

# **The Organizational Implications of the U.S. Army's Increasing Demand for Explosive Ordnance Disposal Capabilities**

**A Monograph  
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## Abstract

THE ORGANIZATIONAL IMPLICATIONS OF THE U.S. ARMY'S INCREASING DEMAND FOR EXPLOSIVE ORDNANCE DISPOSAL CAPABILITIES by MAJ Christopher F. Riemer, U.S. Army, 54 pages.

The United States Army is an institution that competes in a complex, dynamic environment. Although the core competencies of explosive ordnance disposal (EOD) organizations have not dramatically changed over the past forty years, the demands placed upon these organizations by the Army have increased significantly. EOD was once mainly viewed as a logistical or combat service support capability with niche tactical utility. However, the changing nature of society and increasing lethality of the modern battlefield have increased demand for explosive ordnance disposal capabilities throughout the operating environment. The cumulative effect of these forces has been a paradigm shift in the EOD community's warfighting focus.

This monograph traces the development and operational experiences of the U.S. Army's EOD forces since Vietnam to clearly demonstrate the community's gravitational movement towards the Protection warfighting function. Since the beginning of the Global War on Terror, the U.S. Army has transformed its operational EOD forces through the entire range of DOTMLPF (doctrine, organizations, training, materials, leadership, personnel, and facilities). However, it has either failed, or refused, to address the implications that EOD's protection focus has for the institutional Army. EOD's parent branch, the Ordnance Corps, is intensifying its traditional focus on sustainment through its consolidation with the Transportation and Quartermaster Corps at the Combined Arms Support Command (CASCOM) at Fort Lee, VA. Currently, CASCOM is the DOTMLPF integrator for EOD and the lead for the Sustainment warfighting function. Meanwhile, the Maneuver Support Center (MANSCEN) at Fort Leonard Wood is home of the Engineer Regiment, the Chemical Corps, and the Military Police Corps and serves the single integrator for maneuver support and the Protection warfighting function. MANSCEN is the logical integrator for EOD in the 21<sup>st</sup> Century based on the nature of both current threats and anticipated future operational environments. However, the friction created by resource competition and mission protectionism within the Army's traditional branch system – specifically between the Engineer Regiment and the Ordnance Corps – prevents logic from prevailing against parochialism. Thus, the resulting efforts to transform both the EOD community and the overall force have yielded a sub-optimal organizational alignment that generates unnecessary friction and delays critical initiatives.

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## Introduction

“The skills and organizations required for operations against today’s threats are different from those of the recent past. The twentieth century required an Army with a large capacity focused on combat capabilities. Today’s operational environment requires an Army with more diverse capabilities as well as the capacity for sustained operations. Rebalancing involves retraining Soldiers and converting organizations to produce more Soldiers and units with high-demand skills.”<sup>1</sup>

Although the demand by tactical forces for the skills, knowledge, and abilities of the Explosive Ordnance Disposal (EOD) community realized a steady increase between the Vietnam War and OPERATION DESERT STORM (ODS), it exploded during the initial stages of OPERATION ENDURING FREEDOM (OEF) and OPERATION IRAQI FREEDOM (OIF). This appetite was driven by a number of forces that have emerged beginning in the early 1970s such as the increased lethality of the modern battlefield, the United States' transition to a professional force, a general erosion of Explosive Hazard (EH) defeat skills within the maneuver and combat engineer communities, the adoption of deliberate risk management techniques, and the transformation of the global information environment. Over the past forty years, the synergistic effects produced by these forces has driven a 1220%<sup>2</sup> increase in the Army’s doctrinal planning factors for the number of EOD teams required to support operations by a four division Corps.

Although the mission statement and core competencies of conventional EOD forces have not significantly changed since the Korean War, the frequency and conditions under which they are called upon by maneuver forces has dramatically increased. The 1969 version of AR 75-15 states: “This regulation does not change present responsibilities of all branches and services to clear landmines and booby traps to the extent necessary for their continued movement and

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<sup>1</sup> Department of the Army, Field Manual 1, *The Army*, Headquarters, Department of the Army (Washington, D.C.), 14 June 2006, 4-8.

<sup>2</sup> According to the 1970 version of Army Regulation 75-14, a four-division corps would be supported by five EOD detachments with three teams per detachment for a total of fifteen teams. The 2006 Field Manual (Interim) 4-30.50, *Modular Explosive Ordnance Disposal Operations*, allocates approximately four Ordnance Battalions (EOD) containing twenty two Ordnance Companies (EOD) for a total of one hundred ninety eight three-man teams for a four division corps.

operation as well as within their own bivouac and work areas.”<sup>3</sup> Over the course of the next generation, the previous qualifier would evolve to the following:

“Commanders conducting combat operations may clear landmines and booby traps to the extent necessary to accomplish the unit’s mission. Commanders are responsible for conducting appropriate risk analysis and making informed decisions balancing the risk to mission accomplishment with the extensive risks associated with clearing landmines and booby traps. Whenever practical and necessary, commanders should request technical assistance from EOD units.”<sup>4</sup>

Clearly, there has been a shift in the Army’s philosophical approach to when and how it expects maneuver commanders to employ EOD technical capabilities.

Undoubtedly, the modern conventional battlefield contains the potential for a high density of Explosive Hazards (EH). For example: A fire mission of 36 multiple launch rocket system (MLRS) rockets could produce 1,159 Unexploded Ordnance (UXO) hazards in the target area, a B-52 dropping a full load of 45 cluster bomb units (CBUs) may produce 1,462 UXO hazards, and the 92/B Gator scatterable mine system can dispense hundreds of mines covering an area of 200 by 6540 meters in a matter of seconds. Although all scatterable mines have a self-destruct mechanism, those that fail to detonate become UXO.<sup>5</sup> EOD are the only forces trained to identify, neutralize, and dispose of UXO but tactical units perform the mission when operationally necessary.

Another significant threat to soldiers is the battlefield destruction of captured enemy ammunition and explosives (CEA). Engineer commanders in OIF recognized that their units were ill-trained for both UXO clearance and CEA destruction operations, yet combat engineers and other support personnel performed the task because there were insufficient EOD forces

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<sup>3</sup> Department of the Army, Army Regulation 75-15, *Responsibilities and Procedures for Explosive Ordnance Disposal*. Headquarters, Department of the Army (Washington, D.C.), 23 June 1969, 1-1.

<sup>4</sup> Department of the Army, Army Regulation 75-15, *Responsibilities and Procedures for Explosive Ordnance Disposal*, Headquarters, Department of the Army (Washington, D.C.), 22 February 2005, 3-8.

<sup>5</sup> U.S. Army Training and Doctrine Command, Field Manual 3-100.38, *Multiservice Procedures for Unexploded Ordnance (UXO) EOD Operations*, Headquarters, U.S. Army Training and Doctrine Command (Fort Monroe, VA), August 2001, I-1. The calculations above assume a 5% dud rate, but the U.S. goal is to achieve a less than 1% dud rate on all munitions.

available. As of 28 June 2004, coalition forces participating in OEF and OIF had experienced 33 accidents involving CEA resulting in 26 fatalities and 70 injuries.<sup>6</sup> In the case of CEA destruction, well-intentioned efforts sometimes created a greater hazard when explosions kicked out damaged and desensitized ordnance. This can result in both military and civilian casualties and counters coalition efforts to both protect and earn the confidence of the population. When civilians are killed or injured by the explosive remnants of war, they rightfully blame the forces responsible for spreading the munitions. As a result, CEA destruction has become an EOD mission in all but the most critical of circumstances.

From the founding of the original Bomb Disposal companies in World War II<sup>7</sup> and lasting until the 1990s, the historic relationship between combat engineers and EOD technicians had been one of necessary battlefield cooperation followed by an almost absolute peacetime separation that retarded the development of mutual understanding and appreciation. Although both communities employ explosives in the execution of their missions, EOD technicians possess a vastly superior level of knowledge and technical expertise than combat engineers. EOD units have traditionally existed at echelons above corps (EAC) and were considered strategic assets. EOD technicians are the only soldiers authorized to perform Render Safe Procedures (RSP) and

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<sup>6</sup> Raymond J. Fatz, "Army Safety Policy for Captured Enemy Ammunition," (Washington, D.C.: Headquarters, Department of the Army, 28 June 2004), 1.

<sup>7</sup> CSM James H. Clifford, "The Origins Of U.S. Army Explosives Ordnance Disposal," Army History Foundation, <http://www.armyhistory.org/armyhistorical.aspx?pgID=868&id=70&exCompID=32> (accessed 25 September 2007). Prior to World War II, there was no formal qualification in EOD because ordnance was simplistic in design and posed little hazard when it failed to detonate. The application of modern science and industrial technology to design yielded vastly more complicated and sensitive ordnance. In the early years of WWII, The U.S. Army observed the experiences of British forces operating in reaction to the delayed-fuze bombs dropped by the German Luftwaffe in the Battle of Britain. Based on the British example, the U.S. Army's Ordnance Department established a bomb disposal organization and school at Aberdeen Proving Ground, MD in January 1942. Although the original focus for the Bomb Disposal companies was the rendering safe of air-dropped enemy bombs, these highly trained soldiers were soon dealing with the disposal of both Allied and Axis ordnance during the invasion of Sicily because they alone possessed the capability. Over time, Bomb Disposal squads found themselves spread across the battlefield providing their specialized expertise in support of Army forces in both Europe and the Pacific.

trained to dispose of military ordnance and improvised explosive devices<sup>8</sup> (IED), they lack the organic firepower and survivability required to operate independently on the battlefield. Combat engineers, on the other hand, serve at the front lines in the tactical fight. Their traditional mobility focus has been breaching lanes through complex obstacles in support of maneuver forces. They, like all non-EOD warfighters, lack the training and expertise required to positively identify and safely neutralize the majority of munitions encountered on the modern battlefield.

Before Operation Desert Storm (ODS) and the stability and support operations of the 1990s, EOD units had experienced minimal exposure to maneuver units since the Vietnam War. However, during operations in locations such as Somalia, Haiti, Bosnia, and Kosovo the “muddy boots” Army came in close contact with the “garrison support” EOD soldiers. The result among maneuver commanders was an improved appreciation for the capabilities that these highly trained technicians to the combined arms team and increased expectation of EOD support in operations. Meanwhile, the EOD community developed a vision of how they could better support maneuver forces. This vision, however, would not be realized until there was a demonstrated weakness in the current doctrinal paradigm.

When the Global War on Terror (GWOT) began after September 11, 2001, there was no doctrine for incorporating EOD units at the brigade-level and below or for integrating EOD and engineer efforts to assure mobility to maneuver forces. The Army’s doctrinal approach to the battlefield distribution of EOD forces in the initial years of OEF and OIF was a demonstrable failure. EOD forces were overwhelmed by the volume of missions requiring their capabilities because the then current force structure and command and control construct were insufficient to satisfy demands. Due to their basic competence with explosives, combat engineers were the

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<sup>8</sup> According to U.S. Army Field Manual 3-90.119, *Combined Arms Improvised Explosive Device Defeat Operations*, September 2007, an IED is defined as “a device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic, or incendiary chemicals and designed to destroy, incapacitate, harass, or distract. It may incorporate military stores, but is normally devised from nonmilitary components.”

maneuver commanders' second choice to perform these types of missions. However, the combat engineers' lack of technical training on UXO clearance and CEA destruction sometimes resulted in the creation of even greater UXO problems when improper demolition procedures spread desensitized ordnance around the blast area. On rare occasions, catastrophic accidents resulted in unnecessary friendly and civilian casualties.

Early in the GWOT, historic frictions<sup>9</sup> resurfaced between the Ordnance Corps and the Corps of Engineers over the question of roles and missions. Frustration in the maneuver community and the Army mounted. In 2003, a brigade commander from the 3<sup>rd</sup> Infantry Division in Iraq was quoted as stating “the artificial separation between explosive ordnance disposal personnel and combat engineers MUST end. . .combat engineers will deal with unexploded ordnance whether we want them to or not. . .just a matter of inadequate EOD troops to the UXO task. This is a structural deficiency that it is imperative for us to fix.”<sup>10</sup> In March of 2004, the Chief of Staff of the Army, GEN Peter Schoomaker, requested that the United States Army Training and Doctrine Command (TRADOC) investigate the advisability of an organizational alignment that would assign proponentcy for Explosive Ordnance Disposal (EOD) to the U.S. Army Engineer School.<sup>11</sup> This question reflected a common concern among strategic leaders: Is the organization properly structured to overcome emerging challenges? Five years later, the repercussions of the capability gap that had developed between the EOD force structure and modern battlefield's demands for its capabilities continue to reverberate through the Army.

