

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 12-06-2015		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From - To) 21-07-2014 to 12-06-2015	
4. TITLE AND SUBTITLE The Quest for Achilles' Shield: Is the American Military's Fetish with Technology Harming Mission Accomplishment?			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Lieutenant Colonel Charles S. Armstrong, U.S. Army			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Joint Forces Staff College Joint Advanced Warfighting School 7800 Hampton Blvd Norfolk, VA 23511-1702			8. PERFORMING ORGANIZATION REPORT		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release, distribution is unlimited					
13. SUPPLEMENTARY NOTES Not for Commercial Use without the express written permission of the author					
14. ABSTRACT United States combat operations and stability and support operations in Afghanistan and Iraq revealed a number of strategic, operational and tactical-level challenges. Chief among them was the effect the enemy's use of IEDs had on United States and allied operations. The typical response to most problems, with the possible exception of the surge of troops in both theaters, was technological. The technological efforts to counter the effects of improvised explosive devices (IEDs) met with mixed results. The development of dismounted mine detectors allowed Soldiers to identify IEDs, reducing casualties while conducting dismounted operations. The addition of electronic jamming equipment, both vehicle-mounted and dismounted, reduced the impact of IED attacks for these forces as well. While these technological solutions proved beneficial in the execution of assigned missions, the force protection technologies were less effective. The Mine-Resistant Ambush Protected (MRAP) series of vehicles provided Soldiers with greatly increased armored protection while conducting patrols and other combat operations. But solving this problem resulted in a vehicle that was too large to easily transit the battlespace, had minimal troop carrying capability (depending on the variant), and further isolated the Soldier from the population. This technological solution to the IED problem resulted in a series of vehicles that made the accomplishment of the primary mission, securing the population, more difficult. This follows a trend in the United States of focusing primarily on technological solutions for every problem. Without a comprehensive and shared understanding of the strategic and operational environment, the acquisition of technological solutions like the MRAP generate unforeseen second and third order effects that negatively impact the ability of units to accomplish their mission.					
15. SUBJECT TERMS Mission Creep, Siberian Intervention of 1918-1920, Combatant Command Planning					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Unclassified Unlimited	18. NUMBER OF PAGES 49	19a. NAME OF RESPONSIBLE PERSON
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code) 757-443-6301

NATIONAL DEFENSE UNIVERSITY
JOINT FORCES STAFF COLLEGE
JOINT ADVANCED WARFIGHTING SCHOOL



**The Quest for Achilles' Shield: Is the American Military's
Fetish with Technology Harming Mission Accomplishment?**

by

Charles S. Armstrong

Not for Commercial Use without the express written permission of the author

This page intentionally left blank

**THE QUEST FOR ACHILLES' SHIELD:
IS THE AMERICAN MILITARY'S FETISH WITH TECHNOLOGY HARMING
MISSION ACCOMPLISHMENT?**

by

Charles S. Armstrong

Lieutenant Colonel, United States Army

A paper submitted to the Faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

This paper is entirely my own work except as documented in footnotes.

Signature: _____


Charles S. Armstrong, LTC, US Army

25 Feb 2015

Thesis Adviser:

Signature: _____


**Bryon E. Greenwald, Ph.D.
Professor, JAWS
Thesis Adviser**

Approved by:

Signature: _____


**Doug Golden, Colonel, US Air Force
Committee Member**

Signature: _____


**Robert M. Antis, PhD.
Director, Joint Advanced Warfighting School**

Not for Commercial Use without the express written permission of the author

This page intentionally left blank

ABSTRACT

United States combat operations and stability and support operations in Afghanistan and Iraq revealed a number of strategic, operational and tactical-level challenges. Chief among them was the effect the enemy's use of IEDs had on United States and allied operations. The typical response to most problems, with the possible exception of the surge of troops in both theaters, was technological. The technological efforts to counter the effects of improvised explosive devices (IEDs) met with mixed results. The development of dismounted mine detectors allowed Soldiers to identify IEDs, reducing casualties while conducting dismounted operations. The addition of electronic jamming equipment, both vehicle-mounted and dismounted, reduced the impact of IED attacks for these forces as well. While these technological solutions proved beneficial in the execution of assigned missions, the force protection technologies were less effective. The Mine-Resistant Ambush Protected (MRAP) series of vehicles provided Soldiers with greatly increased armored protection while conducting patrols and other combat operations. But solving this problem resulted in a vehicle that was too large to easily transit the battlespace, had minimal troop carrying capability (depending on the variant), and further isolated the Soldier from the population. This technological solution to the IED problem resulted in a series of vehicles that made the accomplishment of the primary mission, securing the population, more difficult. This follows a trend in the United States of focusing primarily on technological solutions for every problem. Without a comprehensive and shared understanding of the strategic and operational environment, the acquisition of technological solutions like the MRAP generate unforeseen second and third order effects that negatively impact the ability of units to accomplish their mission.

This page intentionally left blank

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION.....	1
CHAPTER 2: METHODS.....	6
Technological Determinism Paradigm.....	7
Joint Improvised Explosive Device Defeat Organization (JIEDDO).....	10
Defeat the Network.....	12
Train the Force.....	13
Defeat the Device.....	14
CHAPTER 3: MRAP PROLIFERATION.....	18
Casualties, COIN Politics, and the MRAP.....	19
MRAP Acquisition Process.....	23
Sustainment Woes: “Six and Twelve” Effects.....	25
Additional Parts Sold Separately.....	27
Off-the-Shelf System Blinders.....	30
User Input Not Required.....	31
Training Not Included.....	37
Sticker Price.....	40
CHAPTER 4: FINAL ANALYSIS.....	44
Proving a Negative: MRAP Saves Lives?.....	45
The Future of the MRAP.....	49
CHAPTER 5: CONCLUSION	53
Beware Technological Solutions.....	54
Mythological Quests.....	56
Maintaining Advantage.....	57
BIBLIOGRAPHY.....	61

LIST OF TABLES

Table 1: MRAP Variants by Manufacturer and Service.....	26
Table 2: Estimated GFE Unit Cost Per Vehicle.....	28
Table 3: MRAP Vehicle Characteristics with Other Combat Vehicle Specifications.....	33
Table 4: Cost of MRAP by Variant with Other Combat Vehicle Costs.....	42
Table 5: Percentage of IED-caused Fatalities in Iraq.....	47

CHAPTER 1: INTRODUCTION

War faded away (1989-91). Since then, we have struggled to find a strategic vision that made sense of the post-Soviet world. Without such a vision, we have had little to guide us toward the kind of military forces we need.¹

Tony Zinni and Tony Koltz, *Before the First Shots are Fired: How America can Win or Lose Off the Battlefield*

You go to war with the Army you have, not the Army you might want or wish to have at a later time.²

Secretary of Defense Donald Rumsfeld

On 1 May, 2003, on the deck of the USS Abraham Lincoln, President George W. Bush announced the “end of major combat operations” in Iraq.³ Based on the number of troops still engaged in combat operations in Iraq (and still becoming casualties), this comment elicited an immediate reaction throughout the United States. After all, if major combat operations in Iraq were over, why were American soldiers still being killed and wounded? Over the next year, casualty numbers rose as American forces struggled to transition from combat to stability and support operations, establish security, and build a working democratic government within Iraq. The absence of coherent, coordinated, and synchronized transition planning within Central Command (CENTCOM) and other United States Governmental Agencies resulted in confusion for military forces within Iraq. While CENTCOM and the United States Government worked feverishly to react to the realities on the ground, a nebulous collection of enemy forces (referred

¹ Tony Zinni and Tony Koltz, *Before the First Shots are Fired: How America can Win or Lose Off the Battlefield* (New York: Palgrave Macmillan, 2014), 146.

² Eric Schmitt, “Troops’ Queries Leave Rumsfeld on the Defensive.” *New York Times*. 9 December 2004. http://www.nytimes.com/2004/12/09/international/middleeast/09rumsfeld.html?_r=0&pagewanted=print&position (accessed on 19 November 2014).

³ President George W. Bush (remarks to the crew of the USS Abraham Lincoln off the coast of San Diego, California, 1 May 2003), on-line at <http://www.state.gov/p/nea/rls/rm/20203> (accessed 26 March 2006).

as insurgents for the remainder of the paper) continued to attack American forces while expanding their capabilities and organization.

Despite the overwhelming technological and military advantage possessed by United States forces in Iraq, insurgent elements continued to execute attacks on American forces resulting in increasing casualties.⁴ Based on consistent success against thinly armored military vehicles, the insurgent's preferred weapon quickly became the Improvised Explosive Device (IED). Their success led GEN John Abizaid, Commander of CENTCOM, to send a personal letter to the Pentagon in June 2004, stating "that IEDs were the number one killer of American troops, and recommended a 'Manhattan-Project-like effort', referring to an effort on the scale of building the atomic bomb during World War II."⁵ Despite GEN Abizaid's call for a national scientific effort, the American counter-IED effort in Iraq began not in Washington D.C. or at Los Alamos National Laboratory, but six months after Abizaid's memo at Camp Buehring, Kuwait.

On 8 December 2004, Secretary of Defense Donald Rumsfeld held a town hall meeting with Soldiers preparing to move into Iraq and begin their year-long combat tour. During this meeting, Specialist Thomas Wilson, a Tennessee National Guardsman, asked Rumsfeld why soldiers had to scrounge for scrap metal and bulletproof glass to armor their own vehicles. Wilson asked, "Why don't we have those resources readily available to us?"⁶ Rumsfeld

⁴ Icasualties.org, "Operation Iraqi Freedom and Operation Enduring Freedom Casualties," on-line at <http://www.icasualties.org/> [accessed 10 December 2014]. U.S. Fatalities in Iraq rose from 486 in 2003 to an average of 856 over the next four years (2004 – 2007) with the highest fatalities over the entire 10 year period occurring in 2007 with 904 reported fatalities. U.S. Fatalities in Afghanistan rose from 12 in 2001 to an average of 50 over the next three years (2002-2004), 117 over the next four years (2005-2008), and 287 over the following six years (2009-2014). The highest number of U.S. fatalities in Afghanistan over the entire fourteen year period occurred in 2010 with 488 reported fatalities.

⁵ Walter Carr, "Defeating the IED: JIEDDO's Mission Impossible, the Lure of Technology, and the Emergence of the COIN Solution," Marine Corps University, United State Marine Corps Command and Staff College, 12 April 2011 Carr, 10.

⁶ Schmitt, "Troops' Queries Leave Rumsfeld on the Defensive."

answered this question by stating “you go to war with the Army you have, not the Army you might want or wish to have at a later time.”⁷ While Rumsfeld’s answer was technically accurate, it also admits an appalling lack of forethought on behalf of the Pentagon. More importantly, the American population and Congress emphatically rejected his response and demanded action to increase armor protection for Soldiers in Iraq. This demand resulted in an increased effort to add armor to every military vehicle within Iraq and established a counter-IED effort that eventually resulted in the creation of the Joint IED Defeat Organization (JIEDDO).

JIEDDO “developed its strategy to defeat the use of the IED as a weapon of strategic influence by devising a three-pronged approach: Defeat the Device, Defeat the Network, and Train the Force.”⁸ An analysis of this herculean effort to counter the IED threat in Afghanistan is beyond the scope of this study. Instead, this study examines the U.S. effort to Defeat the Device, specifically the American effort to decrease casualties by increasing vehicle protection. The increase in armor protection for American combat vehicles began prior to the dialogue between Secretary Rumsfeld and Specialist Wilson at Camp Buehring.⁹ This effort started with the addition of up-armor kits for the entire High Mobility Multipurpose Wheeled Vehicle (HMMWV, pronounced Humvee) fleet and eventually culminated in the acquisition of Mine-Resistant Ambush Protected (MRAP) vehicles for operations in both Iraq and Afghanistan. The

⁷ Schmitt, “‘Troop’ Queries Leave Rumsfeld on the Defensive”. This incident initiated continuing controversy over America’s preparation for war. The argument, originally centered on providing additional armored protection for troops in Iraq, quickly changed to a discussion centering on the disparity between the equipment issued to Active Duty units and National Guard units. Additionally, those opposed to the Invasion of Iraq quickly used this incident to highlight the lack of preparation by the Bush Administration prior to choosing to invade Iraq. This political environment greatly motivated DoD to respond rapidly and decisively.

⁸ Carr. “Defeating the IED: JIEDDO’s Mission Impossible, the Lure of Technology, and the Emergence of the COIN Solution,” 12.

⁹ The armor upgrades for all vehicles in SPC Wilson’s unit were completed within 24 hours of the town hall meeting as planned.

U.S. Government accomplished this task at the expense of other future vehicle requirements within the military and at an estimated cost over \$47.7 billion.¹⁰

This study examines the evolution of up-armored vehicles within the United States Military over time and assesses the success or failure of the endeavor. Rumsfeld's replacement as Secretary of Defense, Robert Gates, claims the MRAP as one of his signature accomplishments.¹¹ "With the support of Congress and Secretary Gates, more than 10,000 MRAPs were fielded in record time—about a year and a half. Congress pushed through funding; Secretary Gates made MRAPs a "DX" industrial priority for the country, allowing producers to lay first claim to whatever materials were needed; and acquisition officials worked with industry to increase production capacity."¹² However, to achieve the speed of production and deployment of the MRAP, numerous shortcuts were taken, resulting in a vehicle that was ill-suited to support counterinsurgency operations while disregarding other available solutions such as the Stryker Vehicle.

