joint Doctrine for Targeting*. *JP 3-60*, like the previous JPs, is

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[68] Chairman of the Joint Chiefs of Staff, *Joint Publication 3-09,Doctrine for Joint Fire Support* (Washington DC, 1998): i.

[69] Quintrall, 12.

[70] Chairman of the Joint Chiefs of Staff, *Joint Publication 3-09.3 (CH1), Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)* (Washington, DC, 2005): iv.

"authoritative."[71] This step in creating Joint doctrine enables the Army to create a more efficient organization. By creating the authoritative Joint doctrine, the commander can select the best method for achieving the desired effect(s). The emphasis on Joint targeting gives the ground commander more options for how to achieve the desired effect.

For the Army (and the Marine Corps), *Field Manual 3-09.31, Tactics, Techniques, and Procedures for Fire Support for the Combined Arms Commander* attempted to identify the way to employ lethal and non-lethal systems for the combined arms brigade and battalion.[72] An interesting aspect of *FM 3-09.31* concerns the clearance of fires. The FM identified the need to efficiently and effectively clear fires in both a digital and analog command post and noted that digital "can both assist and hinder in clearance of fires."[73]

To achieve true interdependence, the doctrine must address communications, clearance of fires, and control of the fires. In *Serving a Nation at War*, the Army acknowledges the importance of observers and the need for Joint fires for the Modular Force.[74] This recognition is important for the HBCT. Senior leaders recognize the need for doctrine to adapt to the new character of warfare.

Actions in Afghanistan illustrate the difficulty in achieving the correct balance of ground and air power and how doctrine did not adequately address the new, asymmetric threat. Operation Anaconda demonstrated CAS procedures could take time and not be as responsive as traditional FA support. At times, it took hours from request to attack for some CAS missions.[75] Another occasional drawback to reliance on air support was the lack of surprise. Unlike artillery

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[71] Chairman of the Joint Chiefs of Staff, *Joint Publication 3-60, Joint Doctrine for Targeting* (Washington DC, 2004): i.

[72] Headquarters, Department of the Army, "*FM 3-09.31*, Tactics, Techniques, and Procedures for Fire Support for the Combined Arms Commander (Washington, DC: GPO): v.

[73] Ibid., 4-19.

[74] R.L. Brownlee and Peter Schoomaker, *Serving a Nation at War*, (Available at http://www.army.mil/jec/, Internet, Accessed on 12 January 2006): 21.

[75] *Field Artillery in Military Operations Other Than War: An Overview of the US Experience. Global War on Terrorism Occasional Paper 4* (Fort Leavenworth, Kansas: Combat Studies Institute Press): 38.

rounds impacting with little to no warning, aircraft engines did not allow commanders to surprise the enemy with little warning. However, Operation Anaconda did demonstrate that the Air Force could be effective at fire support. The Air Force did provide critical fire support for Army units in contact throughout the operation. This fire support from the Air Force was crucial since the organic FA units for the Army did not participate in Anaconda.[76]

For the FA, a disadvantage in Afghanistan was the ability to conduct lethal counterfire. When units did deploy artillery and assign the batteries a counterfire role, the U.S. forces had to limit the use of the artillery within population centers. U.S. units could detect enemy rocket or mortar attacks, locate the origin of the attack, but were unable to engage in a timely manner because of collateral damage concerns. These concerns were due in part to the munitions available. The munitions available to the FA units were not accurate enough to allow precise engagement of enemy indirect systems in built-up areas.[77]

For the future of Army doctrine, the move to modularity and the SBCT provide a proving platform to develop and refine doctrine for the FCS. For the FA, the FCS cannon will achieve the sensor to shooter direct link that will improve responsiveness.[78] The Army must validate that important capability (and requirement) of the FCS before the government spends vast sums of money in an effort that could prove senseless. Without experimentation and changes to doctrine, the necessary refinements for the FCS might not occur. The future vehicles for the Army rest in the FCS. In this case, it appears the Army is developing doctrine in an effort to improve the FCS implementation.

With all of this in mind for the different types of doctrine, a key question remains: what is the purpose of the FA? According to the FA Mission statement, "The purpose of the Field

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[76] Sean Naylor, *Not a Good Day to Die, The Untold Story of Operation Anaconda* (New York, New York: The Berkley Publishing Group, 2005): 54 and 148.

[77] Ibid., 40.

[78] Charles J. Emerson, "FCS 20-Ton Cannon in 2008, Fact of Fiction?" *Field Artillery Journal* (May-June 2003): 25.

Artillery is to destroy, neutralize, or suppress the enemy by cannon, rocket and missile fire and to help integrate all fire support assets into combined arms operations."[79] Based on that mission statement for the FA, delivery of fires is only part of the mission. There is still much for the FA to provide to the HBCT as well as the Army. The mission statement for FA is important to remember – the FA mission requires "integration" of fires, not just delivery. To accomplish this part of the mission, the FA must provide the skills and knowledge to assist the maneuver commander to mass in military operations.

FM 3-0 defined mass as "concentrat(ing) the effects of combat power at the decisive place and time."[80] Recall the first quote at the beginning of the monograph, new weapons do not remove mass from military operations but may reduce the power required to achieve the desired effect. Precision weapons and doctrine that meets the realities of the new capabilities of the military make the Principle of Mass easier to achieve than ever before.

With all of this doctrine information, what does this tell us about the research questions? First, does the reduction of FA batteries within a HBCT reduce the effectiveness of fire support for full spectrum operations? The development of Joint and Army Doctrine indicates, "No." The use of Joint Doctrine and Joint interdependence will make fire support even more effective creating a synergistic effect. Until recently, the Army required large quantities of FA fires to achieve the desired results for the maneuver commander. The emerging doctrine indicates a greater emphasis on EBA using precision munitions, both air and surface delivered, for fire support for full spectrum operations.

Second, can ground based precision fires provide maneuver units adequate support versus reliance on close air support? Yes – the use of new munitions and the development of new TTPs will make ground fires more effective. The developments of doctrine to incorporate the emerging

[79] Field Artillery Mission (Available at http://sill-www.army.mil/pao/mission.html, Internet, Accessed on 6 January 2006).

[80] Headquarters, Department of the Army, *Field Manual 3-0, Operations*, 4-13.

munitions and the recent update of documents such as *Field Manual 3-09.31, Tactics, Techniques, and Procedures for Fire Support for the Combined Arms Commander* provide the Soldiers in the field with resources more relevant to today's operations in the GWOT versus doctrine developed for the Cold War.

Third, what are the arguments to support transformation of the FA battalion in the HBCT? The Army is developing doctrine to face the new threats as identified by the NSS, NDS, NMS, and the JOE. The military organizations developed new TTPs, Army doctrine, and Joint Doctrine to support a successful transformation and create a force that is as lethal, if not more lethal, than the one replaced. It is undeniable that doctrine has changed. The use of Joint Fires for operations allows the Army to transform HBCTs and reduce the number of FA batteries in the organic Fires battalions. Concepts such as Joint Interdependence and EBA combined with emerging JTAC procedures are changing and adapting to meet the needs of the Army.[81] The transformation process is not just about the Modular Force, but also for developing an organization for the FCS. Looking to the future, networked fires coupled with developing doctrine will allow the units to select the best system for engaging the adversary.[82] The AOE structure and the previous doctrine would make that transition difficult.

Fourth, are the reasons for HBCT Fires battalion transformation valid? Yes, the military developed doctrine to meet the technological changes and to meet the current threat as well as the anticipated future threat. This doctrine evolution continues. However, the air component cannot use doctrine to overcome weather challenges or other unforeseen obstacles. As demonstrated in Iraq, air power is dependent upon acceptable weather – and this was not the case throughout the OIF.[83] The doctrine must provide for other means of fire support in the event of unforeseen occurrences in the maneuver fight.

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[81] Milliron, 50
[82] Boyle and Raymond, 37
[83] Barry, 16.

Finally, what are the future implications for FA leaders in meeting the emerging threat? FA leaders face several challenges with doctrine to face the emerging threat. The FA leaders must develop doctrine that addresses the emerging terrorist threat, how to fight the GWOT, and the possibility of a conventional confrontation with a near capability competitor. With implementing existing and new doctrine, FA leaders have a variety of challenges. FA leaders must maintain an understanding of a conventional force fight and continue to know how to employ FA for a conventional fight. As the new threat evolves its TTPs, the FA leader must adapt doctrine and realize the doctrine may not change as fast as required. Another challenge for FA leaders to anticipate is that Joint interdependence may not arrive as fast as the Army needs it to be. Finally, FA leaders should recognize and act when the time to change doctrine. The doctrine used now does not appear to solve situational awareness for the Modular Force nor does the doctrine identify what is the right mix of air and ground fire support. For the U.S. Army, a continuing challenge is situational awareness. In Iraq, the difficulty in achieving perfect situational awareness made targeting a challenge in Iraq.[84]

This chapter provided insights into the challenges of developing and maintaining appropriate U.S. military doctrine. Besides Army doctrine, outside agencies also affect the Army. The use of Joint doctrine and other service assets have an impact on the ability of units such as an HBCT to operate. In the current GWOT and the DOD efforts to transform, doctrine writers and units incorporate the most up to date information to make doctrine effective for the current fight and anticipate the needs of the future. This updating of doctrine also influences other aspects of the Army and how the FA is composed for operations. In the next chapter, the monograph examined the organization of the FA.