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<sup>9</sup> The first written references to friction between the Ordnance Corps and Engineer Regiment surfaced after the Army's challenges with UXO clearance and CEA destruction during ODS (See 1<sup>st</sup> EOD Group (Provisional) After Action Review for OPERATION DESERT STORM at [http://www.gulfink.osd.mil/declassdocs/army/19961230/123096\\_sep96\\_decls21\\_0006.html](http://www.gulfink.osd.mil/declassdocs/army/19961230/123096_sep96_decls21_0006.html)) However, anecdotal information suggests that the Ordnance Corps has long resented attempts by the Engineer Regiment to gain proponentcy for Explosive Ordnance Disposal over the years.

<sup>10</sup> Lieutenant Colonel Craig Jolly, “EOD and Engineers ‘Close the Gap’”, *Engineer Magazine*, January-March 2005, 40.

<sup>11</sup> General Kevin P. Byrnes, Memorandum for G3, United States Army, “Explosive Ordnance Disposal (EOD) Proponentcy,” (Fort Monroe, VA: Headquarters, U.S. Army Training and Doctrine Command, 14 April 2004), 1.

# Organizational Dynamics of the United States Army

## The Tosti/Jackson Organizational Alignment Model



**Figure 1: The Tosti/Jackson Organizational Alignment Model**

Source: Donald T. Tosti and Stephanie F. Jackson, "Organizational Alignment", Vanguard Consulting, [http://www.vanguardc.com/org\\_align.html](http://www.vanguardc.com/org_align.html) (accessed 9 April 2008).

This paper analyzes the history of EOD forces operating at the tactical level (corps-level and below) through an organizational theory lens. The Tosti/Jackson Organizational Alignment Model provides a conceptual framework through which organizations can assess their structure. The model contains two independent paths for moving from a broad statement of organizational mission and vision to specific organizational results. The strategic side of the model emphasizes what must be done, while the cultural side of the model captures how the organization prefers to perform those tasks. Within the organization, leadership and systems function as performance levers that either help or hinder people in implementing strategies and producing results. Results are the outcomes that the organization produces as a function of the activities and behaviors it performs. External to the organization, stakeholders and the environment both exert varying

levels of influence. Stakeholders are groups, organizations, and individuals who both define and invest in the organization's desired results. Influencers in the environment include competitors, economic conditions, and market demands.<sup>12</sup>

Applying the model to the U.S. Army enables an assessment of whether the organization is structured to meet emerging threats. The international security environment is truly dynamic and therefore the Army will never achieve "true alignment". Instead, the Army is constantly adjusting itself, within the government's imposed budgetary limitations, to the influences of technology, the capabilities of the current threat, the expectations of the American people, and the anticipated nature of the next conflict. Dysfunctional conditions exist when internal friction hinders or prevents mission accomplishment or when resource imbalances force the Army to employ methods and behaviors that contradict its culture.<sup>13</sup> The Army's doctrine is a cultural artifact that provides a time capsule that communicates not only the tasks that the nation might need performed, but also how the U.S. Army plans to execute them.<sup>14</sup>

## **Applying the Model to the U.S. Army**

Carl Von Clausewitz accounted for the influence that societies exert over their militaries when he wrote "Military institutions and the manner in which they employ violence depended upon the economic, social, and political conditions of their respective states."<sup>15</sup> Every new Army Chief of Staff updates FM-1, *The Army*, to reflect both his vision for the Army and a strategic plan describing the objectives and activities that the institution is undertaking. When

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<sup>12</sup> Donald T. Tosti and Stephanie F. Jackson, "Organizational Alignment", Vanguard Consulting, [http://www.vanguardc.com/org\\_align.html](http://www.vanguardc.com/org_align.html) (accessed 9 April 2008).

<sup>13</sup> Ibid.

<sup>14</sup> Mary Jo Hatch, *Organizational Theory: Modern Symbolic and Post Modern Perspectives* (New York: Oxford University Press, 1997), 210-216. Hatch's book encapsulates the organizational culture theory of Dr. Edgar Schein of the MIT Sloan School of Management. Dr. Schein identifies three distinct levels in organizational cultures; artifacts and behaviors, espoused values, and assumptions.

<sup>15</sup> Carl Von Clausewitz, *On War*, ed. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1989), 6.

updating FM-1, the Army's leadership combines an analysis of both the operating environment and the stakeholders' expectations with their own professional judgment on required adjustments in the organization's path. The strategic side of the model emphasizes what must be done: the goals that the organization will work towards, the objectives that groups and individuals must accomplish; and the activities required to meet objectives. In military terms, the left side of the model represents the strategic, operational, and tactical levels of war. The cultural side of the model reflects how the organization intends to conduct its business: the values that will guide people in carrying out the mission and vision, the practices that reflect those values, the specific day-to-day behaviors that represent the values and practices to others.<sup>16</sup> The foundations of Army culture are the values of loyalty, duty, respect, selfless service, honor, integrity, and personal courage. The tactics, techniques, and procedures that the Army uses in its mission execution reflect its cultural values.

Leadership<sup>17</sup> and systems function as "performance levers" that enable or frustrate the implementation of strategies in accordance with values. Organizational systems include reward systems, information systems, personnel evaluation systems, promotion systems, organizational structure and reporting relationships, training and development, work design, and administrative policies. Soldiers and Army Civilians serve in two functionally discrete entities. The institutional Army exists to support the Army's Title 10 functions of recruiting, organizing, supplying, training, servicing, mobilizing, and administering the force.<sup>18</sup> These organizations include the Training and Doctrine Command (TRADOC), Human Resources Command (HRC), and Army Material Command (AMC). It includes the branch system, described as a "mutually

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<sup>16</sup> Tosti and Jackson.

<sup>17</sup> Department of the Army, Field Manual 6-22, *Army Leadership*, Headquarters, Department of the Army (Washington, D.C), October 2006, Glossary p. 3. The Army defines leadership as the process of influencing people by providing purpose, direction, and motivation while operating to accomplish the mission and improve the organization.

<sup>18</sup> Field Manual 1, *The Army*, 2-6. See also Title 10, United States Code, Section 3013 (b).

supportive brotherhood of guilds”<sup>19</sup> that provides the foundation necessary to design, raise, train, equip, deploy, sustain, and ensure the readiness of all Army forces. When missions and resources are in contention or when perspectives clash, these “guilds” can also become hypercompetitive and parochial in their own interests to the detriment of the institution. The collective capabilities generated by the institutional Army exist in the units of the operational Army. The operational Army consists of all deployable units assigned to U.S. Army Forces Command (FORSCOM), U.S. Forces Korea (USFK), and U.S. Army Europe (USAREUR). The operational Army provides the essential landpower capabilities to regional combatant commanders.<sup>20</sup>

In business, stakeholders and observers can measure results in a variety of ways: financial indicators, product/service measures, or customer retention rates are just some examples. The way an organization measures its performance determines its ability to stay on track – to evaluate its progress against values and strategic goals. At the macro-level, the Army measures its performance in its ability to generate and sustain landpower in order to achieve national strategic objectives. Landpower is the Army’s contribution to joint operations and is defined as

The ability – by threat, force, or occupation – to promptly gain, sustain, and exploit control over land, resources, and people. Landpower includes the ability to impose the Nation’s will on adversaries – by force if necessary – in diverse and complex terrain, establish and maintain a stable environment that sets the conditions for a lasting peace, address the consequences of catastrophic events, both natural and manmade – to restore infrastructure and reestablish basic services, support and provide a base from which forces can influence and dominate their air and sea dimensions of the joint operational area.<sup>21</sup>

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<sup>19</sup> H.H. Gaffney, “The American Way of War Through 2020,” National Intelligence Council, 17. [http://www.dni.gov/nic/PDF\\_GIF\\_2020\\_Support/2004\\_05\\_25\\_papers/way\\_of\\_war.pdf](http://www.dni.gov/nic/PDF_GIF_2020_Support/2004_05_25_papers/way_of_war.pdf) (accessed 20 March 2008).

<sup>20</sup> Field Manual 1, *The Army*, 2-10.

<sup>21</sup> *Ibid*, 1.

Stakeholder groups have varying relationships with, leverage over, and expectations of the Army. An organization's perception of its stakeholders' key interests is a key factor in its decision making. The primary beneficiaries of the U.S. Army are the American people, yet they have the least direct influence. The Army's partners in the joint force – the Navy, Air Force, and Marines – all have a substantial stake in the Army's ability to generate and sustain landpower. The nation's leadership invests politically by risking its popular mandate on their ability to leverage the military instrument of national power as a component of unified action to achieve national interests. Major sectors of American industry financially depend on the Army as their major customer. Last, and most importantly, American families invest their greatest treasure by risking the potential loss of their sons, daughters, husbands, and wives on behalf of the nation. Stakeholder demands from all levels of society both dictate and influence the results that the Army works to achieve and how it goes about achieving them.

Historical influencers in the Army's external environment include the perceived threat, the state of technology, government policy, the national economy, and socio-political factors. In general, the force is a reflection of the environment that not only contributes to its existence but also the environment or which it is ultimately designed for employment. The nature and magnitude of the anticipated threat operate in parallel with the nation's foreign policy to determine the requirements. The Army's capabilities are driven by the availability of financial resources, the nation's industrial might, and the state of technology within society.

The introduction to the 1993 edition of FM 100-5, *Operations*, explains how doctrine reflects the confluence of the direct contributions and indirect influences described in the model. Doctrine outlines the strategic "what", accounts for the cultural "how", and reflects the influences of both stakeholders and the environment. It then attempts to prescribe the functional framework for approaching military problems under these conditions and those anticipated in the immediate future.

“The Army’s doctrine lies at the heart of its professional competence. It is the authoritative guide to how Army forces fight wars and conduct operations other than war. As the Army’s keystone doctrine, FM 100-5 describes how the Army thinks about the conduct of operations... Never static, always dynamic, the Army’s doctrine is firmly rooted in the realities of current capabilities. At the same time, it reaches out with a measure of confidence to the future. Doctrine captures the lessons of past wars, reflects on the nature of war and conflict in its own time, and anticipates the intellectual and technological developments that will bring victory now and in the future... Doctrine derives from a variety of sources that profoundly affect its development: strategy, history, technology, the nature of the threats the nation and its armed forces face, interservice relationships, and political decisions that allocate resources and designate roles and missions.”<sup>22</sup>

The following case studies will rely heavily on both the Army’s operational doctrine and EOD doctrine of each period to frame the analysis of the origins and nature of the forces driving the increasing expansion of demand for EOD capabilities in support of the warfighting functions of M2 and Protection. The resulting narrative clearly explains how this trend is not the result of a single isolated event, but rather the accretive effect of shifts in societal attitudes, military culture, and the contemporary operating environment. The analysis will focus on the Army’s operational doctrine and its complementary EOD organizational doctrine to demonstrate that the problems experienced in OEF and OIF were not unique, unanticipated, or unpreventable if the Ordnance Corps and the Engineer Regiment had developed appropriate doctrinal solutions prior to the system failure that occurred early in OEF and OIF. Unfortunately what the Tosti/Jackson model describes as the Army’s internal support system, in the form of the branch system, was dysfunctional and generated such a level of friction that only a crisis could overcome the organizational inertia. Although adjustments have been made within the DOTMLPF framework<sup>23</sup> of EOD and engineer forces, the Army’s lack of internal alignment remains an

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<sup>22</sup> Department of the Army, Field Manual 100-5, *Operations*, Headquarters, Department of the Army (Washington, D.C.), 1993, V.

<sup>23</sup> Field Manual 1, 4-4. DOTMLPF (doctrine, organizations, training, material, leadership and education, personnel, and facilities) is a problem solving construct used by the United States Army for assessing current capabilities and managing change. Change is achieved through a continuous cycle of adaptive innovation, experimentation, and experience. Change deliberately executed across DOTMLPF elements enables the Army to improve its capabilities to provide dominant landpower to the joint force.

organizational hindrance. The EOD community's gravitation away from Sustainment and towards Protection and Movement and Maneuver (M2) calls into question why the community is not formally aligned with the Maneuver Support Center.

## **EOD in Vietnam and the Active Defense of Western Europe**

### **Vietnam**

The doctrinal planning factors for EOD support to a corps during the 1960s was one Explosive Ordnance Disposal Control (EODC) Detachment providing command and control for five EOD detachments.<sup>24</sup> This structure provided the corps with fifteen three-person EOD teams. In Vietnam, the operational channels for Army EOD units descended from U.S. Army Vietnam (USARV), through the Ammunition Branch of the Deputy Chief of Staff for Logistics (DCSLOG), HQ, USARV down to the 533<sup>rd</sup> Ordnance Detachment (Explosive Ordnance Disposal Control or EODC). The major who commanded the EODC also served as the USARV EOD staff officer. The individual EOD detachments were under the operational control of the EODC, but received their administrative and logistical support through larger units with whom they were co-located. Typically, the EOD detachments aligned themselves with combat service support battalions assigned to the Da Nang or Saigon Support Commands.<sup>25</sup>

At the height of the Vietnam Conflict in 1968, the Army EOD organization consisted of ten EOD Detachments under the operational control of the 533<sup>rd</sup> EODC and four EOD sections assigned to ammunition battalions.<sup>26</sup> The tactical detachments often subdivided into two-man EOD teams that provided support to a specific area, unit, or mission on a semi-permanent basis.