The deeply rooted American reliance on technological solutions for tactical problems does not always provide the purported advantages. While these solutions solve one problem, perhaps the most strategically important one, these solutions often create unforeseen effects that hinder operations. The story of the MRAP is an excellent example of the American belief that technological solutions are capable of overcoming any problem encountered in the conduct of warfare. While the MRAP undoubtedly reduced American casualties in both Iraq and Afghanistan, the statistics associated with this reduction in casualties are nebulous at best. The

¹⁰ Richard Sisk, "Pentagon shuts MRAP production line," *DoD Buzz: Online Defense and Acquisition Journal*, 1 October 2012. <http://www.dodbuzz.com/2012/10/01/pentagon-shuts-mrap-production-line/> (accessed 20 FEB 2015). This figure does not include the cost of shipping vehicles to combat theaters using air and ground assets. This figure also does not include the military furnished equipment required to conduct combat operations.

¹¹ Robert M. Gates, *Duty: Memoirs of a Secretary at War* (New York: Alfred A. Knopf, 2014), 119-126.

¹² Christopher J. Lamb, Matthew J. Schmidt, and Berit G. Fitzsimmons, "MRAPs, Irregular Warfare, and Pentagon Reform," *Occasional Paper*. National Defense University, Institute for National Strategic Studies, June 2009. 16.

overall cost of the program and the negative impact of using MRAPs during counterinsurgency operations makes the overall program a failure.

In the final analysis, the United States Congress and the American population focused on technological solutions to counter the IED threat in Iraq and Afghanistan. The focus on reducing casualties resulted in a single-minded purpose to provide more armored protection to troops conducting stability and security operations. This focus on armored protection resulted in a large budget program to provide MRAPs to troops without understanding the requirements for executing security and stability operations. Numerous papers focus on the cost of the MRAP, the future of the MRAP, and the decrease in fatalities after the MRAP arrived in Iraq and Afghanistan as methods of measuring the program as a success or failure. While this study will discuss these factors briefly, the majority of the analysis of success or failure involves the performance of the MRAP while conducting stability and security operations within Iraq and Afghanistan. This study will show that the single-minded focus on personnel protection hindered the accomplishment of stability and security operations. To put it another way, a football player can be completely covered in protective gear and then further covered in bubble wrap to reduce the chance of injury. But if the football player is unable to run, catch, block, or tackle because of this protective equipment, then the decrease in injuries is irrelevant because the football player is unable to score or stop a touchdown—in short, he is unable to accomplish his job and win the game.

CHAPTER 2: METHODS

America was not more soft or more decadent than it had been twenty years earlier. It was confused, badly, on its attitudes toward war. It was still bringing up its youth to think that there were no tigers, and it was still reluctant to forge them guns to shoot tigers.¹

T.R Fehrenbach, *“This Kind of War”*

There are numerous books, articles, and papers that discuss in great detail the “American Way of War”. The American way of war is defined as relying on technologically superior military formations overwhelming enemy forces to achieve a decisive and resounding victory quickly. This tendency developed during World War II, culminating with the development and use of the atomic bomb against Japan. Over the next seventy years, America’s reliance on a technological advantage leading to asymmetry over its enemies dominated the equipping, organizing, and training of American forces. During the Cold War, the United States responded to the size overmatch of the Soviet military by developing military organizations and doctrine tied to technologically advanced equipment to achieve relative size equivalency of military formations with the Soviet Union based on capabilities.

The fall of the Berlin Wall in 1989 portended the eventual dissolution of the Warsaw Pact and subsequent implosion of the Soviet Union in 1991. While the political environment in Europe rapidly changed between 1989 and 1991, Iraq invaded and occupied Kuwait, thereby gaining control of the Kuwaiti oil fields. In response, a United States-led coalition conducted a military operation to remove Saddam Hussein from Kuwait and restore the international border. “America’s crushing victory in the Second Gulf War [Desert Storm] raised interest throughout the U.S. armed forces in the revolutionary prospects of current and foreseeable technologies to

¹ T.R. Fehrenbach, *This Kind of War: The Classic Korean War History* (New York: Potomac Books, 2008), 299.

an almost uncontrollable pitch.”¹ The demise of the Soviet Union and the overwhelming success of Operation Desert Storm established the United States as the sole remaining super power wielding the premier military force in the world. During this same period of time, the concept of Military Revolutions (MR) and Revolutions in Military Affairs (RMA) dominated the discussions of wars and warfare in the future.

TECHNOLOGICAL DETERMINISM PARADIGM

In 2001, MacGregor Knox and Williamson Murray published *The Dynamics of Military Revolution: 1300-2050*. This book quickly became required reading for American military officers as part of their professional military education. In this book, Knox and Murray describe a methodology for looking at world history through the lens of Military Revolutions and Revolutions in Military Affairs. This methodology established the intellectual foundations for better understanding the role of technological determinism in the United States military based on the belief that an information revolution was underway. As with the previous military revolutions, the information revolution would once again change the framework of war.

Knox and Murray describe the defining feature of a military revolution as “fundamentally changing the framework of war.”² The idea is that military revolutions cause upheavals that develop systemic changes in politics and society. They are unpredictable, uncontrollable, and unforeseeable and are best described through the concept of an earthquake. “Military revolutions recast society and the state as well as military organizations. They alter the capacity of states to create and project military power.”³ Given the broad and sweeping impact of military

¹ Macgregor Knox and Williamson Murray, ed., *The Dynamics of Military Revolution: 1300 – 2050* (Cambridge: Cambridge University Press, 2001), 5.

² Ibid., 6.

³ Ibid., 7.

revolutions, Knox and Murray identified five. These five military revolutions are: 1) the seventeenth-century creation of the modern state and of modern military institutions, 2) the French Revolution, 3) the Industrial Revolution, 4) the First World War, which irrevocably combines its three predecessors, and 5) nuclear weapons and ballistic missile delivery systems.⁴ A debate that a sixth military revolution is under way, fueled by a “shrinking of the world” caused by accessible information based on cyberspace and associated technologies and the impacts of globalization, began in the 1990s and continues to this day. This revolution is known as the information revolution and the United States is the driving force behind it.

Within the framework established by Knox and Murray, Revolutions in Military Affairs (RMAs) are described as “clusters of less all-embracing changes in military affairs.”⁵ RMAs differ from military revolutions in that they “appear susceptible to human direction, and in fostering them, military institutions that are intellectually alert can gain significant advantage.”⁶ So within each of the military revolutions are a number of RMAs that allow nations to gain advantage over their competition for a period of time. Examples of RMAs include strategic bombing, submarine warfare, blitzkrieg tactics, radar, and stealth technologies. Each of these RMAs changed the framework of warfare within the military revolutions and provided marked advantage to the developer for a period of time until opponents developed matching or better capabilities.

Many thinkers within the United States believe that the success of the American Military during Operation Desert Storm displayed the height of achievement as a result of the previous five military revolutions while showing glimpses of possibilities based on a developing

⁴ Knox and Murray, ed., *The Dynamics of Military Revolution: 1300 – 2050*, 13.

⁵ Ibid., 12.

⁶ Ibid., 12.

information revolution. The information revolution is characterized by smaller, more agile forces, operating in unison through networked information, able to quickly deploy and defeat opponents while causing minimal to no collateral damage. Proponents of the information revolution believe that advancements in technology are the primary factor that enable changes in equipment, organization, and doctrine. This leads proponents to foster a technologically deterministic mind-set based on the critical importance of technology to shaping the military and society in general.

With the fall of the Soviet Union in 1991, the United States military quickly downsized as the demand for a large standing military seemed no longer valid.⁷ As a result of shrinking force structure, the tendency of the United States to rely on technology to overcome perceived size mismatch became more pronounced. The use of expensive, technologically advanced weapon systems to respond to crises throughout the world dominated military actions throughout the 1990s and early 2000 encouraging this belief in technological superiority. American actions in Bosnia and Kosovo typified these ideas as faith was initially placed on precision strikes by the Air Force to achieve the desired objective of stopping genocide within these countries. Even after this proved invalid and the need for ground forces became obvious, proponents of this idea of warfare continued to shape the United States military to fit their vision of future war.

The changes in technology and the belief in an information revolution are best seen in Secretary Rumsfeld's concept of "Shock and Awe" during the initial invasion of Iraq in 2003.

⁷ David McCormick, *The Downsized Warrior: America's Army in Transition* (New York: New York University Press, 1998), 29. Between 1987 and 1997, the Army reduced from 18 Divisions and 781,000 personnel to 12 Divisions and 535,000 personnel—a 31.5% reduction. The Navy reduced from 16 Carriers and 587,000 personnel to 13 carriers and 509,000 personnel—a 13.3% reduction. The Air Force reduced from 24 Fighter Wings and 607,000 personnel to 15.75 Fighter Wings and 429,000 personnel—a 29.3% reduction. The Marine Corps reduced from 3 Divisions and 200,000 personnel to 2 1/3 Divisions and 159,000 personnel—a 20.5% reduction. The U.S. Military reduced personnel from 2,175,000 to 1,632,000—a 25% reduction in personnel across the services with the Army bearing the largest reduction in force end strength.

The idea behind “Shock and Awe” is one where technologically advanced military formations attack the enemy from numerous directions using precision guided weapons to overwhelm an enemy’s ability to react quickly enough to stop their destruction.⁸ While “Shock and Awe” achieved the destruction of the Iraqi military and the removal of Saddam Hussein’s regime from power, the resultant force was not properly equipped or sized to transition to stability and security operations. “As a machine-minded culture on the cutting edge of what some now regard as an information-led RMA, the American is inclined to seek advantage through the exploitation of technology.”⁹ With the fall of the Hussein regime, this deeply rooted technological determinism once again looked to technological solutions to overcome problems that arose during the next phase of Operation Iraqi Freedom.

Joint Improvised Explosive Device Defeat Organization (JIEDDO)

By the fall of 2003, as the situation within Iraq continued to deteriorate, it quickly became evident that a growing insurgency was developing throughout the country. Increases in IED attacks were the biggest indicator of the growing insurgency against coalition forces. Following the defeat of Iraqi Forces and the dissolution of the Hussein regime, Coalition forces found themselves responsible for securing the local population and their belongings. Looting became rampant throughout the country and without Iraqi Security Forces, the task of preventing this fell on coalition military forces. While this was occurring, Coalition Forces discovered a more serious issue that would eventually increase IED attacks throughout the country.

⁸ Harlan Ullman and James Wade Jr., “Shock and Awe: Achieving Rapid Dominance,” National Defense University, Institute for National Strategic Studies, Advanced Concepts, Technologies, and Information Strategies, November 1996.

⁹ Colin S. Gray, “Weapons for Strategic Effect: How Important is Technology?” *Occasional Paper No. 21, Center for Strategy and Technology, Air War College*. (Maxwell Air Force Base: Air University, January 2001), 36.

As Coalition Forces continued to expand throughout Iraq, they discovered numerous large ammunition dumps throughout Iraq. Under Hussein, authorities scattered ammunition holding areas throughout the country to remove the risk of a military coups by ensuring that no ammunition was maintained by the majority of Iraqi forces. Coalition Forces quickly moved forces to secure and consolidate these ammunition holding areas to prevent ammunition from becoming available to the growing insurgency, but the insurgents looted the majority of these sites before coalition forces could secure them. In his testimony to the Senate Appropriations Committee in July 2003, GEN Abizaid stated “there’s more ammunition in Iraq than any place I’ve ever been in my life and it’s not securable. I wish I could tell you that we had it all under control. We don’t.”¹⁰ GEN Abizaid knew that the availability of ammunition increased the threat against Coalition Forces.

By October 2003, the continued increases in IED attacks soon reached over 100 a month. The insurgents were adapting and increasing the effectiveness of IED attacks as they refined their IED making and engagement capabilities. Although IED attacks increased during this period of time, Coalition Forces remained complacent because these attacks did not appear overly sophisticated. “Underestimating the enemy’s creativity and overestimating American ingenuity, a pattern established before the war began, continued long after the capture of Baghdad.”¹¹ This generalized contempt toward the capabilities of the growing insurgency prevented American forces from understanding the scope and scale of the IED threat, resulting in a slower response.

¹⁰ Rick Atkinson, “The IED problem is getting out of control. We’ve got to stop the bleeding,” *The Washington Post*. 30 September 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/09/29/AR2007092900751_pf.html (accessed on 26 November 2014).

¹¹ Ibid.

The birth of the counter-IED effort in Iraq occurred in late September 2003 when LTG Richard A. Cody, the Army Operations Chief, told a member of his staff that “the IED problem is getting out of control. We’ve got to stop the bleeding.”¹² A concept was quickly developed to establish an Army Task Force to control the IED problem in Iraq. Between 2004 and 2006, this Army Task Force transitioned into a large, multi-service, multi-agency, multi-national, and four star led organization known as the Joint IED Defeat Organization (JIEDDO).¹³ As previously discussed, JIEDDO developed a three prong approach: Defeat the Device, Defeat the Network, and Train the Force. In many respects, this order—Device, Network, Force—foreshadowed the amount of effort and funding for associated programs. Before delving deeper into the technological response to Defeat the Device and its impact on actual mission accomplishment, this study examines the Defeat the Network and Train the Force aspects of the program briefly.

DEFEAT THE NETWORK

The focus of Defeat the Network is to defeat the IED prior to an attack taking place. These efforts focus on actions “left of the boom” as they target the IED supply chain, or network, to prevent IED attacks from occurring at all. Specific elements of the IED chain include insurgent financial actors and funds, bomb makers to include explosive manufacturing operations, IED emplacement and attack elements, and the leadership directing the IED effort. In order to accomplish the associated tasks of defeating the network, most of the effort centers on intelligence gathering, intelligence fusion, and finally tactical raids to remove the actors from the operational environment.

¹² Ibid.

¹³ Carr, “Defeating the IED: JIEDDO’s Mission Impossible, the Lure of Technology, and the Emergence of the COIN Solution,” 11.

