



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

**“EOD, UPI!”: HOW EXPLOSIVE ORDNANCE DISPOSAL
FORCES CAN BEST SUPPORT SPECIAL OPERATIONS
FORCES**

by

Stephen R. Draper

June 2006

Thesis Advisor:
Second Reader:

Kalev Sepp
Erik Jansen

Approved for public release; distribution is unlimited.

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE June 2006	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE "EOD, Up!": How Explosive Ordnance Disposal Forces Can Best Support Special Operations Forces			5. FUNDING NUMBERS	
6. AUTHOR(S) Stephen R. Draper				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT U.S. special operations forces (SOF) are likely to undertake missions against terrorists, insurgents, and other enemies where they will encounter explosive hazards. Identification, detection, and neutralization of weapons of mass destruction, improvised explosive devices, booby-traps, and similar weapons requires the support of technicians trained in explosive ordnance disposal (EOD), an expertise that is not resident in SOF units. Consequently, there is a need for EOD technicians with SOF capabilities who can readily integrate with them. This thesis employs a variety of methodologies, from an analysis of required capabilities to an application of game theory, to determine how SOF can be best supported by existing EOD forces and how the supporting command structures and relationships may be improved. It concludes that the Navy's EOD force is best suited to provide support to SOF, and should be included in all special operations planning documents. Those Navy EOD units tasked to provide support to SOF should be consolidated into one organization dedicated to that mission. Finally, when supporting SOF, the Navy should replace its current eight-person EOD operational element with a two-man team that will better match SOF operational requirements.				
14. SUBJECT TERMS: Explosive Ordnance Disposal, EOD, Special Operations Forces, SOF, hyper-conventional, SOF support, force enablers, game theory, SWAT, initial trust, Technical Intelligence, hostage rescue, requirements analysis, counter-terrorism, Improvised Explosive Device, IED			15. NUMBER OF PAGES 125	16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited.

**“EOD, UP!”: HOW EXPLOSIVE ORDNANCE DISPOSAL FORCES CAN BEST
SUPPORT SPECIAL OPERATIONS FORCES**

Stephen R. Draper
Lieutenant, United States Navy
B.S., United States Naval Academy, 1999

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN DEFENSE ANALYSIS

from the

**NAVAL POSTGRADUATE SCHOOL
June 2006**

Author: Stephen R. Draper

Approved by: Kalev Sepp
Thesis Advisor

Erik Jansen
Second Reader

Gordon McCormick
Chairman, Department of Defense Analysis

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

U.S. special operations forces (SOF) are likely to undertake missions against terrorists, insurgents, and other enemies where they will encounter explosive hazards. Identification, detection, and neutralization of weapons of mass destruction, improvised explosive devices, booby-traps, and similar weapons requires the support of technicians trained in explosive ordnance disposal (EOD), an expertise that is not resident in SOF units. Consequently, there is a need for EOD technicians with SOF capabilities who can readily integrate with them. This thesis employs a variety of methodologies, from an analysis of required capabilities to an application of game theory, to determine how SOF can be best supported by existing EOD forces and how the supporting command structures and relationships may be improved. It concludes that the Navy's EOD force is best suited to provide support to SOF, and should be included in all special operations planning documents. Those Navy EOD units tasked to provide support to SOF should be consolidated into one organization dedicated to that mission. Finally, when supporting SOF, the Navy should replace its current eight-person EOD operational element with a two-man team that will better match SOF operational requirements.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	METHODOLOGY	3
B.	ORGANIZATION.....	4
C.	IMPACT AND RESULTS	6
D.	TERMS.....	6
II.	DEFINING THE PROBLEM: DETERMINING THE NATURE OF EOD SUPPORT OF SOF	9
A.	CORE TASKS IN WHICH SOF MAY ENCOUNTER EXPLOSIVE THREATS	11
1.	Direct Action (DA).....	11
2.	Special Reconnaissance (SR).....	13
3.	Counterterrorism (CT)	13
4.	Counter Proliferation of Weapons of Mass Destruction (CP)	14
5.	Foreign Internal Defense (FID).....	15
6.	Unconventional Warfare (UW)	15
B.	SO F UNITS THAT FACE EXPLOSIVE THREATS	16
1.	75th Ranger Regiment.....	17
2.	Army Special Forces	18
3.	Air Force Special Tactics Squadrons	18
4.	Naval Special Warfare	19
5.	Marine Corps Special Operations Forces.....	20
6.	Characteristics of SOF Personnel.....	21
C.	SUMMARY AND CONCLUSIONS.....	21
III.	SEARCHING FOR A SOLUTION: EOD FORCE CAPABILITIES AND MISSIONS.....	25
A.	INITIAL EOD TRAINING COMMON TO ALL SERVICES	25
B.	ARMY EOD	27
C.	AIR FORCE EOD	29
D.	MARINE CORPS EOD.....	30
E.	NAVY EOD.....	31
F.	SUMMARY AND CONCLUSION	36
IV.	THROUGH PAST EXPERIENCE... TOWARD A SOLUTION.....	39
A.	THE DEVELOPMENT OF NAVY EOD SUPPORT OF SOF	40
1.	Origins in the British Experience	42
a.	<i>Bomb Threat on the QUEEN ELIZABETH 2</i>	42
b.	<i>The Falklands War</i>	44
2.	U.S. Planners Learn From the British	45
3.	Operation EARNEST WILL	46
4.	EOD Support of SOF Develops Through the 1990s.....	49
5.	Recent Operations.....	50

B.	THE SOLUTION EMERGES	51
C.	SUMMARY	52
V.	MAKING IT WORK: THE DECISION TO INTEGRATE EOD SUPPORT AND OVERCOMING RESULTANT OBSTACLES	55
A.	THE DECISION TO INTEGRATE EOD INTO SOF: AN APPLICATION OF GAME THEORY	55
B.	THE ROLE OF INTELLIGENCE ANALYSIS IN THE DECISION TO INTEGRATE EOD FORCES INTO SOF	57
1.	Determining the Credibility of the Threat	59
2.	Determining Group Intentions	60
3.	Determining Group Capabilities	61
C.	ADDRESSING TRUST ISSUES THAT RESULT FROM THE DECISION TO INTEGRATE EOD FORCES INTO SOF	62
1.	Tight Bonds and Effective Teamwork	64
2.	Initial Trust	66
3.	The Advantages of Joint Training	71
4.	Overcoming Obstacles to Joint Training	72
VI.	CONCLUSIONS AND RECOMMENDATIONS	75
A.	A NOTE ON CIVILIAN SPECIAL OPERATIONS TEAMS	76
B.	CONCLUSIONS FROM THE APPLICATION OF GAME THEORY ...	78
C.	JOINT TRAINING AND TRUST	79
D.	RECOMMENDATIONS	80
1.	Characteristics and Benefits of a SOF Mobile Unit	81
E.	FURTHER RESEARCH	85
	APPENDIX A: BARRICADED TERRORISTS VS. ASSAULTING SOF: AN APPLICATION OF GAME THEORY	87
A.	INTRODUCTION	87
B.	THE PLAYERS	88
C.	METHODOLOGY	88
D.	MOTIVATIONS AND ALTERNATIVE STRATEGIES	89
1.	The Terrorists	89
2.	The Special Operations Force	90
E.	APPLICATION OF GAME THEORY PRINCIPLES	91
F.	CONCLUSIONS	100
	LIST OF REFERENCES	103
	INITIAL DISTRIBUTION LIST	109

LIST OF FIGURES

Figure 1.	The High-Level Model of Initial Formation of Trust (From McKnight, <i>et al</i> , 474)	68
Figure 2.	Terrorists' Strategies	90
Figure 3.	SOF Strategies	91
Figure 4.	Graphical Illustration of the Application of Game Theory Principles ...	94
Figure 5.	Terrorists' cardinal rankings of their alternative strategies.....	95
Figure 6.	SOF's cardinal rankings of its alternative strategies	95
Figure 7.	Payoff polygon formed by the combinations of cardinally ranked strategies and the security levels of each player	98
Figure 8.	Payoff polygon formed by the combinations of cardinally ranked strategies and the security levels of each player when joint training has resulted in indistinguishability between the SOF and EOD forces .	100

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	SOF Tasks and Types of EOD Support Required	16
Table 2.	SOF Units with Missions Requiring EOD Support	20
Table 3.	Hyper-Conventional Capabilities Required for EOD Support of SOF .	37
Table 4.	Initial Payoff Matrix	92
Table 5.	Analysis of Initial Game	93
Table 6.	Matrix of payoff value sets that result from cardinal rankings of alternative strategies of each player	96
Table 7.	Determination of security levels in both the terrorists' and SOF's games.....	97
Table 8.	Illustration of the game when joint training between SOFs and EOD units allows them to achieve indiscernability	99
Table 9.	Determination of each player's security values when joint training between SOF and EOD units results in indiscernability.....	99

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

Any writer with any degree of humility will acknowledge that he or she owes some debt of gratitude to those who helped in the endeavor. This is all the more true for a master's thesis – which is often the first significant writing effort in a career. I am no different. I would like to thank Dr. Kalev Sepp for his expert insight and editing. Without his contagious enthusiasm for the subject, this thesis very likely would have remained half-finished forever. A debt of gratitude is owed to Dr. Erik Jansen, as well, for graciously giving his time – which he already has precious little of – to review this thesis. Academic research will only get one so far when writing about realities in the field. I would also like to thank Joseph “Digger” DiGuardo for his time spent, through numerous interviews and emails, conveying both the history of Navy EOD support of SOF as well as today's political and operational situation.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

Terrorists, insurgents, and other enemies of the state have long embraced the use of explosive devices in the pursuit of their goals, and these methods are increasingly employed in operations against established governments.¹ The proliferation of nuclear devices as well as other chemical, biological, radiological, and nuclear (CBRN) weapons poses new and tempting options for enemies of the state. In the National Security Strategy, President George W. Bush identifies this as the gravest danger to the nation and refers to open declarations by our enemies that they are actively seeking such weapons.² Explosives in the form of bombs, booby-traps, and other threats are a proven weapon of the weak in a conflict between asymmetric powers. Beyond the psychological effects of bombs on the general population³, such devices deny access and inflict casualties upon first responders and bystanders. In the National Military Strategy, General Richard Meyers stated that the foremost priority of the United States military was to win the Global War on Terrorism (GWOT). One of the most effective tools the United States has and will continue to employ strategically and tactically in fighting the GWOT is Special Operations Forces (SOF).

The high stakes involved with strategic special operations and, more specifically, the higher military and political risks consequent to their failure, necessitate their being used as last resort. But sometimes, when diplomacy fails, the government is left with no alternative to the assertion of national power through military means. In areas outside of designated war zones, often the only

¹Rick Jervis, "Militants Sharing Bomb Expertise," *USA Today*, 24 October 2005, pg 1.

² President of the United States of America, *National Security Strategy*, (Washington, D.C.: GPO, 2002), 1.

³ While leading thinkers' definitions of terrorism differ, they all have in common the goal of a psychological impact (namely that of terror) upon a general audience. See Audrey Kurth Cronin, "Behind the Curve: Globalization and International Terrorism," *International Security*, Winter 2002-03: 30-58, and Martha Crenshaw, "The Causes of Terrorism," *Comparative Politics*, July 1981: 379-399.

tool through which national military power can be brought to bear is strategic special operations.

Non-strategic special operations, which are undertaken in designated war zones in support of ongoing war plans, are much more common than those of a strategic nature. While non-strategic special operations may entail less political risk than strategic ones, explosive threats still are encountered that require neutralization for the successful completion of the mission.

In both cases, the government is obliged to ensure its special operations forces have the necessary skills, equipment, and support to be successful. As this thesis illustrates, many of these missions expose the special operations forces to explosive threats that require explosive ordnance disposal support with hyper-conventional capabilities to be seamlessly integrated into the team.

Tactical and strategic operations that fall under the purview of the United States Special Operations Command (USSOCOM) increasingly require the support of Explosive Ordnance Disposal (EOD) units. These units have the expertise to render safe explosive ordnance and improvised explosive devices as well as to allow SOF to detect, identify, and neutralize CBRN threats. This is true in Operations IRAQI FREEDOM (OIF) and ENDURING FREEDOM (OEF), specifically, as well as those missions launched worldwide by USSOCOM as supported command in the GWOT. Bomb-makers are often the targets of SOF operations and are known to protect their homes and work-shops with improvised explosive devices (IEDs). Arms caches, frequently discovered by SOF, are also commonly booby-trapped. In fact, nearly every primary mission with which USSOCOM is tasked is impacted by the existence of explosive threats in the operating areas.

Identification, detection, and neutralization of threats from weapons of mass destruction (WMD), improvised explosive devices, booby-traps, and the like requires the support of technicians trained in EOD, an expertise that is not organic to SOF units. The various services' EOD forces possess these skills and can enable access to and facilitate operations in environments from which SOF would otherwise be denied. Consequently, EOD forces are increasingly requested and tasked to support USSOCOM missions. The requests and tasking of EOD forces to provide support to SOF are often informal, with ad-hoc relationships developed as needed under the stress of combat, which may result in less than optimal support.

The purpose of this thesis is to determine how Special Operations Forces can be best supported by the Department of Defense's various EOD forces. Having determined a model that will most likely result in more effective support of SOF, and thereby the enhancement of SOF capabilities, this thesis recommends the steps necessary to provide such a model to SOF operators.

Formal and ubiquitous recognition of the Navy's EOD force as the one best suited to provide support to SOF should be institutionalized and included in all special operations planning documents. Those EOD units that are tasked with providing SOF support should be consolidated into one organization dedicated to that mission. Finally, the current operational element employed by the Navy's EOD units should, when supporting SOF, be replaced by a two-man team that will better match operational employment.

A. METHODOLOGY

This thesis is presented in two parts and employs a variety of methodologies. The first part employs a requirements analysis that presents a

model for more effective EOD support of SOF. First, SOF missions and tasks are analyzed to determine the nature of the need for EOD support by SOF. Once the nature of the recurring requirement for EOD expertise is determined, this thesis examines that requirement both in terms of the core tasks of USSOCOM as well as each service's forces within the special operations chain of command. This examination of tasks presents commonalities in the capabilities required of those EOD units that support SOF. These capabilities establish the criteria for optimized support against which each service's EOD forces are compared in an effort to determine which service's EOD forces are best suited to SOF support.

The second part of this thesis identifies potential obstacles to the integration of external support into SOF units at the tactical level and offers some recommendations for overcoming them. The problems inherent in the integration of support personnel into an existing, elite team that has been trained and drilled to precision are addressed. The issues of trust, distrust, and influence that are encountered in such a situation are examined. Next, the principles of game theory are applied to the scenario of a terrorist contemplating the employment of explosive threats, in the form of IEDs and booby-traps, against a SOF unit that is itself weighing the option of integrating an EOD capability into its assaulting force. The application of Game Theory to the situation suggests interesting conclusions for both SOF and EOD commanders that impact doctrine and training. The exercise highlights the fact that the costs of integrating EOD personnel can be drastically reduced through joint training, thereby negating one of the terrorists' major advantages.

B. ORGANIZATION

Chapter II defines the problem by examining the legitimacy and nature of the need for EOD support of SOF. This chapter presents a discussion of existing

and emerging SOF core tasks that exhibit a potential to require EOD support. Analysis by task is followed by an outline of USSOCOM units with missions that cause their personnel to face an explosive threat and may require EOD support. The chapter presents an analysis of common characteristics, capabilities, and skills that would be required of EOD forces tasked with providing such support to SOF.

Chapter III discusses organizational and personnel capabilities of the existing EOD forces of the Army, Navy, Air Force, and Marine Corps. It presents an overview of training both common to all services as well as that which is unique to a particular one. Organizational structures of operational elements are discussed and their missions detailed.

Chapter IV details the unique development of the Navy's EOD force and then matches the capabilities required of EOD forces in support of SOF and those currently possessed by each service's existing EOD forces. It then offers a model for more effective EOD support of USSOCOM units and missions.

Chapter V discusses a commander's decision to integrate EOD personnel into a tactical unit, the obstacles likely to be encountered in doing so, and offers methods to surmount them. An application of game theory as it relates to that decision makes clear the advantages and disadvantages of both the assaulting SOF as well as the terrorists. This application of game theory highlights the benefits of integrating EOD technicians into the assaulting force when an explosive threat is suspected; and it indicates how joint training can minimize any disruption caused by the addition of external personnel to an assault force. This is followed by a discussion of the intelligence required by the tactical unit commander who may suspect an explosive threat and is faced with the decision

to integrate an EOD capability into an assault. Finally, the resulting issues of trust and authority are outlined, as well as their proposed solutions.

Chapter VI presents the conclusions and recommendations of this thesis and identifies areas for further research.

C. IMPACT AND RESULTS

This thesis provides commanders of SOF and EOD units information regarding ways to better optimize their training and the operational relationships between their units. Implementation of the recommendations offered will allow EOD commanders to achieve the best fit between the organization and training and operational employment of their forces. This will increase the SOF's likelihood of success against an adversary who increasingly turns to explosives to equalize the asymmetric power balance between itself and the state. SOF commanders will see that the existence of a support element that can provide the necessary expertise to enable access to areas otherwise denied by IEDs and booby-traps without affecting mission effectiveness or mobility will boost the combat power of USSOCOM units. They will also recognize that training of foreign and indigenous forces will be improved by tighter integration of EOD and SOF.

D. TERMS

In order to facilitate discussion of this thesis within a broad military and civilian audience, some terms first must be defined. Special Operations Forces are defined as those tactical units falling under the purview of USSOCOM. For the purposes of this thesis, SOF primarily refers to those tactical military units whose personnel, through the execution of their duties, regularly and directly

encounter the threat of explosive devices and booby-traps. But the principles involved and explosive threats encountered are universal to special operations teams, and the term can be inferred to imply SWAT teams and other government agencies' special operations units. Throughout this thesis these teams are alternately referred to as SOF or the tactical or elite team or unit.

Likewise, EOD refers primarily to those military units and individuals who are specifically trained, organized, and equipped to safely locate, identify, and perform procedures intended to render explosive threats safe. Each branch of the military maintains its own EOD capabilities that are particularly focused on ordnance, munitions, and situations unique to the Army, Navy, Air Force, or Marines. For the purposes of this thesis, however, EOD can imply those teams and individuals who are trained, equipped, and tasked with similar responsibilities within police departments (police bomb squads) and other government departments and bureaus such as the bomb technicians in the Bureau of Alcohol, Tobacco, and Firearms. Individuals trained and qualified by their applicable authorities to perform the actions required to render safe explosive threats are referred to as "technicians," or by the shorthand "tech," as in "bomb disposal technician" or "EOD tech."

The more technical and specific term "CBRNE", referring to chemical, biological, radiological, nuclear, and enhanced explosives, will henceforth be replaced by the more recognized and ubiquitous Weapons of Mass Destruction/Enhanced explosives (WMD/E). The National Military Strategy's discussion of the subject states

The term WMD/E relates to a broad range of adversary capabilities that pose potentially devastating impacts. WMD/E includes chemical, biological, radiological, nuclear, and enhanced high

explosive weapons as well as other, more asymmetrical “weapons”. They may rely more on disruptive impact than destructive kinetic effects.⁴

For the purposes of this thesis, WMD/E is used, except when the author wants to raise specific or technical points for which the term proves too general. In such instances, CBRN may be used in whole or in part, and WMD may be used when discussing Counter-Proliferation, a mission more directed against nuclear, chemical, and biological threats rather than enhanced explosives.

Finally, “EOD, up!” is the command commonly used to call the embedded EOD element of an assault unit from his usual position of rear security. When an assaulting team encounters an explosive hazard such as a trip wire or other booby-trap, it must avoid the area or stop altogether until the EOD technician can assess it and render it safe.

⁴ Joint Chiefs of Staff, *National Military Strategy*, (Washington, D.C.: GPO, 2004), 1.

II. DEFINING THE PROBLEM: DETERMINING THE NATURE OF EOD SUPPORT OF SOF

Special operations are operations that are conducted in hostile, denied, or politically sensitive environments to achieve military, diplomatic, informational, and/or economic objectives employing military capabilities for which there is no broad conventional force requirement.⁵ SOF activities are distinct from any others because they are not performed by conventional forces or comprise capabilities that do exist in the conventional force but are performed to a unique set of conditions or standards.⁶ Special operations are recognized as involving a greater degree of physical and political risk, unique operational techniques, and unorthodox modes of employment. In addition, special operations often require independence from friendly support and a capacity to self-sustain in austere environments, often far behind enemy lines. Special operations are often launched in response to emergent crises that “present limited windows for effective execution and often require first-time access.”⁷ Due to their high-standards and unique skills, SOF are the core of the United States’ ability to combat terrorism, counter proliferation of WMD, and conduct unconventional warfare.⁸

Countering the proliferation of WMD and destroying Al Qaeda and other parts of the international terrorist network are urgent national priorities that fall squarely within the missions of SOF; preempting global terrorist and WMD

⁵ U.S. Special Operations Command, *U.S. Special Operations Forces Posture Statement, 2003-2004: Transforming the Force at the Forefront of the War on Terrorism*, (Washington, D.C.: GPO, 2004), 7.