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<sup>24</sup> Department of the Army, Army Regulation 75-14, *Responsibilities for Explosive Ordnance Disposal*, (Washington, D.C: Government Printing Office, 1969), 1-1.

<sup>25</sup> LTC Willis M. Cooper, Final Report: *U.S. Army Explosive Ordnance Disposal Detachment Operations In The Republic Of Vietnam*, (San Francisco: Army Concepts Team In Vietnam, October 15, 1971), II-33 to II-39.

<sup>26</sup> *Ibid*, I-2.

Through implementation of this decentralized on-site team concept, EOD detachments decreased incident response times and developed closer relationships with their supported units.<sup>27</sup> At times during the Vietnam War, more than twenty on-site teams were in operation.<sup>28</sup>

Generally, the EOD detachments were able to perform their mission functions independently. Reliable communications in Vietnam enabled EOD's doctrinal battlefield framework and strengthened the community's preference for centralized command and control of operations by "badge wearers."<sup>29</sup> Between 1969 and 1971, the EOD detachments destroyed 355 tons of foreign ordnance and 6,673 tons of unserviceable U.S. ordnance. Although the destruction of captured or unserviceable U.S. ordnance was an assigned mission of Ammunition Battalions, EOD forces recognized that they were the most technically capable organizations to perform the task.<sup>30</sup>

Maneuver commanders stated that the EOD detachments provided an exceptional training support program to their units.<sup>31</sup> This program consisted of Explosive Ordnance Reconnaissance Agent training, Explosive Safety Training, Land Mine and Booby Trap training, and Emergency Destruction training.<sup>32</sup> These two week training blocks generated the demolition specialists who performed explosives tasks for their units in the field. Many of these soldiers would claim to be "EOD-trained".<sup>33</sup>

EOD detachments also proved critical to installation protection and recovery efforts. Any base, airfield, or installation was subject to both indirect fire and ground attack. VC

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<sup>27</sup> Ibid, II-23.

<sup>28</sup> Samuel J. Hooper, "The History of U.S. Army Bomb Disposal and Explosive Ordnance Disposal, 1941 thru 1980." Unpublished manuscript, undated. 38. Received via e-mail on 28 September 2007 from Mr. Steve Herman, EOD Combat Developer, U.S. Army Combined Arms Support Command.

<sup>29</sup> Cooper, II-23.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid, II-25.

<sup>32</sup> Ibid, II-27.

<sup>33</sup> Samuel J. Hooper, phone interview by author, 25 January 2008.

infiltrators and ground assaults often penetrated the lengthy perimeters of airfields and placed explosive charges on the aircraft, maintenance areas, ammunition supply points, and fuel storage and distribution systems. EOD detachments cleared pipeline systems that VC forces frequently booby-trapped and cleared UXO following the mortar and rocket attacks that almost every installation endured. The clean up efforts at destroyed ASPs often required thousands of man hours and not only multi-service, but multi-national participation and support. These operations were frustrating because the enemy repeatedly destroyed these facilities. The United States' introduction of 105mm artillery rounds containing multiple submunitions greatly increased the hazards associated with ASP clean up activities.<sup>34</sup>

In contrast to installation protection functions, EOD played only a minor role in battlefield mobility in Vietnam. Enemy forces employed mines along lines of communications to disrupt the flow of support to installations. Within the force, there was no cognitive differentiation between traditionally manufactured mines and the locally produced explosive devices that meet the modern definition of an IED. Combat engineers performed route clearance operations to maintain freedom of movement for friendly forces.<sup>35</sup> Although modern technology has greatly enhanced the ability to analyze explosive devices, the “left of boom” concept being employed by today’s forces is not a new approach to reducing attacks that use locally assembled munitions. U.S. forces recognized the value of exploiting devices to develop intelligence that would facilitate the location of VC munitions assembly operations.<sup>36</sup> Two critical conditions existed to enable the force’s mobility without an EOD support requirement.

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<sup>34</sup> Hooper, 38-40.

<sup>35</sup> COL David H. Thomas, *Final Report: Vehicle Convoy Operations in the Republic of Vietnam* (San Francisco: Army Concept Team in Vietnam, 1971), II-93.

<sup>36</sup> Department of the Navy, Fleet Marine Force Reference Publication 12-43, *Professional Knowledge Gained from Operational Experience in Vietnam, 1969, Special Issue, Mines and Boobytraps* (Quantico, VA: Marine Corps Combat Developments Command, 1989), 9.

First, there was an institutional expectation for units to overcome these obstacles and, more importantly, the units actually possessed the skills, knowledge, and abilities to do so.<sup>37</sup>

## **Reconfiguring the Force for the Active Defense**

The Vietnam War was a transformational event for both the United States and the U.S. Army. The Army underwent a significant drawdown in end strength as it withdrew from Vietnam. The nation, weary from its experience over the previous decade, provided reduced funding to the military budgets. The United States ended conscription in 1973 and in its wake the emergence of the professional All-Volunteer Force reinforced the American cultural tendency to remain ready by carefully selecting people and training them intensively.<sup>38</sup>

A new organization, TRADOC, emerged from the Army's post-Vietnam functional realignment. TRADOC faced the daunting task of overcoming the Army's psychological and institutional uncertainty, while also preparing the force to defeat the growing strategic threat to the North Atlantic Treaty Organization (NATO). The expressed opinion of western military observers that the United States' efforts in Vietnam had resulted in a lost decade of weapons development further exacerbated the situation.<sup>39</sup> TRADOC's mission included individual training, education, doctrine, and defined weapon requirements. TRADOC decentralized the responsibility for combat developments by placing it back within the branch schools. The first commander, GEN William DePuy, placed the individual soldier at the center of the command's work and resisted the temptation to allow technology to dictate the American approach to

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<sup>37</sup> This is a logical conclusion based on the role of EOD as defined in Army publications such as Army Regulation 75-15 (see footnote 1 from this paper) and the anecdotal evidence from the era which describes units performing battlefield mobility tasks without EOD participation (see Thomas, II-93 for an example)

<sup>38</sup> Gaffney, "The American Way of War Through 2020," 5.

<sup>39</sup> Anne Chapman, Benjamin King, and Carol Lilly, *Transforming the Army. TRADOC's First Thirty Years: 1973-2003* (Fort Monroe, VA: Military History Office, U.S. Army Training and Doctrine Command, 2003), 3.

warfare.<sup>40</sup> Thus, the Army emphasized the importance of equipping its men instead of manning its equipment.<sup>41</sup>

The 1976 version of FM 100-5, *Operations*, was a direct reflection of these strategic circumstances and focused almost exclusively on the defense of NATO Europe against numerically superior Warsaw Pact forces via “The Active Defense.” It declared the army’s imperative to be psychologically prepared to fight outnumbered and win the first battle. The quantitatively driven doctrine accepted force ratios as the primary determinant of battle outcomes and argued the virtues of armored warfare and the combined arms team.<sup>42</sup> It also described a battlefield environment with weapons systems of previously unimagined precision and lethality. An entire chapter was dedicated to explaining how the effects of modern weapon systems, many recently revealed in the 1973 Arab-Israeli War, transformed the modern battlefield. With respect to mobility, there was a clear expectation that scatterable mine systems and improved conventional munitions utilized for area denial would exponentially increase the ability of forces to introduce obstacles to their adversary’s movement and maneuver.<sup>43</sup>

EOD detachments, however, were not viewed as part of the combined arms team. After Vietnam, they resumed a near administrative existence at echelons above corps and focused on maintaining their technical expertise. Generally, they performed limited training, if any, with maneuver units in the field. On the other hand, combat engineer forces returned to their traditional focuses of mobility, countermobility, and survivability missions in support of maneuver forces. Over the next twenty five years, their mobility efforts focused on mounted, mechanical and explosive breach efforts that one senior leader would ultimately describe as an

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<sup>40</sup> Ibid, foreword.

<sup>41</sup> Thomas G. Mahnken, “United States Strategic Culture,” (Washington, D.C.: Defense Threat Reduction Agency Advanced Systems and Concepts Office, 13 November 2006), 16.

<sup>42</sup> Department of the Army, Field Manual 100-5, *Operations*, (Washington D.C: Government Printing Office, 1976), 1-1 to 1-5.

<sup>43</sup> Ibid, 2-1 to 2-32.

“orchestrated ballet of farm implements.”<sup>44</sup> The Army’s rededication to high intensity conflict operations through the adoption of a Mission Essential Task List (METL) focused training strategy designed to help units achieve excellence in their primary wartime tasks. However, the downside of this narrow concentration was that it resulted in the gradual erosion of unconventional EH-defeat knowledge within the combat engineer ranks.

The 1971 Army Concepts Team in Vietnam (ACTIV) report had validated the EOD support concept applied to conducting stability operations in Vietnam. However, a new study was conducted to determine the functionality of current doctrine in support of a high intensity conflict against the Warsaw Pact in Western Europe. Unfortunately, the Explosive Ordnance Disposal Organizations study conducted by the Army Combat Developments Command Maintenance Agency (ACDCMA) could not fully account for the realities to be revealed in the Yom Kippur War and later described in the 1976 edition of FM 100-5, *Operations*. The Ordnance Corps initiated the study because EOD doctrine and organizations had not been updated since the Korean Conflict and the consensus was that they had become insufficient for the anticipated operating environment.<sup>45</sup> The major assumption behind the report, proven false in retrospect, was that the “type of EOD missions and functions to be performed by EOD organizations during the 1972-1985 time frame will be substantially the same as those currently performed.”<sup>46</sup> The ACDCMA report was also a clear reflection of the reduced military budgets of the 1970s. It was an optimization effort focused on accomplishing more missions with limited

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<sup>44</sup> Major Harry Greene, “The Wolverine and the Grizzly: An Alternative to the Orchestrated Ballet of Farm Implements”, *Engineer Bulletin*, August 1996, [http://fas.org/man/dod\\_101/sys/land/docs/960800-greene2.htm](http://fas.org/man/dod_101/sys/land/docs/960800-greene2.htm) (accessed 5 April 2008). BG Scott Wallace, Commander, National Training Center, used this term while describing engineer breaching operations to BG Phillip R. Anderson, Deputy Commanding General, U.S. Army Engineer School, 16 April 1996.

<sup>45</sup> Army Combat Developments Command Maintenance Agency Study 4626, “Explosive Ordnance Disposal Organizations,” 30 March 1973, A-VI-I.

<sup>46</sup> *Ibid*, 1-2.

additional resources. The report focused on the substantial cost savings generated by the centralization of EOD's nuclear, chemical/biological, and VIP support missions.

The report concluded that the vast majority of future EOD missions would involve conventional explosives and that the small percentage of EOD missions involving nuclear weapons, toxic chemicals, and biological items did not justify or require that all EOD organizations maintain these mission capabilities. As a result, the report recommended the adoption of a cellular EOD structure built around detachments with a baseline conventional capability. A conventional EOD detachment would contain two-three person EOD work parties and could receive augmentation consisting of two additional three-person teams.<sup>47</sup>

The report also focused EOD units towards rear area protection missions and recommended that EOD forces should remain assigned to logistics channels. The investigation acknowledged many advantages in assigning EOD forces to tactical command channels including improved operational planning, improved effectiveness of tactical execution, rapid dissemination of intelligence within the tactical forces, and improved EOD situational awareness of tactical operations. However, it concluded that the primary mission of EOD was not the support of combat forces, but instead the neutralization of hazardous explosive ordnance throughout the entire theater of operations. Apparently assuming that combat engineers and other combat units would deal with the majority of explosive hazards in the forward areas, the report stated that EOD organizations would primarily perform rear area protection (RAP) missions during conflict.<sup>48</sup>

The 1974 version of FM 9-14, *Explosive Ordnance Disposal Organizations*, allocated seven EOD detachments to a four division corps. This manual reflected many of the changes

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<sup>47</sup> Ibid, 4-24 to 4-36. In the cellular force structure, the baseline detachments could receive augmentation from any of the following: a) a Conventional Augmentation Team consisting of two additional work parties, b) a Nuclear Augmentation Team consisting of one nuclear capable work party, c) a Toxic Chemical Augmentation team consisting of one work party, d) and/or a VIP Support Augmentation team consisting of one two-man team. Corps most commonly received support from conventional EOD detachments.