While technology does have a role within this effort (surveillance assets, networked intelligence analysis and sharing tools, biometric equipment, and forensic equipment), most of the effort remains in the cognitive realm. Over time, very specific and fused intelligence resulted in a robust understanding of specific IED networks throughout Iraq and Afghanistan. These robust network tools allowed tactical commanders to conduct capture or kill operations to remove the targeted IED actor from the network. The detention or death of IED network personnel allowed further refinement of the network, increasing the capabilities to defeat networks throughout Iraq and Afghanistan. Additionally, as American capabilities to effect the network increased, the associated cost for insurgents to conduct IED attacks increased, changing the cost-benefit analysis for continuing to use this method of attack.¹⁴

TRAIN THE FORCE

The focus of Train the Force is to educate and train military personnel prior to deployment on current IED attack trends and countermeasures. This effort provided deploying units with hands-on training of Counter-Improvised Explosive Device (C-IED) devices during pre-deployment rotations to the Combat Training Centers to mitigate the impact of limited C-IED equipment availability during home-station training events. JIEDDO provided updated enemy tactics, techniques, and procedures for conducting IED attacks specific to the unit's future area of operations (AO) within Iraq and Afghanistan. This allowed deploying units to begin gaining a better working knowledge of the IED network within their future AO, decreasing the learning curve upon deployment.

Over time, JIEDDO funded training sites at all of the major military installations to allow units to train more troops on C-IED equipment prior to deployment. Included in this

¹⁴ Ibid., 17-19.

training effort was Company Intelligence Support Team (COIST) training. COIST provided critical intelligence reports and input to the intelligence organizations, increasing the fidelity of IED networks within a given AO. The COISTs are not an organic part of a company's organization, and instead are built by selecting Soldiers from within the formation to man this critical element. Most COIST members have no intelligence training, placing a premium on the training developed by JIEDDO to increase the capabilities and effectiveness of these organizations.¹⁵

Finally, the effort to train the force had an important secondary effect besides improving the ability to identify and react to IEDs. Through training, Soldiers became more comfortable conducting operations while accounting for the IED threat. The initial psychological effect of IEDs on the battlefield caused by the inability to counter the devices and the resulting casualties disappeared over time as Troops became better trained and effective countering this threat during combat operations. While training accounts for much of the decrease in fear of the IED by troops, technological improvements and proliferation of equipment to counter the IED threat also played an important factor.

DEFEAT THE DEVICE

The effort that provided the most reassurance to the American population that the Department of Defense understood the IED threat to service members and was serious about minimizing casualties was the Defeat the Device effort. This effort focused on mitigating the threat of IEDs to Soldiers at the point of attack. As a result, this effort relied primarily on technological solutions to better protect service members from the effects of the IED blast, while also providing technological solutions to identify IEDs prior to detonation initiation. In order to

¹⁵ Ibid., 19-21.

“stop the bleeding”, the Department of Defense turned to the American industrial base to provide solutions. “There was no shortage of technology or innovation, as the American defense industry quickly responded to the possibility of lucrative government contracts on a greatly reduced timeline than normally experienced.”¹⁶ This does not mean that American workers and defense industrial leaders did not actively provide products as their patriotic duty to assist in the effort. But as will be shown later, the prospect of making a large profit in a short period of time established a win-win environment that greatly increased the timeliness of equipment arriving to counter the IED threat in Iraq and Afghanistan.

The history of the development of equipment and devices to counter the effects of IEDs is extensive and beyond the scope of this study. To provide the scope and scale of this effort, this study briefly discusses the general categories of equipment. Counter-IED equipment falls within 5 general categories: individual troop protection; jamming devices; mine detection devices; vehicle gunner and commander protection; and improved vehicle armor.

Individual Trooper protective gear includes interceptor body armor, ballistic eye protection, pelvic protective gear, and improved Kevlar helmets. As technological improvements to ballistic protection resulted in less weight and better protection, industry updated this equipment was updated to provide the best protection available. The pelvic protective gear was the final piece of individual protective gear provided to the force. This piece of equipment protected a psychologically important part of the body. Although the pelvic protective gear decreased some injuries to this area of the body, it slowed the rate of foot march and reduced individual agility during dismounted operations.

¹⁶ Ibid., 13.

The continuous action-reaction-counteraction cycle between Coalition Forces and insurgents regarding the IED fight resulted in the creation of more sophisticated initiating devices. The insurgents mixed command wire, radio controlled, and infrared controlled initiating devices in their IED attacks. Over time, insurgents developed different initiation methods based on American capabilities and tendencies within specific areas of Iraq and Afghanistan. To counter this diffusion of initiation methods, industry developed a long list of jamming devices to maintain flexibility in countering the threat. Eventually, the military equipped all American forces with the same Counter Radio Electronic Warfare (CREW) devices, reducing the impact of CREW devices on combined Marine and Army combat operations.¹⁷ The continuing issue with CREW devices centers on the inability to use some radio systems while operating the CREW device (mounted or dismounted versions). This places individual vehicle commanders on the horns of a dilemma, forcing a choice between continuing to jam or sending a report.

Mine detection devices include dismounted equipment developed to assist patrols with early identification of IEDs, Engineer equipment to assist with identifying and interrogating IEDs along critical routes, and robots. The military provided numerous technological solutions in each category of mine detection devices to increase the probability of IED identification prior to detonation. Each of these systems contained inherent weaknesses, but the employment of combinations of capabilities increased the probability of IED detection, decreasing the effect of IED attacks on military personnel.

¹⁷ The Marine Corps and Army developed separate CREW devices that jammed the other Service's communication equipment and CREW device when in close proximity. This forced planners to mitigate the threat by physically separating forces making combined operations more difficult. The impact of this became the most pronounced in the battles for Fallujah and Ramadi.

American tactical vehicle commanders and gunners were at increased risk in the event of an IED attack based on the lack of armor at their stations. As a result, the military developed urban survivability kits for tanks, Bradleys and HMMWVs. These kits increased the armor protection for all of the associated cupolas and included ballistic glass to protect Troopers while allowing them to see outside the vehicles. This increased protection decreased the number of fragmentary injuries to these crewman resulting from IED attacks.

The final category of Defeat the Device equipment was improved armor protection for combat vehicles conducting operations in Iraq and Afghanistan. This effort began with increase armor protection kits for HMMWVs and other soft skin vehicles conducting combat operations, transitioned to increased armor protection for tanks and Bradleys, and concluded with the development and deployment of Mine-Resistant Ambush Protected (MRAP) vehicles to Iraq and Afghanistan. This effort gained the attention of American political leaders, media outlets, and the population in general following the previously discussed December 2004 town hall meeting by Secretary Rumsfeld. While the MRAP continues to be given the credit for reducing casualties within Iraq and Afghanistan, the evidence for this claim is lacking. In many respects, the MRAP series of vehicles obtained mythical standing within America although numerous deficiencies have been identified.¹⁸ The story of the MRAP highlights the impact of technological determinism as applied to military equipment and organizations. While fatality and casualty rates declined over time, the impact to units conducting stability and security operations as a result of the *proliferation* of MRAPs receives no discussion.

¹⁸ Secretary Gates disuses MRAP concerns in his book *Duty: Memoirs of a Secretary at War*. These identified issues and others not foreseen are discussed later in the study.

CHAPTER 3: MRAP PROLIFERATION

While the threat posed by IEDs is real, and the desire to reduce related casualty levels is understandable, there are implications associated with any decision to field new equipment, such as MRAPs, in large numbers as a response to a specific threat. Vehicles also impose conditions on a force: how heavy it makes the force logistically, how maneuverable the force is on any given battlefield, how rapidly it can deploy to the battlefield and by what means, and how effective it will be in carrying out its military task.¹

Andrew F. Krepinevich and Dakota L. Wood, *Of IEDs and MRAPs: Force Protection in Complex Irregular Operations*.

The effort to increase armor protection to combat vehicles operating in Iraq peaked between 2004 and 2007. Every combat vehicle received the maximum armor upgrades it could carry. While American industry provided additional armor protection for American forces, the insurgent IED attacks evolved in response. “On Aug.3, 2005, the deadliest roadside bomb ever encountered by U.S. troops in Iraq detonated beneath a 26-ton armored personnel carrier, killing 14 Marines and revealing yet another American vulnerability in the struggle against improvised explosive devices.”¹ This catastrophic IED attack signaled the arrival of underbelly, or deep-buried, IEDs to the battlefield. The success of deep-buried IED attacks against any vehicle in the American arsenal caused insurgents to further refine use of these IEDs to attack American forces throughout the country.

The American effort to mitigate the effects of IEDs by increasing armor protection on existing platforms did not produce the desired results. From early 2003 to 2007, IEDs caused 49.5% of all American fatalities due to insurgent attacks. As insurgents continued to improve

¹ Andrew F. Krepinevich and Dakota L. Wood, *Of IEDs and MRAPs: Force Protection in Complex Irregular Operations*. The Center for Strategic and Budgetary Assessments, 2007, 2.

¹ Rick Atkinson, “You can’t armor your way out of this problem” *The Washington Post*. 2 October 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/20/01/AR2007100101760_pf.html (accessed on 26 November 2014).

IED attacks and American force levels increased, American fatalities attributed to IED attacks increased to 72%.² Every additional technology introduced to the battlefield to mitigate the effectiveness of IED attacks was met by insurgent adaptations to IEDs to keep producing American casualties.

The realization that increased armor protection to existing vehicles would not decrease casualties resulted in additional pressure from Congress to acquire a different vehicle to protect troops from IED attacks. As a result of this pressure, the Department of Defense solicited the defense industry to develop vehicles capable of protecting troops from the effects of IED blasts. In the end, five manufacturers provided 12 variants of what would be called the Mine-Resistant Ambush Protected series of vehicles. These large and cumbersome vehicles included a V-shaped hull to dissipate the blast effects away from the crew compartment while increasing armor protection for troops as well.

CASUALTIES, COIN POLITICS, AND THE MRAP

From the earliest times of human history, man has continued to study and develop theories of war. From Thucydides and Sun Tzu through Niccolò Machiavelli and Carl von Clausewitz to contemporary “small war” theorists such as David Galula and Max Boot, wars of all scopes, scales, and types have been analyzed and assessed to distill the essence of this singularly human phenomena. The overriding purpose of these theorists is to provide current and future practitioners of war, both political and military, with insights and guidance as they are contemplating achieving objectives through war. Arguably, Clausewitz penned the most quoted dogma on war in his book *On War* where he asserted that “war is not merely an act of policy but

² Krepinevich and Wood, *Of IEDs and MRAPs: Force Protection in Complex Irregular Operations*, 6.

a true political instrument, a continuation of political intercourse, carried on with other means.”³

This concept places the decision to use force to achieve national objectives squarely on the shoulders of political leaders.

The wars in Afghanistan and Iraq caused a resurgence in the study of small wars, including counterinsurgency war, as the two wars changed following the destruction of the Taliban and Hussein regimes. This study led directly to the creation and publication of the joint *Army and Marine Corps Counterinsurgency Field Manual* in 2007. This field manual distilled the pervasive theories in counterinsurgency to their essential factors, analyzed these factors within the context of previous American efforts at counterinsurgency operations, and applied these factors to the current U.S. Army and Marine Corps efforts within Afghanistan and Iraq. The intellectual thread that runs through all counterinsurgency theory, achieving status as somewhat of a “prime directive”, concerns the critical nature of the population to achieve success. The population includes the population involved in the local struggle for power as well as the population(s) of any other countries providing counterinsurgency forces and other assistance. Like previous counterinsurgency theory, *The U.S. Army and Marine Corps Counterinsurgency Field Manual* echoes this view and makes points concerning the will of the American population to support counterinsurgent efforts abroad.

Within the United States, political leaders have the paramount responsibility of generating and sustaining American public support for the long-term nature of counterinsurgency operations. While political leaders must generate public support, military leaders must ensure the execution of counterinsurgency operations do not undermine the confidence the American

³ Carl von Clausewitz, *On War*, trans and ed., By Michael Howard and Peter Paret (New York: Alfred A. Knopf, 1976), 99.

population has with achieving success.⁴ Based on the history of U.S. counterinsurgency and other operations throughout the world over the past fifty years, “insurgents and local populations often believe that a few casualties or a few years will cause the United States to abandon a COIN effort.”⁵ Public opinion polls between 2003 and 2007 suggest that the belief in an American aversion to casualties is correct.⁶

Members of Congress understood clearly the need to convince the American population that the government was actively pursuing every effort to minimize casualties in Iraq. “Numerous Representatives and Senators from both parties complained about the Pentagon’s inadequate efforts to supply the troops with armor as well as other irregular warfare equipment such as body armor and electronic jammers.”⁷ The U.S. military purchased and deployed a large number of technologies in an effort to reduce the number of casualties produced by IEDs. As previously discussed, the Defeat the Device effort within JIEDDO provided a vast array of equipment to troops in Iraq and Afghanistan during the wars. Between 2003 and 2005, increased armor protection for vehicles, numerous other technologies to defeat the device, and better training for troops to counter IED threats resulted in statistics that showed that casualty numbers were escalating at a lower rate than the number of IEDs on the battlefield. “We are being

⁴ United States Army Field Manual No. 3-24, *Counterinsurgency Field Manual*, (Chicago: University of Chicago Press, 2007), 43-44.

⁵ Ibid.

⁶ Pew Research Center, “Public Attitudes Toward the War in Iraq: 2003-2008. 19 March 2008. <http://www.pewresearch.org/2008/03/19/public-attitudes-toward-the-war-in-iraq-20032008/> (accessed on 18 March 2015). This study shows the decrease in public perception regarding how well operations in Iraq were going between 2003 and 2008. From 2003 to summer 2005, American opinions that the war was going very/fairly well dropped from 88% to 45% with the converse rise in opinion that the war was not going well rising from 7% to 53% during the same period of time. The introduction of a new strategy, additional “surge” troops, and MRAPs between 2006 and 2007 resulted in roughly the same percentage of Americans saying the war was going well as saying the war was not going well. American opinion regarding maintaining troops in Iraq followed roughly the same general pattern as the previous question, with 47% believing American troops should stay in Iraq until the country is stabilized and 49% believing troops should come home as soon as possible.