⁶ Joint Chiefs of Staff, *Joint Publication 3-05: Joint Doctrine for Special Operation*, (Washington, D.C.: GPO, 2003), II-3.

⁷ Kevin Deremer, *Army Explosive Ordnance Disposal and Army Transformation: Is Army Explosive Ordnance Disposal Prepared to Support Forces in the Emerging Environment?*, (FT Leavenworth, KS: US Army Command and General Staff College, 2003), 27.

⁸ USSOCOM, *Posture Statement*, 7.

threats is the SOF community's top priority.⁹ The special operations community's charge to "fill the gaps" in capabilities of the conventional forces also requires it to adapt. As conventional forces evolve and tailor themselves to emerging requirements, they will take on more tasks that SOF currently performs. As they do so, SOF will "increase their capacity to perform more demanding and specialized tasks."¹⁰ Among other changes identified by the Quadrennial Defense Review, SOF will develop and maintain a "greater capacity to detect, locate, and render safe WMD."¹¹ This will require personnel specially trained for the specific hazards encountered. Expertise in these required techniques and capabilities is currently found in EOD technicians who are outside the SOF community.

The following discussion outlines some of SOF's core tasks, as delineated and defined in *Joint Publication 3-05, Joint Doctrine for Special Operations*. These missions are widely accepted, and many have been foundational to special operations forces since their inception. The basic tactics of the commando-style raids characterized by what is now termed "Direct Action" missions remain unchanged since antiquity¹²: that of well-trained soldiers raiding enemy camps, relying on speed, surprise, and overwhelming force to overcome the enemy. All that has changed in these missions are techniques reflecting advances in technology.

There are nine core SOF tasks outlined by JP 3-05. Three of them, Information Operations, Psychological Operations, and Civil Affairs Operations, are more conventional in nature and unlikely to pose a requirement for EOD

⁹ *National Security Strategy*, 5; *National Military Strategy*, iii; and USSOCOM, *Posture Statement*, 29.

¹⁰ Department of Defense, *Quadrennial Defense Review (QDR) Report*, (Washington, D.C.: GPO, 2006), 44.

¹¹ QDR, 44.

¹² John Arquilla, ed., *From Troy to Entebbe: Special Operations in Ancient and Modern Times*, (Lanham, MD: University Press, 1996), 1.

support beyond established capabilities. For this reason, they are not discussed below. The other six tasks do conceivably pose a need for EOD support that may eclipse the abilities of conventional forces. The following discussion endeavors to analyze these missions in an attempt to identify those core SOF tasks that would likely require EOD support. Following this discussion, a few specific SOF units' primary missions are examined to further explore the need for EOD support of SOF. Once the missions that may require EOD support are identified, common skills and capabilities required of the supporting personnel are distilled in an attempt to more clearly define the nature of that support.

A. CORE TASKS IN WHICH SOF MAY ENCOUNTER EXPLOSIVE THREATS

1. Direct Action (DA)

These are short-duration strikes and other small-scale offensive actions conducted as a special operation in hostile, denied, or politically sensitive environments and which employ specialized military capabilities to seize, destroy, capture, exploit, recover, or damage designated targets.

DA missions in support of the GWOT have included clearing terrorist bomb-makers' houses and facilities, weapons cache seizure, and capturing high value targets wherever they may be found. These and other DA missions often involve navigating booby-traps or breaching denied areas, which require EOD expertise. An unclassified Defense Intelligence Agency report recognizes the unique threat posed by booby-traps and the specialized expertise required to safely neutralize it:

The search and clearance of buildings, caves, abandoned vehicles or any suspect area is a specialized skill that requires expert knowledge of BT types and functions. The clearance procedures are also highly skilled, requiring specialized equipment and training.

The task of BT search, clearance, and disposal is an EOD mission. If BTs are suspected, then EOD personnel should be tasked.¹³

Immediately following the completion of a DA mission, the area is often searched for information and evidence that may be of value to intelligence analysts. The systematic and detailed search of these areas is a process that has come to be known as sensitive site exploitation (SSE). A sensitive site is "...a geographically limited area with special diplomatic, informational, military, or economic sensitivity to the United States." SSEs were originally divided into two types: those that potentially contain WMD (or materials or information concerning development programs) and those thought to contain information or documentation that supported the former Iraqi regime's atrocities and/or gave information regarding its structure.¹⁴ EOD technicians were critical to ensuring the safety of search personnel from explosive and CBRN hazards during SSE. Today, the search for Iraqi WMD and information regarding the former regime largely has ceased, but the SSE process has continued and has been expanded to include the search for forensic evidence and intelligence significant to the GWOT. SSE of an area known or suspected to pose explosive threats requires EOD experts. Bomb technicians are trained to recognize explosive hazards where other personnel may not, and can safely handle bomb making materials and components while preserving any forensic evidence for later analysis.

SOF elements are afforded a large degree of protection from explosive hazards through their tactics, techniques, and procedures (TTPs). In OIF, for example, SOF elements are able to conduct many raids at night, thus reducing the odds of being attacked by an insurgent IED enroute. Objectives are often

¹³ Defense Intelligence Agency, *Landmine and Explosive Hazards Reference Guide – Afghanistan* (Washington, D.C.: GPO, 2002), 1-44.

¹⁴ Pete Lofy, "Managing Sensitive Site Exploitation – Notes From Operation IRAQI FREEDOM – From the Field," *Army Chemical Review*, September 2003 [journal online]; available from http://www.findarticles.com/p/articles/mi_m0IUN/is_2003_Sept/ai_110574483.html; Internet; accessed 28 February 2006.

bombers' residences, and wives and children frequently are present. While it is generally unlikely that an insurgent will booby-trap his own home, especially if his family lives there as well, it does happen. While SOFs do not encounter IEDs and other explosive hazards with the frequency that conventional forces do, the relative strategic and operational importance of special operations increases the consequences of a mission failure. For this reason, EOD support of DA missions is a strategic and operational necessity.

2. Special Reconnaissance (SR)

These are reconnaissance and surveillance actions conducted as a special operation in hostile, denied or politically sensitive environments to collect or verify information of strategic or operational significance, employing military capabilities not normally found in conventional forces.

The clandestine nature of special reconnaissance missions and the general goal of avoiding contact with the enemy largely negates the need for EOD support of SOF during these missions. SR teams looking to avoid the enemy can just as easily avoid areas denied by explosive threats and booby-traps. But when SR teams have a fixed position into which they must insert (for example, when gathering intelligence on a target designated for a DA mission), the possibility of booby-traps that must be cleared prior to or upon the team's insertion must be taken into account. If such a threat is deemed to exist or cannot be decisively ruled out, then the insertion of an EOD technician with the SR team is a prudent decision that may act as a force enabler and allow the completion of the mission.

3. Counterterrorism (CT)

These are operations that include offensive measures taken to prevent, deter, preempt, and respond to terrorism. SOF are specifically organized,

trained, and equipped to conduct covert, clandestine, or discreet CT missions in hostile, denied, or politically sensitive environments. These missions include, but are not limited to intelligence operations, attacks against terrorist networks and infrastructures, hostage rescue, recovery of sensitive material from terrorist organizations, and non-kinetic activities aimed at the ideologies or motivations that spawn terrorism.¹⁵ To the extent that CT missions include DA operations, such as raids against terrorist networks and facilities and hostage rescue, the same explosive threats exist as are encountered in DA missions. These can be booby-traps and IEDs placed along likely points of entry or at chokepoints to protect the facilities or to slow or stop any assaulting units. Chapter V of this thesis includes an analysis of an application of game theory to determine the effects of terrorists employing explosive threats in this manner versus an assaulting SOF unit that may or may not integrate an EOD capability into the assaulting element.

4. Counter Proliferation of Weapons of Mass Destruction (CP)

CP refers to actions taken to locate, seize, destroy, render safe, capture, or recover WMD. Actions taken to support DoD and other governmental agencies to prevent, limit, and/or minimize the development, possession, and employment of WMD, new advanced weapons, and advanced-weapon-capable technologies. SOF provide unique capabilities to monitor and support DoD policy.¹⁶

Currently, operations focused upon countering the proliferation of WMDs are the purview of units specifically trained, organized, and equipped for such missions. These Special Mission Units (SMUs) are capable of extremely rapid deployment anywhere in the world. But the nature of today's WMD threats and the difficulties in acquiring intelligence present the possibility of a situation where action must be taken prior to arrival of an SMU. In such a case, specific units

¹⁵ USSOCOM, *Posture Statement*, 36.

¹⁶ *ibid.*

that already are deployed in each theater would be tasked with the counter proliferation mission. These units require EOD experts trained in and equipped for the search, location, identification, and neutralization of foreign and improvised WMDs.

5. Foreign Internal Defense (FID)

These are operations that involve participation by civilian and military agencies of a government in any of the action programs taken by another government or other designated organization, to free and protect its society from subversion, lawlessness, and insurgency. SOF's primary contribution to this interagency activity is to organize, train, advise, and assist host-nation (HN) military and paramilitary forces. The nature of FID missions requires that they necessarily be conducted in countries which are considered "hot-spots" around the world. These countries are often the sites of long-term conflicts where the host-nation's government is still trying to gain political control. Many of these countries were Soviet-controlled until the collapse of the Soviet Union, and they are still littered with mines, minefields, and UXO. FID missions in such countries often assume a collateral SOF task of Humanitarian Demining, and they require the training of local forces in demining operations. An EOD technician attached to a SOF team conducting FID operations of this type would greatly enhance the abilities of the team to not only neutralize explosive threats that eclipse the capabilities organic to the team, but also to train host-nation demining and EOD forces.

6. Unconventional Warfare (UW)

These are operations that involve a broad spectrum of military and paramilitary operations, normally of long duration, predominantly conducted through, with, or by indigenous or surrogate forces that are organized, trained equipped, supported and directed in varying degrees by an external source. The

nature of UW poses few situations when explosive ordnance or explosive threats eclipses the skills of the team engineer or those inherent to the team in general. The offensive use of explosives and booby-traps is not a skill trained or maintained by EOD forces. But UW spans the spectrum of combat, and many times a team engaged in an UW mission is the only one available for emergent DA missions or cache clearance. Such was the case in Afghanistan in the early months of Operation ENDURING FREEDOM. While a SOF team conducting an UW mission may not need EOD expertise attached to it directly or for the entire protracted mission, it is important to maintain EOD technicians with the capabilities to reach, support, and operate with SOF teams in an UW environment for the duration of the requirement.

	<i>Booby-Trap (Identify, Neutralize, Enable Access)</i>	<i>Cache Clearance</i>	<i>IED (render safe)</i>	<i>Sensitive Site Exploitation (SSE)</i>	<i>EOD Training</i>	<i>WMD (Detect, Identify, Locate, Neutralize)</i>	<i>UXO Clearance</i>
Direct Action	X	X	X	X		X	
Combatting Terrorism	X			X		X	
Foreign Internal Defense		X			X		X
Unconventional Warfare	X	X	X	X	X		X
Special Reconnaissance	X						
Counterproliferation of WMD	X					X	
Psychological Operations							
Civil Affairs							
Information Operations							
CSAR							X

Table 1. SOF Tasks and Types of EOD Support Required

B. SOF UNITS THAT FACE EXPLOSIVE THREATS

The following is a discussion of the major combat forces within USSOCOM: the 75th Ranger Regiment, Army Special Forces (SF), Air Force Special Tactics Squadrons (STSSs), Naval Special Warfare (NSW), and Marine

Corps Special Operations Forces (MARSOF). The organizational structures of Special Operations Forces are detailed extensively in many easily accessible documents and sources. Consequently, this thesis does not focus upon their various chains-of-command or administrative and operational mechanisms of control. Instead, this thesis focuses on the range of missions tasked to each unit and examines the extent to which EOD support may be required. This section ends with a general description of the characteristics of SOF personnel. This provides the criteria against which EOD personnel from each service, as described in the following chapter, can be compared and contrasted in Chapter IV.

1. 75th Ranger Regiment

This unit provides a highly trained, forced entry, DA capable force on a scale much larger than any other Special Operations Force. Ranger units can employ specialized insertion techniques to apply a high level of combat power in a precise manner. Techniques for which Rangers are trained include insertion by parachute, helicopter, over land by foot or vehicle, or via small boat (both motorized and rubber rafts). Rangers are trained extensively in building clearance, CQB, and operations at night aided by night-vision devices. The 75th Ranger Regiment is USSOCOM's largest DA force and can operate in platoon through regimental-sized forces, though the primary maneuver element remains the battalion. Rangers specialize in the seizure of hostile or otherwise denied targets requiring forced entry, such as airfields; raids to destroy enemy facilities that require capabilities beyond those of conventional light infantry units. The regiment maintains a Ranger Ready Force that can deploy on short-notice, with a company response time of nine hours and a battalion response time of eighteen hours.¹⁷

¹⁷ Michael Evans, *Army Explosive Ordnance Disposal Operations in Support of Army Special Operations Forces: What Changes Are Required?*, (FT Leavenworth, KS: US Army Command and General Staff College, 2004), 15-16.

2. Army Special Forces

Organized into five Groups, each with its own geographical focus, Army SF – commonly referred to as Green Berets – operate primarily as Operational Detachment – Alphas (ODAs). Each ODA comprises eleven soldiers commanded by a captain. SF soldiers and officers are trained extensively in the customs and culture of their Group's area of responsibility, and they are proficient in local languages, as well. Further, each soldier is a subject matter expert within his ODA, with extensive training in either operations, intelligence, communications, weapons, engineering (to include demolitions), or medicine. ODAs are trained to conduct extended UW operations behind enemy lines and are extremely capable in DA and other missions in support of all of the SOF core tasks. Like the Rangers, Green Berets are trained in many methods of insertion including parachute, helicopter, over land, or by boat. Additionally, some ODAs are trained in and maintain the capability to discreetly breach enemy lines via parachute by employing High Altitude, Low Opening (HALO) and High Altitude, High Opening (HAHO) techniques, while others are trained in combat Self Contained Underwater Breathing Apparatus (SCUBA) operations. Once on their objective, SF units are adept at the precise application of military force and are extensively trained in CQB, building clearance, and night operations.

3. Air Force Special Tactics Squadrons

The Air Force's Special Operations Forces' combatant units are Pararescuemen (PJs), and Combat Controllers (CCTs). The combination of these two specialties has collected very well-trained airmen in one extremely capable and valuable force. PJs are highly trained emergency medical technicians trained in varied methods of high-risk insertion and extraction into and out of hostile, non-permissive areas. Their primary mission is Combat Search and Rescue (CSAR) of downed pilots and other personnel behind enemy lines or in the heat of battle. To allow them to rapidly reach personnel in need of rescue or recovery literally anywhere and at any time, PJs are trained in every conceivable insertion and extraction method, from SCUBA to HALO jumping.

Once they reach the crash site, PJs can be faced with a host of explosive threats and hazardous devices. The aircraft's payload may still be intact and may be more dangerous due to the crash. In addition to live ordnance, aircraft have many explosive devices within their many systems. Ejection systems include explosive bolts on the canopy, explosive actuation devices on many of the rapid-deployment systems, and a rocket booster on the seat. Flare and chaff dispensers also pose explosive threats to rescue personnel at the site.

Combat controllers are FAA-certified air traffic controllers trained to control the air space wherever their skills are needed. They can set up navigational aids and operate an enemy air traffic control tower at an airfield that had been seized by Rangers or coordinate precision aerial bombardment of targets designated by ODAs behind enemy lines. Combat controllers, like PJs and Army SF, maintain the capability to insert in many high-risk, overt and clandestine ways.

4. Naval Special Warfare

Comprising Special Boat Units (SBUs) and Sea, Air, Land (SEAL) teams, Navy Special Warfare units are USSOCOM's maritime commandos. SBUs operate heavily-armed and high-powered boats capable of clandestinely inserting SEALs on missions in coastal and riverine environments worldwide, day or night, in any weather condition. SEALs specialize in DA missions in maritime environments, though their considerable skills in this mission area have led to widespread employment in Iraq, Afghanistan, and other locales far removed from the nearest body of water. But their primary mission is opposed boarding of vessels and off-shore platforms, as well as DA operations on enemy coastal facilities and hydrographic surveys of shorelines. SEALs possess the broad array of insertion capabilities typical of other SOF units: parachuting (to include HALO/HAHO), helicopter insertion, convoying and patrolling over land, and insertion by boat and SCUBA. Not surprisingly, SEALs excel in clandestine maritime insertion, and they are able to navigate great distances underwater to

avoid detection. SEALs also regularly operate off of submarines and are able to lock-out and exit a submerged submarine and swim into a target without ever breaching the surface of the water. Once on target, they are highly trained in boarding vessels, CQB, building and ship clearing, and are expert marksmen.

5. Marine Corps Special Operations Forces

Formally established in February of 2006, MARSOF is still too new for in-depth analysis of missions and requirements. But some initial conclusions are possible. MARSOF will likely be tasked with DA and FID missions that have a maritime component.¹⁸ These missions pose the same threats and requirements as any other SOF engaging in DA and FID. MARSOF probably will be trained in the same insertion techniques, mobility and combat skills, and as skilled in CQB as existing SOFs, and any EOD support required by MARSOF would have to be skilled in these areas. Additionally, port security, a likely component of the FID mission, poses the threat of limpet and other sea mines.

	<i>Direct Action</i>	<i>Combatting Terrorism</i>	<i>Foreign Internal Defense</i>	<i>Unconventional Warfare</i>	<i>Special Reconnaissance</i>	<i>Counterproliferation of WMD</i>	<i>CSAR</i>
US Army Special Forces	X	X	X	X	X	X	
75th Rangers	X						
Navy SEALs	X	X			X	X	
AF Special Tactics							X
MARSOF	X	X	X				

Table 2. SOF Units with Missions Requiring EOD Support

¹⁸ Wood, Sarah, Sgt., USA, "Marine Corps Special Ops Will Add to Military Capability, Commander Says," American Forces Press Service, January 26, 2006, available from <http://www.defenselink.mil>.

6. Characteristics of SOF Personnel

SOF soldiers, sailors, and airmen tend to be older and more mature than their conventional counterparts. By the time they are trained and operating in SOF units, they have volunteered for demanding, high-risk training many times. In addition to volunteering, they have further distinguished themselves from conventional personnel by consistently proving they can perform at high standards under stressful and rigorous conditions. SOF personnel operate in small, highly-mobile, widely-dispersed teams and routinely have responsibilities far greater than those of their conventional peers.¹⁹

C. SUMMARY AND CONCLUSIONS

It is clear from the preceding discussion that there are some skills and capabilities that are common to all SOF, regardless of their specialty. These are high-risk tactics and techniques that require training above and beyond what is typical of conventional forces. While some conventional units are trained in airborne assault and insertion, including static-line parachuting and rappelling and fast-roping from helicopters, the extent to which SOF have honed these skills is unique. Free-fall insertion, HALO and HAHO parachute operations, is unique to SOF within the military. Likewise, insertion via SCUBA, from submarines and otherwise, is a high-risk skill resident only in SOF. SOF further distinguish themselves from conventional forces at their target by engaging in CQB and clearing buildings in a well-rehearsed, precise yet overwhelming application of combat power. They are also capable of completing all actions at the objective at night aided by night-vision devices, a learned skill that requires constant training.

Other combat skills are not unique to SOF, but are more highly developed than those of conventional forces. Some examples are vehicle convoy tactics, patrolling on foot in rough terrain behind enemy lines, marksmanship, and

¹⁹ Deremer, 43.

immediate action drills (IADs) – set plays for varying situations involving contact with the enemy. Such “hyper-conventional” skills distinguish SOF from conventional forces. Proficiency in these skills is required of any external elements providing operational support in combat situations. External experts must be able to shoot, move, and keep up with the highly-trained operators they are supporting.

Many of the SOF core tasks place SOF personnel in situations where they are likely to be threatened by explosive ordnance. The threat may be the objective itself, as is the case with CP, or it may be denying access to the target, a tripwire or booby-trap. FID missions in certain parts of the world will involve extensive demining and UXO training. CSAR operations often involve specialized insertion and extraction techniques and explosive hazards at the crash site. Counter proliferation of CBRNE is now the first priority of SOF²⁰, and it cannot be completed without EOD support. Unfortunately, the documents that delineate CP as SOF’s primary mission do not recognize that any EOD support is required.²¹

Other missions may not entail foreseeable EOD requirements, such as UW. But the possibility exists that the SOF team may encounter a requirement for EOD support once the mission has begun, perhaps for an emergent DA mission or a discovered weapons cache. The clandestine nature of these operations, often undertaken behind enemy lines, would require an EOD force with specialized insertion capabilities. Further, extraction would likely be impossible until the SOF team completed its protracted mission, and the EOD technician would have to blend and operate with them for the duration of the mission.

²⁰ USSOCOM, *Posture Statement*, 36.