<sup>48</sup> Ibid, 3-1 to 3-3.

recommended by the ACDCMA report to include the cellular organizational structure. Under this construct, each base EOD detachment was able to field two- three person teams to conduct operations. Whereas the previous doctrine recommended support for a four division corps at five detachments that collectively generated fifteen-three person teams, this more flexible doctrine allowed for the augmentation of detachments based on mission requirements. With seven cellular detachments, the Corps could receive support from between fourteen and twenty eight teams.<sup>49</sup>

Although the 1976 version of FM 100-5 recognized the development and proliferation of area denial munitions and scatterable mine systems, it did not appreciate the increase in the potential for UXO on the battlefield. The doctrine focused its attention on the close fight and emphasized the importance of mobility to enable the massing of combat power in the Active Defense. TRADOC's decision to charge the branch schools with combat developments enabled the stove pipe effect of the institutional Army's bureaucracy and allowed the Engineer and Ordnance "guilds" worked in isolation. Over time, the limited interface between the Engineer Regiment and the Ordnance Corps permitted the development of the capability gap between combat engineers and EOD forces.<sup>50</sup>

As the Army moved towards the 1980s, the EOD community was doctrinally focused on rear area protection missions and operationally assigned to logistics channels. Institutionally, there was recognition that the widespread employment of submunitions on the modern battlefield created conditions exponentially more lethal than those of previous generation, but there was minimal appreciation for the increased potential of UXO. Although the Army still expected a high-level of self reliance within maneuver units its narrow focus on high intensity conflict tasks

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<sup>49</sup> Department of the Army, Field Manual 9-14, *Explosive Ordnance Disposal Service*, (Washington, D.C.: Government Printing Office, 1974), 7-3.

<sup>50</sup> The Tosti/Jackson framework conceptually facilitates identifying points of friction within an organization's internal support systems to identify potentials for realignment. In this case, there was no friction because of the limited, if any, collaboration between the branches. Strategic leaders must not only assess the suitability of alignments under current conditions, but also anticipate their ability to perform collaboratively in response to emergencies or shocks in the system.

created the conditions where hard-earned battlefield mobility skills eroded within the force. The post-Vietnam Army had endured a drawdown and reduced budgetary resources, but was slowly maturing into a professional force. American society held no illusions as to the potential for catastrophic level of casualties that a conventional struggle in Europe would inflict on both NATO and the Warsaw Pact and was prepared to accept the cost in both blood and national treasure to protect Western Europe from a communist invasion..

## **AirLand Battle and Operation Desert Storm**

### **EOD Grows to Support Operational Maneuver in AirLand Battle**

By 1982, rising defense budgets and a stronger recognition of the possibility of worldwide commitment of Army forces combined with a sharper institutional appreciation for the operational level of war. The notion of stronger interservice integration, introduced as the “air-land battle” in 1976, combined with the conceptual framework of the Central Battle developed by former TRADOC commander GEN Donn A. Starry, to become the AirLand Battle doctrine defined in the 1982 version and then further refined in the 1986 version of FM 100-5.<sup>51</sup> This doctrine reaffirmed the Army’s commitment to retain the primacy of the individual soldier as the centerpiece of the Army. While professing respect for the increased complexity and lethality of modern weapons, AirLand Battle Doctrine also celebrated the human factor by recognizing that such weapons are no better than the skill with which they are brought to bear on the enemy.<sup>52</sup>

Whereas the 1982 version portrayed logistics as a secondary element supporting maneuver, the 1986 version of *Operations* celebrated its essential role in enabling operational maneuver. The 1986 update acknowledged the critical nature of enabling the assembly and movement of reserves, redeployment of fire support, maintenance and protection of sustainment

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<sup>51</sup> Field Manual 100-5, *Operations*, 1993, Introduction.

<sup>52</sup> Department of the Army, Field Manual 100-5, *Operations*, (Washington D.C.: Government Printing Office, 1986), 26.

effort, and maintenance of command and control. Rear area operations became the essential element of momentum that provided operational maneuver with the continuity and ability to reach depth with sufficient combat power.<sup>53</sup> Commanders at all levers were now required to continuously synchronize their close, deep, and rear operations in order to generate and sustain maximum combat power.

The U.S. Army realized that EOD forces were vital to rear area operations and maintaining the momentum of corps operational maneuver. The Army's expanding appreciation for the criticality of rear operations spurred an increase to the corps-level planning factors for EOD detachment allocations by two hundred and twenty percent between the 1979 and 1984 versions of FM 9-15.<sup>54</sup> The 1984 version of FM 9-15 allocated each corps an EODC and four EOD detachments for every division. Also during the mid 1980s, EOD detachments realized a twenty five percent increase in their incident response capability by expanding from four to five teams.

The 1989 version of FM 9-15, *Explosive Ordnance Disposal Operations*, foresaw an operating environment where submunitions and area denial ordnance would lead to the proliferation of UXO that would provide a major obstacle to battlefield mobility. The major shift was the explicit statement of how EOD would serve its function of protecting the commander's combat power by stating that EOD would work with the engineers and other units to ensure maneuverability, survivability, and supportability in the main battle area and back through the

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<sup>53</sup> Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*, (London: Frank Cass Publishers, 1997), 311.

<sup>54</sup> In contrast with the 1974 version, the 1979 version of FM 9-15 authorized a four division corps five OD Detachments (EOD) with four teams each for a total of twenty teams. The 1984 version of FM 9-15 authorized four detachments per division in a four division Corps for a total of sixty four teams.

logistical supply routes. EOD forces would also protect critical logistics assets threatened by UXO in the rear area.<sup>55</sup>

The 1989 manual included many doctrinal changes to the EOD battlefield framework designed to enhance the community's contributions to AirLand Battle. It introduced the concept of an EOD group headquarters providing theater level command and control whenever two or more EODCs were deployed. It also was more prescriptive in the specific distribution of EOD support throughout the area of operations. Each corps was authorized one EODC to operate with the corps support command (COSCOM) at the corps rear tactical operations center (RTOC). Up to four rear area operations centers (RAOC) collocated with corps support groups (CSG) would have an EOD detachment. For the first time, EOD units were assigned in Direct Support (DS) to the division level with one EOD detachment operating out of the division rear command post in a direct support role.<sup>56</sup> Although the 1989 construct represented a slight reduction in EOD strength supporting the corps<sup>57</sup>, it greatly improved the command and control architecture and clarified the battlefield distribution of detachments.

The 1989 manual also provided insight to the Army's approach to two of the issues that led to the question of whether or not EOD should ultimately fall under the Engineer School. The first issue concerned battlefield mobility. Although the manual's language clearly reaffirmed the traditional expectation of self-reliance, it also explicitly stated "the proliferation and advancing technology of area denial submunitions and scatterable mines complicates and blurs the difference between mines and UXO. As a result, engineers and EOD must combine their skills

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<sup>55</sup> Department of the Army, Field Manual 9-15, *Explosive Ordnance Disposal Service and Unit Operations*, (Washington D.C.: Government Printing Office, 1989), 1-1.

<sup>56</sup> Ibid, 1-2 to 1-4.

<sup>57</sup> The 1984 version of FM 9-15 authorized four detachments per division in a four division Corps for a total of sixty four teams. The 1989 manual allocated ten EOD detachments each containing five EOD teams thus providing fifty teams to a four division corps.

and assets when the situation demands.”<sup>58</sup> However, at that time there was no doctrine developed for how these combined efforts would be accomplished.

The second issue was the destruction of Captured Enemy Ammunition (CEA). The manual noted that EOD personnel may help with unit training on demolition procedures for the destruction of ammunition. It also identified three conditions where EOD personnel would assist in the emergency destruction of ammunition: a) when the tactical situation demands emergency measures to prevent capture of ammunition by the enemy, b) there is a command decision that the EOD unit must help destroy the stored ammunition, and c) priorities dictate EOD assets are diverted for this task.<sup>59</sup> These conditions, and their willingness to train units on demolition procedures, indicated that the EOD community did not view this task as a mission for which they alone possessed the required skills. ODS brought these issues to the forefront and exposed both the general force’s inability to perform this task and also the lack of familiarity, coordination, and cooperation between the EOD and maneuver communities.

### **OPERATION DESERT STORM: A “Blind Date” with Maneuver Forces**

Although no titanic clash occurred on the plains of Western Europe against a Warsaw Pact threat, ODS provided the Army with a laboratory in which to assess its AirLand Battle operational doctrine. Across the force, every branch sought to validate the concepts that had driven their training and development over the previous twenty years. The Army’s EOD force, which had not operated on a maneuver battlefield since the Korean War, was thoroughly tested. During ODS, all twenty four Army EOD detachments in theater operated under the command and control of the 1<sup>st</sup> EOD Group (Provisional). The 1<sup>st</sup> EOD Group was assigned to the J-3 in U.S. Central Command’s (USCENTCOM) Army Component Command (ARCENT) headquarters and

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<sup>58</sup> Field Manual 9-15, *Explosive Ordnance Disposal Service and Unit Operations*, 1989, 1-2.

<sup>59</sup> *Ibid.*

had staff responsibility for coordinating with coalition forces and other U.S. service EOD operations.<sup>60</sup> The group commander served as the ARCENT EOD staff officer.

EODC commanders supporting the corps tailored their operations to meet the specific demands of their supported units and the operational requirements. The 512<sup>th</sup> EODCT supporting VIIth Corps placed units in rear areas and sent them forward as required. The 543<sup>rd</sup> EODCT supporting XVIIIth Airborne Corps sent units much farther forward with maneuver elements which moved over enormous distances through the western portion of the battle area against lighter and less densely arranged enemy forces.<sup>61</sup> EOD forces typically co-located with combat service support units instead of combat support or combat units because those units had more resources and, due to their provider mentality, were generally more willing to share.<sup>62</sup>

During the conflict, EOD detachments moved out with supported units and were generally out of contact with their control detachments due to a lack of mobile communications. Fragmented operations at all levels were the norm from response team through group. Coalition air supremacy and the lack of a rear area threat enabled ARCENT to push all of its EOD forces into Kuwait and southern Iraq shortly after the initiation of the ground offensive. During the coalition attack, the teams enabled the VIIth and XVIIIth Corps' momentum by clearing areas of hazardous munitions and keeping main supply routes open. After the cease fire, EOD detachments supervised maneuver units in the demilitarization of southern Iraq. Upon

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<sup>60</sup> 1<sup>st</sup> EOD Group (Provisional) After Action Review for OPERATION DESERT STORM, [http://www.gulflink.osd.mil/declassdocs/army/19961230/123096\\_sep96\\_decls21\\_0004.html](http://www.gulflink.osd.mil/declassdocs/army/19961230/123096_sep96_decls21_0004.html) (accessed 20 March 2008).

<sup>61</sup> 1<sup>st</sup> EOD Group (Provisional) After Action Review for OPERATION DESERT STORM, [http://www.gulflink.osd.mil/declassdocs/army/19961230/123096\\_sep96\\_decls21\\_0005.html](http://www.gulflink.osd.mil/declassdocs/army/19961230/123096_sep96_decls21_0005.html) (accessed 20 March 2008).

<sup>62</sup> 1<sup>st</sup> EOD Group (Provisional) After Action Review for OPERATION DESERT STORM, [http://www.gulflink.osd.mil/declassdocs/army/19961230/123096\\_sep96\\_decls21\\_0011.html](http://www.gulflink.osd.mil/declassdocs/army/19961230/123096_sep96_decls21_0011.html) (accessed 20 March 2008).

redeployment from Iraq, many EOD forces became part of Task Force Freedom and worked with joint and coalition partners in clearing Kuwait of the explosive remnants of war.<sup>63</sup>

The EOD community was generally unimpressed with combat engineers' demolition skills during ODS. After ODS, the memorandum of instruction defining the requirements of EOD detachment after action reviews (AAR) specifically asked about demolitions incidents involving combat engineers. As a result, there were reports and accounts of unsafe or ineffective demolition procedures and cases where engineers ignored the technical advice provided by the EOD technicians. The prevailing belief within the EOD community was that because engineers typically had the higher ranks present at incident sites, they felt empowered to disregard EOD advice and proceed as they wished.<sup>64</sup>

The most egregious example occurred at As Salman Airfield in southern Iraq where combat engineers cleared the airfield to enable its use as a logistics hub. During the clearance operation, the engineers encountered US BLU-97 Combined Effects Munitions (CEM)<sup>65</sup> that had been dropped by the United States Air Force during the air campaign to deny Iraqi forces use of the runway. Against the technical advice provided by an on-site EOD technician, the engineers attempted to consolidate the submunitions for destruction in a single clearance shot. Sometime during the operation, the pile of sub-munitions detonated killing seven U.S. soldiers.<sup>66</sup>

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<sup>63</sup> 1<sup>st</sup> EOD Group (Provisional) After Action Review for OPERATION DESERT STORM, [http://www.gulflink.osd.mil/declassdocs/army/19961230/123096\\_sep96\\_decls21\\_0008.html](http://www.gulflink.osd.mil/declassdocs/army/19961230/123096_sep96_decls21_0008.html) (accessed 20 March 2008).

<sup>64</sup> Ibid.