⁷ Christopher J. Lamb, Matthew J. Schmidt, and Berit G. Fitzsimmons, “MRAPs, Irregular Warfare, and Pentagon Reform,” *Occasional Paper*, (National Defense University, Institute for National Strategic Studies, June 2009), 6.

effective,” said Brig. Gen. Joseph L. Votel, director of the task force. The casualties are not going up as much as the IEDs are.”⁸ Despite these results, almost 500 troops were killed by IEDs in Iraq through August 2005—a number high enough for the American population to demand better equipment from the government and military to protect the troops. The military leadership got the message—IED related casualties were having a strategic impact on American counterinsurgency operations in Iraq. “In short, there was sustained political pressure not only to do something about the IED problem in general, but specifically to provide better vehicular armor to the troops.”⁹

In June of 2004, Representative Duncan Hunter (R, CA) of the House Armed Services Committee showcased a new gun truck with associated placards describing the specifications. Hunter used connections in the military industrial complex to provide an example of a more heavily armored vehicle that provided an “off-the-shelf” procurement option. With this event, Hunter nominally put the Pentagon on notice to work more quickly to provide a new series of uparmored vehicles for military personnel in Iraq. Although no one in the Pentagon chose to argue with Hunter about his desire to procure a more heavily armored vehicle, troops present did provide Hunter with comments supporting the lighter and more maneuverable HMMWV over the larger, more heavily armored vehicles.¹⁰

Based on requirements from commanders in Iraq for more heavily armored vehicles, the Defense Department initiated the Mine-Resistant Ambush Protected (MRAP) vehicle program in November 2006. Secretary of Defense Robert Gates quickly made the MRAP program the Department’s number one program. “It took more than 2 years, political pressure from

⁸ Atkinson, “You can’t armor your way out of this problem,” *The Washington Post*.

⁹ Lamb, Schmidt, and Fitzsimmons, “MRAPs, Irregular Warfare, and Pentagon Reform,” 7.

¹⁰ Atkinson, “The IED problem is getting out of control. We’ve got to stop the bleeding,” *The Washington Post*.

Congress, and a determined intervention by the Secretary of Defense”¹¹ for the military acquisition system to validate the requirement for MRAPs in Iraq. Political leaders finally got their way with the procurement of a more heavily fortified truck despite continued resistance by military leaders that this was not the optimal solution to the IED problem.¹²

MRAP ACQUISITION PROCESS

Published studies of the MRAP acquisition program provide a generally positive narrative of an effective program overcoming numerous bureaucratic hurdles to provide a casualty-reducing vehicle to the troops. As previously discussed, Gates’ efforts proved critical in paving the bureaucratic path to streamline the acquisition process. In many respects, the story of the MRAP acquisition process should make every American feel good about the United States’ ability to produce vehicles quickly to support troops in combat. All three parts of the acquisition equation (military industrial complex, Congress, and DoD) worked in unison to provide MRAPs to the field. What the laudatory studies and articles miss, or only include as an afterthought, is that the MRAP was a sub-optimal solution that may have saved some lives, but prevented soldiers from doing their jobs effectively. While the Rapid Acquisition MRAP Vehicle Program is fascinating and in many respects, highly unusual, the important lesson of the MRAP program is not the speed of the acquisition process, but the impact of MRAPs on the ability of commanders to accomplish their missions in Iraq and Afghanistan.

¹¹ Lamb, Schmidt, and Fitzsimmons, “MRAPs, Irregular Warfare, and Pentagon Reform,” 12.

¹² Ibid., 10-15. Lamb, Schmidt, and Fitzsimmons provide supported rationale for the Army and Marine Corps lack of effort for procuring large numbers of MRAPs. Understanding the tension between procuring needed equipment to support on-going operations while balancing future equipment requirements is critical to gaining a perspective on the Pentagon’s lack of timeliness for acquiring MRAPs. Military leaders in the Pentagon were hesitant to bankrupt future system acquisition programs that addressed more comprehensive threats for the MRAP program that supported a discreet requirement—protecting troops from IED attacks. The military’s divestiture of MRAPs following operations in Iraq and Afghanistan because the MRAP does not support a wide range of military operations exemplifies the concerns discussed between 2005 and 2007.

To ensure MRAP production met accelerated quotas, DoD took shortcuts in the acquisition process, causing second and third order effects that increased the difficulty for troops conducting security and stability operations. First, the MRAP family of vehicles includes 12 variants from five separate manufacturers, creating maintenance and repair issues. Second, MRAPs coming off of the assembly line did not include all of the associated equipment the vehicle needed to conduct operations. This equipment, termed government furnished equipment (GFE), required installation at a different military facility prior to shipment overseas. Because the GFE was not included in the original design or testing, problems emerged as much of the equipment could not be operated simultaneously.¹³ Third, because the “program relied on only proven technologies and commercially available products...minimal operational requirements were established, and production, testing, and fielding were done concurrently.”¹⁴ Interestingly, the Stryker vehicle was not discussed as an option during the MRAP acquisition process although the Stryker was a proven technology and commercially available. Fourth, the rapid fielding limited troop input during the testing and evaluation process, ensuring that MRAP production focused solely on protection eschewing concerns about effective employment in combat. Fifth, the need to procure MRAPs quickly, install GFE, and ship them rapidly to the “war zone” resulted in troops receiving limited, if any, training on the MRAP prior to deployment. Finally, the unit cost per MRAP, and the associated total cost of the program,

¹³ While serving as a Squadron S3, Brigade S3 and XO, and Battalion Commander, leaders and soldiers continued to report difficulties with operating radios while the CREW device was turned on. Over time, issues between short-range radio systems and the CREW devices were corrected, but CREW devices continued to cause issues when using long-range radio systems. This required leaders to develop mitigation strategies to turn off certain CREW devices when conducting patrols to send reports in when long-range radio systems were required.

¹⁴ Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 1. Additional armor protection for crews drove the acquisition of the MRAP at the expense of operational consideration. This single-minded focus coupled with the constraint of using commercially available products removed the normal process of seeking input regarding vehicle requirements from soldiers who will be forced to use the equipment. As a result, operational considerations were not factored in to the acquisition of the MRAP.

required the military to cancel other acquisition programs that arguably were more important to the accomplishment of future missions.

The MRAP acquisition process achieved phenomenal results, cutting through red tape to produce over 14,000 MRAPs in a short time and increasing armor protection for troops traversing Iraq and Afghanistan. The program, however, was extraordinarily expensive, reduced actual combat effectiveness, and failed to stop IED casualties. The following sections provide increased analysis based on the criteria already established. In combating the IED problem, America did what it always does. It threw money and technology at the problem and gave the military 14,000 vehicles it did not want, could not use effectively, and would not keep with the war ended. The MRAP may let the American government, Congress, and the American people feel better about sending troops to Iraq under-manned, under-prepared, and under questionable strategic circumstance, but MRAPs caused more problems than they solved and hindered, rather than helped, achieve the mission.

SUSTAINMENT WOES: “SIX AND TWELVE” EFFECTS

The introduction of a new vehicle to any fleet causes additional sustainment requirements based on unique parts, vehicle specific mechanics, and fuel. Deliberate planning usually accompanies the introduction of a new vehicle to ensure the successful transition of operations. Increased sustainment requirements and associated costs account for the risk associated with altering a vehicle fleet. Another major area of risk involves adjustments to training and use during operations (which will be discussed in a later section).

The final MRAP program consisted of six manufacturers providing twelve variants for use by forces conducting stability and support operations in Iraq and Afghanistan. Table 1 clearly shows the scope and scale of the sustainment adjustments required by each service, with

the Army sustainment system the most challenged by the diversity as “...each of these different versions of MRAP required different maintenance procedures and different repair parts.”¹⁵ To overcome this disadvantage, the services were required to pay increased costs for repair part shipment and maintenance because the existing repair and maintenance system was incapable of supplying parts or repairing these new vehicles.

Table 1. MRAP Variants by Manufacturer and Service¹⁶

Manufacturer	Variant	USMC	USA	USN	USAF	USSOCOM
BAE Systems	CAT I RG33		X			X
	CAT II RG33L		X			
	HAGA	X	X			
BAE-TVS	CAT I Caiman		X			
	CAT II Caiman		X			
FPII	CAT I Cougar	X	X	X	X	
	CAT II Cougar 6x6	X	X	X	X	
	CAT III Buffalo	X				
GDLS-C	CAT I RG31 Mk 5E		X			X
Navistar Defense	CAT I Maxx Pro		X		X	
	CAT II		X			
OTC	M-ATV	X	X	X	X	X

The speed of the MRAP program increased the military sustainment problem because “the warfighters had limited opportunities to train in MRAP vehicle operation or maintenance at their home stations, despite the fact that MRAPs were supplied to troops in war theaters.”¹⁷ In most instances, the first time troops saw, let alone operated, MRAPs was upon arriving in Iraq or Afghanistan. This lack of training meant that MRAP crews and unit maintenance personnel were initially incapable of conducting preventive maintenance, increasing the chance of mechanical failures during operation. Once a vehicle became inoperative, the unit maintainers were unable to fix the vehicles and instead were forced to rely on costly civilian contract

¹⁵ Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 23.

¹⁶ Prospective Technology Incorporated, *Army Programmatic Environmental Assessment of the Mine Resistant Ambush Protected (MRAP) Vehicle Program*, Columbia, Maryland, December 2010, 13.

¹⁷ Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 30.

maintenance support. As a result, “U.S. military operations were dependent on industry partner assistance in the maintenance and combat readiness of equipment.”¹⁸

This ad hoc sustainment solution decreased the effectiveness and efficiency within the established military sustainment system by removing military personnel and military oversight from MRAP maintenance. Further, the lack of MRAPs during pre-deployment training events resulted in troops learning the MRAP maintenance system while simultaneously learning how to operate MRAPs in combat. This forced units to choose between competing MRAP related training issues, most often leading to the ceding of responsibility for maintenance activities from unit commanders to maintenance personnel and contractors. The lack of crew training and organic maintenance caused further issues because preventative maintenance requirements were poorly understood, leading to increased mechanical failures.

ADDITIONAL PARTS SOLD SEPARATELY

The rapid MRAP acquisition program sought every method to speed up production to meet the established critical requirement of saving the lives of troops in combat. Earlier this paper highlighted the primary drivers of the rapid MRAP acquisition program—sustained political pressure, Congressional budget support, and Gates’ personal interest. “Another factor that enhanced the fast delivery of MRAPs was that they were purchased without mission essential equipment, such as radios and intercoms, GPS, visual display enhancements, and IED defeat systems.”¹⁹ The implications of purchasing and receiving MRAPs from six different manufacturers without any of the required equipment needed to actually operate the vehicle is seldom discussed. The military was forced to develop another ad hoc system to purchase and

¹⁸ Ibid., 32.

¹⁹ Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 23.

install this equipment prior to shipment. This effort, while monumental in scale, resulted in troops being given untested vehicles with non-integrated systems to take to combat.

The equipment in question is classified as government furnished equipment (GFE). By adding GFE, one turns an armored vehicle into a fully integrated combat system. While a total cost analysis of the MRAP will be discussed in a following chapter, a discussion of GFE costs provides scale for the amount of equipment required to prepare an MRAP for combat operations. The cost of GFE ranged between \$171,000 and \$522,000 depending on the service and associated mission requirements.²⁰ Table 2 shows the average cost of GFE by service, or in the case of SOCOM, mission specific needs to support combat operations. The fact that GFE is not integrated into the MRAP on the production line is illustrative of the prime directive of the program in the first place—get increased armor protection to Iraq to reduce casualties. The focus on this one element of combat vehicle design caused numerous difficulties for troops conducting operations from these platforms.

Table 2. Estimated GFE Unit Cost Per Vehicle²¹

Service	Dollars (in thousands)
Army	\$171
Navy	\$300
Marine Corps	\$280
Air Force	\$297
USSOCOM	\$522

While it may seem ironic that a series of vehicles made to protect troops from IEDs did not include IED jamming devices in their original design, the limited number of jammers available precluded the installation of jammers prior to deployment. This lack of available

²⁰ Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 55.

²¹ *Ibid.*, 56.

jammers to equip every MRAP prior to deployment does not excuse the MRAP acquisition program from failing to conduct requisite tests to ensure operability with other vehicle systems once installed. The lack of rigorous testing of fully equipped MRAPs prior to issuance to deployed troops resulted in numerous difficulties experienced by those same troops when conducting combat operations.

The late inclusion of GFE in the process resulted in interoperability problems between many of the “aftermarket” equipment installed by the military after purchase. The radios and the IED jammers continued to interfere with each other, making leaders chose between maintaining communications during operations or jamming IEDs. Additionally, the different jammers procured by different services worked incredibly well at jamming other jammers and radios from other services. This caused second and third order effects when task organizing Marine units with Army units. While the need for increased counter-IED (C-IED) capabilities existed, the emotional response of sending technologically advanced, but untested, equipment to the front lines made the accomplishment of the mission more difficult.

The military eventually overcame the difficulties of installing GFE. All MRAPs were eventually moved to the same location where all GFE was installed prior to deployment. The consolidation of GFE installation activities increased the efficiency of the process although it did nothing for Joint or cross-Service systems integration. Ultimately, “the Army and Marine Corps agreed to standardize GFE turret and intra-vehicle communication systems, while also adopting radio and jammer installation kits that allowed interchangeability.”²² While waiting on institutional corrections, troops developed their own “workarounds” and solutions often while in contact with the enemy.

²² Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 55.