²¹ Joseph DiGuardo, LCDR, USN, Executive Officer, EODMU2, “Information paper: Navy EOD Support of Special Operations Forces,” email attachment to author, 14 October 2005.

In these cases, an EOD unit with the training, mobility skills, and capabilities commensurate to the SOF unit would greatly enhance that unit's effectiveness. EOD technicians who can insert in any manner, no matter the training required or risk involved, who can operate seamlessly with the SOF unit at the objective, and can neutralize explosive threats and enable access to denied areas could prove invaluable. In emergent crises requiring first-time access within a small window of opportunity, a force of this type may be the difference between mission completion and mission failure.

THIS PAGE INTENTIONALLY LEFT BLANK

III. SEARCHING FOR A SOLUTION: EOD FORCE CAPABILITIES AND MISSIONS

Chapter II defined the problem by outlining the explosive hazards likely to be encountered by SOF. The solution, to the extent one exists, will be found in one of the four service's existing EOD forces. This chapter discusses the organizational and personnel capabilities of Army, Navy, Air Force, and Marine Corps' EOD forces. It begins by describing initial EOD training, which is common to all services, as well as by discussing some of the personal traits of recruits. Then the organization, missions, and capabilities of each service's EOD forces are outlined. A distinction is made between conventional and hyper-conventional capabilities, as it is the latter that are required for SOF support.

A. INITIAL EOD TRAINING COMMON TO ALL SERVICES

Candidates for qualification as EOD technicians in all services receive initial EOD training at the Naval Explosive Ordnance Disposal School (NAVSCOLEOD), a joint school run by the Navy, based at Eglin Air Force Base, Florida. Soldiers, sailors, airmen and marines are trained side-by-side in classes that are often composed of a mix of members of all services. Initially, Navy-specific classes are manned with Navy personnel but, through the course of instruction, students who fail to pass a module are rolled into the next class, regardless of type. This results in the further mixing of the services within classes.

All services allow direct accession into their EOD forces; recruits may proceed directly into the training pipeline after basic training.²² Most are volunteers. A few young soldiers and airmen each year are designated upon enlistment to go to EOD training regardless of their desires, but those who

²² For the Navy, this is a recent change. Historically, sailors could only transfer laterally from other ratings after they had reached E-5. This resulted in more mature EOD training candidates for navy EOD (with respect to the other services), as all sailors had at least a few years in the Fleet (some had many more years of experience) and the further experience of dive school.

determine that they do not want to be bomb technicians find abundant opportunities to correct the situation either by dropping on request (known as DOR) or indirectly by not applying themselves academically and failing out of training. Airmen selected for training as EOD technicians attend a pre-training course at Lackland AFB, Texas, prior to assignment to NAVSCOLEOD. If a soldier desires to become an EOD technician, he first must be selected for transfer by his command or be accepted directly into the program from boot camp. Once selected, a candidate attends six weeks of pre-training at Redstone Arsenal, Alabama, before beginning seven months of training at NAVSCOLEOD.

Sailors that enlist directly into the EOD pipeline must complete basic training (as is true of all services), then initial rating-specific training (known as A-School). Upon completion of A-School, sailors are transferred to dive school in Panama City, Florida, for three months of intensive training. Trainees learn to safely dive using both open- and closed-circuit rigs. Dive school serves as an initial screening mechanism, as sailors who cannot meet the strict physical standards and demanding academic program either DOR or fail out and are sent back to the fleet to serve within their previously selected rating. Dive training is conducted by qualified Navy EOD technicians and provides further opportunity for interaction between recruits and experienced sailors and EOD technicians on both professional and informal levels, and the increased knowledge of the community that results allows recruits to make a more informed decision when they choose whether they stay or go. Once sailors have completed dive training they are transferred to EOD school. This pipeline results in more mature direct-accession recruits than the other services. Their experiences prior to arriving at Eglin AFB facilitates the development of the strong camaraderie and sense of esprit de corps that pervades the navy classes, as the trainees have already been through intense training together.

Once at Eglin, students are trained in all aspects of explosive ordnance disposal. Students are instructed in basic categories of ordnance and fuze mechanics and basic demolition procedures. Practical training covers all types of ground ordnance (mines, projectiles, rockets, and grenades), air ordnance (bombs, missiles, dispensers and their various payloads), and IEDs. Non-ordnance explosive hazards, such as aircraft ejection seats, gun systems and flare dispensers are covered as well. Students also are trained to detect, locate, identify, and neutralize chemical munitions, as well as in the decontamination of themselves and others. Students at NAVSCOLEOD also are trained in the detection, location, and mitigation of hazards of nuclear ordnance and accidents.

EOD training is recognized as being extraordinarily demanding academically. Historically, out of every ten candidates who begin training only one or two graduate on time. Three to six students graduate after being held back during some phase of training, and three never graduate at all.²³

B. ARMY EOD

Most of the Army's EOD forces are under the command of the 52nd Ordnance Group (EOD), located at Fort Gillem, Georgia. This brigade commands four battalions with thirty-nine deployable EOD companies. Five companies do not fall under the command of the 52nd Ordnance Group (EOD): two each assigned to US Army Europe and US Army Pacific, and one that is assigned to US Eight Army in Korea. Each EOD battalion provides command and control for three to seven companies in support of each corps and theater support command.²⁴

²³ Joshua DeMotts, Capt, USAF, "What's that Ticking Noise?" *Air Force Civil Engineer*, Vol. 13, No. 1 (2005): 17.

²⁴ Evans, 11.

The EOD company is the Army's primary operational unit. Each company is commanded by an EOD-qualified captain and comprises eighteen EOD technicians and three support personnel. EOD companies are traditionally organized into light and heavy teams to execute responses. Two-man light teams, with a staff sergeant team leader, are capable of responding to and rendering safe most conventional US and foreign ordnance and IEDs.²⁵ Prior to employment in Iraq and Afghanistan, heavy teams, which are led by a sergeant first class and comprise two additional technicians, were called for in any scenario that eclipsed the capabilities of a light team. Examples of such incidents are complex chemical or nuclear responses requiring multiple light teams. Operations in support of OIF and OEF have required the restructuring of EOD companies and an informal rewriting of doctrine. Now, while heavy team response is still a capability embedded in the companies, the preponderance of IED and UXO responses are by light teams, and personnel often are organized based on specific mission analysis.²⁶

Army EOD forces are tasked with providing EOD services on Army installations, for explosive ordnance in the physical possession of the Army, and on "land mass areas" except when an area is a specific responsibility of another service.²⁷ Army EOD technicians maintain proficiency in rendering safe of all US and foreign conventional ordnance and, reflecting today's major threats and bulk of responses, are capable of handling IEDs.

Soldiers in the EOD specialty do not have to meet heightened physical standards beyond those of the Army in general. Army EOD is a conventional combat service support force and does not inherently possess any hyper-conventional capabilities. A limited number of Army EOD technicians are trained

²⁵ Evans, 11.

²⁶ Evans, 12.

²⁷ Department of the Navy, *OPNAVINST 8027.1G, Interservice Responsibilities for Explosive Ordnance Disposal*, (Washington, D.C.: GPO, 1992), 2.

in air assault operations and parachuting, but these qualifications are the result of individual opportunities and service in other specialties prior to designation as EOD technicians, rather than the result of an effort to build an EOD force with hyper-conventional capabilities.

C. AIR FORCE EOD

The Air Force's EOD units are organized as *flights* assigned to air bases worldwide. For example, US Air Force 1st EOD Flight is based at Langley AFB, Virginia, and US Air Force 8th EOD Flight is responsible for Kunsan AB, Korea. Each base commander has tactical control of his base's flight. Operationally, EOD flights are part of the Air Force's civil engineering community. This is the result of a series of organizational shifts throughout the 1970s reflecting the Air Force's increased awareness and concern for air base survivability during the height of the Cold War.²⁸ As base commanders studied base threats and defenses and began looking for ways to minimize the time required to return to airfield operations in the event of an attack, local EOD forces became increasingly important. Once the requirement to quickly eliminate an ordnance threat to airfields was recognized as an integral component to airfield viability, EOD flights were moved under the civil engineering commands of each base, where they reside today.

Air Force EOD flights are tasked with providing EOD services "on Air Force installations, at dispersal bases (which include non-DoD installations from which Air National Guard and Air Reserve Forces operate) or in assigned operational areas, or explosive ordnance in the physical possession of the Air Force."²⁹ Reflecting the nature of ordnance that the Air Force primarily employs, Air Force EOD technicians are exceptionally well trained on US bombs and

²⁸ Dave Brown, *et al*, *From Maintenance to Civil Engineering*, Available from <https://www.afcesa.af.mil/ceb/cebh/CEEOD4.html>. Accessed on 25 March 2006.

²⁹ OPNAVINST 8027.1G, 2.

missiles, as well as aerial dispensers and their various payloads. Due to the Air Force's responsibility for Strategic Command's nuclear arsenal, Air Force EOD technicians also maintain proficiency on all US nuclear weapons. Though not a threat traditionally faced by Air Force EOD teams, air bases in Iraq have required the expansion of capabilities to include IED response.

As a part of the Air Force's civil engineering community, EOD flights are not considered combat service support units (though the blurred lines in Iraq have resulted in all forces experiencing combat to some degree). Air Force EOD maintains a conventional response capability which is generally limited to air bases and the immediate vicinity. Airmen in the EOD specialty do not have to meet heightened physical standards beyond those of the Air Force in general. Except for an isolated incident requiring Air Force EOD technicians to fast-rope onto the deck of the *Mayaguez* in support of a Marine boarding force, Air Force EOD flights, have not directly supported combat operations, nor do they maintain hyper-conventional mobility skills.³⁰

D. MARINE CORPS EOD

Marine Corps EOD forces are organized into companies that fall under the Force Service Support Company within a Marine Expeditionary Force (MEF). A Marine Corps EOD company is commanded by a captain and the marines are divided into teams of two or three technicians. A major serves as the EOD officer on the MEF staff and coordinates operations throughout the MEF area of responsibility. The MEF air wing has an EOD detachment assigned to it to provide services on the flight line. This detachment is under the direct command of the air wing commander and does not report to the MEF EOD company.

³⁰ John F. Guilmartin, Jr, *A Very Short War: The Mayaguez and the Battle of Koh Tang*, (College Station, TX: Texas A&M University Press, 1995), 78 and Roy Rowan, *The Four Days of Mayaguez*, (New York: W.W. Norton, 1975), 195.

Marine Corps EOD forces are tasked with providing EOD services on Marine Corps installations, in assigned operational areas, or on explosive ordnance in the physical possession of the Marine Corps.³¹ Marine Corps EOD technicians maintain proficiency in all US and foreign ground ordnance and are often employed to clear small arms, grenade, and artillery ranges. The situation in Iraq often requires the air wing EOD detachment to respond to IEDs and other requests off of their bases, as they are often the only EOD force in their base's vicinity.

Marine Corps EOD companies are combat service support units more closely aligned with engineering and construction units than combat forces. While all Marine units maintain proficiency in fast-roping, and Marine Expeditionary Units are certified as special operations-capable, Marine companies do not develop an ability to respond to scenarios in a hyper-conventional way. Responses require vehicles and tool-kits that, while much smaller than traditional truck-and-trailer loadouts, are still not man-portable.

E. NAVY EOD

Navy EOD forces are organized into two groups based on both the East and West coasts of the U.S. and are responsible for the EOD forces located roughly throughout each hemisphere. Group ONE is based in Coronado, California and is responsible for the western hemisphere and Asia, and Group TWO, located in Little Creek, Virginia, is responsible for the Atlantic, Europe and the Mediterranean, and the Persian Gulf Region. Each group currently shares responsibility for Iraq. Navy EOD Groups comprise Mobile Units, based in areas of major naval concentration worldwide, which themselves comprise ten to fifteen deployable detachments. The EOD detachment is the Navy's primary

³¹ OPNAVINST 8027.1G, 2.

operational unit. Non-deployable shore detachments are assigned to naval bases whose base operations require permanent EOD support.

Consisting of eight technicians, led by a lieutenant or warrant officer, Navy EOD detachments are task oriented and mission-specific. A small number of them are designated as Mine Counter-Measures (MCM) detachments whose members are specially trained and equipped to maintain a traditional sea-mine response capability. The bulk of EOD detachments are designated as mobile detachments, whose members are trained and equipped for a broad array of explosive ordnance threats and procedures. Mobile detachments are assigned to each Carrier Strike Group and Expeditionary Strike Group to respond to any ordnance emergencies on the flight decks or within weapons systems. A growing number of mobile detachments are assigned to support Marine Expeditionary Forces in Iraq. Referred to as MEF detachments, these units provide diving support to Marine forces operating on and over the lakes and waterways of Iraq, and are employed as IED response teams.

Mobile Units TWO and THREE, located in Little Creek, VA, and Coronado, CA, respectively, maintain roughly half of their detachments as Naval Special Warfare (NSW) support detachments. Designated as NSW Dets, these units are equipped and trained to provide support to SEALs in direct action missions. Their personal tactical gear is identical to that of the SEALs, and technicians on NSW Dets receive extra training in tactical shooting and small unit operations. After completion of individual and unit level EOD training at the Mobile Units, NSW Dets are operationally transferred to NSW squadrons for more unit and task force level training. The NSW Dets then deploy as part of the NSW task force. A select few detachments receive specialized training in direct action and counter-proliferation missions above and beyond that of NSW Dets and are assigned to support specifically designated Army Special Forces teams and

other special mission units worldwide. Currently, thirty-five percent of the Navy's EOD force is dedicated to direct support of SOFs.³²

Typical integration of EOD support into Army SF ODAs and SEAL platoons is to have one technician assigned per assaulting cell.³³ In order to maximize tactical effectiveness and minimize any hindrances due to the integration of external personnel into the assaulting units, the technician is fully integrated into the cell for training and operations. He is assigned a position within the assault team and flows with the cell through the objective. This allows the technician to provide an immediate assessment of the situation. It was quickly realized that excluding the EOD technician from the assaulting cell and having him remain outside the objective until it was "secured" was unrealistic.³⁴ The high speeds of raids and desire for a minimal time-on-target (TOT) meant that the EOD technician was constantly being called upon to conduct assessments and render any explosive threats safe before, after, and even during raids. Upon completion of raids, many items at the objective must be identified and cleared if they are deemed to be hazardous. This has resulted in the standard procedure of having the EOD technician lead the SSE. Indeed, often SOF personnel do not enter rooms or approach vehicles until they have been cleared by an EOD technician.³⁵

The contributions made by an assigned EOD technician to one particular mission in Iraq is representative of the support typically provided to SOF missions.

After the assaulting team dismounted their vehicles approximately one hundred yards from the objective, EOD cleared the primary and secondary breach points. This was due to a suspicion of

³² Diguardo, "Information Paper"

³³ John Cuttitta, "Re: AAR," email to author, 10 September, 2005.

³⁴ Cuttitta, 2005.

³⁵ Cuttitta, 2005.

booby-traps protecting each point. Once the breach points were cleared, the assaulting team moved into position to launch the raid. Once begun, the speed of the assault was entirely dependent upon the technician's clearance of doorways for possible booby-traps. Ordnance and IED caches were indeed found in two rooms at the objective. SSE could not proceed nor could the objective be declared "secure" until the EOD technician cleared the caches. As the battle progressed, an assault on a building adjacent to the objective could not proceed until a suspected IED that was blocking a stairway was cleared. After a fire-and-maneuver action allowed access to the follow-on objective, another ordnance cache was discovered. The EOD technician cleared the cache and other rooms at the follow-on objective while under fire. Once the objectives were declared "secure," EOD technicians directed the support element of conventional Army units in the movement of ordnance and weapons. The supporting EOD technicians also cleared all items before their turnover to Army engineers. Several more structures remained to be cleared by EOD before the site could be declared "secure" and the mission was completed.³⁶

In addition to direct support of combat missions, the EOD technicians who are integrated with SOFs in Iraq assist in the training of the Iraqi Counter-Terrorist Force (ICTF).

After the basic joint course of instruction, Army, Air Force, and Marine students graduate and are qualified as Basic EOD technicians. Navy trainees watch them proceed to their next commands while the sailors proceed to navy-specific training. This is another three months of demanding training in open- and closed-circuit diving operations and the neutralization and disposal of underwater explosive hazards. Trainees are subjected to the most intensive practical exercises yet encountered, many lasting over four hours and requiring leadership and teamwork for successful completion. Finally, after at least 51 weeks (if every test is passed initially) – three months after the trainees of the other services have been qualified EOD technicians – Navy trainees graduate and are allowed to pin on the coveted EOD badge. But while newly qualified

³⁶ Cuttitta, 2005.

technicians of other services proceed directly to operational units, Navy technicians have two months of follow-on training before they arrive at their operational commands.

Navy follow-on training is conducted in San Diego, California, and consists of one month of jump training and one month of tactical training. Jump training qualifies candidates in static-line and military free-fall (HALO/ HAHO) operations. Currently, roughly twenty-five percent of the force is airborne qualified.³⁷ Inclusion of jump training into the basic training pipeline of all Navy EOD technicians will result in the increase of airborne qualified personnel commensurate with accession rates. Tactical training consists of developing hyper-conventional mobility skills such as fast-rope, rappel, and other helicopter insertion techniques. Basic combat shooting is introduced. Sailors also are trained in rubber raiding craft operations and small unit tactics, to include patrolling, land navigation, and immediate action drills. Combat first aid also is covered.

Sailors returning from NSW Det deployments may be assigned to other types of detachments. This dispersion of experience, coupled with a concerted effort to “trickle-down” equipment and training from NSW Dets to mobile detachments and a basic training pipeline that includes parachuting and tactical operations has resulted in a hyper-conventionalization of Navy EOD. Tactical shooting schools and evasive driver training, once offered only to NSW Dets, are rapidly becoming standard for all detachments. SOF-specific weapons and tactical gear are standard issue for mobile detachments deploying on ships. The intermingling of mobile detachment and NSW Det technicians facilitates the diffusion of SOF-support tactics, techniques, and procedures throughout the Navy EOD community.

³⁷ DiGuardo, LCDR, USN, Executive Officer, EODMU2, “Another One,” Email to author, 14 October 2005.

Like the other services, Navy EOD forces are tasked with providing EOD services on naval installations, in assigned operational areas, or for explosive ordnance in the physical possession of the Navy. They also are tasked to provide services within the oceans and contiguous waters up to the high water mark of coasts, inlets, bays, harbors, and rivers, as well as in any canals or enclosed bodies of water. Further, Navy EOD forces are to “provide EOD services for rendering safe and disposing of explosive ordnance designed to be used underwater, except when it is in the physical possession of another service.”³⁸

F. SUMMARY AND CONCLUSION

Like the Army’s EOD forces, Marine Corps EOD companies are combat service support units more closely aligned with engineering and construction units than combat forces. Air Force EOD are organized and trained to provide critical services for airfield survivability and repair, but they are more removed from combat than the combat service support units of the Army and Marine Corps. Navy EOD, in stark contrast, is a combat support force. Its detachments are equipped and organized to directly support combat operations, and Navy EOD technicians possess the individual skills and equipment to be significant additions to combat operations. In fact, a growing number of organizational skills and capabilities are hyper-conventional, reflecting the ongoing deployments of NSW Dets and the “trickle-down” effect of the collocation of SOF support and conventional units.

³⁸ OPNAVINST 8027.1G, 2.

	Army	Air Force	Navy	Marine Corps
Parachute Insertion			X	
Helicopter Insertion			X	X
Combat Rubber Raiding Craft			X	
Open/Closed Circuit SCUBA			X	
Tactical Vehicle Operations			X	
Small Unit Tactics	X		X	X
Tactical Shooting/ CQB			X	

Table 3. Hyper-Conventional Capabilities Required for EOD Support of SOF

Table 3 lists hyper-conventional skills and capabilities possessed by each service's EOD forces. It is clear that the Navy's EOD community is the only one that exhibits all of the skills required for operational support of SOF.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. THROUGH PAST EXPERIENCE... TOWARD A SOLUTION

As Chapter II indicated, many missions undertaken by SOF have the potential to place SOF personnel in situations where they are threatened by explosive hazards. The unique and intensive training required to allow someone to safely identify, approach, and render these hazards safe is sufficient in most cases to ensure an EOD technician is required. Consequently, there exists a need for EOD technicians with “hyper-conventional” capabilities who can integrate seamlessly with SOF. These capabilities include unorthodox insertion and extraction capabilities, unique mobility skills such as small boat or tactical vehicle operations, and individual skills such as tactical shooting, CQB, and small unit tactics.

Chapter III showed that while each service branch maintains an EOD capability, they differ greatly in organization and capability. While the small communities and hazardous nature of the work require all EOD technicians to work in small teams of two to four men, the organizational structures of the command and control elements tend to assume characteristics of their respective services. Army EOD teams are organized into companies, themselves attached to battalions, and are trained and equipped to provide support to the combat service elements of large brigades or even divisions. The Air Force EOD teams specialize in airfield clearance and are geared toward flight-line response involving aircraft ordnance. Their airfield clearance mission has resulted in assignment to the Civil Engineering branch of the service, generally operating far from the front lines at secure airfields. Marine Corps EOD is similar to the Army’s forces, assigned to combat service support and organized for support of large combat units. Navy EOD, however, has developed quite differently from the other services’ EOD forces.