[84] MG Raymond T. Odierno, "Division Operations Across the Spectrum – Combat to SOSO in Iraq" interviewed by Patreica S Hollis, *Field Artillery Journal* IX, no. 2 (March-June 2004): 7.

ORGANIZATION

> As long as the insurgent has failed to build a powerful regular army, the counter-insurgent has little use for heavy, sophisticated forces designed for conventional warfare. For his ground forces, he needs infantry and more infantry . . . some field artillery for occasional support.
>
> David Galula[85]

The quote by former French Army officer and counter-insurgency expert David Galula implies the FA, in large numbers, is not required for GWOT. But what did Galula mean when he said "some" field artillery? His comment on some FA was rather easy to make, but Galula did not specify how a military should arrange the composition or disposition of its FA. Developing the organizations for units and finding the correct balance between some, less, or more is a challenging task for force developers.

This section of the monograph will examine the organization of the Fires battalion. For this monograph, organization is that which "addresses the structure and grouping of people skills to accomplish work."[86] Under the Army of Excellence, previous experience demonstrated the need for a division to deploy with its own organic FA plus two additional FA brigades.[87] This amount of artillery gave the division commander great flexibility in operations and the ability to augment each maneuver brigade with reinforcing fires. This large amount of FA battalions for a division reflects an FA platform without precision munitions or Joint fires. With transformation, the Modular Force retains the capability to provide reinforcing fires for major combat operations with the use of Fires brigades.

Operations in OEF demonstrated the ability of other weapons systems to provide adequate fire support for the maneuver commander. In particular, Operation Anaconda saw U.S.

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[85] David Galula, *Counterinsurgency Warfare Theory and Practice* (St. Petersburg, FL: Hailer Publishing, 2005): 93.

[86] Headquarters, Joint Warfighting Center, *JWFC Pam Operational Implications of Effects-based Operations (EBO), 17 November 2004,* 22.

[87] Whiteside, 46.

forces conduct a major operation without FA weapons. On conducting operations without artillery, the 10th Mountain Division Commander, MG Franklin Hagenbeck "knew we could accomplish the mission without them."[88] To compensate for the missing howitzers, the maneuver units relied on a combination of aircraft and mortars. A U.S unit conducting operations without supporting FA is quite an accomplishment for one of the biggest battles of OEF.

The Army designed the new, Modular Army on brigades rather than division elements. Because of this restructuring, the HBCTs must make changes to their organization to be successful. According to GEN Richard Cody, the "brigades are designed as modules, or self-sufficient and standardized brigade combat teams, that can be more readily deployed and combined with other Army and joint forces."[89] The AOE heavy brigades do not meet that vision as described by GEN Cody.

The Fires battalion in the HBCT consists of four batteries: a headquarters battery, a support battery, and two firing batteries (See Figure 1). The firing battery size is roughly unchanged from that of the AOE structure. A benefit to the HBCT is reduced logistics. The Fires battalion organization of two batteries reduced the logistics requirements by condensing the three batteries into two batteries and the elimination of two howitzers. Another benefit to the HBCT is the improved deployability of the Modular Fires battalion. There are fewer Soldiers in the Fires battalion and less equipment to move. The elimination of one firing battery reduces the transportation requirements for command and control structures and redundant support vehicles.

[88] *Field Artillery in Military Operations Other Than War: An Overview of the US Experience. Global War on Terrorism Occasional Paper 4*, 37.

[89] Richard A. Cody, "The Army in Transformation," *Assembly* (May-June 2005): 35.

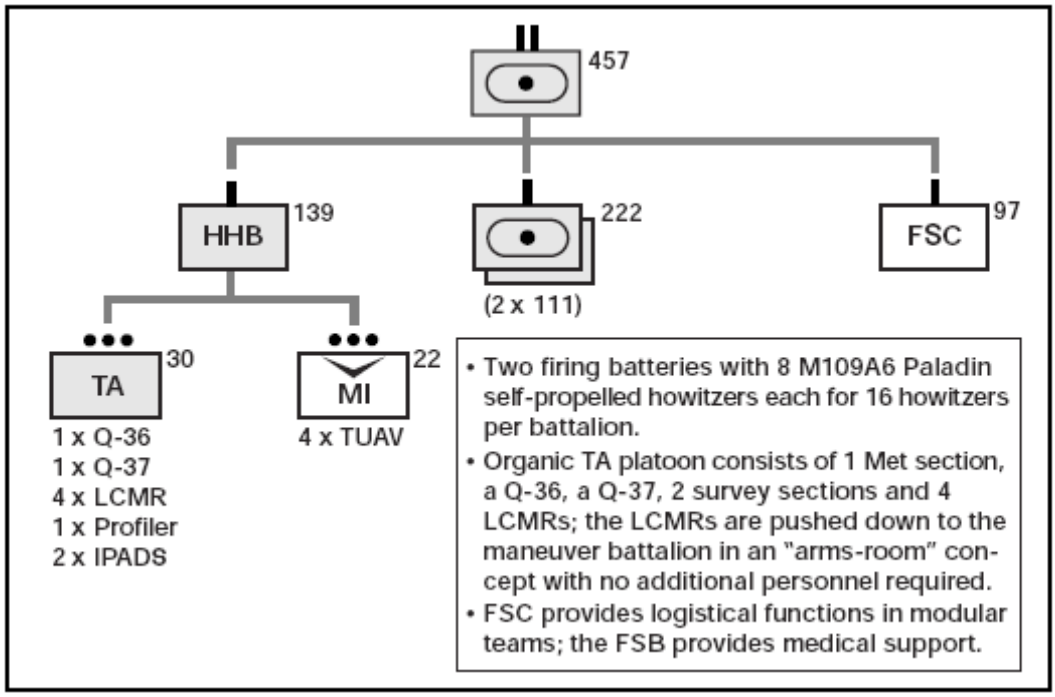

Figure 1. Fires Battalion Organization for an HBCT[90]

The Army faced a tough decision on how to reorganize the HBCTs. To get transformation rolling in the Army, GEN Schoomaker discussed reorganizing the 3rd Infantry Division. He wanted to know what would happen if the Army turned three of the brigades into four, and would the new organization be more lethal.[91] This statement initiated the reorganization efforts for mechanized divisions. The Army had to proceed with thought and care to prevent the planning of units it could not build with the existing resources. The Army cannot instantly field additional howitzers and arbitrarily add Soldiers. The amount of equipment and Soldiers readily available to support the transition to a Modular Force is an influence on the size of the force developed.[92]

[90] MG David P. Valcourt, "Issues and Answers: NLOS-C Caliber Decision, Today's Modularity, Counterfire, and Sound Bytes," *Field Artillery Journal* IX, no.3 (July-August 2004), Available at http://www.usfaa.com/Chief_FA/files/CCOYC_2004-3.pdf, Internet, Accessed on 11 January 2006: 2.

[91] Peter Schoomaker, "CSA Vision: More Brigades – Smaller but Lethal" (Washington, D.C.: Army News Service), Available at http://www.mccoy.army.mil/ReadingRoom/Triad/10242003/csa.htm, Internet, Accessed on 11 January 2006.

[92] Andrew Feickert, "U.S. Army's Modular Redesign: Issues for Congress," *CRS Report for Congress* (Washington, DC: The Library of Congress, 2 January 2005): 17.

Another introduction to the HBCT structure and the Fires battalion was UAVs. UAVs provided a method of proactive counterfire in Iraq. UAVs acting in tandem were able to locate enemy fighters emplacing weapons and provided a platform for precision engagement.[93] The addition of UAVs to the organization of an HBCT Fires battalion provided a powerful ISR capability to improve target location and observation of fires. However, units must prepare for the loss of UAV assets. The addition of UAVs does not guarantee the Fires battalion commander with 24 hour, uninterrupted coverage of enemy activity or his area of operation (AO). During operations in Kosovo, the United States lost fifteen UAVs.[94] This example from Kosovo demonstrates that UAVs can operate in dangerous areas, providing commanders with information. However, commanders must remember that UAVs are not invincible, and if the plan requires observation of a particular area, redundant coverage should be planned.