<sup>65</sup> E-mail letter from Colonel Allan Vosburgh, USA, Assistant Secretary of Defense, Special Operations Low Intensity Conflicts, EOD Division, to LTC Kevin D. Lutz, "As Salman Airfield: Don't Let Hooah Overload Your Rucksack.," 2 February 2005. LTC Lutz referenced this e-mail in his Marine Corps War College paper entitled "Resourcing Joint Explosive Ordnance Disposal (EOD) Forces for the Combatant Commander." At the time of the incident, the CEM were some of the most dangerous munitions in the US inventory. Due to the operational mechanics of the fuze, the only authorized disposal technique for these munitions is to blow them in place.

<sup>66</sup> Lieutenant Colonel Kevin D. Lutz, "Resourcing Joint Explosive Ordnance Disposal (EOD) Forces for the Combatant Commander", (Quantico, VA: Marine Corps War College, 2006), 2. This

Not all incidents were solely caused by ignorance, however. Many times it was a matter of lacking the proper resources in terms of time, explosives, or chemical detection equipment. The destruction of Iraqi ammunition supply point complexes during the demilitarization of southern Iraq was a major mission that required the combined efforts of combat engineers and EOD technicians. The mission was not a matter of destroying small caches, but rather the systematic destruction of entire industrial complexes that contained thousands of tons of Iraqi ordnance. Although EOD units had the specific tasks of identifying and destroying munitions in theater, there were an insufficient number of teams available to dispose of the vast quantities present in the time available. As a result, soldiers with less technical capability were pressed into duty to assist with the destruction efforts. Many times, untrained and improperly resourced units used both incorrect techniques and improper amounts of explosives in their efforts to destroy Iraqi munitions. This often resulted in “fly outs” that created hazardous conditions for coalition personnel.<sup>67</sup>

The most compelling example took place in the XVIIIth Airborne Corps sector where the 37<sup>th</sup> Engineer Battalion worked with the 60<sup>th</sup> EOD detachment to complete the demilitarization of the Khamisiyah ASP. Over the course of approximately two weeks, the units worked together to destroy seventy-seven large ammunition bunkers and forty-five warehouses. Despite the EOD and engineer soldiers’ best efforts to identify all munitions prior to detonation, the debris within one of the bunkers (Bunker 73) was later conclusively shown to contain materials characteristic of chemical munitions. According to the United Nations Special Commission (UNSCOM) report of the incident, none of these rockets in question was marked in any way that would distinguish them from conventional munitions. Although the soldiers were located in an observation area

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unpublished Marine Corps War College paper was received by the author via e-mail from Colonel Lutz on 19 January 2008.

<sup>67</sup> Dr. William Winkenwerder, Jr., “Case Narrative: U.S. Demolition Operations at Khamisiyah, Final Report,” [http://www.gulflink.osd.mil/khamisiyah\\_iii/khamisiyah\\_iii\\_s08.htm#VI\\_A](http://www.gulflink.osd.mil/khamisiyah_iii/khamisiyah_iii_s08.htm#VI_A) (accessed 20 March 2008)

upwind of the ASP, their chemical agent alarms sounded and their initial tests indicated a weak positive result for the presence of chemical agents. Follow up tests were negative and the soldiers performed unmasking procedures. No soldiers in the incident ever demonstrated signs of exposure to chemical agents.<sup>68 69</sup>

Based on the lessons learned from battlefield demilitarization and cleanup, the Winkenwerder report<sup>70</sup> concluded that the safe removal of ordnance from the battlefield is a major mission that requires technical expertise, time, and proper explosives, and should remain an EOD function. However, it also noted that the EOD community would require additional resources to conduct large scale munitions destruction operations. He further recommended that the Army should review manpower requirements for future likely scenarios involving EOD and that combat engineer officer basic training and non-commissioned officer (NCO) training should include enhanced instruction to provide a supplemental force with the requisite technical expertise to assist the EOD in similar situations.<sup>71</sup>

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<sup>68</sup> Dr. William Winkenwerder, Jr., “Case Narrative: U.S. Demolition Operations at Khamisiyah, Final Report,” [http://www.gulflink.osd.mil/khamisiyah\\_iii/khamisiyah\\_iii\\_s04.htm#III\\_D1](http://www.gulflink.osd.mil/khamisiyah_iii/khamisiyah_iii_s04.htm#III_D1) (accessed 20 March 2008)

<sup>69</sup> Ibid. A second munitions misidentification occurred just outside the Khamisiyah ASP when EOD forces failed to accurately identify the presence of chemical agents in approximately 1,250 122mm rockets located in an area referred to as “the Pit”. Again, these munitions bore no special markings and the technicians made their assessment based on the absence of markings identified in their recognition handbooks. Despite the lack of chemical alarm soundings, the report determined, based on atmospheric modeling results, that the destruction of these rockets “exposed some U.S. units to very low levels of chemical warfare agents. For further information, see *Section V: Assessment* in the Winkenwerder report at [http://www.gulflink.osd.mil/khamisiyah\\_iii/khamisiyah\\_iii\\_s07.htm#V](http://www.gulflink.osd.mil/khamisiyah_iii/khamisiyah_iii_s07.htm#V)

<sup>70</sup> Dr. William Winkenwerder Jr. was the Assistant Secretary of Defense (Health Affairs) and the Special Assistant to the Under Secretary of Defense (Personnel and Readiness) for Gulf War Illnesses, Medical Readiness, and Military Deployments. His report, “Case Narrative: U.S. Demolition Operations at Khamisiyah, Final Report” was a Department of Defense directed study into one of the incidents commonly attributed by Gulf War veterans as a source of their unexplained illnesses. The Department of Defense established a task force in June 1995 and Dr. Winkenwerder’s report was published on 16 April 2002.

<sup>71</sup> Dr. William Winkenwerder, Jr., “Case Narrative: U.S. Demolition Operations at Khamisiyah, Final Report,” [http://www.gulflink.osd.mil/khamisiyah\\_iii/khamisiyah\\_iii\\_s08.htm#VI\\_A](http://www.gulflink.osd.mil/khamisiyah_iii/khamisiyah_iii_s08.htm#VI_A) (accessed 20 March 2008)

The EOD reports also expressed concern about the dangerous lack of UXO awareness within the force. During ODS, there were twenty one Army personnel killed and fifty three injured as a direct result of handling/mishandling of UXO.<sup>72</sup> The 64<sup>th</sup> EOD detachment commander stated that the “number of soldiers needlessly injured or killed by handling unexploded ordnance during ODS proves that ordnance safety should be a common skills task taught to every soldier in the Army.”<sup>73</sup> EOD units therefore called for a re-energized commitment to the Explosive Ordnance Reconnaissance Agent (EORA) program. The EORA program is designed as part of the total force’s approach to UXO safety and also as reporting asset that EOD leverages to help them prioritize their workload and maximize their limited resources. Detachment commanders felt that every company should have at least one trained agent to provide guidance on UXO incidents in the absence of EOD. Although the Army did not reintroduce this program, it acknowledged the risks posed by battlefield UXO by including UXO recognition and reporting procedures as part of its annual common training task in the years following OPERATION DESERT STORM.

Besides inadequate EOD integration within the force, detachment-level After-Action Reviews (AAR) also indicated dissatisfaction with the command and control of EOD forces. There was general agreement that the command and control was provided by units that were understaffed and of incorrect ranks.<sup>74</sup> Most indicated a belief that the centralized control of decentralized operations could only be enabled on a battlefield characterized by rapid maneuver

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<sup>72</sup> “Unexploded Ordnance (UXO),“ <http://www.globalsecurity.org/military/systems/munitions/uxo.htm> (accessed 20 March 2008)

<sup>73</sup> Captain Catherine A. Reese, “64<sup>th</sup> EOD recalls war experience,” *Ordnance*, February 1992, 38.

<sup>74</sup> Captain Shannon, “After Action Report for Operations Desert Shield/Desert Storm,” 147<sup>th</sup> EOD Detachment, 9 May 1991. [http://www.gulfink.osd.mil/declassdocs/army/19961203/120396\\_sep96\\_decls1\\_0010.html](http://www.gulfink.osd.mil/declassdocs/army/19961203/120396_sep96_decls1_0010.html) (accessed 20 March 2008)

through the acquisition of robust mobile communications capabilities.<sup>75</sup> As in the post-Vietnam ACDCMA study, there was no consensus as to command channels under which the EOD detachments should fall. Many EOD commanders endorsed being placed under the operational control of their supported unit in order to ensure better integration; however, others in the community resisted the thought of “badge wearers” relinquishing command and control.

ODS was the first time EOD units operated on a maneuver battlefield since the Korean War. They found that they had not replicated the challenges of the modern battlefield in their relatively frictionless garrison operations environment. The need to achieve better integration with maneuver forces was obvious. The detachments recommended participation in combat training center rotations, field training, deployments, and exercises with combat units in order to build relationships.<sup>76</sup> The trend within the force was that corps, divisions, and brigades had very little understanding of what EOD could or should be doing for them or what support EOD units required. In the absence of established training relationships and standard operating procedures, there were significant differences between the way that VIIth Corps and XVIIIth Airborne Corps employed their supporting EOD forces.<sup>77</sup>

As a result of a few unfortunate incidents, the Ordnance and Engineer branches emerged from ODS with an untrusting and distant relationship. EOD forces recognized the need to improve relationships and understanding with maneuver units. However, there was minimal success in correcting the coordination deficiencies with combat engineers. Although recent experiences had clearly demonstrated both a lack of understanding and a training void within the

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<sup>75</sup> Unknown author, “After Action Review for Deployment to Southwest Asia,” 543<sup>rd</sup> EOD Control Team, 30 May 1991. [http://www.gulflink.osd.mil/declassdocs/army/19961108/110596\\_sep96\\_decls2\\_0005.html](http://www.gulflink.osd.mil/declassdocs/army/19961108/110596_sep96_decls2_0005.html) (accessed 20 March 2008)

<sup>76</sup> Master Sergeant Thomas S. Hall, “After Action Review on EOD Operations in Operations Desert Shield and Desert Storm”, 147<sup>th</sup> EOD Detachment, 22 April 1991. [http://www.gulflink.osd.mil/declassdocs/army/19961203/120396\\_sep96\\_decls1\\_0004.html](http://www.gulflink.osd.mil/declassdocs/army/19961203/120396_sep96_decls1_0004.html) (accessed 20 March 2008)

<sup>77</sup> 1<sup>st</sup> EOD Group (Provisional) After Action Review for OPERATION DESERT STORM, [http://www.gulflink.osd.mil/declassdocs/army/19961230/123096\\_sep96\\_decls21\\_0005.html](http://www.gulflink.osd.mil/declassdocs/army/19961230/123096_sep96_decls21_0005.html) (accessed 20 March 2008).

force, the Ordnance Corps and Engineer Regiment produced no solutions to codify roles and relationships for meeting the EH requirements of the modern battlefield.

The increased emphasis on rear area operations in the 1980s had resulted in EOD's shift from logistical to the operational channels and also its increased command and control structure. The dominance of the U.S. Air Force and its contribution to the absence of a rear area threat enabled EOD forces to push forward in the battlespace in support of maneuver units. ODS clearly highlighted the overall force's ignorance regarding EH on the modern battlefield and the inability of units to maintain the traditional level of self-reliance in maintaining tactical mobility. In addition, the low casualty rate experienced by U.S. forces exponentially lowered the American public's expectations of how many casualties should be expected in modern military operations.

While the EOD community emerged from ODS with many unsettled questions, the operational Army had victoriously validated the major tenets of its warfighting doctrine. The institutional Army, however, had many lessons to incorporate and was faced with planning for an uncertain post-Cold War future. Above all, the decisive victory by U.S. forces served as the ultimate testament to the professional competence of the All-Volunteer Force. The synergistic force generated by highly trained crews operating first-rate technology accounted for much more than the performance of superior weapons themselves.<sup>78</sup> The Army had greatly benefited from the increased defense budgets of the 1980s and its performance in ODS was the payoff for the nation's investment. The outcome affirmed the Army's commitment to training and maintaining career service members and cemented their position as the nation's most valuable military asset.

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<sup>78</sup> Gaffney, "The American Way of War Through 2020," 5.

# EOD in Post-Cold War Conflict

## Stability and Support Operations in the 1990s

The post-Cold War security environment represented a major paradigm shift for the United States. Liberated from fears of state-based intercontinental nuclear exchanges or a Warsaw Pact invasion of Western Europe, the U.S. stood alone as the world's single superpower. On taking command of TRADOC in 1991, GEN Frederick Franks set as his primary goal the complete revision of the Army's operational doctrine. The intent of the new FM 100-5 was to focus less on tactics and more on the Army's position in a challenging new world. The manual stressed the numerous missions the Army faced in the emerging environment and included a realistic assessment of joint requirements in future operations.<sup>79</sup>

The 1993 version of *Operations* stated that “unlike the Cold War era when threats were measurable and, to some degree, predictable, Army forces today are likely to encounter conditions of greater ambiguity and uncertainty.”<sup>80</sup> The manual anticipated potential Army employment in response to natural and man-made disasters, drug trafficking, regional conflicts, civil wars, insurgencies, and intimidation by irrational and ruthless extremists with military capabilities possibly including weapons of mass destruction (WMD).<sup>81</sup> The manual also reflected the Army's perception of a new societal intolerance for casualties. “The American people expect decisive victory and abhor unnecessary casualties. They prefer quick resolution of conflicts and reserve the right to reconsider their support should any of these conditions not be met.”<sup>82</sup>

As the U.S. Army downsized by one-third in the early 1990s, it placed a greater emphasis on the protection of both its highly trained, professional workforce and also its expensive,

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<sup>79</sup> Chapman, et al, 36.