OFF THE SHELF SYSTEM BLINDERS

A critical factor in the effort to expedite increased armor protection in vehicles centered on the requirement to utilize “off the shelf” systems to minimize the research and development timelines associated with a new vehicle. As a result of this constraint, the services evaluated the ability to increase armor protection for the up-armored HMMWV (UAH), the capabilities and timelines for the joint light tactical vehicle (JLTV), and the existing armor protection of the MRAP. The single-minded focus on increased armor protection as the primary consideration to decrease casualty rates skewed the analysis towards the MRAP. While other factors of vehicle capability were discussed, in the end, crew protection became the sole evaluation criteria for selection of the MRAP.

As stated earlier, the UAH already had the maximum amount of armor added while ensuring it could still function. As a result, the modified HMMWV and UAH were incapable of meeting the crew survivability rates established in the requirements for the program. The JLTV program was unable to meet the timelines required. Today, the JLTV is in the testing phase of the acquisition process, highlighting the fact that the JLTV program could not have been sped up to meet the immediate requirement for a more heavily protected vehicle.²³ As a result, the MRAP was chosen based on market research that showed that the MRAP vehicle program met the requirements of time and survivability better than either the UAH or JLTV.²⁴

What is most striking about the discussions surrounding the selection of the MRAP is the lack of discussion and inclusion of another combat vehicle already conducting operations within Iraq—the Stryker vehicle. The UAH, JLTV, and MRAP monopolize the discussion during this

²³ Prospective Technology Incorporated, *Army Programmatic Environmental Assessment of the Mine Resistant Ambush Protected (MRAP) Vehicle Program*, Columbia, Maryland, December 2010, 21.

²⁴ *Ibid.*, 21.

phase and no other alternatives are included in any of the research conducted. While there are a number of reasons why the Stryker might have been excluded, the fact that the Stryker appears to not even be considered is curious. The original version of the Stryker deployed in support of Operation Iraqi Freedom had the same issue with protecting crewman from the effects of IEDs. Over the course of combat operations, however, the Stryker received armor upgrades and the inclusion of initially a “v-shaped hull” and finally a “double v-shaped hull” to minimize the effects of deep buried IEDs on the crew. The modified Stryker vehicle provided MRAP-like protection, while causing none of the tactical problems associated with using the MRAP in combat. While an assessment of the Stryker vehicle in lieu of the MRAP is speculative at best and beyond the scope of this paper, the Stryker’s increased crew capacity and improved crew protection fit the strategy and guidance for conducting operations established by GEN Petraeus and LTG Odierno in conjunction with the “surge” better than the MRAP.

USER INPUT NOT REQUIRED

The selection of the MRAP as the primary solution for decreasing casualties from IED attacks showcases the single minded focus on increased armor protection as the primary consideration for the new vehicle. This myopic view of vehicle requirements for executing security and stability operations in Iraq removed other considerations from the debate, further decreasing the acquisition timelines. As a result of the MRAP selection methodology, no attempt was made to seek input regarding vehicle requirements from troops who would use this vehicle to accomplish their mission. The preeminence of increased armor protection as the single determining factor throughout the process is clearly articulated by the primary decision maker, Secretary Gates, in his book *Duty: Memoirs of a Secretary at War*. Gates also discusses the troop response to MRAPs he received during visits to Iraq.

This portion of his book revolves around the positive reaction from troops who lauded the crew protection of the MRAP. Gates relates stories highlighting that soldiers survived IED attacks in the MRAP while other soldiers in different combat platforms did not. What is most telling, however, is how quickly Gates marginalizes the other comments received from troops about the deficiencies associated with MRAP operations while performing missions. These deficiencies include the tight seating and associated lack of leg room, the size of the vehicle including weight and height, off-road effectiveness, rollover likelihood, and the impact of the vehicle on the population.²⁵ The emphasis Gates places on the increased troop protection compared with troop concerns during operations illustrates that Gates' only consideration for MRAP procurement was reducing casualties.

As operations in Iraq and Afghanistan changed over time, units were no longer permitted to deploy any of their own vehicles to theater to mitigate challenges in using the MRAP. This single vehicle sourcing solution for all deployed units generated numerous second and third order effects, negatively impacting the ability of units to accomplish their mission. Prior to the single vehicle option for deployed units, leaders were able to tailor equipment sets to specific missions, increasing the ability to successfully accomplish the mission. Additionally, the ability to tailor equipment to the mission allowed leaders to ensure specific vehicle weaknesses were mitigated by other vehicle strengths. Most units chose the UAH for urban operations based on their lower profile, maneuverability, and impact on the population, while using the MRAP for operations involving more open spaces and long driving requirements. Table 3 provides the vehicle specifications for MRAPs and other combat vehicles typically conducting security and stability operations. As this table clearly shows, the size and weight specifications for the

²⁵ Robert M. Gates, *Duty: Memoirs of a Secretary at War* (New York: Alfred A. Knopf, 2014), 125.

MRAP are closer to the Stryker and Bradley than to the UAH. All of these vehicles include strengths and weaknesses for executing combat operations. The interesting point is that no discussion of MRAP weaknesses or implications during operations is discussed in detail. Instead, these concerns are marginalized in books, articles, and other publications lauding the success of the MRAP program.

**Table 3. MRAP Vehicle Specifications²⁶
with Other Combat Vehicle Specifications²⁷**

Variant	GVW (Pounds)	Height (Feet)	Width (Feet)	Length (Feet)	Crew	Passengers
CAT I RG33	36,000	9.33	8.25	21.92	2	4
CAT II RG33	58,000	11.33	8.25	28.16	2	12
HAGA	58,000	11.33	8.25	28.16	2	*2litter / 6
CAT I Caiman	34,500	9.33	8.17	22.83	2	4
CAT II Caiman	60,728	9.75	8.46	27.08	2	10
CAT I Cougar	38,000	8.67	8.5	19.42	2	4
CAT II Cougar	52,000	8.67	8.5	23.25	2	10
CAT III Buffalo	50,660	10.5	8.42	28.67	2	4
CAT I RG31 (Mk5E)	22,487	8.75	8.08	19.67	2	10
CAT I MaxxPro	43,500	9	9	21.33	2	4
CAT II MaxxPro	41,000	10	9	23.5	2	10
M-ATV	37,000	10.33	8.17	19.5	2	3
AVG MRAP	44,323	9.75	8.42	23.62	2	* 4 or 10
UAH	13,450	6.5	7.6	16.2	2	3
Stryker	36,320	8.67	8.92	22.83	2	9
M1A2 Abrams	136,000	8	12	26	4	n/a
M2A3 Bradley	55,200	9.8	12	21.5	3	7

The primary issue with conducting security and stability operations using MRAPs revolves around their size, different passenger capabilities, limited ability to maintain situational

²⁶ Prospective Technology Incorporated, *Army Programmatic Environmental Assessment of the Mine Resistant Ambush Protected (MRAP) Vehicle Program*, Columbia, Maryland, December 2010, A-2.

²⁷ M1A2 Abrams, M2A3 Bradley, and Stryker vehicle specifications were obtained from Wikipedia, http://en.wikipedia.org/wiki/M1_Abrams, http://en.wikipedia.org/wiki/Bradley_Fighting_Vehicle, <http://en.wikipedia.org/wiki/Stryker> (accessed on 5 FEB 2015). Information for the UAH was obtained from AM General (manufacturer) specification sheets found at <http://www.amgeneral.com/vehicles/hmmwv/specs.php> (accessed on 5 FEB 2015).

awareness, and impact on the population. While troops appreciate the increased armor protection of the MRAPs, their effect on mission accomplishment caused leaders significant stress during operations. “Trades between force protection, battlefield mobility, deployability, and operational effectiveness must constantly be weighed when considering available alternatives.”²⁸ The use of the MRAP to support operations in Iraq and Afghanistan significantly increased the leadership challenge associated with determining the best course of action to accomplish the mission.

LTG Raymond T. Odierno, MNC-I Commander, clearly articulated the purpose of security and stability operations to all personnel in Iraq in his 2007 *Counterinsurgency Guidance*. This document identified security of the Iraqi population as the central pillar of all operations directing military personnel to conduct operations where the population was most vulnerable—in their own communities. A section of this guidance includes the sub-title, “Get out and walk,” and includes the guidance to “move mounted, work dismounted. Vehicles like the up-armored HMMWV limit our situational awareness and insulate us from the Iraqi people we intend to secure.”²⁹ This guidance clearly outlines the weakness of conducting mounted operations to secure the population and articulates the mitigation of this weakness through dismounted patrols to increase relationships with the population through human interaction. The size of the MRAP, while increasing challenges of moving to patrol locations, dwarfed the UAH and further intimidated the population along all of the routes of movement.

The effect of the MRAP on the populations in Iraq and Afghanistan is best exemplified through the public reaction to U.S. law enforcement agencies buying MRAPs to support their

²⁸ Krepinevich and Wood, *Of IEDs and MRAPs: Force Protection in Complex Irregular Operations*, 38.

²⁹ LTG Raymond T. Odierno, “Counterinsurgency Guidance,” Headquarters Multi-National Corps-Iraq, Baghdad, Iraq, June 2007, <http://smallwarsjournal.com/documents/mncicoinguide.pdf> (accessed 8 FEB 2015).

missions. Much of the debate associated with excess military equipment sales to U.S. law enforcement agencies highlights the growing militarization of the police force.³⁰ Despite public concerns that the MRAP is not suited for local law enforcement based on the size and intimidation of these vehicles, the same public demanded MRAP acquisition to support similar operations in Iraq and Afghanistan. Why would the American public reaction to MRAPs patrolling the streets in Middle America be any different than Iraqi or Afghan public reactions to the same vehicles within their neighborhoods? As one policeman stated when discussing his departments use of the MRAPs in conducting local law enforcement tasks like serving warrants, “It’s more about the intimidation factor than anything else. Someone looks out their window and sees that big ol’ MRAP sitting there...it changes their whole thought process pretty quickly.”³¹ This intimidating quality of the MRAP negatively impacted the ability of deployed troops to develop positive relationships with local populations while traversing neighborhoods to conduct dismounted patrols. Simply stated, MRAPs are intimidating vehicles, regardless of your nationality or culture.

The inclusion of the Common Remotely Operated Weapon Station (CROWS) to MRAPs further complicated the execution of operations. The CROWS removes the more exposed vehicle gunner cupola from the top of the MRAP by leaving the machine gun exposed and moving the gunner into the vehicle. The machine gun is then operated by a remote gunner’s console located in the passenger seat behind the driver. While the CROWS increases crew

³⁰ Articles discussing the militarization of local police forces are readily available. For examples of the argument, see Michael Shank and Elizabeth Beavers, “The militarization of U.S. police forces,” <http://blogs.reuters.com/great-debate/2013/10/22/the-militarization-of-u-s-police-forces/> (accessed 9 FEB 2015) or Taylord Wofford, “How America’s Police Became an Army: The 1033 Program,” <http://www.newsweek.com/how-americas-police-became-army-1033-program-264537> (accessed 9 FEB 2015).

³¹ Dan Parsons, “Repurposed MRAPs Find New Life in Police Agencies”, *National Defense Magazine*, April 2014, <http://www.nationaldefensemagazine.org/archive/2014/April/Pages/RepurposedMRAPsFindNewLifeinPoliceAgencies.aspx> (accessed 9 FEB 2015).

protection by eliminating the gunner's exposure, this increased crew protection further separates the MRAP crew from the population while decreasing 360-degree situational awareness for the crew. The gunner's cupola allowed one member of the crew to interact with the population through hand gestures and general visibility. Additionally, the gunner's cupola allowed the gunner to see in multiple directions quickly as opposed to the gunner's display viewpoint the CROWS provides. This decreased crew visibility added to the previous visibility problems caused by the decrease in size and increase in depth of the MRAP windows to enhance crew protection. The addition of the CROW to the MAT-V variant of MRAP, while increasing gunner protection, caused the largest impact to mission accomplishment.

The terrain in Afghanistan required a smaller MRAP to support operations in more restricted off-road environments. The development of the MAT-V variant of MRAP provided troops in Afghanistan with increased protection and maneuverability compared to UAHs and other MRAP variants. As with all decisions associated with MRAPs, the increased protection for troops to mitigate IED casualties included a tactical risk for the accomplishment of the mission. The MAT-V crew consists of a driver, a vehicle commander, and a gunner with the capability of including two dismounted troops. Some specification sheets list the crew as consisting of the gunner and driver only, but the size and limited crew visibility makes the MAT-V difficult to operate without a vehicle commander, even in a stationary position.³² Within the MAT-V variant, two versions exist with different strengths and weaknesses: with or without CROWS.

³² Table 3 provides crew / passenger information based on information obtained from the manufactures in addition to sources used to create the table. In all instances, the size of the crew is stated as 2 personnel which is counter to experiences using MRAPs in combat. The manufacturers do not list what they consider as the crew of the vehicle, but all military wheeled vehicles with gun turrets require a crew of 3 to operate. The crew consists of the vehicle commander, the driver, and the gunner. While moving, all of these personnel are required to safely operate the vehicle. While stationary, the driver and gunner are required to support defensive actions for the vehicle and patrol. The inclusion of the CROW system to the MRAP removes one passenger to support the gunner's station within the vehicle.

When equipped with CROWS, the number of dismounted Soldiers in the MAT-V drops to one, as the other seat holds the CROWS station. The limited dismounted troop capacity within the MAT-Vs greatly hindered the execution of combat operations.

LTG Odierno's guidance to troops in Iraq to "move mounted and work dismounted" carried over to Afghanistan when GEN Petraeus included it in his ISAF Commander's guidance. The number of MAT-Vs required to move the minimum number of dismounted troops to "to work" resulted in commanders either accepting risk by further removing crewmen (usually the vehicle commander) from the MAT-V to conduct dismounted patrols, or increasing the number of MAT-Vs involved in the patrol and upsetting the local population with increased MAT-V presence on their streets. While commanders possessed numerous options to mitigate this risk, such as air assault operations, requesting other MRAP variants or Strykers, and establishing additional combat outposts to permanently base troops within the community, the dynamic nature of operations in Afghanistan constantly changed the options available to support any given mission.