The Division Artillery (DIVARTY) owned the counter-fire/counter-rocket radars under the AOE. In the HBCT, the addition of Q-36, Q-37, and four Lightweight Countermortar Radars (LCMR) is a new development, as well as organic meteorological section for each Fires battalion. These assets greatly facilitate accuracy of the Fires battalion artillery fires as well as locate enemy rocket and mortar attacks. The HBCT ownership of the radars allows the maneuver commander to emplace radars in positions to cover the assets and locations that he deems important. The same is true for the entire Fires battalion. With the demise of the DIVARTY organization, the Army is making the artillery battalion an organic part of the HBCT. With the Fires battalion a permanent part of the HBCT, the HBCT commander can now organize the battalion as he sees appropriate to conduct operations. This addition of these former DIVARTY assets also allows the HBCT commander to shape the deep battlespace. The deep fight was a mission that used to belong to the division and higher, but now the HBCT can fight in depth.[95]

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[93] Dempsey, 7.
[94] Daalder and O'Hanlon, 236.
[95] Headquarters, United States Army Training and Doctrine Command, 7-10.

A potential drawback of the new, Modular unit is the size and organization reduced the number of Soldiers, firing sections, platoons, platoon fire direction centers, and battery headquarters. A negative consequence is the limited amount of units available for missions or the conduct of non-traditional FA tasks. The reduced size increases the amount of distance the two batteries must cover to adequately support maneuver operations with FA support compared to the area three firing batteries can cover with their range and communications capability.

The material on organization provided answers to the five research questions for this monograph. For the first question, does the reduction of FA batteries within a HBCT reduce the effectiveness of fire support for full spectrum operations, the answer is no. Properly placed firing units bring sixteen howitzers to bear on targets. These howitzers benefit from a meteorological section within the Fires battalion thus providing weather data that is accurate for the AO. UAVs aid the Fires battalion by providing observation of the fires and aid in correction of targeting.

Second, can ground based precision fires provide maneuver units adequate support versus reliance on close air support? The answer is yes. The organization of the Fires battalion provides the HBCT with a command and control structure similar to the AOE. The reduction of the Fires battalion's howitzer strength will not adversely affect critical fire support. Even though the HBCT Fires battalion contains two firing batteries versus the three firing batteries in the AOE direct support FA battalion, this does not accurately reflect the change to howitzer strength. The Fires battalion reorganize does eliminate one firing battery but it only reduces the overall battalion howitzer sections from 18 to 16 sections.

Third, what are the arguments to support transformation of the FA battalion in the HBCT? In some respects, the organizational structure of the Modular Fires battalion remains very similar to that of the AOE. The basic structure of a headquarters and headquarters battery remains an essential element of both designs. Under the AOE, the FA battalion had an organic service battery for logistical support. In the Fires battalion of the Modular Force, a field service company performs that logistics role. For the firing batteries, the basic command and control

structure remains within the batteries. However, each battery now has two additional howitzers. This configuration of two platoons with four guns each is not new idea. Before the fielding of the M109A6, Paladin, the AOE structure utilized a similar arrangement. What is significant for the Modular Fires battalion is the reduction of firing batteries with the elimination of the third battery. These changes and the addition of counter-fire radars and use of improved ISR assets such as UAVs provide a strong argument for transformation.

Fourth, are the reasons for HBCT Fires battalion transformation valid? Yes, the organization links with the change to doctrine. The changes seen in the Modular organization reflect emerging technology, adapting doctrine, and retention of 16 of 18 howitzers within the Fires battalion. The structure exists to allow the Fires battalion HQ to command and control the addition of a third firing battery for a mission. The reduction of two howitzers and the elimination of the third battery's fire-direction center (FDC) and other support requirements reduce the logistical burden on the Fires battalion and the HBCT.

Fifth, what are the future implications for FA leaders in meeting the emerging threat? For the organization of the Fires battalion in the HBCT, an implication is the reduced manpower under the Modular organization compared to the AOE. With the GWOT and operations in Iraq, Army units now conduct missions in addition to their branch tasks. Once major combat operations are complete, FA units can expect taskings for stability and support operations. By reducing the organizational size to two batteries, the Army has reduced the number of small units available for the HBCT staff to assign an AO. Another implication is the reduction of the firing battery from three to two and the reduction in the area covered by dispersed batteries, the loss of redundancy in platoon FDC from six to four, and the impact on essential field artillery tasks (EFAT). The reduction from three to two batteries decreases the number of units for a Fires battalion to task for the accomplishment of an EFAT or fire a special mission such as FASCAM, smoke, or illumination.

The organization of the FA within the HBCT provides leaders with new challenges as well as benefits. With modularity, FA leaders must confront how to accomplish battalion tasks with a smaller battalion and fewer Soldiers. The change from 3x6 to 2x8 provides the HBCT with two less howitzers but the reorganization into two batteries reduces some of the logistical issues associated with FA operations. Another benefit of the transformed Fires battalion is the integration of counter-fire radars and meteorological sections into the battalion. The next chapter in this monograph examined the impact of modularity on training for field artillerymen.

TRAINING

> What is now done by surveyers, tables, charts, computers, weather stations, devices for measuring muzzle velocity, and the well-worn pencil of the artillery officer will be done by the wrist of a young man raised on video games. The technique of artillery will have disappeared.
>
> Bruce I. Gudmundsson[96]

The historian Bruce Gudmundsson used this quote to end his book about FA in the twentieth century. As for the ability to see the future, he appears to be correct. Innovations in weapons and fire direction systems changed the way FA conducts operations. These changes certainly influence training of the units. For this monograph, training addresses individual and collective training for Soldiers in the Fires battalion and fire support Soldiers within the HBCT.

Some questions a leader may ask himself are: "How do you train a Fires battalion for full-spectrum operations?" or "What should be the priorities?" How can a unit maintain FA proficiency at basic tasks such as cannon crew drill, observation of fires or accurate computational procedures when the realties of deployment demand they serve as light infantry or provide Forward Operating Base (FOB) security during stability and reconstruction operations? The implications for the Fires battalion and the HBCT are enormous. Should certain parts of the battery be "off-limits" for non-traditional FA tasks? For example, should fire direction Soldiers (13D) be exempt from all non-artillery tasks in order to maintain proficiency? In the words of a former FA battalion commander, "The Field Artillery can have the best optics, best-trained forward observers and most precise fire control systems available, but unless the right things are happening in the battery/platoon FDCs, fire missions grind to a halt."[97] For the observation of fires, the FA needs Soldiers (13F) with skills that are more diverse. A skill that is required is Joint Terminal Attack Controllers (JTAC). Operations across a large area in Iraq showed the Air

[96] Gudmundsson, 164.
[97] Waters, 30.

Force and Army lacked the required number of certified Enlisted Terminal Attack Controllers (ETAC).[98] Certification process is difficult and requires the efforts of not only the Army but also all the services.[99] The ability to control attack aircraft is not the only skill required. For major combat operations, Army leaders must effectively use CAS to provide the synergy needed for the HBCT to be successful. From previous National Training Center and Joint Readiness Training Center rotations, a lesson for the fire support planners to learn (and remember) is to develop a CAS plan and understand the communications plan of the supporting aircraft.[100]

As events in Iraq developed following the successful invasion and capture of Baghdad, the need for manpower forced Army leaders to find a solution to the shortage. The leaders turned to the FA battalions to provide extra manpower. The FA battalions became available for reorganization once major combat operations ceased. For the FA battalions, only a small force was required to maintain capability to detect enemy indirect fire and conduct counter-fire operations. For some of the units pressed into service as light infantry, this change was the first time to conduct such tasks and presented challenges to the leaders.[101] This need for manpower creates issues for the FA community to determine if FA units should include light infantry tactics into their training. At the same time, Army leaders struggle with how to organize these units non-traditional FA roles.

For the small units that execute non-traditional FA missions in the Modular Force, some argue the "brigade-centric approach to Transformation promises to compound these challenges."[102] The responsibility placed on junior leaders with the new threat and modularity may be more than the responsibility incurred by Soldiers of similar rank faced during the Cold

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[98] Dempsey, 8.

[99] Brown, 20.

[100] Neuenswander and Andrews, 10.

[101] Stephen Lanza et al., "Red Team Goes Maneuver, 1st Cav Div Arty as a Maneuver BCT," *Field Artillery Journal* X, no. 3 (May-June 2005): 10.

[102] Thomas P.Odom et al., "Transformation: Victory Rests with Small Units," *Military Review* 85, no. 3 (May-June 2005): 85.