<sup>80</sup> Field Manual 100-5, *Operations*, 1993, 1-1.

<sup>81</sup> Ibid.

<sup>82</sup> Ibid, 1-3.

technologically advanced hardware. The period witnessed the institutionalization of risk management protocols and force protection measures throughout the Department of Defense designed to mitigate mission risk and minimize accidental and operational equipment and personnel losses. Force protection became a significant planning factor for American military operations throughout the 1990s. Composite risk management gained acceptance in the military's culture and would ultimately become the force that drove increased demands for EOD capabilities as the institution became less willing to accept the risk of having anyone but the most highly trained experts deal with the threat of explosive hazards. While combat engineers continued to focus on the breaching of complex linear obstacles on a conventional battlefield, the EOD community sought to demonstrate the relevance of its capabilities to protect the force.

Some observers believed the Army had carried force protection efforts to the extreme and were in fact reducing the Army's effectiveness. As a senior British officer wrote, "in future conflicts, the United Kingdom will have to work within, or possibly around, the constraints imposed by this American aversion to casualties."<sup>83</sup> Some argued that the casualty aversion was a product not only of perceived external pressures from the American public, but also from internal organizational dynamics that had generated a "zero defects mentality" and a fear of risk taking.<sup>84</sup> Critics would claim that it reached its peak during OPERATION ALLIED FORCE, the NATO's 1999 campaign to stop Serbian ethnic cleansing in Kosovo.<sup>85</sup> In many ways, America's

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<sup>83</sup> Wing Commander K.S. Balshaw, RAF, "Spending Treasure Today but Spilling Blood Tomorrow: What are the Implications for Britain of America's Apparent Aversion to Casualties?" *Defence Studies*, Vol 1, No. 1, Spring 2001, 101.

<sup>84</sup> Lieutenant Colonel William F. Bell, "Risk Aversion in the U.S. Army Officer Corps," (paper presented at the 1999 Joint Services Council on Professional Ethics (JSCOPE 99)). <http://www.usafa.edu/isme/JSCOPE99/Bell99-2.html> (accessed 20 March 2008)

<sup>85</sup> Jeffrey Record, "Force Protection Fetishism: Sources, Consequences, and (?) Solutions," *Air and Space Power Journal*, Summer 2000, 4-11. Dr. Record rails against the restrictive impact that the nation's devotion to force protection has on the execution of successful operations. "Consider the joint statement by Secretary of Defense William Cohen and Gen Henry Shelton, chairman of the Joint Chiefs of Staff (CJCS), that "the paramount lesson learned from Operation Allied Force is that the well-being of our people must remain our first priority."<sup>2</sup> Consider also the postwar caution of Gen Wesley Clark, supreme allied commander of the North Atlantic Treaty Organization (NATO): "In an air campaign you don't want

reluctance to put American troops in harm's way was a logical response to the circumstances of the 1990s. Throughout the decade, the United States' forces conducted operations in locations such as Somalia, Haiti, Bosnia, and Kosovo for national interests that were secondary, even tertiary.<sup>86</sup>

Although the Army's operational mission set was gravitating towards stability and support operations, much of the institution's intellectual focus remained on optimizing its performance in conventional warfare. The 1996 version of FM 9-16, *Explosive Ordnance Disposal Service and Unit Operations*, reaffirmed EOD's role in rear area operations during a high intensity conflict on a linear battlefield. The first block of text in the manual clearly states "EOD service helps preserve the commander's combat power. It enables the commander to integrate and coordinate a variety of functions to prevent degeneration of combat power at the operational and tactical levels. The challenge for EOD is to help maintain the maneuver, firepower, sustainment, and protection functions across the full range of Army Operations."<sup>87</sup>

The updated doctrine included a stronger organizational structure designed to address many of the deficiencies identified during ODS. The manual prescribed an Ordnance Group (EOD) with an O-6 commander for theater planning and command and control. No longer a provisional structure, the 52<sup>nd</sup> Ordnance Group (EOD) was activated subordinate to U.S. Army Forces Command (FORSCOM) and charged with the command and control of all CONUS EOD organizations. The Ordnance Battalion (EOD) and Ordnance Company (EOD) replaced the EODC and EOD detachment, respectively. The battalion, commanded by Lieutenant Colonel, included personnel, intelligence, operations, and supply staff sections to provide improved

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to lose aircraft" because when "you start to lose these expensive machines the countdown starts against you. The head-lines begin to shout, 'NATO loses a second aircraft,' and the people ask, 'How long can this go on?'

<sup>86</sup> Gaffney, "The American Way of War Through 2020," 13.

<sup>87</sup> Department of the Army, Field Manual 9-15, *Explosive Ordnance Disposal Service and Unit Operations*, (Washington D.C.: Government Printing Office, 1996), 1-1.

support for subordinate units. In recognition of the increasingly complex operating environment, the updated Ordnance Company (EOD) composition represented a partial return to the cellular detachment structure of the 1970s. Tactical companies each contained five “light” teams capable of responding to most conventional ordnance incidents. The company also included two “heavy” teams for non-routine incidents involving nuclear weapons, special tool or equipment requirements, or chemical incidents beyond the capability of the light team.<sup>88</sup>

In terms of strength, the 1996 doctrine represented a forty percent increase in the number of EOD teams assigned at corps-level.<sup>89</sup> The battlefield organization prescribed by the 1996 manual placed the Ordnance Group (EOD) at the theater-level and charged it with the command and control of all assigned or attached Ordnance Battalions (EOD). At the corps-level, Ordnance Battalions (EOD) would command and control ten ordnance companies. Companies were no longer assigned DS to divisions, but rather to the individual corps support battalions (CSB) that each supported a division. The EOD companies supporting the CSBs could be tasked to go forward and perform EOD missions in the division areas of operation.<sup>90</sup>

During the stability and support operations conducted by the U.S. Army in the 1990s, the EOD community seized the opportunity to showcase their capabilities and instill a vision of how they could best contribute to the overall mission. Previously, many combat units’ impression of EOD was that it was a garrison activity that typically responded to range incidents. The lack of interaction between the tactical units and the EOD units, which were assigned to echelons above

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<sup>88</sup> Ibid, 1-5 to 1-8 and A-1 to A-4.

<sup>89</sup> Field Manual 9-15, *Explosive Ordnance Disposal Service and Unit Operations*, 1989, allocated ten EOD detachments with five teams each for a total of fifty teams. The 1996 updated version allocated a corps ten EOD detachments with seven teams each for a total of seventy teams- a 40% increase.

<sup>90</sup> Field Manual 9-15, *Explosive Ordnance Disposal Service and Unit Operations*, 1996, 1-6 to 1-7.

corps, prevented maneuver commanders from appreciating EOD as an organization that should be integrated into the battlefield framework as part of the basic force structure.<sup>91</sup>

The Army participated in numerous humanitarian, peacekeeping, and peace enforcement operations during the 1990s including Somalia, Haiti, Bosnia-Herzegovina, and Kosovo. None of these tactical operations included forces greater than a division-size plus corps-level supporting units and therefore did not provide an opportunity to test the updated EOD doctrine developed since ODS. Nevertheless, these operations were often conducted in mine and UXO saturated environments that presented a tremendous hazard to U.S. forces and generated strong demand for EOD capabilities.

In preparation for deployments, EOD forces began conducting Mission Rehearsal Exercises (MRX) with brigade-sized units at the maneuver training centers. Initially, many of the same problems from ODS continued to exist. In 1996 observer/controllers at the Joint Readiness Training Center (JRTC) observing an MRX identified the following pre-deployment trends: a) engineers and EOD had a poor understanding of each other's capabilities, battle drills, and SOPs, b) they were generally unfamiliar with working together; especially when an EOD company was placed under the command and control of an engineer battalion, c) the majority of maneuver commanders also did not understand EOD capabilities because EOD units typically work on a general support<sup>92</sup> (GS) basis to installations and maintain no relationships with deployable units during peace time, d) there were no doctrinal references prescribing the incorporation of EOD forces into echelons below corps, and e) generally, the staff engineer's lack of understanding

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<sup>91</sup> Lutz, "Resourcing Joint Explosive Ordnance Disposal (EOD) Forces for the Combatant Commander," 11.

<sup>92</sup> According to Field Manual 5.0, *Army Planning and Orders Production*, 20 January 2005, General Support is defined as "that support which is given to the supported force as a whole and not to any particular subdivision thereof."

regarding EOD units resulted in their poor integration into task force-level planning.<sup>93</sup> In short, almost all the same institutional problems that arose in ODS still existed in 1996. Ultimately, change occurred at the point of execution as units adapted by applying the lessons learned from their MRX's, establishing standard operating procedures (SOPs), and developing stronger bonds between maneuver units, engineer units, and EOD units during their deployments. However, none of these adjustments were ever codified in doctrine.

Stability operations during the 1990s provided maneuver units a prolonged opportunity to work closely with EOD forces. Combat engineers established mine actions centers to document and manage the dirty battlefield and worked with EOD units to provide both intelligence and training support to deployed units. In Bosnia, EOD detachments pushed their teams to the task force level in order to minimize incident report times.<sup>94</sup> In Kosovo, the EOD detachments supporting U.S. operations in the Multi-National Brigade East sector conducted split-based operations from Camp Bondsteel and Camp Monteith.<sup>95</sup> During these stability operations, EOD detachments were often assigned to combat engineer battalions for command and control. Although generally functional, this arrangement became a friction point whenever EOD commanders assessed that their engineer chains of command were inhibiting their ability to advise the senior tactical commander.

Slowly but surely during the 1990s, maneuver commanders developed an appreciation for the capabilities of EOD forces in the micro-laboratories of stability and support operational deployments. The artificial divide that had segregated EOD from tactical units since Vietnam had been shattered. As a result of these operations, commanders at the brigade and task-force

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<sup>93</sup> Department of the Army, Center for Army Lessons Learned JRTC Trends and TTPs, "Explosive ordnance disposal (EOD) and engineer integration", 1<sup>st</sup> and 2<sup>nd</sup> Quarter 1996.

<sup>94</sup> Department of the Army, Center for Army Lessons Learned Newsletter No. 98-6, *Fighting the Mine War in Bosnia*, [http://www.globalsecurity.org/military/library/report/call/call\\_98-6\\_minesch7.htm](http://www.globalsecurity.org/military/library/report/call/call_98-6_minesch7.htm) (accessed 20 March 2008)

<sup>95</sup> Captain Matthew J. Geraci, "Less Bang for the Buck," *Army Logistician*, July-August 2002, 24.

levels developed an increased expectation that EOD forces would be readily available to support their operations. However, there was no doctrinal framework for the integration of EOD forces at the brigade-level, limited appreciation for EOD requirements at the higher planning staff levels, and insufficient EOD force structure to meet the maneuver community's expectations in a large scale contingency. Leadership in the EOD community had a vision of what was necessary to meet the demands, but EOD expansion was not a priority in the pre-9/11 military.<sup>96</sup>

### **Capability Gaps and Shortfalls in the Global War on Terrorism**

Afghanistan and Iraq represent two of the most demanding explosive hazard environments imaginable. Before the U.S. invasion in 2001, Afghanistan had been a nation at war for over twenty years. Although the nation was ruled by the Taliban, there was a minimal amount of centralized government control. During the 1980s, the Soviet Union had scattered millions of mines across the country in order to deny safe havens to the Mujahedeen fighters. Over time, these mines degraded and became unstable. In addition, the countryside was littered with UXO. Warlords maintained private armies equipped with Soviet-era weaponry and possessed little or no appreciation for the safe storage and handling of modern munitions. The result was caches of weapons and ammunition in varying states of decay all across the countryside which required disposal by properly trained soldiers.