A. THE DEVELOPMENT OF NAVY EOD SUPPORT OF SOF

Much has been written about the origins of military EOD and its origins in the intrepid British officers tackling unexploded German long time-delay fuzes in the streets of London during the blitz. Draper Kauffman, an American and a graduate of the Naval Academy who had been denied a commission due to poor eyesight, through pluck and happenstance found himself a commissioned officer in the Royal Navy learning to defuse mines and bombs. His experiences and exploits found their way across the Atlantic Ocean when he was recalled to the United States to open a mine and bomb disposal school in 1941.³⁹

The experiences of EOD forces after World War II are less well known, though that is not for lack of employment. The now-ubiquitous use of explosive ordnance in martial exploits has resulted in the near constant, if unheralded, employment of EOD forces in every theater and combat operation since WWII. Indeed, the eager use of landmines and sub-munitions, as insidious and persistent as they are effective, has required many recurring deployments to areas of the world where hostilities have long since ended. That busy history has led to the forces' present involvement in OIF, the most EOD-intensive war to date. The enemy's choice of IEDs as the primary weapon against the asymmetric might of the Coalition Forces has ensured that the vast majority of U.S. EOD forces see time in the desert sands of Iraq and that they will enjoy very little idle time while they are there.⁴⁰ But a growing number of missions have not been discussed in literature: that of EOD support of SOF.

The vast majority of EOD support to SOF missions, regardless of service branch, is provided by the U.S. Navy. The sequence of events that led to Navy

³⁹ For an insightful biography of RADM Draper L. Kauffman's (USN, ret.) life from a unique perspective, see Elizabeth Kauffman Bush, *America's First Frogman: The Draper Kauffman Story*, (Annapolis, MD: Naval Institute Press, 2004), written by his sister.

⁴⁰ Rick Jervis, "Militants Sharing Bomb Expertise," *USA Today*, 24 October 2005, pg 1.

EOD forces being the service of choice to provide EOD support to SOF has not been chronicled.⁴¹ It exists only in the memories of senior officers, some active and some retired, who experienced the operations first-hand. Some are stories that surface anytime the "old salts" get together; others are still classified and are discussed only in confidence, if at all. This thesis is not intended to exhaustively record every mission that involved EOD forces providing support to SOF. Rather, it is an account of significant events in the recent history of EOD. Events that directly led to the awkward situation of EOD forces, who are not a part of the USSOCOM but are nevertheless an increasingly integral part of U.S. Special Operations, and the distinction of Navy EOD as the service of choice to provide that support.

Navy EOD has been involved in special operations, to varying degrees, for decades. It, rather than any other service's organic EOD forces, is the service of choice when SOF require EOD support due in large part to an organizational and operational similarity to SOF units. Specifically, Navy EOD possesses mobility skills, training and experience in various methods of insertion and extraction which mirror those of SOF.⁴² But these skills are not the result of leaders presciently identifying the direction of EOD. No one foresaw the rise of terrorism and subsequent increase in special operations employment. Nor did anyone embark on an effort to place the Navy EOD forces in a position where they possess the mobility skills that may be necessary decades down the road. Rather, it is the result of looking to the east at the experiences of British forces.⁴³

⁴¹ The formality of Navy EOD support for SOF varies. OPNAV has approved ongoing support of Naval Special Warfare. PACOM and EUCOM have documented support of Army SF teams with specific missions, though support of CENTCOM units remains ad hoc. From Jeffrey Trumbore, CAPT, USN, "Re: EOD Support of SOCOM" Email to author, 8 November 2005.

⁴² Joseph DiGuardo, LCDR, USN, Executive Officer, EODMU2, interview by author, October 13, 2005.

⁴³ Trumbore, "Re: EOD Support of SOCOM."

1. Origins in the British Experience

a. *Bomb Threat on the QUEEN ELIZABETH 2*

The first modern instance of direct EOD support to SOF occurred in 1972.⁴⁴ The British Counter-Revolutionary War (CRW) cell⁴⁵ was alerted to a bomb threat onboard the luxury cruise liner *Queen Elizabeth 2*, underway 1300 miles from shore enroute from New York to Southampton. The bomber had called the New York office of Cunard Lines and threatened to detonate six bombs that had been smuggled aboard the 65,000-ton ship if he didn't receive \$350,000. On May 18, an Ammunition Technical Officer (ATO)⁴⁶, Captain R. Hacon Williams, who was untrained in military parachuting but had been on a handful of recreational jumps, responded to the request for jump-qualified ATOs by offering, "If the Colonel wished, he was willing to have a go."⁴⁷ He was paired with a Special Air Service (SAS) Staff Sergeant and two members of the Special Boat Service (SBS). All three were SOF members who were highly trained in parachuting into the sea.

In the team's effort to reach the stricken cruise liner prior to the designated deadline, Captain Hacon was shuffled aboard and given parachute training while the C-130 Hercules transport plane made its way to the ship's position. Once there, despite poor weather affecting visibility of the sea's surface, the four men jumped from an altitude of 800 feet into the North Atlantic.

⁴⁴ The term "modern" is used here to describe the post-Vietnam period of history. EOD lent support to MACV-SOG in Vietnam, but as a conventional reaction force. The first instance of EOD forces being integrated into a special operations force in a way that required specialized training and mobility skills in order to accomplish the mission was the British experience on the *Queen Elizabeth 2* in 1972.

⁴⁵ The CRW cell was set up within the SAS structure in the 1960s when the Regiment recognized the growing terrorist threat. From Barry Davies, *SAS: Shadow Warriors* (Miami, FL: Lewis International, 2002), introduction.

⁴⁶ An ATO is the British equivalent of an EOD officer.

⁴⁷ Peter Birchall, *The Longest Walk: The World of Bomb Disposal*, (London: Sterling Pub, 1998), 83.

They landed without incident 300 yards off the *Queen Elizabeth 2's* bow and were quickly picked up by one of her small boats. When the men reached the ship, they quickly conducted a thorough search of the vessel, which revealed the whole episode to be an elaborate hoax. This incident went on to inspire the 1974 Richard Lester feature film *Juggernaut*.⁴⁸

Despite the non-existence of the bombs, the experience had some lasting benefits. It was the first time the SAS worked with British EOD in a special operation, a relationship that has since been improved and is now routine. And the realization by British commanders that a similar event could easily occur again prompted them to resolve that there would always be a number of ATOs trained and equipped for parachuting into the sea.⁴⁹

It would not be long before the United States was faced with a small operation of its own that would require the integration of EOD personnel into a special operation. On May 15, 1975, U.S. Marines launched a raid to recapture the U.S. merchant ship *Mayaguez*, which had been seized three days earlier by the forces of Cambodia's new Communist regime.⁵⁰ The complex operation included a forty-eight-man boarding party that would storm over the vessel's gunwales and overcome any Communist forces onboard. Whether the ship was booby-trapped or not was unknown, and six Air Force EOD technicians were included in the assault to deal with any explosive threats encountered by the marines.⁵¹

⁴⁸ Birchall, 83, and Davies, 6.

⁴⁹ Birchall, 83.

⁵⁰ Lucien Vandenbrouke, *Perilous Options: Special Operations as an Instrument of U.S. Foreign Policy*, (New York: Oxford University Press, 1993, 72).

⁵¹ Roy Rowan, *The Four Days of Mayaguez*, (New York: W.W. Norton, 1975), 195.

b. The Falklands War

The next major event that challenged the mobility skills of EOD forces was the Falklands War. In 1982, Britain and Argentina clashed in the south Atlantic in a dispute over the territorial claims of the Falklands island chain. It was a chance for Britain to test many new weapons platforms and doctrine, while Argentina mounted a significant struggle with aging weapons and decades-old munitions. Due partly to the age of the iron bombs dropped by the Argentine Air Force and partly to poor delivery tactics, a staggering eighty percent of Argentine bombs that hit their targets failed to explode.⁵² In all, ten British ships were hit with bombs that did not detonate.⁵³ The harrowing task of defusing the live ordnance fell to the clearance teams of the Royal Navy. Throughout the conflict, these teams moved from ship to ship, each time descending into the deserted interior decks to defuse the unexploded 500- and 1000-pound bombs.⁵⁴

Getting these royal engineers to the unexploded bombs posed a new challenge: the ships could not come in to port with their unwanted and deadly cargo ready to explode at any moment, and they often were too small to have been equipped with helicopter landing pads. Commanders realized the need to have experts that could rappel or otherwise be delivered by helicopter without the aircraft having to land. These new skills decreased the time required for response, as the men now did not have to fly to the nearest ship that was large enough to be outfitted with a helicopter deck only to transfer once more to a small launch for the final movement to the stricken vessel. They also increased the response options to smaller vessels operating in the shallower littoral waters.

⁵² Anthony Cordesman and Abraham Wagner, *The Lessons of Modern War, Volume III: The Afghan and Falklands Conflicts*, (San Francisco: Westview Press, 1991), 319.

⁵³ Cordesman, 254.

⁵⁴ *ibid.*

This led to the addition of helicopter insertion techniques as a prerequisite for Royal Navy EOD forces.⁵⁵

2. U.S. Planners Learn From the British

The U.S. Navy saw this and realized helicopter insertion techniques were a valuable skill for their own EOD personnel.⁵⁶ Teams tasked with EOD response and support for an entire Carrier Battle Group or Amphibious Readiness Group were often billeted on the command ship with responsibility for all ships in the group. The most expeditious method of movement to the site was by helicopter. Men were trained in rappelling and fast-roping, methods of insertion involving descending ropes suspended from a hovering helicopter. Subsequently, as a result of these insertion techniques, the normal EOD load-out had to be pared down. No longer could responding technicians arrive on scene with the usual truck-and-trailer full of tools. The unknown nature of the threat had always prompted teams to prepare for any eventuality, often loading their entire shop into the response vehicle. This tactic worked well for relatively conventional responses to explosive threats on land. But helicopter insertion to the rolling deck of a stricken vessel required a different approach. The thousands of pounds of tools and gear that filled an extended cab truck and trailer had to be whittled down to what could be carried in a backpack by one man descending a rope.

Later, with the British experience on the *Queen Elizabeth 2* as evidence, the U.S. Navy determined that there was a requirement to move EOD personnel to vessels farther out to sea which may be acting autonomously and out of reach of helicopter assets, specifically submarines.⁵⁷ The specter of a submarine, steaming thousands of miles from either land or the nearest navy ship, having a

⁵⁵ DiGuardo, October 13, 2005.

⁵⁶ Trumbore, "Re: EOD Support of SOCOM."

⁵⁷ *ibid.*

problem with explosive ordnance was haunting. While the technically advanced designs of modern torpedoes, missiles, and mines carried aboard submarines made the likelihood of a problem very remote, the prospect of something happening that would require a submarine to steam hundreds or thousands of miles on the ocean's surface to reach EOD expertise required a new capability. Select Navy EOD units were then given parachute training for the specific mission of jumping into the ocean in the vicinity of a stricken submarine.⁵⁸

Though conventional response was still a maintained and exercised capability, indeed it was still the primary skill set, Navy EOD was gaining additional skills and experience that would result in a leaner, more responsive tactical element resembling the small, autonomous, light and self-sufficient teams of Special Operations. They were already proficient at SCUBA diving, swimmer cast and recovery (a core competency for mine countermeasures operations) and quickly building the capability to parachute and insert by helicopter.⁵⁹ As a result, the expansive load-out of heavy tools specifically designed for every eventuality and the techniques and procedures that corresponded to them would no longer suffice. Now the United States had EOD technicians who could dive, jump, and insert by helicopter in small groups with the tools that were anticipated to be necessary carried on their backs. The units developed the tactics, techniques and procedures to make full use of the unorthodox insertion methods. And it would not be long before they were put to the test.

3. Operation EARNEST WILL

In 1987, the United States launched Operation EARNEST WILL (OEW), an effort to re-flag Kuwaiti tankers, which had been falling prey to Iranian mine and small boat attacks, under the American flag. The re-flagged vessels now

⁵⁸ Joseph DiGuardo, LCDR, USN, Executive Officer, EODMU2, interview by author, November 9, 2005.

⁵⁹ Trumbore, "Re: EOD Support of SOCOM."

rated American protection, and the U.S. found itself plunged into a “quasi-war” with Iran. To counter Iranian nighttime small boat and mining attacks, Army SOF helicopters and Naval Special Warfare assets (SEALs and Special Boat Units) were deployed to the Persian Gulf in August of that year. Navy EOD technicians were among the SOF task force. Two of the three SOF actions launched during the fall of 1987 that effectively ended both the Iranian’s ability and their will to mount another serious attack in the northern Persian Gulf relied heavily upon the support provided by EOD personnel. These were the capture of the minelayer *Iran AJR* and the destruction of the Rostam oil platform.⁶⁰

Iran AJR was a 2,275-ton roll-on roll-off cargo ship modified for laying mines. On September 21, 1987, three Army SOF helicopters responded to reports of possible mine-laying activity by the vessel and witnessed her crew launching mine-like objects in international waters. The helicopters subsequently engaged *Iran AJR* with 2.75-in rockets and 7.62mm mini-guns, and they succeeded in destroying her propulsion plant and rudder. The next day, a boarding party that consisted of a SEAL platoon supported by a Farsi translator, a Marine Force Reconnaissance team, and a Navy EOD element prepared to board the vessel that was now dead in the water. The SEALs met no resistance from the remaining crew (most of the crew was dead or had abandoned ship, only to be rescued by U.S. Navy ships). The EOD technicians followed the SEALs onto *Iran AJR* and secured the remaining mines and gathered valuable intelligence about Iran’s mine laying operations. After the trove of intelligence onboard (including charts marked with minefields, war plans, and nine M-08 naval mines) was gathered and analyzed, the SOF task force, including the EOD

⁶⁰ John Partin, *Special Operations Forces in Operation EARNEST WILL/ PRIME CHANCE 1* (N.p.: U.S. Special Operations Command History and Research Office, 1998, iii). The third SOF action was the Middle Shoals Buoy engagement on October 6, 1987. Though it was a significant event in convincing Iran that it could not operate with impunity in the Persian Gulf, it did not involve EOD and is not included in this paper.

element, sank Iran AJR on September 26, 1987. The evidence gathered made it impossible for Iran to credibly continue to deny that it had mined international waters.⁶¹

On 15 October, 1987, the Iranians hit the British-owned merchant ship *Sungari* with a Silkworm missile launched from the Fao Peninsula. The Reagan Administration considered several retaliatory attacks of varying degrees of intensity, but eventually settled upon destroying the Rashadat oil platforms.⁶² The same SEAL task unit that had captured the *Iran AJR* was tasked with the destruction of the platforms. The task unit commander immediately requested the addition of six EOD technicians, including one who was experienced in destroying oil platforms.⁶³ Once the SEALs had chosen the particular platform that would be targeted, they would board and secure it. Once secured, the SEALs and EOD technicians would set explosive charges to cut the platform's structural legs and cross members, toppling it into the sea. If resistance was encountered, the SEALs would engage the Iranians while EOD planted the charges.⁶⁴

As it happened, the Iranian crew abandoned both platforms when the approaching task force broadcast warnings in English and Farsi. The crew of a platform two nautical miles to the north manned their weapons, and then abandoned their platform when they were challenged. The naval ships of the task force then bombarded the two Rashadat platforms, collapsing one and heavily damaging the other. The SEALs and EOD technicians approached the damaged platform to finish the work of toppling it, racing against the oil-fueled fires that raged on the surface of the water due to the bombardment. The EOD

⁶¹ Partin, 51-65.

⁶² The Rashadat GOSP had two platforms, 130 meters apart, and was located in the Rostdam oil field in the northern Persian Gulf. Partin, 76.

⁶³ *ibid*, 77.

⁶⁴ *ibid*, 78.

team quickly deduced the best placement of their explosive charges given the damage already inflicted upon the platform and began placing their haversacks. The SEALs were redirected to board the platform whose crew had manned their weapons earlier, and they left the EOD team to complete the rigging of the explosives and finish destroying the platform.⁶⁵ Destruction of the Rashadat oil platforms finally convinced Iran that they could not attack merchant vessels in the Persian Gulf and, though OEW and the American presence continued until early 1989, Iran never mounted another serious attack in the northern Persian Gulf.⁶⁶

4. EOD Support of SOF Develops Through the 1990s

In the early 1990s theater commanders-in-chief (now called combatant commanders) began to designate specific Army SOF units to be tasked with rapid response to threats in the event specialized national assets could not respond. The units also were authorized limited authority to deal with foreign nuclear weapons. A Navy EOD detachment was tasked with providing the necessary technical support to the European theater's designated unit. In cooperation with other government agencies, the Navy detachment allowed the European theater's Commander-in-Chief to field a broad array of new capabilities that were previously unavailable to him until the arrival of domestic national assets.⁶⁷ The value of an EOD capability organic to these units was proven during an exercise in Poland when the target building, an abandoned Soviet facility, was discovered to be surrounded by real landmines. The embedded EOD forces safely removed the mines, allowing the exercise to continue.⁶⁸

The value of EOD forces being attached to SOF was proven again in Bosnia. Though fought largely as an air campaign, special operators on the

⁶⁵ Partin, 77-80.

⁶⁶ *ibid.*, iii.

⁶⁷ DiGuardo, October 13, 2005.

⁶⁸ *ibid.*

ground conducted direct action raids, special reconnaissance missions, and searched for and captured high-value targets. Many missions included the insertion of sniper teams onto Serbian rooftops to act as an over-watch for raids conducted in the streets below. Due to the Serbian affinity for booby-traps and intelligence of explosive threats on rooftops, the missions were nearly cancelled for fear of the snipers' safety. Navy EOD teams in the area offered to insert with the snipers and clear any booby-traps that they encountered. The missions were approved and the EOD technicians disarmed the explosive threats, allowing for the safe execution of the missions.⁶⁹

5. Recent Operations

The mobility skills that have become institutionalized within Navy EOD forces have had more recent consequences, as well. Early in OIF, Task Force 3/75 Ranger conducted a night combat parachute assault to seize a remote desert landing strip in the western Iraqi desert. It was the first Ranger combat parachute assault since Operation JUST CAUSE in Panama.⁷⁰ Early in the planning stages of the assault, dirt mounds and barrels on the runway were assessed by intelligence agencies to likely be booby-trapped or protected by IEDs. A requirement for a supporting EOD team was included in the plan.⁷¹ Prior to the decision to assault by parachute was made, an agreement had been reached by the Navy and Army EOD teams that were each being considered to support the raid. If the assault was to be conducted by ground, the Army EOD team would go; if the assault was to be airborne, the Navy would support it.⁷² The assault was indeed determined to be by parachute, and the Navy team, the only EOD personnel who were airborne qualified, loaded into the Air Force special operations MC-130 Combat talon aircraft and, along with 199 Army

⁶⁹ DiGuardo, October 13, 2005.,and DiGuardo, November 9, 2005..

⁷⁰ Charles Briscoe et al., *Weapon of Choice: U.S. Army Special Operations in Afghanistan* (FT Leavenworth, KS: Combat Studies Institute Press, 2003), 109.

⁷¹ Evans, 68.

⁷² DiGuardo, November 9, 2005.

Rangers, jumped from an altitude of 800 feet under zero illumination conditions.⁷³ On the ground, the EOD technicians searched and cleared dozens of mounds and obstacles, allowing the airfield to be used throughout Operation IRAQI FREEDOM.

Innumerable other SOF missions in support of Operations ENDURING FREEDOM and IRAQI FREEDOM continue to require the support of EOD technicians. SOF teams on direct action missions targeting bombers and bomb-makers often encounter booby-traps and IEDs at the target sites. Enemy weapons caches are found daily by SOFs in caves in the Afghan mountains and hidden in the Iraqi desert.

B. THE SOLUTION EMERGES

Much of the EOD support required as a result of special operations, such as the destruction of arms caches, can be provided by the conventional EOD teams with responsibility for the area in which the missions requiring support are conducted. These teams are, however, in high demand and often cannot respond for hours or even days. The skills of these technicians are well-honed, but some special operations exist outside the capabilities of conventional EOD. Raids may require EOD personnel to be on-scene to respond immediately or may even require the bomb technician be integrated into the assaulting force. Such missions require “hyper-conventional” capabilities such as training in close quarters battle and shooting skills. Other operations may require proficiency in dangerous, unique or unorthodox insertion or extraction methods. Due to a few significant events in the recent history of military explosive ordnance disposal, Navy EOD has developed and honed those “hyper-conventional” skills that have resulted in it consistently and habitually being chosen as the service of choice to provide EOD support to SOF.

⁷³ Briscoe, *et al.*, 109.