While Secretary Gates acknowledges some of the operational concerns associated with MRAPs, these are portrayed as minor. Roll-overs, crew comfortability, excessive height, and limited off-road capabilities caused additional friction and only exacerbated the difficulty of accomplishing the mission. If one agrees that population security is a pillar of COIN doctrine, then the value of MRAPs in accomplishing this mission quickly becomes questionable.

TRAINING NOT INCLUDED

The rapid acquisition and deployment of MRAPs resulted in crews learning to operate MRAPs while conducting missions in combat. Army Regulation 600-55, *The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing)*, defines the

driver certification requirements for every vehicle within the Army inventory. Every driver must complete the unit / installation drivers training program, pass a written test, pass a PMCS test, and pass a road test to become qualified to operate any military vehicle.³³ The extensive and necessary requirements for drivers to obtain a military driver's license force commanders to maintain and rigidly enforce a comprehensive standard operating procedure (SOP) for the driver certification program within their units. In most instances, vehicle commanders are required to also be licensed on the vehicles to ensure they are trained to supervise every aspect of the vehicle's operation. These requirements are often difficult to schedule based on competing training demands within the units, instructor availability, and training area scheduling. The difficulties increase exponentially when the entire unit requires training on a new vehicle in a short timeframe.

The licensing requirements outlined in AR600-55 require over two weeks of training to certify a driver. Training requirements include a forty hour classroom program of instruction, a vehicle specific classroom program of instruction, vehicle specific hands-on training, vehicle driving training (day and night), and accident avoidance training. All of this training increases driver performance while mitigating accidental risk inherent in military vehicle operations. The limited MRAPs available for training based on overseas mission requirements caused additional friction in MRAP licensing training. The Army established pre-deployment training equipment (PDTE) sets at most installations to assist units with MRAP availability to support training prior to deployment. The limited availability of MRAPs to support driver training efforts forced units to alter training schedules, often at the last minute, to ensure every future MRAP driver was properly trained. In many instances, this caused the unit to maintain twenty-four hour driver

³³ Department of the Army, *The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing)*, Headquarters Department of the Army, Washington D.C., 18 June 2007.

training operations to ensure each Soldier received the required number of hours of MRAP driving to earn their certification. The drivers training requirements for MRAPs received the highest prioritization of limited resources, almost ensuring that MRAPs were not available to support other training requirements during pre-deployment training activities.³⁴

As previously discussed, the height and weight of the MRAP resulted in a vehicle prone to roll-over accidents. The limited training of many drivers further increased the probability of roll-over accidents while deployed. “At least 66 MRAP-related accidents happened between November 2007 and June 2008. Bad roads, weak bridges, or driver error, resulted in five soldier deaths and 40 MRAP rollovers.”³⁵ To mitigate the effects of roll-over accidents, the military developed and deployed Mine-Resistant Ambush-Protected Egress Trainers (MET) to Afghanistan and Kuwait to train troops on how to egress an MRAP following a roll-over. Over time, Central Command included MET training as a deployment requirement for all personnel entering theater.³⁶ The MET reinforced following load plans, allowed troops to feel the disorienting effect of rolling over, and provided experience for egressing an MRAP from alternate positions. The MET was an afterthought that arrived after troops were already operating MRAPs with little pre-deployment training.

³⁴ As a Battalion Commander in receipt of short-notice deployment orders, the challenge of licensing MRAP operators prior to the unit’s culminating training event at the National Training Center forced the companies to alter their training schedules to immediately focus on MRAP driver training as the resources became available. The limited number of MRAPs available to support training events resulted in soldiers training on patrolling and clearing tasks with other available vehicles to include HMMWVs and LMTVs. This produced a negative training effect.

³⁵ Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 31.

³⁶ 3d Sustainment Command Expeditionary Public Affairs, “Army fields new MRAP rollover trainers,” [WWW.ArmY.MIL: The Official Homepage of the United States Army](http://www.army.mil/article/20897/Army_fields_new_MRAP_rollover_trainers/), May 11, 2009. http://www.army.mil/article/20897/Army_fields_new_MRAP_rollover_trainers/ (accessed 10 FEB 2015).

STICKER PRICE

When the Pentagon shut down the MRAP production program in 2012 the cost of the program exceeded \$47.7 billion.³⁷ The program's staggering costs continue to generate a heated debate between the cost and the benefits of the program, particularly as related to any decrease in fatalities. This emotionally charged debate focuses on a statistical analysis of survival rates for IED attacks while operating different vehicles. One of the principal issues with the debate concerns the difficulty of analyzing a wide array of factors contributing to the decrease in IED fatalities.

As the situation in Iraq evolved, the military increased armor protection for all military vehicles. As a result, any statistical analysis must take into account the improved armor protection of the specific vehicle based on the time of the IED attack. As an example, the M1 Abrams tank received a number armor upgrades between 2003 and 2008. As a result, statistics associated with M1 Abrams crewman survival rates during an IED attack must account for these changes. Additionally, every IED is unique and the effectiveness of the attack also includes the type of the explosive used, the method of emplacement, the timing of the trigger, and other factors. As a result, comparing survivability rates of IED attacks is problematic based on the number of disparate factors involved.

A comprehensive cost analysis of the MRAP program based on IED survivability rates is beyond the scope of this paper.³⁸ While the cost-benefit argument over the MRAP provides

³⁷ Richard Sisk, "Pentagon shuts MRAP production line," *DoD Buzz: Online Defense and Acquisition Journal*, 1 October 2012, <http://www.dodbuzz.com/2012/10/01/pentagon-shuts-mrap-production-line/> (accessed 20 FEB 2015).

³⁸ Chris Rohlfs and Ryan Sullivan applied economic statistical analysis to the MRAP program and assert that the MRAP program receives too much credit for saving the lives of troops. They also assert that the MRAP did not statistically increase survivability rates compared to the much cheaper UAH already in theater. For additional information on their argument, see "The Cost-Effectiveness of Armored Tactical Wheeled Vehicles for Overseas US Army Operations, *Defence and Peace Economics*, volume 24, number 4, 2013, 293-316, <http://dx.doe.org/10.1080/10242694.2012.723158> (accessed on 15 December 2015). A summary of their argument

insight into the continued emotionally charged nature of the IED problem and MRAP solution, a simple discussion of the cost of MRAPs compared to other vehicles provides the necessary understanding for this paper.

The MRAP costs between \$434,000 and \$776,000 per vehicle depending on the variant. This cost does not include the additional GFE required to make the MRAP operational. The addition of MFE increases the cost range to \$605,000 – \$1,222,000 per MRAP “depending on the service branch and mission profile of the particular MRAP.”³⁹ The Defense Department bought over 27,000 MRAPs and deployed them to Iraq and Afghanistan, making the MRAP the most ubiquitous vehicle within the combat fleet.⁴⁰ Stated more bluntly, the MRAP is the “face” of American military operations in support of the “Global War on Terror”. Whether the MRAP represents saving lives or intimidating the population remains in the eye of the beholder.

Table 4 provides the cost of the MRAP variants per vehicle with a corresponding cost per vehicle for other combat vehicles within the U.S. Army inventory. As the table shows, the average MRAP is almost three times more expensive than the UAH. The Stryker vehicle cost rose from \$1.42 million in 2003 to \$4.9 million in 2012 per vehicle due to the shift to the “double-v” hull as well as other armor and equipment improvements.⁴¹ This makes the Stryker, a vehicle designed to transport troops in combat, almost ten times more expensive than the MRAP. The M1A2 Abrams tank and the M2A3 Bradley Fighting Vehicle are also more expensive than the MRAP with the tank providing no capability for additional troops above the

is available in “The MRAP Boondoggle,” *Foreign Affairs*, 26 July 2012, <http://www.foreignaffairs.com/print/135040> (accessed on November 24, 2014).

³⁹ Bulkley and Davis, *The Study of the Rapid Acquisition Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter*, 55.

⁴⁰ Chris Rohlf and Ryan Sullivan, “The MRAP Boondoggle,” *ForeignAffairs.com*, July 26, 2012, <http://www.foreignaffairs.com/print/235040> (accessed November 24, 2014).

⁴¹ Wikipedia, the free encyclopedia, “Stryker,” <http://en.wikipedia.org/wiki/Stryker#Cost> (accessed 20 February 2015).

four man crew. Both the Abrams and Bradley also contain weaknesses for supporting security and stability operations based on their vehicle profile and armament. There is a place for both in COIN operations, but not as the primary vehicle to conduct patrols within the population.

**Table 4: Cost of MRAP by Variant⁴²
with Other Combat Vehicle Costs⁴³**

Manufacturer	Variant	Unit Cost Per Vehicle (dependent on LRIP)
BAE Systems	CAT I RG33	\$510,540
	CAT II RG33L	\$570,364
	HAGA	\$776,800
BAE-TVS	CAT I Caiman	\$443,000
	CAT II Caiman	\$457,599
FPII	CAT I Cougar	\$557,562
	CAT II Cougar 6x6	\$621,185
	CAT III Buffalo	\$699,139
GDLS-C	CAT I RG31 Mk 5E	\$593,703
Navistar Defense	CAT I Maxx Pro	\$529,610
	CAT II MaxxPro	\$570,364
OTC	M-ATV	\$434,445
AVG MRAP		\$563,693
UAH		\$ 220,000
Stryker		\$ 4,900,000
M1A2 Abrams		\$ 8,580,000
M2A3 Bradley		\$ 3,166,000

Based on the cost of military vehicles, the military acquisition process includes a number of steps to ensure that the selected vehicle meets mission requirements for an array of military operations and not simply one type. While many politicians, pundits, and military personnel lament what they see as burdensome bureaucracy, the acquisition process has proven reliable at assessing emerging requirements, seeking alternative solutions, selecting the best alternative,

⁴² Prospective Technology Incorporated, *Army Programmatic Environmental Assessment of the Mine Resistant Ambush Protected (MRAP) Vehicle Program*, Columbia, Maryland, December 2010, A-2.

⁴³ M1A2 Abrams, M2A3 Bradley, and Stryker vehicle specifications were obtained from Wikipedia, http://en.wikipedia.org/wiki/M1_Abrams, http://en.wikipedia.org/wiki/Bradley_Fighting_Vehicle, <http://en.wikipedia.org/wiki/Stryker> (accessed on 5 FEB 2015). Information for the UAH was obtained from AM General (manufacturer) specification sheets found at <http://www.amgeneral.com/vehicles/hmmwv/specs.php> (accessed on 5 FEB 2015).

rigorously testing the best alternative in multiple conditions, and procuring the equipment needed to support the force over numerous military operations. As has already been discussed, speeding up the procurement process results in missing steps that increase other risks for troops.

CHAPTER 4: FINAL ANALYSIS

The previous chapters discussed the factors leading to the development of the MRAP program, resultant difficulties with maintaining and operating MRAPs in combat, and the overall cost of the program. Remembering that the primary driver of MRAP development centered on reducing IED fatalities and casualties, one of the final pieces of the MRAP story must assess the MRAP in terms of this measure of effectiveness. The following analysis will show the difficulties associated with assessing the success, limited or resounding, of the MRAP in decreasing IED related casualties because of the numerous factors involved with the environment within Iraq when the MRAP arrived.

The final piece of the MRAP story looks into the future to determine changes to military equipping strategies that include the MRAP based on on-going debates and actions within the services. The efforts of the Army and Marine Corps to divest their services of MRAPs highlights the difficulties of incorporating a niche capability into the services. Further, the ongoing effort to decrease forward presence of forces and rely on expeditionary capabilities, makes the inclusion of MRAPs problematic based on size and weight.

The lessons of the MRAP highlight the need for strategists to clearly articulate military equipment requirements based on a comprehensive vision of future conflicts. Secretary Rumsfeld's assertion that "you go to war with the Army you have, not the Army you might want or wish to have at a later time,"¹ is correct. The Army you have includes the resultant vulnerabilities based on equipping, manning, and training decisions made well in the past. "The far more powerful IEDs we encountered in Iraq and Afghanistan

¹ Eric Schmitt, "Troops' Queries Leave Rumsfeld on the Defensive," *New York Times*. 9 December 2004, http://www.nytimes.com/2004/12/09/international/middleeast/09rumsfeld.html?_r=0&pagewanted=print&position (accessed on 19 November 2014).

presented a threat we didn't expect (but certainly should have given the terrorists' heavy reliance on explosive devices). If you can't foresee or plan for every possible threat, the best you can do is adapt quickly to the ones you didn't expect."² The final question is did America adapt appropriately based on the prolific use of IEDs in Iraq and Afghanistan or did it merely react in the traditional manner by spending large amounts of money on new technologies to achieve success. The answer to this question determines whether or not the \$47.7 billion investment in MRAPs to mitigate IED casualties is now a "sunk cost" based on competing vehicle demands to meet future challenges.

Proving a Negative: MRAP Saves Lives?

On 9 February 2009, four American Soldiers and their translator were killed by a Suicide Vehicle Borne IED (SVBIED) attack while moving to a meeting outside FOB Marez in Mosul, Iraq. On 10 April 2009, five American Soldiers were killed in an SVBIED attack while leaving FOB Marez to conduct a patrol. The two attacks were similar in most ways. Both attacks included SVBIEDs allowing the attackers to adjust the attack, effectively countering the actions of the crews. Both SVBIEDs consisted of thousands of pounds of explosives, the first in a pick-up truck and the second in a dump truck. Both attacks killed all the crewmen.³

The differences in the attacks offer a measure of justification for the argument that increased armored protection is incapable of protecting troops from harm from a determined and capable enemy. The crew of the first attack used a UAH to execute their mission while the crew of the second attack operated an MRAP. The UAH was the primary target of the SVBIED attack

² Tony Zinni and Tony Koltz, *Before the First Shots are Fired: How America can Win or Lose Off the Battlefield*, (New York: Palgrave Macmillan, 2014), 148.