War. One interesting argument uncovered during the research was to make platoon leaders of infantry units captains and have lieutenants as section leaders with two subordinate squads.[103] This organization structure for training and operations as light infantry appears to mesh well with the typical battery strength of a Modular firing battery in a HBCT Fires battalion. For example, the firing platoon has two officers and approximately 30 enlisted Soldiers. When conducting non-traditional FA tasks, this smaller organization with more officer involvement may reduce some of the responsibilities and burdens of the junior leaders. This greater officer involvement may improve mission accomplishment and counter the argument that the Army has placed too much responsibility on Soldiers now compared to the Cold War.

Operations other than delivery of fires will require training. If possible, units should identify before the deployment what Soldiers may be required to perform and prepare accordingly. For instance, the 1st Cavalry Divarty used Soldiers in tasks "unrelated to their military occupational specialties (MOS), which increased the requirement for thorough training. One example of this is training cooks in detainee operations so they could run the 5th BCT interrogation facility."[104] This was the same case in 4th Infantry Division where "my artillery battalions owned its own battlespace."[105] The Fires battalion Mission Essential Tasks List (METL) must meet the realities of the GWOT. MG Raymond Odierno suggests the Army must "be sure FA units have tasks for military operations across the spectrum and then train those tasks."[106] The Fires battalion METL will continue to address traditional area of FA such as counter-fire.

The FA provides maneuver commanders an effective method to detect and attack an indirect fire system. FA systems coupled with counterfire radars and UAVs make a formidable

[103] Ibid., 83.
[104] Stephen Lanza et al., 14.
[105] Odierno, 11.
[106] Ibid.

challenge to overcome for an adversary wanting to fire at U.S. forces. In OIF, MG Odierno stated, "We also shot a lot of counterfire. . . Our counterfire was so successful that the enemy would only shoot one or two mortar rounds because he knew that if he stayed longer than 30 to 90 seconds, he would die."[107] Success stories like that will continue to drive expectations for traditional FA roles.

New vehicles, the latest technology, and a new brigade structure affected all aspects of leader training and development in the development of the SBCT. As the Modular Force evolves and the Army fields the FCS, units will also encounter unexpected obstacles. Looking to the first SBCTs, leaders can expect to face challenges in garrison support for training as well as information overload by their own technology.[108] At the same time, the look into the SBCT provided a glimpse at the possibilities inherent in the Modular HBCT design.

The training requirements of the Modular Fires battalion to meet the new challenges of the 21st Century are high. For training today and the future, does the reduction of FA batteries within a HBCT reduce the effectiveness of fire support for full spectrum operations? No, but what the reduction created was a need for greater skill in many areas for the Soldiers of the Fires battalion. As a consequence of a smaller Army, the changing of the threat from a large, conventional force, and the need to conduct stability operations, the Army requires FA units to become more multi-functional and to some degree, to be better able to perform tasks that are not traditional FA tasks.

Second, can ground based precision fires provide maneuver units adequate support versus reliance on close air support? Yes, provided those Soldiers supporting the maneuver commander properly train for their FA tasks and the units within the Fires battalion maintain their proficiency in fire mission processing. After major combat operations, the need for manpower for patrolling,

[107] Ibid., 10.
[108] Brown and Sims, 24-25.

security, or other tasks may cause HBCT commanders to use field artillerymen in non-traditional FA roles. Units can provide the required FA precision fires as long as there remain a elements of the Fires battalion trained in clearance of fires, fire direction, and howitzer crew drill.

Third, what are the arguments to support transformation of the FA battalion in the HBCT? Changing the structure of the Fires battalion does not fundamentally change the training requirements of the Soldiers within the Fires battalion. For example, modularity does not affect the training requirements of the howitzer crewmembers. Individual howitzer sections must perform crew drill the same way regardless of how many batteries comprise the Fires battalion. The skills a platoon leader or a platoon sergeant require for emplacing a platoon, preparing a platoon for fire mission processing, or moving from one point to the next remains the same regardless of the number of platoons within the Fires battalion. On a broader scale, the changing of training and creating JTACs is another argument to support the transformation. JTACs provided the Army a capability to develop Soldiers with the ability to use aircraft from other services and reduce the reliance on FA. The combination of the basic section, platoon, battery, battalion training and the implementation of JTACs in the maneuver units allow the Army to change the FA battalion in the HBCT into a Fires battalion.

Fourth, are the reasons for HBCT Fires battalion transformation valid? Yes, the change to Army training with the JTACs and the Air Force's willingness to rely on JTACs supports the transformation of the Fires battalion to a 2x8 unit. The Air Force and the Army programs to develop the JTACs will provide the HBCTs Soldiers properly trained and certified in the delivery of Joint fires. The integration of JTACs with existing precision technology and development of Joint doctrine supports the decision to transform the Fires battalion. The training of JTACs allows the Army to convert FA battalions into Fires battalions for the HBCTs.

Fifth, what are the future implications for FA leaders in meeting the emerging threat? Maintaining skills in traditional FA tasks will be a significant challenge. The fight in the GWOT is now more than four years old and appears to consume all aspects of training. To maintain the

ability to conduct full-spectrum operations, leaders cannot forget some of the basic FA skills. The demands of GWOT may have prevented the newest captains to practice traditional FA skills such as occupations, hip shoots, etc. The officers who are now or soon will be the battery commanders may not have the first hand experiences to share with their lieutenants. With the emphasis on GWOT and the absence of a near competitor to focus military efforts, maintaining the corporate knowledge of smoke missions, Family of Scatterable Mines (FASCAM) delivery, large-scale ammunition movement and rapid rearmament and refuel of a platoon and battery on the move will be a challenge for every FA leader.

The training of field artillerymen is a challenge that will confront FA leaders in the GWOT. Field artillerymen will face many training issues with transformation and the need to perform non-traditional FA duties in the war on terrorism. The HBCTs and the Fires battalions will need to ensure their training provides an adequate number of JTACs, prepares FA Soldiers for infantry type operations, and maintain their skills in basic FA tasks. The next chapter examined the materiel aspects of the Fires battalion in the HBCT.

MATERIEL

> Materiel development is a special challenge for an army at war, because we must not only anticipated and address future needs, we must meet pressing current demands.
>
> *Serving a Nation at War*[109]

Shoot, move, and communicate are the basic requirements for an FA unit to conduct operations. Before the collapse of the Soviet Union, the U.S. Army focus was on fielding weapons to defeat a massed, conventional threat. With the collapse of the Soviet Union, the attacks of 9/11 and the GWOT, the U.S. Army is conducting a war against unconventional threats. As *Serving a Nation at War* emphasized, the U.S. Army is facing a challenge to meet the current threat and prepare for the future. The U.S. Army is attempting to achieve the balance between winning today's conflict and preparing for the future threat by equipping the artillery battalion with a mix of new and old technology.

The development of the right materiel is essential for the U.S. Army. The materiel provides a key component of the means to achieve an endstate, accomplish a mission, or protect U.S. lives. According to the Joint Electronic Library, materiel is "all items (including ships, tanks, self-propelled weapons, aircraft, etc., and related spares, repair parts, and support equipment, but excluding real property, installations, and utilities) necessary to equip, operate, maintain, and support military activities without distinction as to its application for administrative or combat purposes."[110] Using this definition of materiel as a starting point, one can see the materiel considerations for transformation have the potential to be quite complex. Materiel considerations have a significant impact for the Fires battalion. Within the Fires battalion,

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[109] Headquarters, Department of the Army, *Serving a Nation at War – A Campaign Quality Army with Joint and Expeditionary Capabilties*, 18.

[110] Joint Electronic Library, Materiel, Available at http://www.dtic.mil/doctrine/jel/doddict/data /m/03255.html, Internet, Accessed 31 January 2006.

materiel issue comprises more than the number of howitzers to field. For the purposes of this monograph, discussions of materiel are limited to projectiles, howitzers, and launchers.

In the past, military units used large-scale bombardments to prepare an area before launching a ground attack. The U.S. Army has a history rich in massed artillery barrages. During the Korean War, the United States could coordinate multiple battalions for simultaneous strikes on a single target. Not only did numbers of weapons available facilitate the Army's ability to use many battalions but also the amount of ammunition provided for an operation. In one particular example of the Korean War, a single battalion "fired 11,600 rounds in 12 hours."[111]

Today, the U.S. Army conducts fire support operations in a different manner. In October 2003, retired General Barry McCaffrey stated that in OIF, the "U.S. Army and Marine Corps artillery fired 34,322 155mm cannon rounds, 4,107 105mm cannon rounds, 294 Multiple Launch Rocket Systems 30-kilometer rocket pods and 414 ATACMs 100-plus rockets."[112] The use of fewer rounds of FA in OIF compared to a single battalion in a 12-hour period in the Korean War is a tremendous change to fire support operations.