Integration with NSW began informally within Carrier and Amphibious Strike Group deployments. Navy EOD detachments assigned to support the strike groups were able to provide critical EOD support to the SEAL platoons that were also assigned to the strike groups. The successful partnership was made more formal when Navy EOD detachment support was included in the NSW 21 Strategy in 2000. Similarly, the informal support of specific Army SF teams worldwide – begun as a result of operational necessity and the initiative of tactical commanders to act upon their recognition that Navy EOD technicians would most easily integrate into their operations – has become more institutionalized. Support to Special Operations Command, Europe (SOCEUR) began in September, 1996, with a tasking by the Geographical Combatant Commander and was included in the force listing in the theater Concept Plan in 1997. The Pacific and Central theaters have since followed suit.⁷⁴

C. SUMMARY

Operational necessity has required Navy technicians to be trained in SCUBA and closed-circuit diving, all manners of insertion and extraction by helicopter, parachuting, and small boat operations. Further, sailors who volunteer for EOD tend to have characteristics similar to those of SOF personnel. These are men and women who are drawn to life on a small team and the excitement of jumping, diving, shooting, and working with explosives. They are also not deterred by the dangers inherent in the mission. The individual traits of Navy EOD technicians, coupled with the community's organization as combat support, as opposed to combat service support, result in a remarkable similarity between Navy EOD detachments and SOF teams. For these reasons, Navy EOD is an obvious choice as the force to provide EOD support to SOF. Indeed, Navy EOD has provided support to SOF for years to varying degrees. The support provided has been overwhelmingly successful and has allowed Navy

⁷⁴ Diguardo, "Information Paper."

EOD to be a critical enabler to many special operations. As a result of this success, requests for EOD support of SOF operations will surely continue to increase.

THIS PAGE INTENTIONALLY LEFT BLANK

V. MAKING IT WORK: THE DECISION TO INTEGRATE EOD SUPPORT AND OVERCOMING RESULTANT OBSTACLES

The integration of external support into tactical units poses unique and interesting challenges. Factors involving the costs versus the benefits of integration, the intelligence that is necessary when deciding whether or not to integrate, and resultant issues of trust are all relevant.

A. THE DECISION TO INTEGRATE EOD INTO SOF: AN APPLICATION OF GAME THEORY

Ultimately, a commander's decision of whether or not to integrate EOD personnel into their tactical teams is based on an analysis of the costs versus benefits of doing so. A commander is more likely to include an EOD capability in his assault force if the costs of doing so can be minimized while still maintaining the benefits. An application of mathematical game theory to a particular scenario involving barricaded terrorists and an assaulting SOF (Appendix A) can illustrate how prior planning and forward thinking can reduce the costs of integrating external personnel into a tactical unit. A complimentary result of the application of game theory of particular interest to commanders of elite units is the analysis of the terrorists' decision process. It is apparent that, given the requisite resources and materials, it is always in the terrorists' favor to pose an explosive threat.

In 2004, Carlos Perez published his thesis, "Anatomy of a Hostage Rescue: What makes a hostage rescue successful?" In it, he relied heavily upon Game Theory to conclude that the best strategy for a government facing hostage-takers was to adopt a hard-line stance and assault the target rather than

negotiate.⁷⁵ Building upon his conclusion, and expanding his parameters, this thesis analyzes the actions of the terrorists and SOF after the decision to assault has been made. Specifically, should the terrorists pose an explosive threat, placing IEDs and booby-traps at points of entry and along the assaulting force's expected paths of movement, and should the assaulting force commander integrate an EOD capability into his team at the expense of team cohesion and orchestrated precision?

Once a government makes the decision to take a hard-line stance against a barricaded enemy, a new game emerges. Knowing an assault is forthcoming, the barricaded terrorist must now decide if he wants to impose an explosive threat (assuming the technical knowledge and supplies are available) to the assaulting force such as booby-traps or IEDs placed at likely points of entry and along likely paths of movement. The tactical unit commander, once ordered to prepare for an assault, must decide whether or not to integrate an EOD capability into his assault force. If an explosive threat is encountered, an integrated EOD capability will likely allow the assault to continue and will save lives. If there is no explosive threat, however, integration of outside personnel into the assaulting force will interrupt the precise teamwork necessary to achieve relative superiority in Close Quarters Battle (CQB) and maintain momentum through the target.

Game theory principles reveal that the terrorists have a dominant strategy of posing an explosive threat, and the SOF can be assumed to respond to this strategy and maximize their own payoff by integrating an EOD capability into the assaulting force. This is the likely outcome of this zero-sum game. But when the

⁷⁵ For a complete discussion of the game that results in a government's decision to assault the position of barricaded hostage-takers, see Carlos Perez, *Anatomy of a Hostage Rescue: What makes a Hostage Rescue Successful?* (Monterey, CA: US Naval Postgraduate School, 2004).

strategic combinations are assigned relative utilities and ranked accordingly, analysis of the resulting game is more telling.

The relative strength of the terrorists' dominant strategy of posing an explosive threat is very strong, regardless of which strategy the SOF employs. The SOF's dominant strategy, on the other hand, is of only marginal strength. It is interesting and worthwhile to note, however, that those characteristics that detract from the payoff value of the integration strategy for the SOF – such as the interruption of the precise teamwork that is necessary to achieve relative superiority in CQB and maintain momentum through the target – are trainable. As such, those things, and the corresponding payoff value of integration, can be improved. As SOF units and EOD support personnel train jointly the payoff value of the integration strategy approaches that of the non-integration strategy. At its peak, when the two units are seamlessly integrated and indiscernable from one another, the payoff values are equal in the case that the terrorists do not pose an explosive threat. In the case that they do pose such a threat, the payoff substantially increases. The utility of this strategic combination to SOFs (integrating EOD personnel when terrorists pose an explosive threat) is not maximized merely because there is more danger (despite the integrated capability to neutralize it), which makes this outcome of less utility than those when the terrorists do not pose any explosive threat at all. Therefore, it can be concluded that the payoff value the SOF can guarantee itself is solely dependent upon the degree to which supporting EOD forces are integrated.

B. THE ROLE OF INTELLIGENCE ANALYSIS IN THE DECISION TO INTEGRATE EOD FORCES INTO SOF

Commanders facing the decision to integrate often have an incomplete picture of the threat and must rely on intelligence analysis to fill in any gaps. Analysis is only as good as the information being analyzed; which information is

relevant and which is not is a fundamental question that must be answered before any conclusions can be drawn. In this case, real-time tactical data and historical trends are of equal salience and, when analyzed correctly, can allow a commander to make the best decision.

For a tactical unit commander, the decision to integrate EOD technicians into the assault team is an important one. Adding external personnel to the tactical team raises safety issues when the supporting EOD unit has not trained with the assault force in realistic scenarios and will almost certainly add to the response time of the tactical unit. However, the decision not to include an EOD capability in the assault team can have dire consequences, as well. If the targets, whether they are terrorists or barricaded fugitives, have determined to defend themselves with booby-traps or IEDs positioned along anticipated routes of entry, EOD support is critical. In these cases, the explosive threat can pose a serious hazard to the assaulting unit and can delay progress to the target, deny access to critical areas, or even result in friendly casualties.

Sometimes the decision is easy. Intelligence may be readily available, as in the case of a specific threat. The airborne response to the *Queen Elizabeth 2* by three British commandos and a bomb expert in 1972 was in reaction to a specific threat to the luxury cruise liner.⁷⁶ The British SAS assault on the Iranian embassy in London in 1980 included an integrated EOD capability because there was a specific threat to blow up the building.⁷⁷ U.S. Navy EOD technicians were included in the Ranger parachute assault on the airfield near Kandahar, Afghanistan, because of intelligence that suspicious mounds of earth on the tarmac were likely booby-trapped.⁷⁸ In these cases, the intelligence was readily forthcoming that there were specific explosive threats. Indeed, in the cases of

⁷⁶ Alvin Schuster, "Bombs Hunted on Queen Elizabeth 2 at Sea," *New York Times*, 19 May 1972, 1A.

⁷⁷ Davies, 92.

⁷⁸ DiGuardo, 13 October, 2005.

terrorism, the information was offered by the targets themselves. In such an instance, the tactical commander is well-served to include EOD personnel in the assault unit.

But sometimes the right choice is less clear. The tactical commander may have neither a specific threat nor a historical precedent leading him to include EOD personnel in the tactical operation. It is in these situations that intelligence and analysis become essential. The role of intelligence in these cases is not to determine if an explosive hazard exists. Bomb squads and EOD personnel are generally able to respond within a reasonable amount of time in the event the tactical team happens upon an explosive hazard at the target site. Rather, the goal must be to determine if those explosive hazards pose a real and direct threat to the assaulters. The operational commander of the tactical team needs to know if there is a threat to the assaulting force that would require integration of EOD personnel into the assault train. This requires sufficient intelligence and analysis to determine if a credible threat exists.

1. Determining the Credibility of the Threat

A threat can be deemed to be credible if the person or group issuing the threat possess both the intent and capability to carry out the threat.⁷⁹ Both characteristics are necessary for credibility; neither by itself is sufficient. A threat may have sufficient intent behind it: the person or group issuing the threat may have the necessary desire and self-justification to blow up the threatened target. But without the capability to actually do so, such a threat is only bluster. Likewise, an organization may have the technical means and supplies to pose an

⁷⁹ The concept of threat credibility as the sum of intent and capabilities at the geo-political, strategic level is examined at length in Paul Huth's *Extended Deterrence and the Prevention of War* (New Haven and London: Yale University Press, 1988), 33. The application of analysis of intent and capabilities to determine threat credibility on the tactical level is explored in detail by Hawley, *et al.*, 94.

explosive threat, but without the intent to do so there is little likelihood of it being carried out. It is the purpose of intelligence to qualify both characteristics.

2. Determining Group Intentions

In analyzing the intentions behind the threat, the intelligence apparatus must attempt to determine the issuing person or group's motivation, history and behavior pattern, and current activity.⁸⁰ The person or group must be motivated to commit the threatened act. If there is a specific doctrine known to the intelligence community, was there a catalyst? The specific motivation of the person or group is generally not relevant to tactical operations, as the event has already occurred and, for whatever reason, has resulted in the target package that the tactical commander faces. But analysis of motivation is useful in determining which groups should be the target of strategic threat assessments.

History and behavior patterns can be very important, as past behavior often determines future action. In the Bosnian campaign, the Serbs' penchant for booby-trapping rooftops and other key terrain features was well known, and commanders had to include EOD forces with tactical teams in order to neutralize this threat.⁸¹ Frequent assaults on bomb-maker's houses and workshops in Iraq have established the standing threat of IEDs and booby-traps when these targets are "taken down" by SOF. The need for EOD support in these situations is understood. Likewise, experience in assaulting methamphetamine labs have proven the prudence of police SWAT teams including Bomb Squad personnel in their tactical operations against such targets.

Current activity is the most salient characteristic of a person or group's intent. Is there evidence that the individual or organization has been actively

⁸⁰ Hawley, *et al.*, 94.

⁸¹ DiGuardo, 13 October, 2005.

pursuing explosives or acquisition of bombs and bomb-making materials? Even the absence of specific intelligence regarding the tactical problem faced by SOF (for example, the sighting of a bomb or a freed hostage reporting the use of booby-traps) is dominated by intelligence revealing the pursuit of explosives.

3. Determining Group Capabilities

When analyzing the capabilities of the threatening organization or person, the intelligence apparatus must look at four areas: technology, force structure, mobility, and geographic access.⁸² Intelligence officials must attempt to determine the types of hardware and software to which the group has had access. In prosecuting the GWOT, the groups SOF would be directed to engage can be assumed to universally have access to explosives of one sort or another. State-sponsored terrorist organizations can be assumed to have access to military grade explosives. Well-established and financed groups can be assumed to have access to explosives, homemade, military surplus, or otherwise.

In examining the force structure of the target, the intelligence community must focus on whether the group has organic explosives experience or if it is dependent upon outside expertise. This information, coupled with any intelligence about the locations and recent actions of any identified experts, can aid the tactical commander in assessing the nature of the explosive threat that faces his team.

Mobility as a capability refers more to strategic threat assessments of potential future threats, rather than an identified threat that has taken place or is occurring to which the tactical team has been called. The question of whether or

⁸² Hawley, *et al.*, 94.

not the group has transportation sufficient to move itself along with any explosives and other arms to a target site has been answered by the time the tactical unit is called to respond. Lastly, when a threat is received, the intelligence apparatus must discern whether or not the group has access to the geographic area or facility. This aspect, like motivation and mobility, tends to have been overtaken by events from the tactical leader's point of view if the threatening person or group already occupies the target site. But it can have great impact if the threat is removed from the threatened area, as was the case on the *Queen Elizabeth 2*.⁸³

The notional sum of the analyses of intentions and capabilities can allow the intelligence community and tactical commander to determine whether or not there is a credible explosive threat that would demand the integration of EOD forces into the tactical element.

C. ADDRESSING TRUST ISSUES THAT RESULT FROM THE DECISION TO INTEGRATE EOD FORCES INTO SOF

The high-risk scenarios that are common operating environments of SOF result in high levels of trust being of paramount importance. Joint training and drills requiring integration of EOD experts into elite units markedly eases initial trust issues and allows obstacles to integration to be surmounted. Each member is dependent upon the others for their safety and often find themselves in life-and-death situations, the escape from which requires unfettered trust in each other. Situations requiring the integration of external support, such as EOD technicians, into the SOF are by definition those that require expertise that lies outside the organic capabilities of the unit. Such situations are apt to raise the collective consciousness of the team to the dangers that are faced, and also

⁸³ The threat to the cruise liner was called into the New York office of Cunard Lines when the vessel was already over 1,000 miles off the coast of Britain. Analysis of the security procedures at the point of embarkation revealed that a malevolent individual or group could have indeed gained access to the ship to emplace bombs on board prior to her getting underway.

reinforce the disconcerting notion that, despite their considerable training, there exist obstacles for which they are not prepared. Without previous training or integration, it is into this atmosphere of heightened fears and tightened circles of trust that an EOD technician must insert himself.

Historically, the weapons of choice used by terrorists have been explosives and firearms; however, in recent years terrorists have sought and, in some cases, have obtained the capability to use other types of more effective weapons.⁸⁴ Multi-threat scenarios involving hazardous materials have been encountered by civilian SWAT units for years and lately have been increasing in frequency.⁸⁵ This trend will spread to military units engaged in operations in support of the GWOT and specifically to tactical units within USSOCOM. It is a fact that “the presence of these dangerous materials during tactical operations ... presents unique hazards and risks that require special precautions.”⁸⁶ Units trained in dealing with the CBRNE hazards that are now posed by terrorists already exist, and many are commanded by or “on-loan” to USSOCOM. But integration into the tactical teams, where the hazards will be initially encountered, is scarce. Tactical teams, EOD technicians, and Hazardous Materials (Hazmat) units (known as Technical Escort or Chemical Reconnaissance Detachments) will be called upon to cooperate with growing frequency. An EOD technician’s training in chemical and radiological detection, containment, and decontamination procedures allow him to act as a frontline expert with the ability to reach-back to the more robustly-equipped Technical Escort unit. An EOD technician’s training and expertise in rendering safe explosive devices likely to be encountered by a tactical team make his integration into the tactical element necessary. But how does an outside support element successfully integrate into

⁸⁴ Hawley, Chris, Michael Hildebrand, and Greg Noll, *Special Operations for Terrorism and Hazmat Crimes* (Chester, MD: Red Hat, 2002), 326.

⁸⁵ *ibid*, 326.

⁸⁶ *ibid*, 326.

an existing elite tactical team that has trained to the point that its members act as one?

1. Tight Bonds and Effective Teamwork

Elite tactical teams form exceptionally tight bonds. Often, their member's professional and social network ties are the same. Team members work together and relax together. In the case of military units that deploy for many months at a time, they even live together. These bonds are strengthened by the stresses encountered during the course of a mission. Special Forces units and police special operations teams exist and are trained to execute missions beyond the capabilities of conventional forces. Often, these missions involve very high levels of personal danger and precise execution of specific roles by each team member. Training offers only minimal sanctuary from danger, as hostile forces are not involved, but drills often are conducted with live ammunition under the most realistic of circumstances to maintain the highest levels of proficiency. CQB requires extreme muzzle control and surgical precision. Often gunshots are inches from a teammate's body. Such precision is only attained through many hours of practice and the firing of thousands of bullets.

The bonds formed between members of a tactical team who as a matter of course must depend upon one another to live become very strong indeed. The transient nature of military life results in permanent change of duty stations every few years, with corresponding changes in team chemistry. Operational units are continually being created, trained, deployed, and then broken up again. This personnel rotation would seem to impede the formation of tight bonds, and it does to an extent, but the common backgrounds provided by rigorous selection processes, qualification, and training courses allows for trust to be established very quickly among operators. Trust bonds are strengthened within military units again when they deploy to remote areas of the world and must live in what are

often very hostile conditions for months. Police units, in contrast, are rarely broken due to rotating personnel. Membership can be very static on SWAT teams, often with members working together for many years. This longevity allows teammates to become very familiar with each other and complicated maneuvers to become second nature.

The success of a highly trained tactical unit, whether it is a military unit or a police SWAT team, comes from frequent, intense, and realistic training and the knowledge that each member's life is in the hands of the others. Indeed, each person knows and accepts that he is responsible at any time for the life of each of his teammates. The constant drilling results in a surgical precision, each man knowing what the other is going to do in any circumstance. All the conceivable unknowns in any situation are identified and rehearsed, ensuring the absolute best chance of success. The team works as one entity, a fluid and precise wave of fantastic force that is meant to overwhelm the target, so that the defensive advantage is overcome by surprise, speed, and firepower.

But even the fastest team cannot outrun an explosion. Booby-traps and other explosive hazards can stop even the best-trained teams in their tracks. Stacks – operators arranged in single file during an assault – move so quickly when clearing rooms that the first two or three men may become casualties before the train's momentum can be stopped. The unfortunate reality is that without prior intelligence of an explosive threat, it is the entry man, first through the door, who will find a booby-trap. Tactically, a bomb maker's house in Baghdad and a methamphetamine lab in Seattle pose the same problem: a target inside a structure with a very high probability that it is defended by explosive hazards (booby-traps, tripwires, IEDs) meant to kill any unwanted guest. Whether the mission is the apprehension of a high value target or the recovery of a weapon of mass destruction (WMD), a tactical team will require the assistance of an EOD technician. An EOD technician is trained to counter the

explosive threat. Once that threat is determined to exist, and access is denied as a result, the EOD technician must be incorporated into the tactical team to defeat the threat, enable access, and allow the mission to continue.

2. Initial Trust

A forward-thinking unit commander will recognize the need for integration with specialized support elements and develop a training plan that includes experts in areas in which his team's tactical training is deficient. A more realistic case is a tactical unit that suddenly finds itself faced with a threat outside the range of skills possessed organically. In such a case, the experts are called in, and an ad-hoc relationship is formed between the elite unit and the support element. The operative trust in a case such as this is "initial trust," reflecting the fact that the relationship is improvised and that the parties have not worked together long enough to develop an interaction history.⁸⁷ The power to influence the situation required of an expert brought in to support a tactical operation when a relationship does not exist is based solely upon expertise. This power and resulting trust is tenuous and unstable, and it can be lost at the slightest appearance of incompetence or naiveté.

Trust theorists have postulated that trust grows over time, implicitly assuming that trust levels begin small.⁸⁸ Empirical data suggests otherwise, however, as is exemplified by elite tactical units. This paper's definition of trust is that one believes in, and is willing to depend on, another party in a time of vulnerability. It follows then that the definition of initial trust is that trust between parties that is not based on any kind of experience with, or firsthand knowledge of, the other party. Rather, it is based on an individual's disposition to trust or on

⁸⁷ McKnight, Harrison, Larry Cummings, and Norman Chervany, "Initial Trust Formation in New Organizational Relationships," *The Academy of Management Review* Vol. 23, No. 3 (Jul., 1998): 474.

⁸⁸ McKnight, *et al.*, 473.

institutional cues that enable one person to trust another without firsthand knowledge.⁸⁹ This is true for the team that has no prior training with supports elements such as EOD. Yet, in a tactical situation, team members must place their lives in the hands of such outside support elements, often having just met the technician. This requires an exceptional amount of trust in the best of circumstances, exceedingly so in the case of initial trust.

The High Level Model of Initial Formation of Trust (Figure 1) implies that trust forms partly because of one's disposition to trust. "Disposition to trust" refers to a tendency to be willing to depend on others; "a person exhibits a disposition to trust to the extent she or he demonstrates a consistent tendency to be willing to depend on others across a broad spectrum of situations and persons."⁹⁰ Operators on tactical teams demonstrate their willingness to depend upon one another as a matter of course. They could not accomplish their missions if they did not. But does this disposition to trust extend to others outside the team? It must. When faced with an explosive threat that denies access to the tactical team operating within its normal skill set, the EOD technician who is brought in to support the team must be trusted immediately.

⁸⁹ McKnight, *et al*, 474.

⁹⁰ *ibid*, 474-77.