³ Both attacks occurred while the author was assigned as the Brigade Operations Officer for the units involved in the attacks. The complete destruction of the MRAP altered the view of most Soldiers that the MRAP was impervious to IED attacks causing non-technological solutions to be further developed and implemented. The primary solution included a better assessment of the terrain and subsequent altering of movement techniques and formations to mitigate the risk of catastrophic SVBIED attacks.

and the attacker altered his course to ensure his vehicle impacted the side of the UAH prior to detonation. The MRAP was not the primary target of the SVBIED attack and therefore the two vehicles did not collide prior to detonation. The patrol happened to be departing FOB Marez while the SVBIED targeted the entrance to the National Police Brigade Headquarters compound located on the same access road to FOB Marez. Despite these differences, the effects on the two vehicles were the same with both vehicles completely destroyed with all Soldiers killed.

These incidents highlight the concern many members of the military voiced during the debate leading up to the MRAP program—“you can’t armor your way out of the [IED] problem.”⁴ This argument received derisive comments from Secretary Gates in his book, *Duty: Memoirs of a Secretary at War*, when he offered only one response to their argument—“talk to the countless troops who survived IED blasts because they were riding in an MRAP.”⁵ This assertion discounts the countless number of troops who survived IED blasts while operating UAHs, Bradleys, Abrams, and other military vehicles as well.⁶ The many factors involved in IED attacks make the assertion that vehicle type determines casualty rates problematic. The size of the IED (from 10 to thousands of pounds), the method of attack (deep buried, road-side, “pop-and-drop), the type of IED (Explosively Formed Projectile, VBIED, suicide), the capabilities of the IED maker, the timing of the trigger (victim operated, command wire, remotely controlled), and the effectiveness of the explosive all affect the effectiveness of the IED.

The impact of other factors within Iraq also contributed to decreased IED related casualties in 2007 just as the MRAP appeared. Table 5 shows the percentage of IED-caused

⁴ Atkinson, “You can’t armor your way out of this problem,” *The Washington Post*.

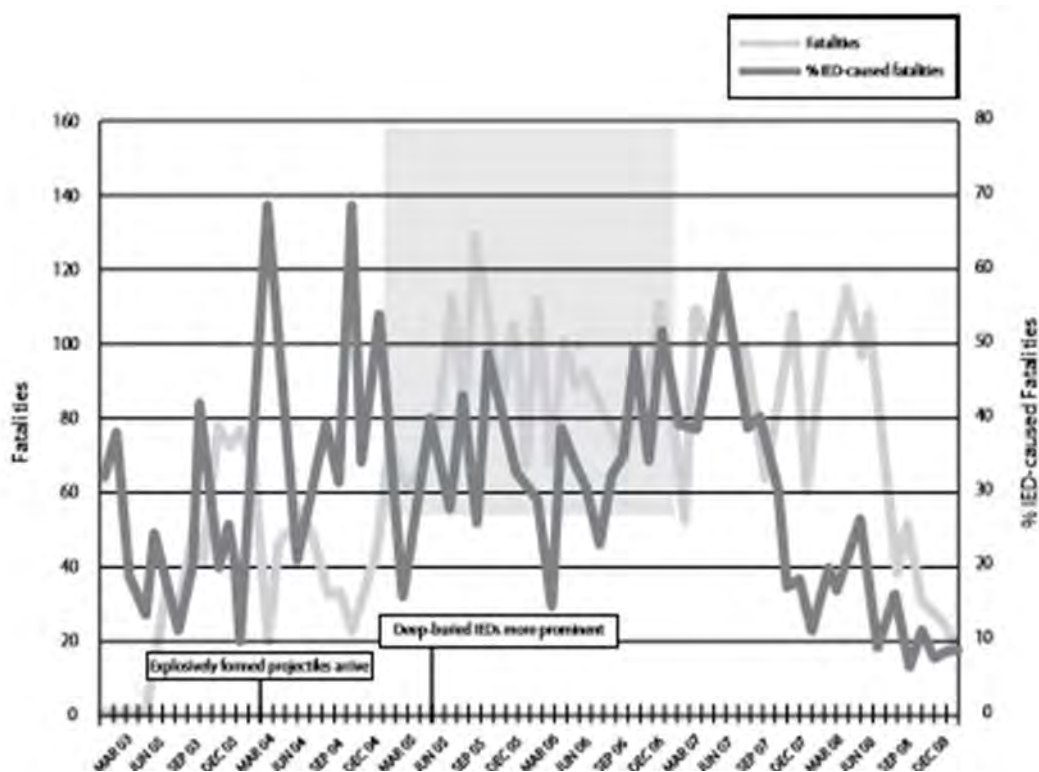
⁵ Robert M. Gates, *Duty: Memoirs of a Secretary at War* (New York: Alfred A. Knopf, 2014), 126.

⁶ As the Squadron Operations Officer of a unit in Muqadadiyah, Iraq in 2007, I personally survived an IED blast while operating a Bradley Cavalry Fighting Vehicle. The Squadron’s AOR included three tier-1 hot spots within MND-N and possessed no MRAPs. While the Squadron did receive casualties from IED attacks, the UAH and Bradley Cavalry Fighting Vehicle effectively protected the crews for the majority of IED attacks.

fatalities in Iraq between 2003 and 2008. The shaded box represents the period of time when the operational plan sought the transfer of security responsibilities to Iraqi Security Forces. Terms like “Iraqi Police in the lead” or “Iraqi Security Forces in the lead” dominated the operational approach during this period of time. In hindsight, the problem with these plans centered on the lack of capacity and capabilities for Iraqi Security Forces to assume primary responsibility for security anywhere within the country. U.S. attempts to force the issue by removing forces from these areas provided insurgents with the time and under-secured space to plan, resource, and execute IED attacks on known U.S. force routes, therefore increasing casualties.

Table 5: Percentage of IED-caused Fatalities in Iraq⁷

The box represents the roughly 2-year period before the 2007 “surge” when U.S. operational strategy was to reduce risks to U.S. forces and transfer security responsibilities to Iraq.



⁷ Carr, “Defeating the IED: JIEDDO’s Mission Impossible, the Lure of Technology, and the Emergence of the COIN Solution,” 2.

The change in strategy directed by GEN Petraeus and the “surge” drastically changed the environment within Iraq. The increased U.S. and Iraqi forces in Baghdad coupled with the order to live in and among the population and operate from Combat Outposts (COPs) within the neighborhoods changed the environment, increasing the difficulties for insurgents to plan, resource, and execute IED attacks. The “Sunni Awakening” during the same period of time resulted in former insurgents supporting the Iraqi Government by assisting with security responsibilities within their neighborhoods. The “Sunni Awakening” removed a number of the insurgents conducting IED attacks from the environment because they changed their allegiance and supported the security effort.

The efforts to “get left of the boom” through network analysis and targeted raids, increased biometric operations, the establishment of intelligence fusion centers, and terrain analysis using technologically advanced systems also impacted the effectiveness of IED attacks throughout Iraq. “The nature of the conflict combined with the complex interaction between the relevant factors make it nearly impossible to determine which action elicited a given reaction.”⁸ As a result, the argument that MRAPs were decisive in reducing casualties is difficult to prove. This is especially true given the wildly speculative assessments of the numbers of lives saved by the MRAP. The Joint Program Office for MRAPs conducted an analysis that “found” that the MRAP saved the lives of 40,000 troops in Iraq and Afghanistan.⁹ Using the worst fatality rates in both Afghanistan and Iraq, it would take over 27 years to reach 40,000 fatalities.¹⁰ This wild

⁸ Ibid., 2.

⁹ Chris Rohlfs and Ryan Sullivan, “The MRAP Boondoggle,” *ForeignAffairs.com*, July 26, 2012, <http://www.foreignaffairs.com/print/235040> (accessed November 24, 2014).

¹⁰ Icasualties.org, “Operation Iraqi Freedom and Operation Enduring Freedom Casualties,” on-line at <http://www.icasualties.org/> [accessed 10 December 2014]. The worst year for fatalities in Iraq was 2007 with 961 total fatalities, not just IED related. The worst year for fatalities in Afghanistan was 2010 with 499 total fatalities, not just IED related. Adding these two figures results in a worst case of 1,460 fatalities. It would take over 27 years at this fatality rate to reach 40,000 lives saved.

assertion is simply not supported by the facts and raises doubts about other MRAP life-saving claims. The simple fact is that “by the time the vehicles [MRAPs] finally flowed into the combat zone, the need for them had diminished because the insurgency and the IED problem in Iraq were on the decline.”¹¹

The MRAP undoubtedly saved the lives of troops. The difficulty is proving the life-saving statistics given the numerous changes in the environment during the same period as the introduction of the MRAPs. All of the disparate efforts of JIEDDO combined during the same period in Iraq to create a synergistic effect that reduced the IED threat to troops. These efforts combined with the increased capabilities and capacity of Iraqi Security Forces as well as the “Sunni Awakening” to decrease the ability for insurgents to plan, resource, and execute effective IED attacks at the same level as previous years. “IED effectiveness dropped from a high of over 50 percent (measured by their ability to produce coalition casualties) early in the war to less than 10 percent effectiveness by the time MRAPs began flowing to theater in the fall of 2007.”¹² The MRAP added to insurgent difficulties to execute effective IED attacks, but is only one part in a larger effort to increase security within the country. As a result, proving the effectiveness of the MRAP in reducing casualties is difficult at best, making the future of the MRAP more questionable.

The Future of the MRAP

The end of military operations in Iraq in 2011 and the impending completion of operations in Afghanistan shifted the focus of the MRAP debate from crew protection in the current fight to the capabilities of the vehicle to support military operations in future conflicts. This assessment is relatively straightforward based on ongoing activities to divest the Marine

¹¹ Lamb, Schmidt, and Fitzsimmons, “MRAPs, Irregular Warfare, and Pentagon Reform,” ix.

¹² Ibid., 9.

Corps and Army of the vast majority of the MRAP fleet. The debate on the future of the MRAP brings to light another weakness not identified in the frenetic activities to acquire a vehicle with drastically improved armor—a lack of a long-term plan for the combat platform.¹³

Current fiscal constraints result in an emphasis on ensuring the military only maintains capabilities that provide the most “bang for the buck”; specifically, vehicles with capabilities across numerous mission sets instead of those with a single-purpose. The cumbersome size of the MRAP, bought as a wartime contingency to meet one specific threat, along with the associated operating costs, force the services to reduce the MRAP fleet drastically. Not surprisingly, the cost to demilitarize the MRAPs and sell the pieces as scrap proves more cost effective than shipping the vehicles home. Army estimates describe a requirement for \$1.7 billion in supplemental wartime funds to reset, modernize, and retain the desired number of MRAPs within the inventory. Given the current fiscal realities, this is a large budgetary requirement. If overseas contingency operations (OCO) funds are not able to resource this cost, the Army will have to use funds from the operating budget to resource the MRAP reset and modernization bill.¹⁴

The Army is planning on maintaining roughly one third of the MRAPs purchased, with the vast majority moving into pre-positioned stocks around the world with a small fleet available within the United States to conduct training. Of these 8,585 MRAPs, the Army plans to store 5,036 (59%) in pre-positioned fleets. Of the other 3,549 MRAPs, 1,073 will resource training

¹³ Paul McLeary, “Majority of US MRAPS To Be Scrapped or Stored,” *DefenseNews.com*, 5 January 2014, at <http://www.defensenews.com/article/20140105/DEFREG02/301050007/Majority-US-MRAPs-Scrapped-Stored> (accessed November 19, 2014).

¹⁴ Ibid. It costs approximately \$12,000 to demilitarize the MRAP and ship the parts compared to \$50,000 to ship the MRAP home. Army estimates for redeploying, repairing, and modernizing the MRAP is between \$250,000 and \$300,000 per vehicle.

requirements with the remaining 2,476 MRAPs being added to the modified table of organization and equipment (MTOE) of Army units. The vast majority of these MRAPs are the Oshkosh produced M-ATV (5,651 or 66%), with the Navistar produced MaxxPro Dash (2,633 or 31%) and MaxxPro ambulances (301 or 3%) constituting the remainder of the MRAP fleet.¹⁵ The Army's plan to reduce the number of MRAP manufactures and variants will reduce the sustainment cost.

The cost of maintaining the MRAP continues to cause budgetary difficulties that are only exacerbated by current fiscal constraints. Given the current fiscal realities, any dollar spent on the MRAP reduces the funds available to acquire more effective capabilities that ensure the safety and security of military personnel in combat. Continuing to purchase a large number of expensive vehicles with limited utility across a broad spectrum of mission requirements constitutes a waste the military does not need.¹⁶ Rather than using the MRAP as the primary vehicle for every unit within the Army, as done in Iraq and Afghanistan, the Army should prioritize MRAP allocation to sustainment forces based on established needs for these forces to have increased security and protection while conducting sustainment convoys.

The other primary factor contributing to the military divestiture of the vast majority of MRAPs is the size and weight of the vehicle. The dimensions of the MRAP and friction this causes with the employment of MRAPs also make the deployment of MRAPs problematic. These MRAP characteristics increase Army and Marine Corps operations by increasing the requirements for ships to either deploy in the case of the Army or conduct landing operations in the case of the Marine Corps. Prior to the introduction of the MRAP, cube space was the limiting factor for support ships to move equipment to theaters of operation. The weight of the

¹⁵ Paul McLeary, "Majority of US MRAPS To Be Scrapped or Stored."