Battle damage assessment of missions fired by friendly forces plays an important role in the targeting methodology of Decide, Detect, Deliver, and Assess (D3A). Looking at the U.S. experience in Iraq and OIF, the age-old problem of accurately predicting effects and making an accurate assessment of the results continues to challenge military planners and leaders. The problem of reliable assessment exists for the other services as well as the Army.[113] In the past, such as the Korean War, the Army used large volumes of dumb rounds to achieve the desired results. New technology is reducing the requirement for large volumes of fire. However, the current precision technology does not solve the BDA issues for planners and executers.

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[111] Doughty, 11.

[112] Barry M. McCaffrey, "Joint Firepower Wins Wars, Apache Helicopters Are Getting A Bad Rap," *Armed Forces Journal* (October 2003): 10.

[113] Wilson, 36.

For the ground commander, does the source of fire support matter? In the words of a commander in OIF, "After a while I really didn't concern myself with the source of firepower to my front. I simply wanted the target to go away."[114] To make the target "go away," commanders do not necessarily need massive, multiple round FA volleys. What ground commanders require are weapons with precision capability to limit damage to the area surrounding the target.[115] However, there are still requirements for large volumes of FA fires. For example, FA delivered smoke screens requires multiple howitzers to effectively build the smoke screen and require several howitzers to sustain the smoke screen. In the use of FA delivered FASCAM, units can employ different techniques to deliver the minefields but it still requires a relatively high volume of fire in a short period. The Fires battalion can select one unit to deliver the minefield over a long period or use multiple units to emplace the minefield in a shorter time. Other examples are when the maneuver commander needs suppressive fires and high explosive rounds to cover a large area.

The current equipment provided units in Afghanistan and Iraq an ability that was unthinkable just a few years ago. These current technologies allowed units to conduct missions in a variety of environments, some of which hampered traditional air support. OIF provided an example of how effective indirect systems can be as an all weather capability. When the adverse weather slowed the advance on Baghdad, "the all-weather capability of artillery and mortars became literally a lifesaver when the storm limited the ability of airpower to deliver precise, close-in strikes."[116]

The new precision weapons used in OIF for the FA included the cannon fired Sense and Destroy Armor Munition (SADARM). SADARM proved effective in OIF and allowed the FA to

[114] Robert Scales, "Artillery's Failings in the Iraq War," *Armed Forces Journal* (November 2003): 47.

[115] Wilson, 34.

[116] Scales, 46.

conduct fire support in a new way. The Army designed SADARM as a fire-and-forget round. Beyond the initial call for fire, SADARM does not require input from an observer once fired from the howitzer crew. Previous precision technology for the FA consisted of the Copperhead projectile. To achieve a precision hit and function as a smart round, the Copperhead required the unit follow a complex process involving the observer, the FDC and the howitzer crew. The observer had to paint the target with a specific laser beam and notify the FDC, the FDC had to relay the information and compute data, and finally, the howitzer crew had to properly set the seeker and fire the howitzer. With these steps and the battlefield environment, achieving a first round hit using the Copperhead could be challenging.

For use in combat, some were skeptical of how effective SADARM could be. In OIF, "thermal images of tanks mysteriously erupting in flame over the horizon after each SADARM mission were proof the doubters were wrong."[117] This one round can significantly reduce the logistics requirements for conventional Dual Purpose Improved Conventional Munition (DPICM) rounds for anti-armor fire missions. In OIF, artillery fired 108 SADARM rounds and "killed" 48 vehicles.[118] In this case, less than one cargo truckload of 155mm ammunition allowed the ground commanders to strike vehicles that would have required several loads of DPICM using a planning factor of multiple rounds per vehicle.

For the HBCT, the method of delivery for the SADARM round and other munitions is the Paladin self-propelled howitzer. The Paladin can trace its origins to the late 1950s. Since the original model, the M109, there have been numerous upgrades until the latest version, the M109A6 Paladin. The Paladin entered service in the mid 1990s and continues to provide the basic fire support for the HBCT. The Paladin provides the capability to deliver several different munitions to the target while providing limited crew protection on an all terrain, tracked chassis.

[117] Ibid., 46.
[118] McCaffrey, 10.

The Paladin is capable of providing high explosive, smoke, illumination, and improved conventional munitions. There is also a crew-served weapon for use in direct fire and armor that provides limited crew protection from small arms and shell fragments. For the near future, the Army expects the Paladin to continue to be the weapons platform for the Fires battalion.

A technology that enabled greater precision was the Global Positioning System (GPS). The use of GPS allowed the FA to improve two parts of the five requirements for accurate predicted fires: firing unit location and target size and location. The GPS allowed improvement in the location ability of FA batteries down to individual artillery pieces. This improvement in location allowed units to produce better firing data. For the requirement of target location, the observer can now locate a target with the aid of GPS enabled equipment. With greater accuracy of target location, the fire support officer does not need to target a large area with multiple munitions to achieve the desired effect.

Emerging technology provides promise for increased precision capabilities and greater range for cannon fired projectiles. One of the newest rounds for the 155mm howitzer is Excalibur.[119] The Excalibur round incorporates a built-in guidance system that allows for fire and forget capability. Unlike Copperhead, this emerging technology does not require the observer to paint the target with a laser. Another benefit is the increase in range of approximately 15% to 30% the Excalibur munition offers over the unguided, rocket-assisted projectile (RAP). The extended range of the Excalibur provides a larger coverage area for each howitzer.

For the future, the FA will utilize precision technology with better capabilities than today's equipment that will provide Soldiers a greater ability to assess targets before and after a strike. Some future precision technology that is in development provides a missile type capability in a portable container. The non-line-of-sight launch system (NLOS-LS) will have missile

[119] J. Riley Durant, "Excalibur Unitary PGM Down Range in Iraq," *Field Artillery Journal* (July-August 2005): 3.

components. The Precision Attack Munition (PAM) will provide long-range fire and forget precise engagement. The Loiter Attack Munition (LAM) will provide some similar capability as the PAM, but the military also expects the LAM to provide the capability to conduct battle damage assessments.[120] The LAM and PAM could provide the HBCT a missile capability that is possible only in the MLRS at this time. These munitions will give the FCS equipped HBCT a deep attack capability beyond the current Paladin equipped Fires battalion.

As mentioned in the Organization section of this monograph, the HBCT owns its own counterfire radars. However, there is a need for new radar with longer range. The Army anticipates the Phoenix to replace the aging Q-37.[121] With the addition of the Phoenix, the HBCT will have an increase in acquisition range and reliability. For the HBCT, this improvement in target acquisition will improve the Fires battalion capabilities to provide counterfire throughout the AO.

The Army expects the NLOS cannon to replace the Paladin. The NLOS cannon is part of the FCS currently under development by the U.S. Army. The Army may see the NLOS cannon begin to replace the Paladin as early as 2008. Like the Paladin, it will mount a 155mm cannon. However, the sustained rate of fire will be six rounds per minute, improved electronics, and lighter weight.[122] Another benefit to the FCS NLOS cannon is commonality of parts and systems with other vehicles in the brigade.[123] This commonality will facilitate the repair of damaged equipment and ease the logistics burden caused by items unique to the current Paladin equipped firing batteries.

New ideas that may have seemed impossible years ago are becoming possible with new technology. Creative use of technology and solicitation of ideas should continue. Commander

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[120] Rocky G. Samek, "ATACMS Fires for the Objective Force," *Field Artillery Journal* (November 2003): 21.

[121] Ibid., 24.

[122] Emerson, 9.

[123] Ibid., 27.

Denny's suggestion of a surveillance type munition fired to locate targets and then a follow-up mission using SADARM type munitions is an example of new thinking. The use of an expendable surveillance munition would allow commander to see into areas that have a high ADA threat to manned aircraft as well as UAVs.[124]

Technological innovation will make the FA an even more lethal unit than the previous AOE. The integration of new precision rounds with extended range makes FA more effective at longer ranges compared to the current family of dumb projectiles. There are many benefits to the HBCT as the extended range compensates for the reduction of two howitzers in the Fires battalion. Besides an increased area of coverage, the new precision provides commanders options for target attack in urban areas or against adversaries in close proximity to friendly troops. For instance, with improved accuracy, commanders can minimize legal considerations compared to using larger explosives or dumb rounds.

Even though the U.S. military has an extensive array of precision weapons, this assortment of weapons does not ensure all operations will succeed as planned. Precision technology does not eliminate risk and collateral damage consideration from missions. For example, operations in Kosovo proved that technology does not ensure a risk free bombing mission. Unintended damage by precision weapons was a challenge to leaders during the Kosovo air war. Daadler and O'Hanlon identified fifteen "incidents" in which NATO attacks had unintended effects. The fifteen incidents involved attacks that erred or provided the adversary with propaganda points to counter NATO operations.[125] These errant attacks demonstrated that precision airpower is not always precise. However, considering the number of sorties flown, these fifteen incidents are a small percentage of the overall missions conducted.