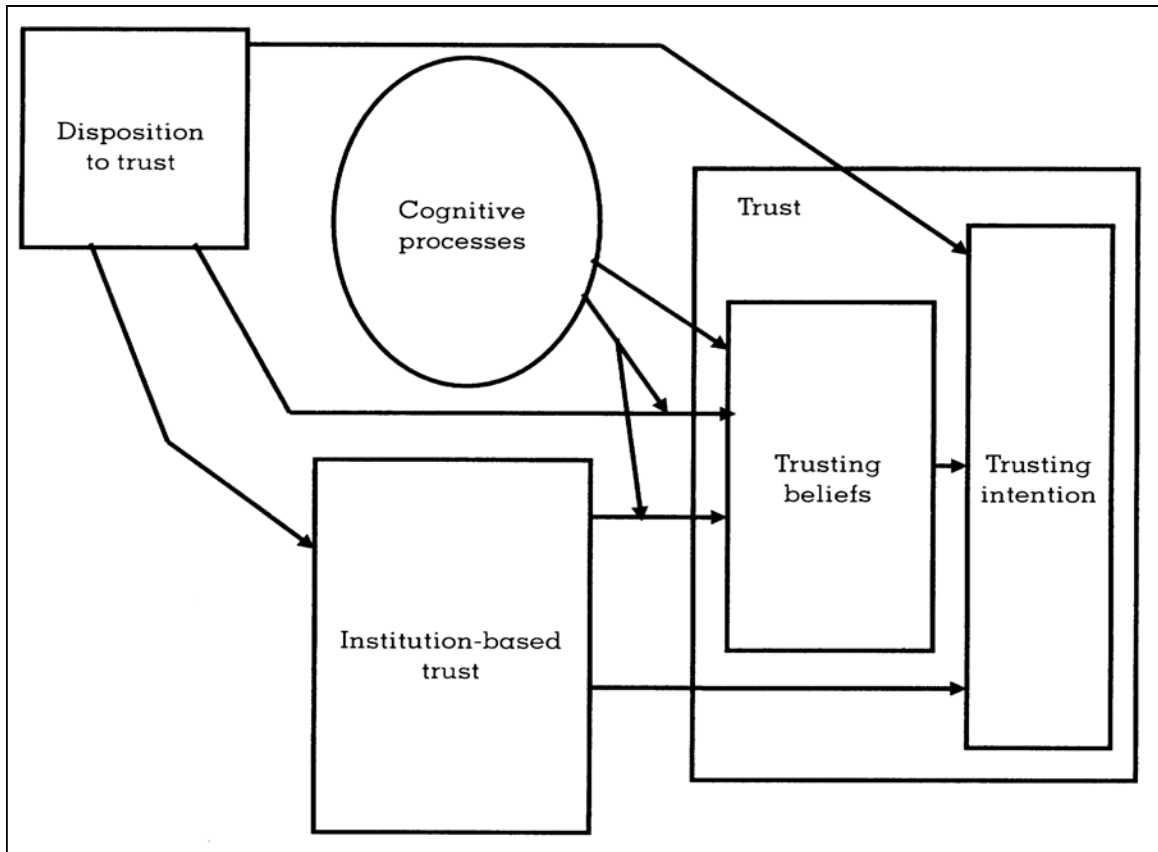


Figure 1. The High-Level Model of Initial Formation of Trust (From McKnight, *et al*, 474)

Fortunately, two factors assist in the rapid formation of initial trust in such a situation. The first is the fact that there are two types of dispositions to trust based on personality traits, one of which is relevant to the elite unit: faith in humanity. “Faith in humanity” means that others are typically well-meaning and reliable.⁹¹ The people elite military units and police SWAT teams come into contact with during the course of their missions are terrorists, criminals, and in general those who have decided to live outside the bounds of society. Given their frequent and adversarial contact with such people, team members may appear the most unlikely of those to exhibit faith in humanity. But if the term is altered to be “faith in operators,” it becomes relevant and descriptive. Operators tend to trust operators. Beyond the common training and backgrounds

⁹¹ McKnight, *et al*, 477.

membership in tactical units implies, a factor discussed below, operators tend to be like-minded people who can find some amount of shared experiences or beliefs that exist even across disciplines. It is this commonality of personal traits, in part, that allows high levels of initial trust to exist. A member of an elite tactical team exhibits a general faith in those who can be called operators within their own fields because of a general faith in all operators which is, in essence, a faith in themselves.

The second factor that results in exceptionally high levels of initial trust of an outsider by a tactical team is that of institution-based trust. This type of trust means that “one believes the necessary impersonal structures are in place to enable one to act in anticipation of a successful future endeavor.” Specifically, “structural assurances, defined as the belief that success is likely because such contextual conditions as promises, contracts, regulations, and guarantees are in place.”⁹² The structural assurances relevant to the formation of initial trust in a tactical situation are qualifications. The tactical unit requiring the support of an outside expert, such as an EOD technician, knows that they can be confident that person has been through the necessary training to be qualified within his field. The wearing of a badge or insignia is an immediately recognizable way to convey the expertise a technician possesses. The tactical team need not know what the training consists of or what exact qualifications are possessed by the supporting EOD technician, and often they don't. But the fact that the team requested EOD support and the technician responds with the expertise necessary, as exemplified by the EOD qualification badge, allows the team to place a large amount of trust in the technician. It is this institution-based trust, as a result of structural assurances, coupled with a disposition to trust other operators, that results in the high levels of initial trust required of an elite tactical unit in a supporting element.

⁹² McKnight, *et al.*, 478.

Two categorization processes that further enable high levels of trust are reputation categorization and stereotyping. Reputation in this instance reflects professional competence as “those with good reputations are categorized as trustworthy individuals.”⁹³ A person may be perceived as a competent individual because he or she is a member of a competent group or because of her or his actions. In the case of an EOD technician supporting a tactical unit, the competency of the EOD unit or bomb squad of which the technician is a member contributes to the reputation of the individual. Though the members of the tactical team may not have any firsthand knowledge of the technician personally, there is a good chance that many team members have had interactions with members of the bomb squad and will transfer the reputation of the group onto the technician. Therefore, if the individual has a good reputation, one will quickly develop trusting beliefs about that individual, even without firsthand knowledge. Stereotyping reflects prejudices for or against occupational groups (such as bomb squads).

By positive stereotyping, one can quickly form positive trusting beliefs about the other by generalizing from the favorable category into which the person was placed. In the initial relationship, categorization processes that place the other person in a positive grouping will tend to produce high levels of trusting beliefs.⁹⁴

This initial trust allows the members of a tactical team to place their lives in the hands of an outside expert after nothing more than a situation brief and a handshake.

⁹³ McKnight, *et al.*, 480.

⁹⁴ *ibid*, 481.

3. The Advantages of Joint Training

If the elite tactical team's commander is forward-thinking, as suggested above, he will anticipate situations that require expertise outside of his team's skill set. "Many public safety special operations teams are routinely cross training to some extent so that they can support one another with various areas of expertise. Cross-training usually focuses on learning terminology, special hazards and risks, capabilities, and standard operating procedures."⁹⁵ Cross-training does not mean that the tactical team learns how to render safe an explosive device, nor that the EOD technician becomes an expert in CQB. It does mean, however, that the tactical team becomes aware of how to integrate the unique capabilities of the EOD technician and that the technician can cooperate as seamlessly as possible with tactical operations.

A unique aspect to the tactical team operating jointly is the fact that power must transfer according to the threat. This flow of power can be described as it pertains to tactical operations:

In situations where the location is vacant and there is a possibility of chemicals being involved, an experienced Hazmat technician must be involved in the entry. The bomb technician should enter first, looking for explosive hazards. Once the area is cleared and rendered safe, the Hazmat tech enters looking for chemical hazards ... When rendering safe the explosive the bomb squad takes the lead; when dealing with a chemical hazard, the Hazmat team takes the lead. When ... the location is known to be occupied SWAT should enter first to secure the suspect.⁹⁶

When explosives are suspected or encountered upon entry or during the course of clearing the building, the lead must shift rapidly between the EOD technician and the tactical team in order to render the device safe with the least

⁹⁵ Hawley, et al, 326.

⁹⁶ *ibid*, 327.

disruption to the tactical team's momentum. This rapid transfer of power can only be achieved through practice and drill.

As tactical units train with external support personnel, initial trust is replaced by knowledge-based trust. Knowledge-based trust develops over time as one accumulates trust-relevant knowledge through experience with the other person.⁹⁷ The power to influence the situation required of an expert brought in to support a tactical operation when a relationship previously exists (as is developed through training) is based upon legitimacy, expertise, and reverence. This power and resulting trust is much more stable and grounded than power based solely on expertise, as is the case with initial trust.

Special operations teams that understand the hazard and risk assessment process through joint training and exercises function at a higher level of safety and efficiency.⁹⁸ If USSOCOM's three service components are to carry out their missions to full effectiveness, they must learn to depend on each other's capabilities by working jointly.⁹⁹ Ultimately, SOF components must be interoperable for they are more interdependent than elements of any other military force.¹⁰⁰

4. Overcoming Obstacles to Joint Training

Despite the great need for and identified advantages of joint training, it occurs at best intermittently and usually under protest at some level. The problem that most affects attainment of SOF jointness is ever-present service

⁹⁷ McKnight, et al, 473.

⁹⁸ Hawley, et al, 328.

⁹⁹ Curtis Thiery, *Special Operations Joint Training*, (Maxwell AFB, AL: Air University Press, 1993), 17.

¹⁰⁰ *ibid*, 18.

bias. As noted by former Secretary of Defense James R. Schlesinger, “The tendency for each service is to build into itself capabilities that will permit it to be independent of the other services.”¹⁰¹ This tendency toward independence results in general objection to training that requires the integration of external support, such as EOD. Consequently, when situations arise that do require experts from outside the tactical unit, prior relationships rarely exist and inter-service bias tends to result in the request being made of the perceived expert within the requesting unit’s particular service rather than the expert who is best suited for the task. “Routine contact eliminates conventional barriers to good communications, faith, trust, and cohesion.”¹⁰² At the tactical level, a paucity of real situations requiring EOD support relative to the number of tactical operators can lead to a false sense that it is unnecessary. Frequent exercises that include threats requiring expertise outside the organic skills of the tactical unit and which require the request of support from EOD forces would both convince tactical units that the threat is real as well as lead to increased safety and efficiency, build high levels of trust among operators, and enhance mission effectiveness.

¹⁰¹ Thiery, 18.

¹⁰² *ibid*, 19.

THIS PAGE INTENTIONALLY LEFT BLANK

VI. CONCLUSIONS AND RECOMMENDATIONS

Many of the missions and core tasks of SOF place personnel in situations where they are likely to be threatened by explosive ordnance. Counter proliferation of CBRNE is now the first priority of SOF¹⁰³, and cannot be completed without EOD support. Unfortunately, the documents that delineate CP as SOF's primary mission do not recognize that any EOD support is required.¹⁰⁴

The threat encountered by the SOF may be the objective itself, as is the case with CP, or it may be denying access to the target, a tripwire or booby-trap. FID missions in certain parts of the world will involve extensive demining and UXO training. CSAR operations often involve specialized insertion and extraction techniques and explosive hazards at the crash site. Other missions may not entail foreseeable EOD requirements, but the possibility exists that the SOF team may encounter a requirement for EOD support once the mission has begun. In these cases, an EOD unit with the training, mobility skills, and capabilities commensurate to the SOF unit would greatly enhance that unit's effectiveness. EOD technicians who can insert in any manner, no matter the training required or risk involved, who can operate seamlessly with the SOF unit at the objective, and can neutralize explosive threats and enable access to denied areas could prove invaluable. In emergent crises requiring first-time access within a small window of opportunity, a force of this type may be the difference between mission completion and mission failure.

Some skills and capabilities are common to all SOF, regardless of their specialty, and distinguish them from conventional forces. These are high-risk tactics and techniques, such as HALO and HAHO freefall operations, clandestine insertion underwater via SCUBA, and CQB, that require training above and

¹⁰³ USSOCOM, *Posture Statement*, 36.

¹⁰⁴ DiGuardo, "Information Paper."

beyond what is typical of conventional forces. Other combat skills are not unique to SOF, but are developed to a degree greater than that of conventional forces. An EOD force directed to support SOF missions must possess these hyper-conventional skills and capabilities if it is to act as a mission enabler, rather than a hindrance.

Army and Marine Corps EOD forces are combat service support units more closely aligned with engineering and construction units than combat forces. Air Force EOD is organized and trained to provide critical services for airfield survivability and repair, but is further removed from combat than the combat service support units of the Army and Marine Corps. Navy EOD, in stark contrast, is a combat support force. Its detachments are equipped and organized to directly support combat operations, and Navy EOD technicians possess the individual skills and equipment to be significant additions to combat operations. In recognition of its unique skills and capabilities within the Department of Defense's EOD forces, the Navy's EOD force should be designated the sole provider of EOD support to SOF.

A. A NOTE ON CIVILIAN SPECIAL OPERATIONS TEAMS

Municipal SWAT teams' long experience in tactical situations involving explosive threats allow several lessons to emerge from the civilian side of the operational spectrum. These teams often encounter explosive hazards, from barricaded hostage-takers to booby-trapped methamphetamine labs. Despite the increasing encounters with explosive hazards, some SWAT teams have not embraced the integration of EOD technicians into their tactical elements, preferring instead to call upon conventional police bomb squad personnel when needed. This often adds to the response time of the SWAT team as they must wait for the bomb squad to arrive and become apprised of the situation.

Following the Columbine High School shooting in 1999, Deputy Inspector Joe Dempsey, bomb squad leader for the Arapahoe Sheriff's Office, remarked that the incident demonstrated the importance of more closely integrating bomb experts with tactical units. "Had bomb technicians deployed with the SWAT team, for example," Dempsey said, "they could have told [the SWAT commander] that the bombs obstructing the emergency exit from the library posed no risk as long as they weren't moved."¹⁰⁵ As it happened, the SWAT team delayed their entry into the library over two hours, a tactical decision for which the authorities received much criticism.

Other SWAT teams have embraced the integration of bomb technicians into tactical operations with great success. Kitsap County SWAT, in Washington State, is fortunate to have a member of the team who is also a certified bomb technician. This has, in effect, allowed the full integration – to the point of indiscernability – of the bomb squad into tactical operations. The technician's position in the center of the assault element ensures explosive hazards are identified and handled quickly and with minimal effect on the operation. Commenting on this integration, SGT Jim Porter, the team's operations sergeant, said:

If we are aware of a specific explosive threat on an operation, we include him in the initial planning and follow his recommendations. If we encounter an explosive device during an operation our bomb tech would be responsible for [dealing with] the device. Depending on the operation and advice from him, the team would either pull out until the device was rendered safe/ removed or complete the mission.¹⁰⁶

While having a bomb technician who is a full member of the tactical unit is a fortunate situation for the SWAT team and is representative of the ideal level of integration, the frequency of encounters probably does not require it. A close

¹⁰⁵ Susan Rosegrant, "The Shootings at Columbine High School: Responding to a New Kind of Terrorism, Sequel," *Kennedy School of Government Case Program, C16-01-1612.1*, (President and Fellows of Harvard College: Cambridge, MA, 2001), 8. Cited with permission.

¹⁰⁶ Jim Porter, "Bomb Squad Integration," email to author, 11 September 2005.

working relationship, facilitated by frequent joint training and a familiarity each other's procedures, would suffice in those times when the tactical situation indeed calls for an explosive expert. Military SOF both in and out of war zones, in contrast to the civilian operating environment, face an increased probability of encountering an explosive hazard. This is due to the availability of explosives within regions in which SOF operate. The threat is great enough to warrant the creation of a solution somewhere above the current model yet less than mandating the membership of EOD technicians on every SOF unit. The creation of a SOF Mobile Unit (SOF MU) dedicated to training and equipping EOD technicians for support of special operations forces and missions would fill this need.

B. CONCLUSIONS FROM THE APPLICATION OF GAME THEORY

Once a government makes the decision to take a hard-line stance against a barricaded enemy, a strategic game emerges from the direct action scenario. The players in this game are barricaded terrorists and the SOF that is assigned to assault the position. Knowing an assault is forthcoming, the terrorists must decide if they want to impose an explosive threat (assuming the technical knowledge and supplies are available) to the assaulting force such as booby-traps or IEDs placed at likely points of entry and along the assaulting force's expected paths of movement. Having made the decision to assault, the tactical unit commander must decide whether or not to integrate an EOD capability into his assault force. If an explosive threat is encountered, an integrated EOD capability will likely allow the assault to continue and will save lives. If there is no explosive threat, however, integration of outside personnel into the assaulting force will interrupt the extremely precise teamwork necessary to achieve relative superiority and maintain momentum through the target.

The relative strength of the terrorists' dominant strategy of posing an explosive threat is great, affording the terrorists a high security level regardless of

which strategy the SOF employs. The SOF, on the other hand, has a dominant strategy of only mediocre strength. It is interesting and worthwhile to note, however, that those characteristics that detract from the payoff value of the integration strategy for the SOF (such as the interruption of the precise teamwork that is necessary to achieve relative superiority in CQB and maintain momentum through the target) are trainable. As such, those things, and the corresponding payoff value of integration, can be improved. As SOF units and EOD support personnel train jointly the payoff value of the integration strategy approaches that of the non-integration strategy. At its peak, when the two units are seamlessly integrated and indiscernible from one another, the payoff values are equal in the case that the terrorists do not pose an explosive threat. In the case that they do pose such a threat, the payoff increases. The utility of this strategic combination to SOFs (integrating EOD personnel when terrorists pose an explosive threat) is not the maximum attainable merely because there is more danger, despite the integrated capability to neutralize it, which makes this outcome of less utility than those when the terrorists do not pose any explosive threat at all. It can be concluded that the payoff value that the SOF can guarantee itself is solely dependent upon the degree to which supporting EOD forces are integrated.

C. JOINT TRAINING AND TRUST

The missions outlined in Chapter II require the elite military and civilian tactical units tasked with them to integrate experts from outside their existing organizations. In particular, tactical teams will need to call upon the expertise of an EOD technician, who can provide the ability to render safe explosive hazards such as IEDs and booby-traps as well as detect, identify, and provide first-line tactical protection from chemical, radiological, and nuclear hazards. The extraordinarily high levels of trust required between teammates on tactical units can be achieved initially based upon the types of people that find their way onto specialized teams. But the trust that is developed by frequent joint training involving both tactical teams and supporting elements is robust and stable. Only

through exercises incorporating all threats likely to be encountered and requiring the tactical unit to request EOD support can seamless integration be achieved that will allow the elite unit to accomplish its mission, regardless of threats encountered, with maximum safety and efficiency.

D. RECOMMENDATIONS

Navy EOD support of SOF should be further formalized and fully institutionalized. Special operations planners must realize EOD support as critical to the completion of many high-priority missions and core tasks, and include EOD forces in any strategic plans and documents. Further, these plan and documents should specify Navy EOD as the provider, leaving no question as to the source of support. Necessary supporting documents and actions should be generated, such as a National Security Council Decision Directive (NSC DD) and Memoranda of Understanding (MOUs) that focus on Navy EOD's SOF support and open a funding line through the Office of the Secretary of Defense for Special Operations and Low Intensity Conflict (OSD SO/LIC) for operations in support of GWOT.

With current support operations as a base model, a few changes will result in the optimization of the EOD support that the Navy can provide to SOF. The efforts of the current Navy EOD organization to meet the unique training requirements of a detachment assigned to support SOF has resulted in differences between units in Groups 1 and 2 and even between different Mobile Units within the same Group. These differences in products, which are created to fill the same need, introduce an opportunity for inefficiency and a risk of failure. Consolidation of all requests for support of SOF into one Mobile Unit will standardize training packages and remove the risks associated with disparate products. The training requirements and tactics, techniques and procedures associated with support of SOF missions differ enough from those of

conventional EOD detachments to warrant their organizational separation and the creation of a SOF MU dedicated to training and equipping EOD technicians for support of special operations.

1. Characteristics and Benefits of a SOF Mobile Unit

A SOF MU would allow for a standard training package to be created. While many hyper-conventional skills are core capabilities of Navy EOD, there are some schools and training courses that must be added to the individual level training plans for SOF support detachments. Schools such as Survival, Evasion, Resistance and Escape (SERE), advanced tactical shooting training, and various individual level SOF-specific schools and courses are included in the training cycles of personnel assigned to NSW Dets and other SOF support detachments. Heightened operational tempo and constant changes to deployment schedules that are a result of operations during wartime cause differences in schooling received by detachments of different mobile units as well as those within the same mobile unit. Consolidation of all training requirements specific to SOF support missions would streamline the training cycle and allow for a standard schedule and recurring billets at frequented schools and courses.

More significant than improvements to training are the operational tactics, techniques and procedures that could be tailored to the mission within a SOF MU. Currently, detachments train and deploy as full detachments, then operate in two man elements in support of SOF teams. A SOF MU would allow this operational reality to be institutionalized. Rather than a mobile unit comprising EOD detachments of seven to eight technicians, a SOF MU could have as its operational element-two man teams. These teams, identified and created at the beginning of a training cycle deployable as separate elements to be attached to SOF units, would foster new levels of teamwork and camaraderie as each member must learn to count on and be responsible for the other. The two-man

team concept would have the added benefit of being a closer fit to the operational model employed on the battlefield, and it would therefore better align the training cycle to prepare technicians for real-world operations. Under the right leadership, a SOF MU could develop an organizational culture that greatly enhances its performance. An organization that allows flexibility and encourages innovation while respecting professionalism and expertise would produce teams that fit seamlessly into existing SOF units.