In many ways, Iraq was the exact opposite of Afghanistan. The central authority of Saddam Hussein maintained an iron grip through maintaining an appearance of military strength. The Iraqi government maintained huge ammunition storage complexes across the country. Although the Iraqi military did not have the weapons systems to employ much of this ordnance, the stockpiles achieved the intended purpose of intimidating the population. In areas where the

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<sup>96</sup> "EOD Capability Brief 25 April 07", PowerPoint presentation e-mailed to author by LTC Bill Fiske, September 2007. This briefing states that the EOD community had previously submitted Force Design Updates that were valid requirements but were unsuccessful in gaining institutional support.

munitions were left in plain sight, they were exposed to the elements and degraded. During the invasion, American forces had neither the manpower to secure all of these facilities nor the resources required to destroy them. As a result, these sites became easily accessible sources for explosives used to fuel insurgent IED operations.<sup>97</sup>

The battlefield environment encountered by U.S. troops in Iraq is arguably the most complex terrain in which American soldiers have ever fought. In many places throughout the country, the Army conducted operations in cities containing millions of people. For years, the Army had recognized the global trend of increasing urbanization yet never adopted a mobility construct that fully addressed its implications. In congested city environments, there was an operational necessity to minimize collateral damage by protecting both the population and the critical infrastructure that required the employment of skilled EOD technicians to RSP and remove devices from congested areas. However, insufficient EOD force structure in the initial stages of OEF and OIF left the task of neutralizing IEDs to the less skilled combat engineers.

Beginning with OEF and continuing in the opening months of OIF, field commanders reported challenges with both the availability and the integration of EOD capabilities in support of their combat operations.<sup>98</sup> In OEF, there were accidents resulting in the loss of life to U.S. soldiers resulting from non-EOD soldiers performing CEA destruction operations. In one incident that killed eight soldiers, the AR-15-6 investigation concluded that it “is widely recognized within the maneuver, engineer and EOD communities that there are not enough EOD

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<sup>97</sup> Colonel Mark D. Klingelhoefer, “Captured Enemy Ammunition in Operation Iraqi Freedom and Its Strategic Importance In Post-Conflict Operations”, (Carlisle Barracks, PA: U.S. Army War College, 18 March 2005), 1-3. This U.S. Army War College student research paper provides an exceptional description of the magnitude of the CEA problem faced by coalition forces during the initial months of OIF and the strategic impacts of failing to identify and plan for CEA requirements.

<sup>98</sup> Department of the Army, Center for Army Lessons Learned Newsletter 04-13, *Operation Iraqi Freedom (OIF) CAAT II Initial Impressions Report*, [http://www.globalsecurity.org/military/library/report/call/call\\_04-13\\_chap03-c.htm](http://www.globalsecurity.org/military/library/report/call/call_04-13_chap03-c.htm) (accessed 20 March 2008)

teams to accompany all missions occurring throughout the Combined Joint Operations Area.”<sup>99</sup>

As a result of this incident, Combined Joint Task Force 76 in Afghanistan revised its IED/UXO/Landmine/Caches Policy Memorandum. These changes gave EOD complete responsibility for the intelligence exploitation and destruction of IEDs and the inspection and inventory of all caches identified in country. EOD was also the only element authorized to respond to UXO, although Explosive Ordnance Clearance Agent<sup>100</sup> (EOCA) qualified soldiers could destroy them in the conduct of their operations.<sup>101</sup> The policy in Afghanistan clearly accepted the tactical risk of waiting for EOD response over the accidental risk of attempting CEA destruction with non-EOD qualified personnel.

In contrast to OEF where there was a clear policy assigning responsibility to EOD forces for UXO, IED, and CEA, the tactical realities of OIF necessitated that combat engineers perform the majority of the work. In OIF-1, almost every brigade and division-level after-action review clearly identified the need for additional EOD capabilities on the battlefield. In short, these documents express that there were insufficient EOD forces available to meet the IED, UXO and CEA mission requirements. In the absence of these forces, combat engineers assumed the role that they jokingly refer to as the E.O.D. – “Engineer On Duty.” In May 2004, the OIF Combined Arms Assessment Team (CAAT) II Initial Impressions Report published by the Center for Army

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<sup>99</sup> Combined Joint Task Force-180, AR 15-6 Investigation: “Cache Explosion IVO OBJ San Diego.” Memorandum for Chief of Staff, 26 March 2004, 8.

<sup>100</sup> According to Field Manual (Interim) 4-30.50, *Modular Explosive Ordnance Disposal Operations*, 2006, page 5-22 “the design of the EOCA is to enhance the engineer’s ability to ensure mobility and provide maneuver units with a limited alternative capability to counter UXO. EOCA’s are combat engineers who have attended and graduated from the EOCA course.... If the UXO is out of the scope of operations of the EOCA, EOD Soldiers must respond....EOCA personnel are authorized to destroy by detonation individual UXO identified in the EOCA Identification Guide and Joint Operation Area (JOA) UXO supplemental list. EOCA’s cannot move, combine, and/or destroy multiple UXO. EOCA’s cannot reconnaissance or handle IEDs or large vehicle improvised explosive device incidents. EOCA’s can only perform CEA operations under EOD personnel direct supervision. EOCA Soldiers are not to be used for EH response calls, but can conduct initial reconnaissance if EOD forces are not readily available.”

<sup>101</sup> Lutz, “Resourcing Joint Explosive Ordnance Disposal (EOD) Forces for the Combatant Commander,” 5.

Lessons Learned (CALL) described the problem in Iraq and how it impacted both EOD and engineers. Among those most important findings and recommendations were:

At the present time, the mission of finding and disabling IEDs has become one of the engineer's primary counterinsurgency missions.

EOD units are not capable of eliminating all caches found. Combat engineers using their demolition expertise have picked up the bulk of the operation. Combat engineers and EOD should receive the same training necessary for the destruction of captured enemy ammunition and unexploded ordnance.<sup>102</sup>

Current doctrine and employment places one EOD company in general support to each division. The basic unit of action is a team operating in support of a BCT. There are not enough EOD teams to destroy/clear all UXO and caches found in the AO in a timely manner and stay in synch with OPTEMPO.

EOD companies lack the C2 and span of control to synchronize operations at both division level and with all BCTs...There is no higher headquarters at the division level to provide operational oversight and guidance, enforce division/BCT commander's intent and priorities, and ensure effective support of EOD operations.

Resolution of issues, competing priorities, etc. takes time due to location and focus of EOD battalion. In addition, EOD companies and teams lack CSS to sustain their operations. The GS role of an EOD company reduces "ownership" by the division.<sup>103</sup>

Clearly, the initial outcomes in Afghanistan and Iraq portray the picture of organizational dissonance with regard to capabilities, roles, and missions. There was an imbalance between what the Army *wanted to do* and what *it could do* to accomplish its missions. The increase in demand for EOD capabilities could not be met with a corresponding and immediate increase in capacity, thus forcing maneuver commanders to assign the tasks to less qualified soldiers. These initial deficiencies have mostly been corrected in the ensuing years, although restrictions on the use of combat engineers to neutralize IEDs intensified the friction between the Ordnance Corps

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<sup>102</sup> The findings by the CAAT II IIR Team regarding the training of combat engineer to dispose of CEA echo those of the Winkenwerder Report. See Dr. William Winkenwerder, Jr., "Case Narrative: U.S. Demolition Operations at Khamisiyah, Final Report," [http://www.gulflink.osd.mil/khamisiyah\\_iii/khamisiyah\\_iii\\_s08.htm#VI\\_A](http://www.gulflink.osd.mil/khamisiyah_iii/khamisiyah_iii_s08.htm#VI_A) (accessed 20 March 2008)

<sup>103</sup> Department of the Army, Center for Army Lessons Learned, *Operation Iraqi Freedom (OIF) CAAT II Initial Impressions Report*, [http://www.globalsecurity.org/military/library/report/call/call\\_04-13\\_chap03-c.htm](http://www.globalsecurity.org/military/library/report/call/call_04-13_chap03-c.htm) (accessed 20 March 2008)

and Engineer Regiment as they continued their traditional struggle over roles, missions, and resources.

As a result of the EOD shortfall in Global War on Terrorism (GWOT) operations, the U.S. Army has implemented a plan to correct the deficiencies. In recognition of the tactical significance of EOD forces, service-level staff proponentcy for EOD was moved from the G-4, Logistics to the G-3, Operations. It also approved a force design update to almost double the active duty EOD force structure. A second active duty EOD group, the 71<sup>st</sup> Ordnance Group (EOD), was established in 2006. Both EOD groups are under the command and control of the 20<sup>th</sup> Support Command (CBRNE)<sup>104</sup>, a new organization that also provides command and control for the active Army's two chemical battalions that specialize in technical escort.

There were also major doctrinal changes to the allocation and command and control of EOD forces. The 2006 FMI 4.30-50, *Modular Explosive Ordnance Unit Operations*, nearly triples the level of EOD support allocated to a four-division Corps.<sup>105</sup> EOD companies almost doubled in size and now contain nine teams distributed among three modular platoons designed to provide dedicated support at the battalion task force level. EOD battalion headquarters now align divisions instead of corps and EOD companies either directly support or are under the operational control (OPCON) of brigade combat teams. EOD companies now consist of three modular

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<sup>104</sup> 20<sup>th</sup> Support Command (CBRNE) mission focus, <http://www.cbrne.army.mil> (accessed 16 April 2008). The 20th Support Command (CBRNE) integrates, coordinates, deploys, and provides trained and ready CBRNE forces. Capable of exercising command and control of specialized CBRNE operations to support Joint and Army force commanders primarily for overseas contingencies and warfighting operations, but also in support of homeland defense. Maintains technical links with appropriate Joint, Army, Federal and State CBRNE assets, as well as the research, development, and technical communities to assure Army CBRNE response readiness. CBRNE stands for Chemical, Biological, Radiological/ Nuclear, and Explosives.

<sup>105</sup> This is the author's assumption for a four division Corps based on the 2006 interim Field Manual 4-30.50, *Modular Explosive Ordnance Disposal Operations*. Each division has one OD BN (EOD) with four OD CO (EOD) to support its four BCTs. The Corps has one OD BN (EOD) with six OD CO (EOD) to support its operations. Twenty two total companies with nine teams each is one hundred ninety eight teams.

platoons each containing three EOD teams; this modular framework enables the company to further expand its operations in support of maneuver forces.

The Ordnance Corps and Engineer Regiment have established more formal structures to establish doctrine and deconflict roles and missions. The recent update to the former U.S. Army Field Manual 20-32, *Mine/Countermine Operations* has been appropriately renamed *Explosive Hazards Operations* and includes a section which provides a doctrinal framework for EOD-Engineer integration.<sup>106</sup> For the first time ever, the Ordnance Corps assigned EOD liaisons to work with combat engineers at the Maneuver Support Center. Despite these efforts, an unfortunate level of institutional animosity and distrust regarding motives still exists between the communities.<sup>107</sup>

## **Analysis and Conclusions**

### **Future Requirements for EOD Capabilities in Combat Operations**

As indicated by operations in Iraq and Afghanistan, future conventional battlefields will continue to contain a multitude of explosive hazards. The increasing sophistication of high technology munitions and area denial weapons will continue to demand expertise in the identification and neutralization of UXO. Army commanders' actions will continue to reflect a conscious analysis of risk and this behavior dictates that the most skilled technicians will be called upon to perform hazardous duties. This is a manifestation of an American cultural preference for specialists. Unless there is a change in the training requirements for combat

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<sup>106</sup> Department of the Army, Field Manual 3-34.210, *Explosive Hazards Operations* (Washington D.C., Government Printing Office, 27 March 2007), 3-1.