NATO operations in Kosovo in 1999 again demonstrated that airpower does not always

[124] Denny, 21.
[125] Daalder and O'Hanlon, 240-242.

work in a threat free environment. However, Kosovo did demonstrate aircraft could operate in a high ADA threat environment with only a few restrictions.[126] What planners must remember is the Kosovo air campaign did not involve friendly troops on the ground relying on CAS. Kosovo also provided an early glimpse into the abilities and limitations of UAVs and their vulnerabilities. The Serbian military demonstrated their ability to attack UAVs as well as F-117 stealth fighter.[127]

As for conducting operations against an adversary, most enemy organizations will not remain passive if attacked. For those inclined to think of more airpower and less FA, they should remember the example of the Middle East in the 1970s. During the 1973 Arab-Israeli War, the Egyptians and Syrians had time to prepare against the Israeli air threat. The Egyptians recognized Israel possessed a potent air power and looked for ways to attack this strength. Their solution was a mix of surface to air missiles (SAM). This mix comprised portable, short-range systems to relatively fixed, long-rang systems. For the Israelis, a comprehensive ADA umbrella would not have been a significant obstacle to operations if the Israeli Air Force (IAF) had the time to systematically dismantle the Egyptian ADA network. However, events of the war forced the IAF to commit before dismantling the ADA network and lost 102 aircraft as a result. Exact numbers lost due to missiles and ground fire is unknown but only five were lost because of air-to-air combat.[128] This devastating ADA umbrella had a direct impact on the ability of the IAF to conduct CAS operations for the ground forces. Lessons learned by the Israelis before the war encouraged them to favor air power over traditional FA.[129] When the Egyptian ADA umbrella kept the IAF from functioning as "flying artillery," the Egyptians were able to exploit the Israeli's lack of combined arms operations. The Egyptians waited patiently and prepared extensively to

[126] Daalder and O'Hanlon, 122.
[127] Ibid., 118, 236.
[128] Herzog, 310-311.
[129] Ibid., 210.

attack the Israelis. After the stunning Israeli success in 1967, the Egyptians recognized they had to find a new way to defeat the Israeli military.[130]

This information on Materiel for fire support provided answers for the monograph research questions. First, does the reduction of FA batteries within a HBCT reduce the effectiveness of fire support for full spectrum operations? Given the technology that is now available for use by the Paladin, the answer is no. If anything, the capabilities of today's FA units are more capable of delivering lethal fires than under the AOE organization. The new munitions such as Excalibur provide the units with an increase in range and the greater accuracy of the round enable the FA units to cover a larger area and reduce the number of howitzers required to engage a target.

Next, can ground based precision fires provide maneuver units adequate support versus reliance on close air support? The emerging precision munitions and the future NLOS systems indicate yes, ground based fires can provide adequate support for the HBCT. The Fire battalion has the ability to provide lethal fires with great accuracy. The Excalibur enables the Paladin and the Fires battalion to attack targets at much greater ranges without the need for JTACs or especially trained observers. The use of munitions such as Excalibur speeds the responsiveness of FA units in providing the accurate fires needed by ground units.

The third research question is what are the arguments to support transformation of the FA battalion in the HBCT? The future developments in materiel for the FA are a strong argument to change the way the Army organized the FA battalion for a HBCT. Developments in precision cannon-fired projectiles such as the Excalibur and the future NLOS-LS missiles make the Fires battalion a more lethal unit than an AOE FA battalion.

Fourth, are the reasons for HBCT Fires battalion transformation valid? Yes, the new cannon fired projectiles allow the FA to provide the required fire support to the HBCT. The

[130] Shazley, 13.

requirements for fire support are more about the munition fired than about the platform delivering. The Army no longer relies on massive artillery preparations like those of previous conflicts. Today, the requirement for fire support no longer is not to provide large amount of lethal munitions, but to deliver the munitions that achieves the correct effect. Using GPS aided weapons and more accurate target acquisition systems, the Fires battalion does not need to deliver the thousand round prepatory fires to get effects on the target.

The final question is what are the future implications for FA leaders in meeting the emerging threat? For the FA leader, the current and future munitions provide a capability unknown before now. The FA now possesses the systems to precisely locate, target, and attack a point target. The FA leader must learn how to best employ this new capability and maintain the skills to provide fires using conventional dumb, unguided munitions. FA leaders must make a thorough examination of a planned battle or operation and determine what is the correct balance of fire support. Another implication for the future is with more technologically advanced projectiles and missiles, the more complex the support equipment and specific training the

Materiel issues for the U.S. Army are complex and history does not provide the cut and dry answers for what will work as technology evolves. Today, the FA can employ a number of artillery rounds with the Paladin howitzer in order to provide the right type of FA support to the HBCT. When integrated with other technologies, these rounds provide the HBCT with the ability to engage targets at any time. However, as long as the Army continues to fight an adaptive enemy that is difficult to locate, the equipment must change to meet the threat. With the discussion of materiel, doctrine, organization, and training complete, the final area to analyze for this monograph is the impact of transformation on personnel.

PERSONNEL

Steel is cheaper than lives and much easier to obtain.

General Matthew B. Ridgeway[131]

This section of the monograph briefly examined some of the impacts of the transformation process on the HBCT and the Fires battalion. General Ridgeway may be correct in his assessment that steel is easier to obtain than Soldiers. To reorganize the FA units and create Fires battalions within the HBCT required thought and planning to have the correct Soldiers with the appropriate rank and skills. With recruiting challenges and mandated caps on force levels, the Army cannot requisition additional field artillerymen for overnight delivery to new units.

The reorganization of FA battalions to Fires battalions brings some changes to the traditions of the FA community. One of these changes is the assignment of the Fire Support Element to the combined arms battalions (CAB). The integration of the Soldiers within the CAB enhances the ability of all Soldiers involved to know and trust each other. However, the challenge of FA officers and non-commissioned officers (NCO) being assigned to the CABs may have unintended consequences to FA tradition, esprit de corps, knowledge, and other intangibles.

The requirements for JTACs increased dramatically with modularity. Under the AOE, the Army and Air Force had requirements for tactical air controllers (TACs) at the battalion task force level and above. Today, the requirement is to have qualified TACs at the company level.[132] Some would argue the need for JTACs extends down to platoon.[133] From the FA perspective, the 13F, Fire Support Soldier, is a good choice for the JTAC training. As the JTAC process evolves, tracking the status of those trained and certified and assigning to appropriate units to prevent an imbalance in manning will be a leadership challenge.

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[131] Doughty, 11.
[132] Brown, 18.
[133] Batiste, 5.

For the future, the transition to the FCS NLOS cannon will enable the Army to deploy FA batteries with fewer Soldiers. This ability to man batteries with fewer Soldiers is in part due to new technologies and automation of the ammunition handling process. A drawback to this small manpower is fewer Soldiers available for security, stability and reconstruction operations, or to perform non-standard artillery tasks such as those conducted by FA units in Iraq today.

A current issue for FA leaders is the artillery battalions owning ground in stability operations. In Iraq, it was not unheard of for an artillery battalion to organize into a maneuver unit.[134] An issue for all Army leaders is the training of Soldiers to perform the traditional FA tasks and execute maneuver unit tasks. The development of the Army "pentathlete" will be a challenge.[135] A consideration for the HBCT may be to exchange officers and NCOs between FA, infantry, and armor units to provide the necessary expertise.

As the Army transitions to the concept of unit manning and promotion time to captain at slightly more than three years of service, the integration of lieutenants into the Fires battalion present challenges for these battalions to grow their own captains. Limited assignments within the FA may cause many to seek opportunities outside the branch and permanently opt out of the career field. Another challenge for the Fires battalion is to fill the fire support officer (FSO) positions in unit life cycle manning. There are two types of manning procedures planned for the HBCTs: lifecycle management and cyclic management.[136] The time for assignment can become a delicate issue for lieutenants as they seek positions with maneuver units but also need to develop an understanding of how a battery operates. As for the assignment to a fire support position, the length of assignment will also pose challenges for leaders. Under life cycle manning, ideally the HBCT would form units that would train and deploy together for up to three

[134] Ibid., 7.

[135] There is not a definition of an Army pentathelete; however, for this monograph, a pentathelete is a Soldier that is versatile, adaptable, and capable of performing multiple tasks in addition to his basic skill set expected for his military occupational specialty.