Two-man teams would also increase the number of SOF units that may be supported. Each SOF support detachment could be broken down into four two-man teams, each of which could support its own SOF unit. The four-fold increase in support provided would allow the Navy's EOD community to match the increasing pace of SOF buildup and operational tempo. For example, if ten existing SOF support detachments were to be consolidated into a SOF MU employing the two-man team concept, up to eighty operational elements could be formed. Even adopting a conservative rotation of one-third of the teams deployed, one-third in training, and one-third awaiting deployment orders or returning from deployment, over twenty-five teams could be maintained in the field. These teams could be supporting SEAL task units, Army SF ODAs, or any other SOF unit anywhere in the world. The result would be an EOD force that was as flexible as the special operations forces it was supporting. Furthermore, teams returning from deployment could be easily rotated into a training role to immediately disseminate their lessons learned and experiences to teams preparing to deploy. Thus a returning deployer's experience would be maximized. Maintaining the integrity of teams throughout an entire tour, to include multiple deployments and training cycles, would maintain an extremely high level of organizational readiness and institutional knowledge. Within a few deployment cycles, a cadre of capable and trained teams could be maintained for emergent missions and short-notice support.

Critics have advanced several arguments against the creation of a mobile unit dedicated to SOF support. They believe that the consolidation of SOF support missions and personnel specifically trained for them would have several negative effects upon the community as a whole. They fear capabilities for conventional missions will be degraded as the SOF support missions attract attention, personnel, and money. Critics also believe that the current cross-pollination of NSW Det gear, training, and tactics, techniques and procedures to the rest of the force will be stemmed. Finally, there exists the concern that the establishment of a “hyper-conventional” mobile unit would attract the best personnel and pull all talent from conventional forces.

The creation of a SOF mobile unit would enhance the Navy EOD community’s capabilities for conventional missions rather than degrade them. Mobile units which must now divide their time and resources between conventional missions, such as Fleet support and mine countermeasures, and SOF support missions would be able to focus on the former. Maintaining command and control of the SOF MU within the existing organizational structure, rather than attaching it to USSOCOM, would ensure that the Navy allocates resources such as money and personnel according to its priorities and that the SOF MU will not attract an inordinate amount of either.

The exchange of innovations that are developed within NSW Dets with personnel in conventional detachments benefits the entire community. While the consolidation of SOF support resources into one mobile unit may indeed stem that exchange, responsible detailing of personnel can improve it. If assignment to the SOF MU is integrated into a sailor’s standard career path in the EOD community, rotation into and out of the unit can foster the diffusion of SOF-specific ideas to the rest of the community. In order to ensure the free exchange of personnel and ideas between the SOF and conventional mobile units, assignment to each must be viewed and weighed equally by promotion and

selection boards. The higher risk inherent in “hyper-conventional” tactics as well as the stricter physical standards that would likely be required to be met for selection to the SOF mobile unit would restrict some sailors from assignment there. Candidates for selection to the SOF mobile unit would have to be restricted to males in order to match the requirements of SOF, as well. This would bar female EOD technicians from assignment to the mobile unit regardless of personal characteristics or physical qualifications. The inability or lack of desire to be assigned to the SOF mobile unit must not be made a factor that would damage a sailor’s career.

The effect of a SOF mobile unit as a “talent drain” on the conventional community can be mitigated by the active discouragement of sailors “homesteading” – serving several successive tours in the same place – within the command. This would have the added benefit of enhancing cross-pollination of ideas between the SOF support and conventional communities, as well. A requirement to rotate back to the conventional community after one or two tours at the SOF mobile unit would aid in the distribution of tactics, techniques and procedures throughout the community. Close interaction between the staffs of all mobile units would help as well, and would also facilitate the flow of SOF tools and gear to the rest of the community.

The intent of this thesis is not to argue for the permanent attachment of EOD technicians to tactical units. Rather, it is to suggest that the creation of a Navy EOD Mobile Unit dedicated to the support of SOF missions combined with frequent joint training can maximize the flexibility of EOD teams and optimize any support required for the completion of special operations. It is significant, however, that the tactical benefits of employing a two-man team concept do not require the creation of a SOF MU. An intermediate step between the present full-detachment operational model and a SOF MU model is the employment of two-man teams at existing Mobile Units. The autonomy inherent in the detachments within a Mobile Unit allows a large degree of latitude in force employment among

them. The NSW Dets could be dissolved upon return from current operational commitments and the personnel be reorganized in the two-man team concept. This restructuring could be done piecemeal, as deployment schedules allow, and would not affect the operations of other conventional detachments. As deployment cycles progress, ultimately every NSW Det could be restructured in the two-man team model, allowing the tactical benefits of the model to be realized without the considerable effort and politicking required to create a SOF MU. Adoption of the two-man team concept at existing Mobile Units would illustrate the benefits of the model, and provide support to proponents of a SOF MU.

E. FURTHER RESEARCH

Opportunities for further research include case studies and an in depth foray into the organizational design and operational logistics of a SOF MU. Case studies of the integration of EOD elements into elite tactical forces around the world such as the British SAS, Israeli YAMAM, and American SWAT teams and special mission units would require access to these secretive units that was unavailable to the author. The training and integration of EOD support into the tactical elements of these units would provide a range of models upon which a SOF MU can base its design of its own operational elements. Research into the operational procedures in use today by elite units would require a classification that is both unattractive to an author and incompatible with publication and general distribution of the finished product.

A staggering amount of thought and effort must be put into the development of a new military unit. From mission statements and organizational design to command hierarchies and tables of allowances listing required equipment in excruciating detail, the process requires paperwork both broad in range and deep in content. These documents were beyond the scope of this

thesis. The purpose of this thesis was to present the case for dedicated EOD support of SOF and present a possible solution of a Navy SOF EOD Mobile Unit. Whether or not such a unit is established is a decision that will be made in the upper levels of the Navy. Such a radical alteration to a large bureaucratic system like the Navy takes considerable time and support from upper-level decision makers. As the notion of a Mobile Unit that is dedicated to the training and equipping of EOD technicians for support of SOF missions takes hold, all of the supporting documents and organizational design of such a unit will become necessary.

APPENDIX A: BARRICADED TERRORISTS VS. ASSAULTING SOF: AN APPLICATION OF GAME THEORY

A. INTRODUCTION

In 2004, Carlos Perez published his thesis, “Anatomy of a Hostage Rescue: What makes a hostage rescue successful?” In it, he relied heavily upon Game Theory to conclude that the best strategy for a government facing hostage-takers was to adopt a hard-line stance and assault the target rather than negotiate.¹⁰⁷ Building upon his conclusion, and expanding his parameters, this thesis analyzes the actions of the terrorists and SOF after the decision to assault has been made. Specifically, should the terrorists pose an explosive threat, placing IEDs and booby-traps at points of entry and along the assaulting force’s expected paths of movement, and should the assaulting force commander integrate an EOD capability into his team at the expense of team cohesion and orchestrated precision?

Once a government makes the decision to take a hard-line stance against a barricaded enemy, a new game emerges. Knowing an assault is forthcoming, the barricaded hostage-taker must now decide if he wants to impose an explosive threat (assuming the technical knowledge and supplies are available) to the assaulting force such as booby-traps or IEDs placed at likely points of entry and along likely paths of movement. The tactical unit commander, once ordered to prepare for an assault, must decide whether or not to integrate an EOD capability into his assault force. If an explosive threat is encountered, an integrated EOD capability will likely allow the assault to continue and will save lives. If there is no explosive threat, however, integration of outside personnel

¹⁰⁷ For a complete discussion of the game that results in a government’s decision to assault the position of barricaded hostage-takers, see Carlos Perez, *Anatomy of a Hostage Rescue: What makes a Hostage Rescue Successful?* (Monterey, CA: US Naval Postgraduate School, 2004).

into the assaulting force will interrupt the precise teamwork necessary to achieve relative superiority in Close Quarters Battle (CQB) and maintain momentum through the target.

B. THE PLAYERS

As was true in *Anatomy of a Hostage Rescue*, the players in this game remain a barricaded enemy and the assaulting government force, but the terms have been expanded to add a breadth of relevancy across GWOT operations. The barricaded hostage-taker may be inferred to include any enemy of the established government who has established some sort of refuge. This may indeed be a hostage-taker, but may also be a bomb-maker's house or workshop, a storehouse for supplies along the IED flow-path, or a terrorist's safe-house. The common characteristic is that it is a fixed site where the terrorists would have the time and means to pose an explosive threat. The assaulting force can be any tactical unit, military or civilian, that is charged with direct action operations against armed opponents. These units may be police SWAT teams or military SOF, but this paper will use the term SOF exclusively.

C. METHODOLOGY

In an attempt to determine a logical solution to the game described above, the principles of Game Theory are applied to the scenario. First, the motivations of the terrorists are defined which will allow for the ordinal ranking of the various outcomes. Then, the same is done for the SOF. Once the motivations and ordinal rankings of various strategies are defined, the application of Game Theory principles identifies a dominant strategy for either player. Analysis of emergent dominant strategies helps a tactical commander to make an informed decision regarding the integration of an EOD capability into the assaulting force. Analysis of one side necessarily means a corresponding analysis of the other,

and the dominant strategy that emerges for the terrorists can serve to inform government agencies in illuminating ways.

D. MOTIVATIONS AND ALTERNATIVE STRATEGIES

1. The Terrorists

The terrorists in this game are assumed to have as their motivation primarily the infliction of casualties. *Anatomy of a Hostage Rescue* dealt with the negotiations process of the incident, and this game assumes that the government already has made the decision to assault. This assumption is predicated on the government having weighed its policy options, employing diplomacy and negotiating as it sees fit. Then, that the talks break down and the government decided to adopt a hard-line stance. Therefore, the prospects of the terrorists obtaining their initial goals are slim and, realizing they are not to be successful, will attempt to capitalize upon their declining position. Though their bargaining opportunities may be gone, they still have control over the hostages, the defensive advantage, and by this time will most likely have the attention of the media. Because attracting attention is a main goal of any terrorist group¹⁰⁸ and the reality of mass media is that “If it bleeds, it leads,” the terrorists are assumed at this point to adopt the primary motivation of causing as many casualties as possible. Slowing down the assault and interrupting the SOF’s momentum is assumed to be a secondary motivation. This will allow time for a spectacular end to the stand-off, whether that is a firefight, the execution of hostages, suicide, or some combination of the three. A spectacular ending will command the media attention that is a primary goal of any terrorist attack. It is further assumed that the terrorists have no inhibitions about using IEDs and booby-traps, nor about inflicting casualties on SOF or law enforcement personnel.

¹⁰⁸ Bruce Hoffman, “Inside Terrorism,” (New York: Columbia University Press, 1998), 183; and Crenshaw, 383.

Given these motivations, the terrorists have the following alternative strategies once the government decides to mount an assault (Figure 2). These strategies are ranked in order of preference, with 4 being most desirable and 1 being the least. The rankings are scaled in ordinal intervals only, and they do not reflect relative utility to the terrorists (4 is not necessarily twice as desirable as 2, for instance).

- 4: Terrorists pose an explosive threat, SOF does not integrate EOD because they have the capacity to inflict casualties and will certainly slow down the assault.
- 3: Terrorists pose an explosive threat, SOF integrates EOD because they still have the capacity to inflict casualties (though it is diminished) and will certainly slow down the assault.
- 2: Terrorists do not pose an explosive threat, SOF integrates EOD capability because the tactical team is encumbered with outside personnel (which may slow them down and affect momentum).
- 1: Terrorists do not pose an explosive threat, and SOF does not integrate EOD because SOF is free to bring their full range of skill and capabilities to bear in the assault.

Figure 2. Terrorists' Strategies

2. The Special Operations Force

The SOF is assumed to have as their motivation the capture or killing of hostile forces without sustaining casualties or allowing any hostages to be killed. This requires an assault that is as fast and unobstructed as possible.

Given these motivations, the SOF has the following alternative strategies once the decision to assault is made (Figure 3). Like the terrorists' strategies, these strategies are ranked in order of preference, with 4 being most desirable

and 1 being the least. The rankings are scaled in ordinal intervals only, and they do not reflect relative utility to the SOF.

- 4: SOF does not integrate EOD and does not encounter any explosive threats because this situation allows the fastest and most straightforward assault.
- 3: SOF integrates EOD and does not encounter any explosive threats because, while outside personnel are integrated into the assaulting force, there are no obstacles to the momentum of the assault.
- 2: SOF integrates an EOD capability and encounters an explosive threat because the momentum of the assault is interrupted, but they have the ability to deal with the obstacles, thus minimizing the obstacle's effect.
- 1: SOF does not integrate an EOD capability and the assaulting force encounters an explosive threat because the assault's momentum is interrupted and the force stands serious risk of suffering casualties.

Figure 3. SOF Strategies

E. APPLICATION OF GAME THEORY PRINCIPLES

To begin modeling the game described above, each players' strategies, now assigned ordinal values, are juxtaposed in a two-by-two matrix. The resulting payoff values are shown for each strategic combination. For example, the particular strategic combination where the terrorists pose an explosive threat (strategy C) and the SOF does not integrate an EOD capability (strategy B) results in the cell value BC: (1,4). The payoff value set reflects the strategy combination BC's value to the terrorists of 4 and of 1 to the SOF. Payoff values of the other strategic combinations are shown in Table 4.

		4 is Best		Terrorists' Strategies	
		1 is Worst		Pose Explosive Threat [C]	Do Not Pose Explosive Threat [D]
SOF's Strategies	Integrate EOD Capability [A]	(2,3)		(3,2)	
	Do Not Integrate EOD Capability [B]	(1,4)		(4,1)	

Table 4. Initial Payoff Matrix

The application of Game Theory principles to the game described above allows a player's dominant strategy to emerge. To determine a player's dominant strategy, that player must analyze his strategic alternatives relative to his opponent's alternatives. For example, if the SOF was assumed to integrate an EOD capability into the assault team (strategy A), the terrorists would choose to pose an explosive threat (strategy C) because their payoff is greater (3 versus 2) than if they did not. Likewise, if the terrorists were to assume the SOF employed strategy B, they would themselves choose strategy C over D (enjoying a payoff of 4 versus 1). Upon completion of this analysis, the terrorists would realize that the strategy returning the greatest payoff value is C regardless of which strategy the SOF chose. Strategy C is referred to as the terrorists' dominant strategy. In their corresponding analysis, the SOF would realize that it does not have a dominant strategy. Its greatest payoff value is dependent upon which strategy the terrorists choose. If the terrorists were to choose strategy C, the SOF's greatest payoff value would be returned by the employment of strategy A. Similarly, if the terrorists employ strategy D, the SOF should choose strategy B. Table 5 illustrates the analysis of this game. The arrows indicate the players' rational choices.

		Terrorists' Strategies	
		Pose Explosive Threat [C]	Do Not Pose Explosive Threat [D]
SOF's Strategies	Integrate EOD Capability [A]	(2,3)	(3,2)
	Do Not Integrate EOD Capability [B]	(1,4)	(4,1)

Table 5. Analysis of Initial Game

Since each player can be assumed to be rational and to seek to maximize their own benefit, the terrorists will choose to employ strategy C. The SOF will see this through its own analysis, and will act accordingly by choosing strategy A. The strategic combination AC: (2,3) is said to be the game's likely outcome. This combination is also a Nash Equilibrium, an outcome from which neither player can unilaterally improve his payoff. The payoff value set (2,3) can be considered to be the value of the game.

Anatomy of a Hostage Rescue determined that the rescue force (or assaulting force) has a dominant strategy of conducting an assault. The terrorists' best strategy, then, becomes killing the hostages (when, prior to analyzing the rescue force's strategies, no dominant strategy emerged). It has been determined here that not only is the terrorists' best strategy to kill the hostages, but also to pose an explosive threat. The SOF's best strategy then emerges: that of integrating an EOD capability into the assaulting force.

Figure 4 is a graphical illustration of the application of Game Theory principles, as described above. The strategic combination AC: (2,3) is apparent as the likely outcome and a Nash Equilibrium.

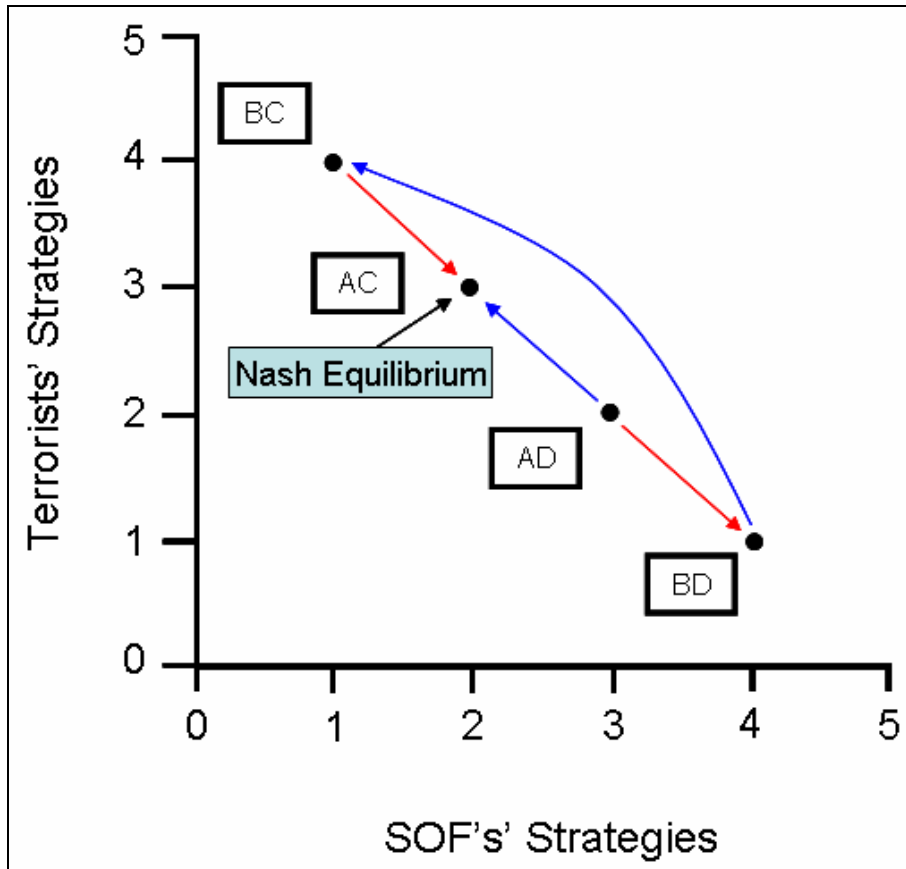


Figure 4. Graphical Illustration of the Application of Game Theory Principles

Using ordinal interval values the various strategic combinations above result in a zero-sum game. The terrorist's best alternative is the SOF's worst, and vice versa. Any improvement in the position of one player requires a corresponding decrease in the position of the other. While this may be an accurate illustration of reality, it is simplified and not precise. Ordinal rankings, as defined above, simply reflect the relative order of alternatives as ranked by each player rather than reflecting the relative utilities associated with each strategy. In order to analyze the relative utility of each strategy to each player, cardinal interval scaling must be used. To do so, the strategies assigned ordinal values of 1 and 4 are kept as upper- and lower-bounds on a scale expanded to 10. Alternative strategies that were ranked as 1 (worst strategy for that player) are still 1, but those ranked 4 (best outcome for that player) are now assigned the upper value of 10. This allows the middle strategies, previously limited to either 2

or 3, to be assigned a value between 1 and 10 that more accurately reflects their utility to the player relative the other alternatives. Figure 5 is the terrorists' cardinal rankings of their alternative strategies.

- 10: Terrorists pose an explosive threat, SOF does not integrate EOD; because they have the capacity to inflict casualties and will certainly slow down the assault.
- 6: Terrorists pose an explosive threat, SOF integrates EOD; because they still have the capacity to inflict casualties (though it is diminished) and will certainly slow down the assault.
- 2: Terrorists do not pose an explosive threat, SOF integrates EOD capability; because the tactical team is encumbered with outside personnel (which may slow them down and affect momentum).
- 1: Terrorists do not pose an explosive threat, and SOF does not integrate EOD; because SOF is free to bring their full range of skill and capabilities to bear in the assault.

Figure 5. Terrorists' cardinal rankings of their alternative strategies

Figure 6 is the SOF's cardinal rankings of its alternative strategies.