<sup>107</sup> Blake Morrison and Peter Eisler, "Destroy or Investigate? A Commander's Choice." *USA Today*, 6 November 2007. The article clearly shows the concerns about roles and missions between the two forces. EOD technicians cite their high level of training and forensic requirements while Engineer officers point to extensive wait times for EOD response to IED incidents that expose the force to additional risks. The article clearly identifies the operational tension between maintaining mobility and exploiting IEDs for intelligence.

engineers, in particular, and soldiers in general, EOD forces will remain responsible for the clearance of these hazards. Identifying the appropriate EOD force structure for an operation requires thorough mission analysis by staff officer familiar with the modern battlefield's explosive hazards. Underestimating EOD forces and effects of EO threats upon combat operations will ripple across all phases of combat operations. This ripple causes maneuver commanders to accept substantial risk by asking soldiers to attempt to perform tasks for which they are untrained and not equipped to conduct.<sup>108</sup>

In response to the overwhelming conventional superiority demonstrated by U.S. and coalition forces during OEF and OIF, adversaries of the U.S. have and will continue to employ irregular tactics resembling what military theorists have coined as Fourth Generation Warfare (4GW).<sup>109</sup> The rapid proliferation of powerful images via the global media and the internet will continue to enable adversaries to achieve strategic effects through their tactical actions. The enemy documents its attacks against U.S. forces and seeks to weaken the will of the American public by broadcasting the images via the internet or global media. The same recorded attacks serve to strengthen the resolve of their followers and encourage more recruits to join their struggle. As long as an adversary feels that it cannot match the U.S. in a conventional fight, the use of 4GW tactics will continue. The imperative to destroy IED networks via a "left of boom" strategy will continue the demand for EOD technicians to RSP devices for exploitation. Success

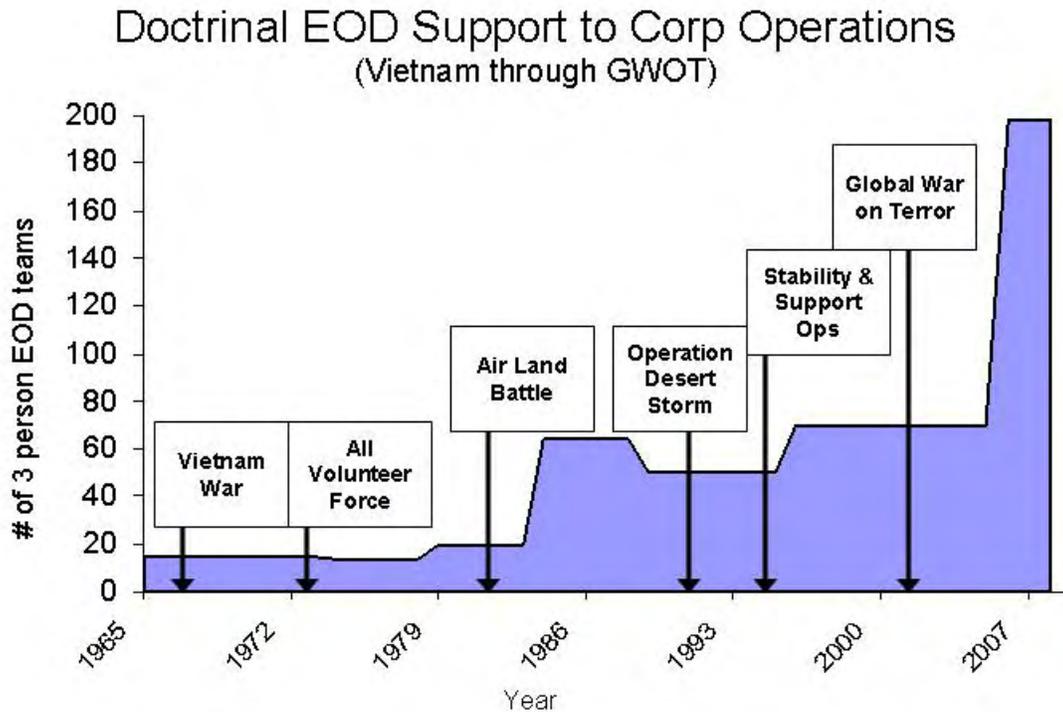
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<sup>108</sup> Department of the Army, Field Manual (Interim) 4.30-50, *Modular Explosive Ordnance Disposal Operations*, (Washington D.C.: Government Printing Office, July 2006), 1-4.

<sup>109</sup> According to T.X. Hammes, 4GW is rooted in the concept that in lengthy struggles that often last decades, superior political will can defeat greater economic and military power. This model starts with the premise that state and non-state actors understand that they cannot directly face the West's overwhelming conventional military power. Instead, they rely on methods of irregular warfare designed to degrade and destroy America's political will. It is an evolved form of insurgency that makes use of political, economic, social, and military networks to convince political decision makers that their strategic goals are unachievable or will be too costly for the perceived benefit. Hammes discusses the concept of 4GW in *The Sling and the Stone*, 2006. See also, United States Joint Forces Command (USJFCOM) publication *Joint Operating Environment: Trends and Challenges for the Future Joint Force through 2030*, December 2007, 45-46.

in dismantling the networks will not only reduce the strategic ammunition that America's enemies can deploy, but also save U.S. lives. EOD capabilities will undoubtedly continue to be in high demand in future conflicts.

## Conclusions and Recommendations



**Figure 2: Doctrinal EOD Allocations to Support Corps Operations Since Vietnam**

The increased demand for EOD capabilities by maneuver forces and the resultant increase in EOD forces supporting corps-level operations since the Vietnam War has been exceptional. These increases clearly reflect changes in all of the variables in the Tosti/Jackson Organizational Alignment Model. They result from a synergistic combination of increased explosive hazard threats (Environment), the American military's dedicated efforts to manage risk (Culture and Leadership), changes in Army operations and tactics (Strategy), and perceived societal expectations for low casualties in the performance of military operations (Internal

decision making impacted by Stakeholder demands). All of these forces interact against frictions generated by a parochial branch system where actors compete for missions, roles, and finite resources.

Major growth spurts in EOD force structure are traceable to periods where the magnitude of the prevailing forces was strong enough to overcome the Army's institutional friction. The first major increase in EOD forces resulted from the Army's analysis of AirLand Battle requirements for rear operations to generate and maintain the momentum of a corps' operational maneuver. The AirLand Battle Doctrine also necessitated the shift in EOD operations from logistical to operational channels. The second increase in EOD force structure came in the 1990s as a result of the lessons learned from ODS. The doctrinal tripling of EOD teams for corps-level operations since the start of the Global War on Terror is a reaction to current operational requirements for the destruction of mass quantities of CEA, the RSP of IEDs, and the need to compensate for the absence of basic, yet critical, skills within combat engineer and tactical units. It is also representative of both the maneuver community's demand for the EOD technicians' skills, and the Army's preference to rely on specialists versus increasing the proficiency of the general force. The proliferation of EOD technicians has been essential to supporting operations, but the pendulum has swung too far towards a reliance on specialists that imbalances the force and places it at risk.

There are some negative impacts from the maneuver community's reactionary demand for EOD forces. The Army must now work to update the skills of the rest of the force and reduce their reliance on EOD technicians for EH conditions that have become routine on the modern battlefield. These actions would require a drastic change in an Army culture whose risk averse nature make it reluctant to empower its workforce to exercise judgment in situations with potentially catastrophic outcomes. Most importantly, maneuver units must be trained to identify and authorized to neutralize explosive hazards such as submunitions whose disposal protocol requires small arms munition disruption (SMUD). The critical warrior training requirements are

munitions identification and the corresponding appropriate immediate actions. If the power of knowledge can be coupled with an authority to neutralize selected submunitions, tactical units will regain a level of self-reliance that until recently they were expected to maintain. This will also reduce the demand for EOD units to perform simple tasks.

Combat engineers also require greater training on ordnance identification and neutralization. New courses such as the EOCA and Route Reconnaissance and Clearance Course (R2C2) train engineer soldiers in tasks that they should receive in their Basic Non-Commissioned Officer Course (BNCOC) and Advanced Non-Commissioned Officer Course (ANCOC) training. The risk of resourcing these courses with GWOT funds is their potential disruption or disappearance when the military budget recedes to pre-GWOT levels. The materials taught in these courses must be ingrained in the military occupational specialty (MOS) training programs attended by combat engineer NCOs and officers. Both the Winkenwerder report and the CALL CAAT II report indicate the operational need to provide combat engineers with training on CEA demolition procedures, yet the institutional Army remains divided along Ordnance/Engineer branch lines.

EOD technicians are and must remain essential to the force. These soldiers experience months of specialized training to develop their expertise and should remain the only forces authorized to perform RSP on explosive devices or neutralize those EOs which cannot be positively identified. At the execution level, EOD capabilities must become more fully integrated into task forces and brigade combat teams. Units should no longer establish ad-hoc relationships to provide support to their EOD technicians. Operational experience has demonstrated that security force requirements for an EOD team must become a dedicated platoon mission in counterinsurgency and non-contiguous battlefield operations.<sup>110</sup> EOD technicians must also be

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<sup>110</sup> 4<sup>th</sup> Infantry Division, *Initial Impressions Report: Observations of a Modular Force Division in Operation Iraqi Freedom* (Fort Leavenworth, KS: Center for Army Lessons Learned, February 2007), 104.

integrated with engineer Route Clearance companies in order to codify relationships, maximize efficiency, and minimize EOD response time. EOD forces must also be outfitted with vehicles that provide a suitable level of protection such as the MRAP or Cougar. The Army cannot allow these critical assets to travel the battlefield in light skinned vehicles.

In the contemporary operating environment, EOD's role in support of the Sustainment warfighting function is tertiary to its role in Protection and M2. For example, the U.S. Army Corps of Engineers contracted out disposal operations in Iraq focused on the logistical mission of systematically destroying the remnants of Saddam Hussein's arsenals so it could focus its EOD organizations on M2 and Protection missions.<sup>111</sup> Although there is a technical training requirement for the EOD community to remain connected with the Ordnance Branch, there is an overarching operational requirement for them to integrate into the maneuver support community. The 2007 version of FM 3.0, *Operations*, defines explosive ordnance disposal as an activity performed under the Protection warfighting function.<sup>112</sup> This paper does not advocate administratively separating EOD from the Ordnance Corps, but rather recommends a functional restationing.

Simply put, EOD technicians have a great deal more in common with combat engineers and chemical soldiers than quartermasters and transporters. The mission of the Maneuver Support Center at Fort Leonard Wood, Missouri is to create warriors and develop leaders and capabilities that assure the mobility, freedom of action, and protection of the forces they support.<sup>113</sup> It is also the home of the Engineer, Chemical, and Military Police Schools and the Army's integrator for maneuver support and the Protection warfighting function. Meanwhile, the

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<sup>111</sup> Klingelhofer, "Captured Enemy Ammunition in Operation Iraqi Freedom and Its Strategic Importance in Post-Conflict Operations," 6.

<sup>112</sup> Department of the Army, Field Manual 3.0, *Operations*, (Washington D.C.: Government Printing Office, 2008), 4-7.

<sup>113</sup> Maneuver Support Center Mission Statement, <http://www.wood.army.mil/Mission.htm> (accessed 5 April 2008)

Ordnance Corps is consolidating at Fort Lee, Virginia with the Transportation Corps and Quartermaster Corps as part of the Combined Arms Support Command (CASCOM) with the stated purpose of developing multi-functional logisticians focused on Sustainment functions.

The Army cannot achieve the functional alignment described by the Tosti/Jackson model if it remains bound by the traditional framework of a stovepipe branch system. The current system fails to maximize cooperation between branches and thus allows the institutional development of capabilities in an askew manner that, over time, results in capability gaps. The institutional focus should balance between integrating DOTMLPF at the capability level and synergizing those capabilities at the Warfighting function level. Since EOD's self-described purpose is the protection of the commander's combat power, the community should shift its base of operations to the Maneuver Support Center. This would facilitate more direct interaction with both the Engineer Regiment and the Chemical Corps and will undoubtedly improve the DOTMLPF integration of Maneuver Support and Protection.<sup>114</sup> Unfortunately, the institutional Army's internal support structure is married to the concept of branch schools and home installations. In a transformed Army where officers no longer wear their branch insignia on their uniforms, why is the concept of splitting a branch along functional lines between multiple installations not seriously considered? The debate between the Ordnance Corps and the Engineer Regiment over the allocation of EH neutralization capabilities within the force is an example of the retarding influence of a military culture dominated by competition for roles, missions, and resources between branches. The Base Realignment and Closure Act (BRAC) of 2005 provided a window of opportunity to move the institutional EOD community from Aberdeen Proving

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<sup>114</sup> Hatch, 251-252. "In general, the more space separating people, the fewer the opportunities for direct interaction and the more time such activities will consume. While it is true that new methods of electronic communications and faster modes of transportation have considerably reduced the limitations of geographical distribution on interaction capabilities, these limitations are far from being entirely overcome. Face-to-face interaction is still considered superior to all other forms of communication.... Physical distance usually creates problems for the formation of relationships because, when potential partners are far apart, they must take the trouble to arrange their meetings. When locations are close, relationships can form through casual interactions that occur spontaneously..."

Ground, MD to integrate alongside their Protection and Maneuver Support brethren at the Maneuver Support Center. Instead, the Army adhered to the traditional monolithic branch construct and relocated the Ordnance Branch to Fort Lee, VA in total.

Finally, the Army's leadership must further adjust its culture by its qualifying its recognition of the EOD force's technical capabilities with the understanding that the rest of the force cannot become overly dependent upon these assets. The institution must accept risk by increasing the level of explosive hazards neutralization training across the entire force. The developing trend of over-reliance on specialists must return to a healthy balance point where tactical units, including combat engineers, are once again expected to and capable of maintaining tactical mobility in the execution of their operational missions. Such a culture shift would require the institution to fully examine how and why it intended focus on risk management slowly evolved to force-wide risk aversion and encouraged over-dependence on technical specialists.

The expansion of battlefield support requirements performed by the EOD community since Vietnam cannot be linked to any one single cause or as the net sum of a number of factors. Instead, it is the product of the complex interactions that take place both internal to and external of an organization. There is a greater demand by maneuver commanders for EOD forces as a result of the exponential increase in explosive hazards on the modern battlefield, the influence of the composite risk management approach prescribed to by Army culture, and efforts to counter the strategic effects of 4GW tactics employed by current adversaries. Now, the institutional Army must realign its internal support systems to minimize friction and ensure the effective and efficient integration of these assets while avoiding the risk of tactical paralysis in a force that relies heavily on EOD capabilities.

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