[136] Jarosz and Bingham, 39.

years with little to no turnover in personnel. If the HBCT locks a FA lieutenant into the FSO position for the duration of the life cycle process, there will not be time for him to experience other duties before promotion to captain. To complete officer development, leaders should anticipate placing FSO into some type of system such as cyclic manning to allow professional development in other FA positions.

The future of the FA with FCS equipped units will use smaller batteries with fewer enlisted Soldiers. Some issues that may arise are leadership and promotion opportunities for the enlisted Soldiers. The FCS will allow units to operate with fewer Soldiers operating the equipment than today's manpower intensive equipment and as a result, gun crew ratios of leader to lead will decrease.

With this information on Personnel, the monograph can answer the research questions. First, the reduction of FA batteries within a HBCT will not reduce the effectiveness of fire support for full spectrum operations from a personnel perspective. What the reduction of the battery strength of a Fires battalion does do to full-spectrum operations is reduce the number of Soldiers available for tasks such as security, patrolling, radio-watch, and a myriad of other day-to-day tasks.

Next, can ground based precision fires provide maneuver units adequate support versus reliance on CAS? The reorganization of the Fires battalion from a personnel perspective does not affect the ability of the unit to provide fire support. The firing batteries retain their basic structure only with the addition of two howitzer sections to form the 2x8 battalion structure. Within the HBCT, the CABs retain their ability to call for fire and observe indirect fires with the use of organic fire support teams.

The third research question is what are the arguments to support transformation of the FA battalion in the HBCT? The arguments to support transformation of the FA battalion in the HBCT include reducing the number of Soldiers to support. Fewer Soldiers on the ground means fewer logistic requirements. Another reason to reduce the batteries in a battalion includes finding

the number of Soldiers with the proper rank and skills to lead the battery. The Army plans for Fires battalions show the number of battalions going from 33 to 43 in a few short years. Such a fast move does not necessarily lend itself to filling 11 new battalions with senior NCOs. The reduced battalion size provides the Army some breathing room with personnel growth and training.

Fourth, are the reasons for HBCT Fires battalion transformation valid? If the DOD transformation is to meet a future threat, then the change in the structure to a Fires battalion is appropriate. For the future, the Army expects to be expeditionary and shift from more overseas bases to bases in the United States. To meet the needs of an expeditionary Army, the force requires stabilization such as that made possible through life cycle manning or cyclic manning. Within the Fires battalion, the change to a 2x8 organization makes sense from the personnel perspective. The condensing of headquarters and support Soldiers requirements from three units into two units provides the Army with additional people for other requirements.

The final question is what are the future implications for FA leaders in meeting the emerging threat? For the FA, the path for becoming a "pentathlete" is a reality. The FA force finds itself conducting a myriad of tasks in addition to traditional missions such as counterfire and fire for effect missions. For the FA leader, finding the correct balance in maintaining FA competency, traditions, and camaraderie in the pursuit of becoming pentathletes will be a challenge. The need for squads to conduct patrols forces leaders to use howitzer crews to perform tasks that were once considered non-artillery missions. For the FSO, working and living with the maneuver battalions in garrison as well as the field will challenge FA leaders to develop officers with in-depth FA skills.

The personnel issues for FA leaders are complex with transformation to a Modular Force and conducting operations in support of the GWOT. The integration of new Soldiers in to the unit and the need to stabilize the force for the life cycle manning process will challenge FA leaders on manning and training the Fires battalion. For the HBCT, there are issues about finding

the right mix of expertise within the Fires battalion to allow it to task organize the Fires battalion to conduct SRO mission. The next chapter focuses on conclusions and recommendations, given the preceding discussion on doctrine, organization, training, materiel, and personnel.

CONCLUSIONS AND RECOMMENDATIONS

At Tallil, American artillery entered the precision age.

MG (Ret) Robert Scales[137]

There is no doubt that the U.S. FA is now part of the precision age. The events in Iraq referred to by MG(R) Scales showed how the U.S. FA could accomplish significant effects against mechanized forces with new precision weapons such as SADARM. This final chapter of the monograph will provide the reader with some final thoughts on transformation, recommendations for the leaders of the FA, and suggestions for further study.

OIF and OEF provided the Army and DOD with new perspectives on the capabilities of modern firepower. Again, these operations reinforced the idea that "the most effective firepower in support of maneuvering units is provided by a balanced medley of cannon, rocket and aerial systems capable of delivering both dumb and smart munitions tailored to fit the demands of the mission."[138] Technology changed what is required as well as what is not required to achieve the balanced medley of fire support.

The framework for this monograph used portions of DOTMLPF to evaluate the research questions. The literature available for research identified the three general groups of people for fire support as the traditionalist, the Joint proponent, and the air power view. Doctrine looked at Joint and Army as well as emerging TTPs and MOAs. A historical perspective of the last 50 years indicated that U.S Army doctrine always evolves and adapts as the threat and technology change. The organization of the U.S. Army started the transformation with the AOE and is now fielding BCTs with UAVs and their own organic counter fire radars.

The training chapter examined the eyes, brains and the muscle of fire support. The various pieces of the fire support chain each have unique training challenges associated with

[137] Scales, 46.
[138] Ibid., 47.

modularity and the GWOT. These changes range from training and certifying JTACs to maintaining cannon crewmember proficiency when organized as a motorized infantry unit. Materiel examined projectiles, howitzers, and the precision capabilities of MLRS as well as improvements in determining target location. Finally, the review of personnel identified some of the issues for the manning of HBCT and skill sets required for fire support.

The purpose of the FA has not changed with the GWOT. The review the of FA Mission statement on the Fort Sill website stated that besides using cannon, rocket and missile fires, the FA still helps to integrates fire support assets. The Fires battalion did see some reduction in capabilities with the reorganization from 3x6 to 2x8. However, this change was prudent because of increase in the number of BCTs, the GWOT, and the development of new technology.

As the quote by MG Scales at the beginning of this section indicates, the FA entered the precision age during OIF. Today, units can employ FA munitions with great results. As the transformation continues, some may wonder if this is the appropriate time. Given the GWOT and the uncertainty of the FCS, should the Army wait for technology to catch up before proceeding with transformation? The doctrine and technology are emerging to support the transformation and waiting to change the FA structure would not meet the needs of the maneuver commander. Events in Iraq show that Soldiers do not worry about the means, they are concerned with wanting "the target to go away."[139]

For the near and mid-term, the implications for FA modularity in the conduct of operations in support of the GWOT are challenging. Conducting operations as part of GWOT, the FA units will conduct a wide range of missions. Besides being basic field artillerymen, units will call FA Soldiers to function in a variety of other roles such as infantry, police, and security. The elimination of two howitzers in a Fires battalion does not severely impact traditional FA operations when you consider increased range and lethality of the precision munitions. The

[139] Scales, "Artillery's Failings in the Iraq War," 47.

Army changed dramatically from the days of the Korean War using multiple battalions firing rounds in support of operations. What will be a challenge for the FA are fewer Soldiers in the Fires battalion to conduct any type of operation.

However, there are some positive outcomes of FA units conducting non-standard missions. The FA provides the Army with a needed source of manpower for a number of vital tasks. Upon conclusion of major combat operations, the Soldiers in the Fires battalion can shift their concentration from the manpower intensive delivery of lethal fires to assisting the HBCT in stability and reconstruction operations (SRO). Often the missions performed in the SRO require a sense of teamwork, communications, coordination, and planning at the squad or section level. In the process of performing these SRO duties, the FA Soldiers develop the skills and attributes to form the core of pentathletes for the future. This group of pentathletes will provide the foundation for transforming to Fires battalions and the evolution of the Modular Force.

Looking at the literature available and listening to military experts, anyone can readily find historical examples that argue more artillery is better or transformation doubters who disagree with modularity and speak of gloom and doom with the 2x8 concept. History demonstrated that FA could provide excellent surface-to-surface fires. In the Korean War, the Army relied heavily on the FA to deliver larger volumes of fire to support maneuver units. This use of large volumes of fire continued throughout the remained of the 20th century. However, events in Afghanistan and Iraq have shown that the new technology can reduce this reliance on massive volleys to shape the battlefield. The new munitions, better ability to target, the integration of GPS, and other emerging technologies is only making FA better.

The future implications of modularity to the FA and the Army are not certain. For instance, what if the military is wrong in its efforts to transform to a brigade based Army and FA restructuring? One could argue the worst case that the Modular Force will fail. If that does prove true, the Army's history of doctrine shows that the Army will adapt and will correct any mistakes. Since the end of World War II, history has shown the U.S. Army evolves as technology change,

new threats emerge, and the capabilities of other services change. Using the past to predict the future is not a way to guarantee success, but based on the previous success of the U.S. Army, it is reasonable to expect this iteration of transformation to succeed.