- 10: SOF does not integrate EOD and does not encounter any explosive threats; because this situation allows the fastest and most straightforward assault.
- 8: SOF integrates EOD and does not encounter any explosive threats; because, while outside personnel are integrated into the assaulting force, there are no obstacles to the momentum of the assault.
- 2: SOF integrates an EOD capability and encounters an explosive threat; because the momentum of the assault is interrupted, but they have the ability to deal with the obstacles, thus minimizing the obstacle's effect.
- 1: SOF does not integrate an EOD capability and the assaulting force encounters an explosive threat; because the assault's momentum is interrupted and the force stands serious risk of suffering casualties.

Figure 6. SOF's cardinal rankings of its alternative strategies

Table 6 is the matrix and payoff value sets that result.

		10 is Best		Terrorists' Strategies	
		1 is Worst		Pose Explosive Threat [C]	Do Not Pose Explosive Threat [D]
SOF's Strategies	Integrate EOD Capability [A]	(5,9)	(8,2)		
	Do Not Integrate EOD Capability [B]	(1,10)	(10,1)		

Table 6. Matrix of payoff value sets that result from cardinal rankings of alternative strategies of each player

If the game shown in Table 3 is analyzed further, interesting conclusions can be drawn from it. When the payoff value sets are deconstructed to depict each player's game only, the following analysis can be made. Each player has already been assumed to be rational and to act in accordance with his own greatest benefit. If each player is further assumed to adopt a conservative strategy of maximizing the payoff value of his worst-case (maximin) and minimizing the payoff value of his opponent's best-case (minimax), each player's respective payoff values are determined. For example, in the terrorists' game, the terrorists' minimum values for each strategy they can themselves choose (C or D) are found (9 and 1, respectively). Then, playing conservatively, the terrorists can choose the maximum of the two values, knowing that is the best of the worst-cases. Correspondingly, the SOF, also playing conservatively and attempting to hold the terrorists' payoff values to the minimum possible, find the maximum payoff values for the strategies over which it has control (A or C), (9 and 10, respectively). The SOF can then choose to play strategy A in the attempt to hold the terrorists' maximum payoff values as small as possible. In this way, the maximin and minimax values for the terrorists' game are both determined to be 9. This is referred to as the terrorists' security level, that value that they can consider to be guaranteed by each player independently playing

their own conservative strategies. Table 4 illustrates the determination of security levels in both the terrorists' and SOF's games.

		Terrorist's Game			SOF's Game			
		C	D	minimax			maximin	
A		9	2	9	A	5	8	5
B		10	1	10	B	1	10	1
	maximin	9	1		minimax	5	10	
Terrorists' Security Level: 9				SOF's Security Level: 5				

Table 7. Determination of security levels in both the terrorists' and SOF's games

It becomes clear, through the determination of security levels, that the terrorists have a strong incentive to pose an explosive threat. They achieve this if they play strategy C, referred to as their prudential strategy. By doing so, they can guarantee themselves a payoff value of 9 regardless of what strategy the SOF employ. The SOF's security value, on the other hand, is only 5 if it plays its own prudential strategy of A. Figure 7 illustrates the payoff polygon formed by the combinations of cardinally ranked strategies and the security levels of each player.

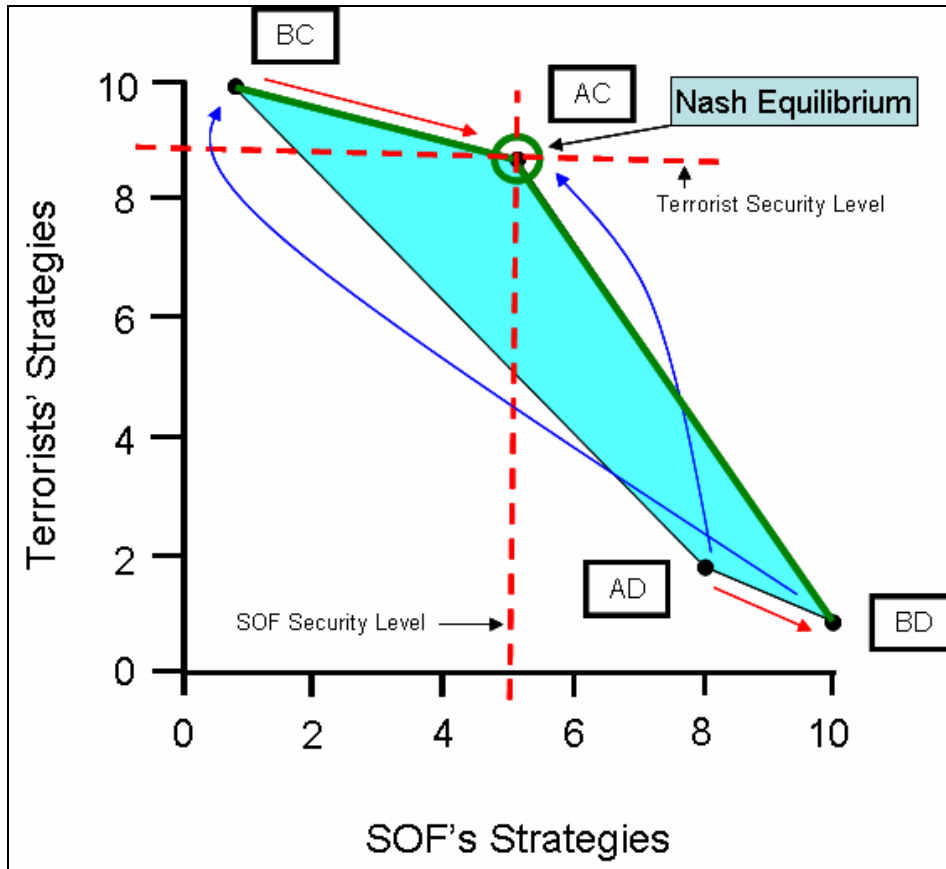


Figure 7. Payoff polygon formed by the combinations of cardinally ranked strategies and the security levels of each player

It is interesting to note that those characteristics that detract from the payoff value of the integration strategy for the SOF (strategy A), such as the interruption of the precise teamwork necessary to achieve relative superiority in CQB and maintain momentum through the target, are trainable. As such, those things, and the corresponding payoff value of integration, can be improved. As SOF units and EOD support personnel train jointly the payoff value of the integration strategy approaches that of the non-integration strategy. At its peak, when the two units are seamlessly integrated and indiscernible from one another, the payoff values are equal in the case that the terrorists do not pose an explosive threat. In the case that they do pose such a threat, the payoff increases (from 5 to 8). The utility of this strategic combination to the SOF (integrating EOD personnel, terrorists pose an explosive threat) is not 10 merely

because there is more danger, despite the integrated capability to neutralize it, which makes this outcome of less utility than those when the terrorists do not pose any explosive threat at all. Table 8 illustrates the game when joint training between SOFs and EOD units allows them to achieve indiscernability.

	10 is Best			Terrorists' Strategies	
	1 is Worst			Pose Explosive Threat [C]	Do Not Pose Explosive Threat [D]
SOF's Strategies	Integrate EOD Capability [A]	(8,9)			(10,2)
	Do Not Integrate EOD Capability [B]	(1,10)			(10,1)

Table 8. Illustration of the game when joint training between SOFs and EOD units allows them to achieve indiscernability

Table 9 shows the determination of each player's security values when joint training between SOF and EOD units results in indiscernability. Note that, as the result of joint training, the SOF's security value is now 8. This illustrates the relationship between joint training and the SOF's security level. It can be concluded that the payoff value that the SOF can guarantee itself is solely dependent upon the degree to which supporting EOD forces are integrated.

		Terrorist's Game				SOF's Game			
		C	D	minimax		C	D	maximin	
	A	9	2	(9)		A	8	10	(8)
	B	10	1	10		B	1	10	1
	maximin	(9)	1			minimax	(8)	10	
Terrorists' Security Level: 9					SOF's Security Level: 8				

Table 9. Determination of each player's security values when joint training between SOF and EOD units results in indiscernability

Figure 8 depicts the payoff polygon formed by the combinations of cardinally ranked strategies when joint training has resulted in indiscernability between the SOF and EOD forces and the security levels of each player.

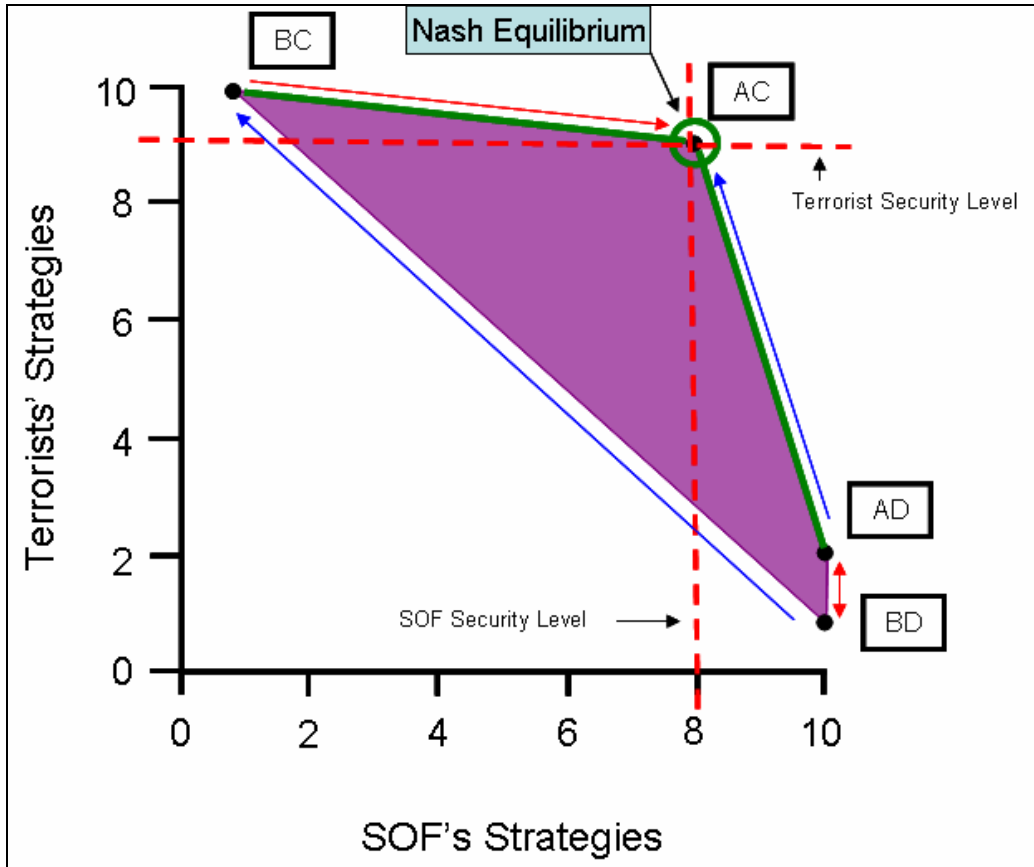


Figure 8. Payoff polygon formed by the combinations of cardinally ranked strategies and the security levels of each player when joint training has resulted in indiscernability between the SOF and EOD forces

F. CONCLUSIONS

Once a government makes the decision to take a hard-line stance against a barricaded enemy, a strategic game emerges. The players in this game are barricaded terrorists and the SOF that is assigned to assault the position. Knowing an assault is forthcoming, the terrorists must now decide if they want to impose an explosive threat (assuming the technical knowledge and supplies are available) to the assaulting force such as booby-traps or IEDs placed at likely

points of entry and along the assaulting force's expected paths of movement. Having made the decision to assault, the tactical unit commander must decide whether or not to integrate an EOD capability into his assault force. If an explosive threat is encountered, an integrated EOD capability will likely allow the assault to continue and will save lives. If there is no explosive threat, however, integration of outside personnel into the assaulting force will interrupt the extremely precise teamwork necessary to achieve relative superiority and maintain momentum through the target.

When the various combinations of each player's alternative strategies are ranked in order of precedence (ordinal interval scaling) and the principles of Game Theory are applied to them, a zero-sum game emerges. This is not surprising, as the two players are in direct opposition to one another and one player's best outcome is the other player's worst. Illustrated graphically, the outcomes form a downward-sloping line, where every combination is Pareto optimal and neither player can improve his standing without a corresponding decrease in the position of the other.

The terrorists have a dominant strategy of posing an explosive threat, and the SOF can be assumed to respond to this strategy and maximize their own payoff by integrating an EOD capability into the assaulting force. This is the likely outcome of this game. But when the strategic combinations are assigned relative utilities and ranked accordingly (cardinal interval scaling), analysis of the resulting game is more telling.

The relative strength of the terrorists' dominant strategy of posing an explosive threat great, affording the terrorists a security level of 9 regardless of which strategy the SOF employs. The SOF, on the other hand, has a security level of only 5 in this game. It is interesting and worthwhile to note, however, that

those characteristics that detract from the payoff value of the integration strategy for the SOF, such as the interruption of the precise teamwork that is necessary to achieve relative superiority in CQB and maintain momentum through the target, are trainable. As such, those things, and the corresponding payoff value of integration, can be improved. As SOF units and EOD support personnel train jointly the payoff value of the integration strategy approaches that of the non-integration strategy. At its peak, when the two units are seamlessly integrated and indiscernable from one another, the payoff values are equal in the case that the terrorists do not pose an explosive threat. In the case that they do pose such a threat, the payoff increases (from 5 to 8). The utility of this strategic combination to SOFs (integrating EOD personnel, terrorists pose an explosive threat) is not 10 merely because there is more danger, despite the integrated capability to neutralize it, which makes this outcome of less utility than those when the terrorists do not pose any explosive threat at all. Therefore, it can be concluded that the payoff value that the SOF can guarantee itself is solely dependent upon the degree to which supporting EOD forces are integrated.

LIST OF REFERENCES

- Arquilla, John, ed. *From Troy to Entebbe: Special Operations in Ancient and Modern Times*. Lanham, MD: University Press, 1996.
- Birchall, Peter. *The Longest Walk: The World of Bomb Disposal*. London: Sterling Pub, 1998.
- Bolz, Dudonis, and David Schulz. *The Counter-Terrorism Handbook: Tactics, Procedures and Techniques*. New York: Elsevier, 1990.
- Briscoe, Charles, Richard Kiper, James Schroder, and Kalev Sepp. *Weapon of Choice: U.S. Army Special Operations in Afghanistan*. FT Leavenworth, KS: Combat Studies Institute Press, 2003.
- Brown, Dave, Marshall B. Dutton and Marshall G. Dutton. *From Maintenance to Civil Engineering*. Available from <https://www.afcesa.af.mil/ceb/cebh/CEEOD4.html>. Accessed on 25 March 2006.
- Bush, Elizabeth Kauffman. *America's First Frogman: The Draper Kauffman Story*. Annapolis, MD: Naval Institute Press, 2004.
- Clark, Joanna, Mary Jackson, Peggy Schaefer, and Gail Sharpe. "Training SWAT Teams: Implications for Improving Tactical Units." *Journal of Criminal Justice* 28 (2000): 407-13.
- Cordesman, Anthony and Abraham Wagner. *The Lessons of Modern War, Volume III: The Afghan and Falklands Conflicts*. San Francisco: Westview Press, 1991.

Crenshaw, Martha. "The Causes of Terrorism." *Comparative Politics*. July 1981: 379-399.

Cronin, Audrey Kurth. "Behind the Curve: Globalization and International Terrorism." *International Security*. Winter 2002/03: 30-58.

Curtis, Thiery. *Special Operations Joint Training*. Maxwell AFB, AL: Air University Press, 1993.

Davies, Barry. *SAS: Shadow Warriors*. Miami, FL: Lewis International, 2002.

Defense Intelligence Agency. *Landmine and Explosive Hazards Reference Guide – Afghanistan*. Washington, D.C.: GPO, 2002.

DeMotts, Joshua, Capt, USAF. "What's that Ticking Noise?" *Air Force Civil Engineer*, Vol. 13, No. 1 (2005): 16-17.

Department of Defense. *Quadrennial Defense Review Report*. Washington, D.C.: GPO, 2006.

Department of Defense. *Directive 2000.19, Joint Improvised Explosive Device (IED) Defeat*. 2005. Washington, D.C.: GPO.

Department of the Army. *Field Manual 34-54, Technical Intelligence (TECHINT)*. 1998. Washington, D.C.: GPO.

Department of the Navy. *OPNAVINST 8027.1G, Interservice Responsibilities for Explosive Ordnance Disposal*. Washington, D.C.: GPO, 1992.

Deremer, Kevin. *Army Explosive Ordnance Disposal and Army Transformation: Is Army Explosive Ordnance Disposal Prepared to Support Forces in the*

Emerging Environment? FT Leavenworth, KS: US Army Command and General Staff College, 2003.

DiGuardo, Joseph, LCDR, USN, Executive Officer, EODMU2. Interview by author, October 13, 2005.

----- "Another One." Email to author, 14 October 2005.

----- "Information paper: Navy EOD Support of Special Operations Forces." email attachment to author, 14 October 2005.

----- Interview by author, November 9, 2005.

Evans, Michael. *Army Explosive Ordnance Disposal Operations in Support of Army Special Operations Forces: What Changes Are Required?* FT Leavenworth, KS: US Army Command and General Staff College, 2004.

Guilmartin, John F., Jr. *A Very Short War: The Mayaguez and the Battle of Koh Tang.* College Station, TX: Texas A&M University Press, 1995.

Hawley, Noll, and Michael Hildebrand. *Special Operations for Terrorism and Hazmat Crimes.* Chester, MD: Red Hat, 2002.

Huth, P. *Extended Deterrence and the Prevention of War.* New Haven and London: Yale University Press, 1988.

Joint Chiefs of Staff. *Joint Publication 2-0, Doctrine for Intelligence Support of Joint Operations.* 2000. Washington, D.C.: GPO.

Joint Chiefs of Staff. *Joint Publication 3-05: Joint Doctrine for Special Operations.* Washington, D.C.: GPO, 2003.

Joint Chiefs of Staff. *National Military Strategy*. Washington, D.C.: GPO, 2004.

Lofy, Pete. "Managing Sensitive Site Exploitation – Notes From Operation IRAQI FREEDOM – From the Field." *Army Chemical Review*, September 2003. Journal online. Available from http://www.findarticles.com/p/articles/mi_m0IUN/is_2003_Sept/ai_110574_483.html; Internet; accessed 28 February 2006.

McNight, Harrison, Larry Cummings, and Norman Chervany. "Initial Trust Formation in New Organizational Relationships." *The Academy of Management Review* Vol. 23, No. 3 (Jul., 1998): 473-90. <http://www.jstor.org>, accessed 13 September 2005.

Partin, John. *Special Operations Forces in Operation EARNEST WILL/ PRIME CHANCE 1*. N.p.: U.S. Special Operations Command History and Research Office, 1998.

Perez, Carlos. *Anatomy of a Hostage Rescue: What makes a Hostage Rescue Successful?* Monterey, CA; US Naval Postgraduate School; 2004.

Pinski, James. "EOD Mobile Unit 11 Det Five: Baghdad's Bomb Squad." *All Hands*, April 2004.

President of the United States of America. *National Security Strategy*. Washington, D.C.: GPO, 2002.

Porter, Jim. "Bomb Squad Integration." Email to author, 11 September 2005.

Rosegrant, Susan. "The Shootings at Columbine High School: Responding to a New Kind of Terrorism, Sequel." *Kennedy School of Government Case Program, C16-01-1612.1*. President and Fellows of Harvard College: Cambridge, MA, 2001.

Rowan, Roy. *The Four Days of Mayaguez*. New York: W.W. Norton, 1975.

Taillon, J. Paul de B. *The Evolution of Special Forces in Counter-Terrorism: The British and American Experiences*. Westport, CT: Praeger, 2001.

Trumbore, Jeffrey, CAPT, USN, Commodore, EOD Group 2. "Re: EOD Support of SOCOM." Email to author, 8 November 2005.

U.S. Special Operations Command. *U.S. Special Operations Forces Posture Statement, 2003-2004: Transforming the Force at the Forefront of the War on Terrorism*. Washington, D.C.: GPO, 2004.

United States Central Command. *Appendix 22 to USCENTCOM Counter-IED (C-IED) Campaign Plan, Technical Intelligence (TECHINT) Support to Annex B (Intelligence)*. Draft. Washington, D.C.: GPO.

Vandenbrouke, Lucien. *Perilous Options: Special Operations as an Instrument of U.S. Foreign Policy*. New York: Oxford University Press, 1993.

Wood, Sarah, Sgt., USA. "Marine Corps Special Ops Will Add to Military Capability, Commander Says." *American Forces Press Service*, 26 January 2006. <http://www.defenselink.mil>.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California
3. Dr. Gordon McCormick
Department of Defense Analysis
Naval Postgraduate School
Monterey, CA
4. Dr. Kalev Sepp
Department of Defense Analysis
Naval Postgraduate School
Monterey, CA
5. Dr. Erik Jansen
Department of Information Sciences
Naval Postgraduate School
Monterey, CA
6. CAPT Jeffrey Trumbore, USN
EODGRU TWO
Norfolk, VA
7. CAPT Marvin Hienze, USN
EODGRU ONE
San Diego, CA
8. Dave White
Kitsap County Sheriff's Office
Port Orchard, WA