For the future, the HBCT will rely on fixed wing, rotary wing, naval gunfire, and other Joint fires to be effective. That may well be true but that will be in line with achieving Joint interdependence and using all available resources. The current cannon equipped Fires battalion does not provide the HBCT commander the ability to influence the battlefield much beyond 30km but the addition of Joint fires and weapons such as NLOS-LS and Excalibur will increase HBCT lethality. If current plans for the FCS continue, the BCT will look and operate differently in a few years. The Army expects the FCS to be composed of vehicles with lighter armor than today's heavy combat vehicles. To offset the lighter armor, the FCS will possess a battlefield network capability to share information rapidly between vehicles.

If history is any indication of the future, precision munition effectiveness and availability will continue to expand in the Army. The FCS will rely on precision munitions to function effectively. The Modular Force will bridge the gap between the AOE and the FCS. This bridge to the FCS will allow the Army to test concepts and develop the necessary munitions to make the FCS a reality. The reduction of batteries in the Fires battalion decreased the number of "boots on the ground" for stability and reconstruction operations. With the fielding of the FCS, battery strength will decrease over 50% in the Modular Fires battalion. This manpower reduction will make non-traditional FA tasks even more difficult for Fires battalions to execute. The use of FA battalions to conduct maneuver type operations and own maneuver space may be a short-lived event. If the future of warfare involves the use of FA units conducting full-spectrum operations, the organization must contain the equipment and manpower to properly execute stability operations.

The title of this monograph asked if the GWOT signaled the demise of the FA. This is hardly true; the change to a Modular Force is making the FA a more modern, efficient, and lethal

system. With today's capabilities, ground and air fires create a synergy that is more than one system by itself. The future of the Field Artillery is bright for those willing to embrace change of the organization and the mindset. The enemy the United States faces today is radically different from the old Soviet threat. The FA no longer faces hundreds of enemy artillery pieces and rocket launchers arrayed across a broad front in Europe. Today's threat involves smaller, more agile adversaries armed with mortars and small rocket launchers often working in an urban area. General George S. Patton once said, "There is still a tendency in each separate unit…to be a onehanded puncher. By that I mean that the rifleman wants to shoot, the tanker to charge, the artilleryman to fire…That is not the way to win battles…Team play wins."[140] The synergy created by the current precision weapons helps to achieve the "team play" General Patton spoke about in 1941.

Today's threat and the adversary of the future will most likely use asymmetric approaches to defeat the United States. The literature available provides leaders with multiple views on how to meet these asymmetric threats. The use of precision artillery projectiles and UAVs provide the HBCT with the internal ability to conduct operations without the assistance of air power. Perhaps not the most desired method to conduct major combat operations but certainly suitable for operations against insurgents using guerrilla tactics.

Army and Joint doctrine will continue to change and evolve, just not as rapidly as techniques on the ground. The movement to using EBA as the future for DOD will facilitate the move toward a common language and improving Joint Interdependence. The emerging doctrine will facilitate the transition to the FCS. Doctrine does not signal the demise of FA, just redefines what the Army expects of the FA. The doctrine developed works but will not solve all the issues. Fortunately, U.S. Army doctrine allows flexibility.

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[140] Headquarters, Department of the Army, *Field Manual 3-09.31, Tactics, Techniques, and Procedures for Fire Support for the Combined Arms Commander*, 1-1.

The organization of FA assets changed dramatically. The HBCT commander now owns the Fires battalion. Unlike the DIVARTY structure where the FA battalion was a supporting organization with a parent headquarters outside of the brigade, the Modular Force places the Fires battalion under the control of the HBCT commander. This significant change allows the HBCT to position the Fires battalion and reduce the likelihood that a unit outside of the HBCT will receive priority of fires.

The U.S. Army and the military need the three groups of people to maintain a balance in the air versus ground power debate. The traditionalist with their belief that more artillery is better offset the proponents of fire support through overwhelming air power. Those people that have the Joint view with a balance of air and ground based fire support facilitate the movement of DOD to Joint interdependence. The Army and DOD must avoid the choice between either air or FA providing all of the fire support. The Joint view will keep everyone honest about what capabilities air and FA can provide as well as their limitations.

The following are some recommendations for Army leaders. First, FA leaders must remember the FA mission statement and not lose sight of the requirement to integrate all fire support assets. Second, leaders should not allow either the air power or the traditional views to dominate the fire support debate. Remember the examples of the Israeli Air Force, Kosovo, MG(R) Scales, and GEN Patton; combat requires a mix of fire support assets. Third, exploit technology and push the limits of what is possible. Do not hesitate to suggest a new way of using technology or suggest a new idea for research. Finally, FA leaders must prepare for the arrival of the FCS, smaller batteries, and assignment to conduct non-traditional FA missions.

The subject of FA modularity has many unanswered questions. One question for further study is should the Army replace the third firing battery with another unit. In place of the AOE Charlie Battery, could the Modular Fires battalion field a mortar battery, a towed battery, or a

composite battery with UAVs?[141] This additional battery would provide the Fires battalion commander a unique capability. The alternate Charlie Battery could provide commanders the ability to deploy fires in a small, light package. This addition of non-tracked systems could provide the HBCT a fire support capability for use in areas that tracked vehicles would be inappropriate.

Another question for study concerns officer duty positions. With the limited expertise in maneuver operations, do Fires battalions need infantry and armor officers on the Fires battalion staff? FA battalions are not comprised only of field artillerymen. With the GWOT and the issue of FA units owning land, the time to assign officers from maneuver branches to FA battalion headquarter may have arrived.

No matter how the Army organizes the FA, maneuver commanders expect the FA to provide many capabilities. In the Hollis interview with MG Dempsey, he stated field artillerymen "must maintain your ability to provide full-spectrum fires and effects whenever the ground force needs them, including massed fires and precision lethality."[142] This is sound advice for FA leaders to remember no matter what the state of change is within the Army. Within the HBCT, given the changes to the way the HBCT and the Fires battalion operate, the reduction of FA batteries within a HBCT does not reduce the effectiveness of fire support for full spectrum operations. The Fires battalion still has the ability to provide the support MG Dempsey requires of field artillerymen. In conclusion, the Global War on Terrorism is not the demise of the Field Artillery, just an opportunity for the Field Artillery to evolve and to be better able to support the maneuver force commander.

[141] Benson, "Thoughts on Restructuring Army Brigades," 21.
[142] Dempsey, "Fires and Effects for the 1st Armored Division in Iraq," 9.

APPENDIX A – ACRONYMS

ADA	Air Defense Artillery
AGOS	Air Ground Operations School
AO	Area of Operation
AOE	Army of Excellence
ATACMS	Army Tactical Missile System
BDA	Battle Damage Assessment
CAB	Combined Arms Battalion
BCT	Brigade Combat Team
CAS	Close Air Support
COL	Colonel
D3A	Decide, Detect, Deliver, Assess
DPICM	Dual Purpose, Improved Conventional Munition
DIVARTY	Division Artillery
DOD	Department of Defense
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and education, Personnel, Facilities
EBA	Effects Based Approach
EBO	Effects Based Operations
EFAT	Essential Field Artillery Task
ETAC	Enlisted Terminal Attack Controller
FA	Field Artillery
FASCAM	Family of Scatterable Mines
FCS	Future Combat System
FDC	Fire Direction Center

FM	Field Manual
FOB	Forward Operating Base
GEN	General
GPS	Global Positioning System
GWOT	Global War On Terrorism
HBCT	Heavy Brigade Combat Team
IAF	Israeli Air Force
JOE	Joint Operational Environment
JSTARS	Joint Surveillance Target Attack Radar Systems
JTAC	Joint Terminal Attack Controller
JTTP	Joint Tactics, Techniques, and Procedures
LAM	Loiter Attack Munition
LCMR	Lightweight Countermortar Radar
LTC	Lieutenant Colonel
METL	Mission Essential Tasks List
MG	Major General
MLRS	Multiple Launch Rocket System
MOA	Memorandum of Agreement
MOS	Military Occupational Specialty
NCO	Non-Commissioned Officer
NLOS	Non-Line Of Sight
NLOS-LS	Non-Line Of Sight Launch System
NDS	National Defense Strategy
NMS	National Military Strategy
NSS	National Security Strategy
OEF	Operation Enduring Freedom

OIF	Operation Iraqi Freedom
PAM	Precision Attack Munition
RAP	Rocket Assisted Projectile
SADARM	Sense and Destroy Armor Munition
SAM	Surface to Air Missile
SBCT	Stryker Brigade Combat Team
SOSO	Stabilty Operations and Support Operations
SRO	Stability and Reconstruction Operations
TAC	Terminal Attack Controller
TTP	Tactics, Techniques, and Procedures
UA	Unit of Action
UAV	Unmanned Aerial Vehicle

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