¹⁶ Chris Rohlf and Ryan Sullivan, "The MRAP Boondoggle," *ForeignAffairs.com*.

MRAP altered this limiting factor with many ships now transiting the oceans with available space, but at full weight capacity.¹⁷ A central component of Marine Corps operations include battalion to regimental sized forces onboard ships with all of their equipment, prepared to execute combat operations. The increased requirements to support MRAPs alters the method of deployment and employment of Marine Corps forces, increasing the difficulty and risk levels for executing war-time missions. The size and weight factor of the MRAP increases difficulties for the Army for much of the same reasons, with the reduction in forward basing only adding to the Army's strategic lift needs.

MRAP operations costs and increased requirements for shipping resources limits the inclusion of this vehicle within the military fleet in the future. These factors led to decisions to minimize the size of the MRAP fleet while ensuring that these vehicles are included in pre-positioned stock throughout the world to mitigate the impact of the size and weight of the MRAP on deployment operations. These decisions allow the military to maintain the MRAP to support contingency operations as required, while allowing forces to focus effort in training and resource management on systems supporting a wider array of mission capabilities.

¹⁷ This information was obtained from a briefing given to the JAWS class on unit deployment operations from the instructor.

CHAPTER 5: CONCLUSION

We love technology. We blanket the battlefield with high-tech, chip-driven devices and precision munitions. If our electronic eyes can see it, we can hit it with great precision. We like a big battlefield that we can control, that allows us to stretch out and overwhelm the enemy. We want short-duration conflicts in which we dominate the tempo of operations and casualties are minimal; we compel the enemy to fight on our terms. We are obsessed with intelligence and invest greatly in all sorts of systems that dissect the battlefield and the enemy every which way from Sunday. We don't like "boots on the ground" for any prolonged period. We are enamored with special operations forces that can strike with great skill and disappear into the darkness. And we need to have absolute moral certainty in our cause.¹

Tony Zinni and Tony Koltz, *Before the First Shots are Fired: How America can Win or Lose Off the Battlefield*

The quote above speaks to what is commonly referred to as the "American Way of War." Operation Desert Storm reinforced this uniquely American vision of war, providing proof that technologically superior forces can decisively defeat any adversary quickly, without sustaining large numbers of casualties. The lessons of Desert Storm merged with the theory of military revolutions and revolutions in military affairs, furthering the belief that smaller, more agile, and technologically advanced forces could achieve success in the newly arriving information revolution. The change in the international environment caused by the implosion of the Soviet Union in 1991 increased the growing American hubris by proving another example of U.S. victory in war, albeit a Cold War. While the United States basked in the "glory" of being the "Global Hegemon", no serious effort occurred to take a deeper look at the rapidly changing international order fueled by the effects of globalization and information availability. This lack of understanding directly contributed to the fallacious theory of "Shock and Awe" endorsed by

¹ Zinni and Koltz, *Before the First Shots are Fired: How America can Win or Lose Off the Battlefield*, 161-162.

Secretary Rumsfeld and followed during the opening stages of war in both Afghanistan and Iraq. In hindsight, this theory of war contributed greatly to the mistakes made by the United States following the destruction of the Taliban and Hussein regimes.

The proponents of “Shock and Awe” overlooked the nature of war as postulated by Clausewitz in *On War*. The United States approached combat operations without an appreciation of the element of chance in war. Instead, the Bush Administration approached these wars with a certitude unknown in previous times. This certitude led to miscalculations and bad decisions like limiting the number of forces for post-conflict operations, disbanding the Iraqi Army, and de-Baathification efforts. These miscalculations increased the chaos within Iraq, setting the stage for the development of an insurgency. The technological determinism of American decision makers caused them to miss the fact that “new technologies, even when intelligently absorbed into a plausible RMA, are not likely to lessen the gamble inherent in war.”² The outcome of operations in Afghanistan and Iraq were never assured—the decision to attack both countries remained a gamble like every other decision of this type throughout history.

Beware Technological Solutions

The largest lesson learned from operations in Afghanistan and Iraq is that war remains a fundamentally human endeavor where adversaries remain vigilant to identify and exploit weaknesses in their opponent to gain an advantage. “Although war is fraught with problems with a technological dimension, the institution of war is not itself a technological problem.”³ The U.S. effort to seek technological solutions to the IED problem is an example of placing too much importance on the use of technology and the negative impacts this single-minded focus

² Colin S. Gray, “Weapons for Strategic Effect: How Important is Technology?” *Occasional Paper No. 21, Center for Strategy and Technology, Air War College*. (Maxwell Air Force Base: Air University, January 2001), 13.

³ *Ibid.*, 8.

causes during the execution of missions. The IED surprised U.S. forces not because the use of IEDs in previous conflicts was not understood, but because the almost fanatical belief in “Shock and Awe” was incapable of accounting for the idea of an evolving adversary maintaining the will to fight once “freed” from a dictator.

As security continued to devolve within Iraq, insurgents continued to seek an asymmetric advantage over U.S. forces through the use of IEDs. The IED proved a strategic weapons based on the impact casualties made on the will of the American people to continue to support combat operations. The insurgent belief that Americans will not tolerate large numbers of casualties contributed to their concerted efforts to counter every mitigation strategy developed to counter the effects of IED attacks. “New technologies, even when packaged for effectiveness with appropriate changes in military organization, ideas for operations, and forces, must encourage strategically competitive responses from abroad.”⁴ As armor protection increased, insurgent forces modified IED size and employment to counter these advancements and continue to cause American casualties.

The evolution of JIEDDO shows the amount of effort placed on countering the IED threat. The political environment within the United States and a continued rise in IED casualties forced an emphasis on defeating the device, forcing other efforts—defeating the network and training the force—into the background.. In most instances, a lack of equipment to resource training resulted in limited exposure prior to deployment. Technological advancements increase the chance of success, but require time to train and incorporate into operations to truly become effective. Attempting to incorporate new technologies into operations effectively while in contact with the enemy is problematic, often placing mission success in jeopardy. Although the

⁴ Ibid., 11.

phrase “there is no silver bullet” is often stated, U.S. efforts to consistently seek technological solutions for every problem shows an unwillingness to learn from previous mistakes.

Mythological Quests

The story of Achilles is appropriate as a metaphor for the MRAP. While still a baby, Achilles mother dipped him in the River Styx to make him impervious from harm. While accomplishing this task, she held Achilles by the ankle, preventing the water from covering his flesh in that spot, making his ankle a vulnerable point. To protect Achilles further, his mother asked Hephaestus, the god of the forge, to make him an impenetrable shield. Despite every effort by his mother, Achilles died in battle from an arrow shot through his ankle.

The story of the MRAP shares many similarities with the story of Achilles. The United States Government made every effort to provide impenetrable equipment to the troops. Despite these efforts, insurgent forces continued to cause casualties from IED attacks although the effectiveness of IED attacks decreased over time. Many factors led to the decreased effectiveness of IED attacks and resultant decrease in U.S. casualties. As this paper has shown, the argument that the MRAP proved the decisive factor is fraught with problems. Instead of providing troops with an impenetrable vehicle, the MRAP contained numerous limitations that made the accomplishment of security issues more difficult.

The emphasis placed by senior commanders in Iraq on technological advancements to solve IED casualties is a critical fact in the MRAP story. Lt. Gen. James N. Mattis, who headed the Marine Corps Combat Development Command, propagated the technological myth by stating, for “a country that can put a man on the moon in 10 years, or build a nuke in 2 ½ years of wartime effort, I don’t think we’re getting what we need from technology on that point

[mitigating the effects of IEDs on Marines]”⁵ The belief that technology could overcome the IED threat shows American over-reliance on technology to solve problems. A multi-faceted and complex problem-set like the IED simply cannot be solved through the development of a single technological solution like the lunar rocket or atomic bomb. There simply is no silver bullet for solving the IED problem. Comparing a dynamic network to a discreet problem is an act of futility and highlights a lack of understanding in the nature of the wars in Afghanistan and Iraq.

The MRAP did provide increased armor protection from IED attacks, but like Achilles shield and vulnerable ankle, the MRAP proved incapable of ending IED casualties. Insurgent forces continued to adapt with bigger IEDs and altered attack methods to counter the armor protection provided by the MRAP. No increases in technology proved capable of overcoming chance in war. The understanding that technology could not overcome the IED threat is best expressed by Brig. Gen. Votel, the Joint IED Task Force Director, who regretted the Manhattan Project metaphor used by Abizaid. “The metaphor implied a facile, scientific solution to IEDs, a technological silver bullet.”⁶

Maintaining Advantage

Between the fall of the Berlin Wall in 1989 and the implosion of the Soviet Union in 1991, the world changed. Most of the writings during this period of time focused on the theory of a unipolar world order with the United States as the “Global Hegemon”. While the effects of globalization and information availability throughout the world generated much debate, no clear and concise understanding of the dynamics of the international system emerged. Instead, focus

⁵ Rick Atkinson, “You can’t armor your way out of this problem,” *The Washington Post*, 2 October 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/20/01/AR2007100101760_pf.html (accessed on 26 November 2014).

⁶ Rick Atkinson, “There was a two-year learning curve...and a lot of people died in those two years,” *The Washington Post*, 1 October 2007. http://www.washingtonpost.com/wp-dyn/content/article/2007/09/30/AR2007093001675_pf.html (accessed on 26 November 2014).

remained on symptoms without the identification of the disease with the expectation that the administration of a cure developed to combat a different disease would still prove effective.

While we continue to focus the development of military equipment and force structure to face advanced technologies of the future, we overlook examples that our enemies of the future will be enemies out of our past. The Pentagon continues to place effort and funding behind more technologically sophisticated equipment that proves counterproductive to the military's ability to face emerging enemies. These efforts increase asymmetries between U.S. military forces and their adversaries, but not necessarily to American advantage. "In this age of technological miracles, our military needs to study mankind. The heart of the problem is not the weapon, but the man who builds and wields it."⁷

The rise of the Islamic State of Iraq and the Levant, the actions of violent extremist organizations throughout Northern Africa and the Middle East, Russian actions in Ukraine, and other conflicts throughout the world are indicative of an almost complete breakdown in the international system. Despite the efforts of the United States to increase stability throughout the world, agents of instability continue to exist and in most aspects are expanding beyond borders and regions and encapsulating the world. "In recent decades we have so far failed to think and act strategically. Our leaders...never give serious thought to how we should respond to this new, complex world."⁸ Leveraging American intellectual capital by comprehensively studying the changes in the international environment following the end of the Cold War is the first step to maintaining U.S. advantage.

⁷ Ralph Peters, *Fighting for the Future: Will America Triumph* (Mechanicsburg, PA: Stackpole Books, 1999), 171-172.

⁸ Zinni and Koltz, *Before the First Shots are Fired: How America can Win or Lose Off the Battlefield*, 91.

This level of understanding forms the foundation for developing a National Strategy that achieves American objectives in the twenty-first century. Without this understanding, efforts to identify attainable ends and subsequently link ways and means to achieve those ends is an act of futility. This will lead to military formations that are not manned or equipped to achieve success. The current fight over the future of the A-10 within the Air Force is indicative of this difficulty. The A-10 is a proven capability, but for what conflict? Much like the MRAP, the A-10 is suited for a specific type of conflict which may no longer be possible. But the argument over the A-10 does not include any discussions of this type. An understanding of the evolving international system is required to determine the utility of the A-10 to meet future challenges. Until the U.S. alters the analytical lens to properly “see” the world as it now is and subsequently identify a probable future world, the decision over which system to retain or develop will continue to be based on emotions and limited gains at the expense of the Nation. “In this still new century, we must learn how to blend the powers we so successfully developed in the twentieth century—military, economic, and governance—with the ones we need to work on: diplomacy, conflict resolution, and building international partnerships.”⁹ This is the way to maintain United States advantage.

⁹ Ibid., 218.

This page intentionally left blank

BIBLIOGRAPHY

- Bacevich, Andrew J. *The New American Militarism: How Americans are Seduced by War*. Oxford: Oxford University Press, 2005.
- Balle III, Joakim Kasper Oestergaard. "About the MRAP Vehicles." *Aerospace and Defense Intelligence Report 2014*. <http://www.bga-aeroweb.com/Defense/MRAP-Vehicles.html> [accessed on 19 NOV 2014]
- Bulkley, Michael E. and Gregory C. Davis, "The Study of the Mine Resistant Ambush Protected (MRAP) Vehicle Program and Its Impact on the Warfighter." Joint Applied Project, Naval Postgraduate School, June 2013.
- Bush, George W. (remarks to the crew of the USS Abraham Lincoln off the coast of San Diego, California, 1 May 2003), on-line at <http://www.state.gov/p/nea/rls/rm/20203> (accessed 26 March 2006).
- Carr, Walter. "Defeating the IED: JIEDDO's Mission Impossible, the Lure of Technology, and the Emergence of the COIN Solution." Marine Corps University, United State Marine Corps Command and Staff College, 12 April 2011.
- Carroll, Ward. "A Primer in MRAP Variants." *Defensetech*. 23 October 2007. <http://defensetech.org/2007/10/23/a-primer-in-rap-variants/> [accessed on 29 November 2014].
- Clausewitz, Carl von. *On War*. Translated and Edited by Michael Howard and Peter Paret. New York: Alfred A. Knopf, 1976.
- Department of the Army. *The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing)*. Headquarters Department of the Army, Washington D.C., 18 June 2007.
- Feickert, Andrew. *Mine-Resistant, Ambush Protected (MRAP) Vehicles: Background and Issues for Congress*, Washington, D.C.: Library of Congress, 1 August 2008, 15 June 2009, and 7 June 2010.
- Fehrenbach, T.R. *This Kind of War: The Classic Korean War History*. New York: Potomac Books, 2008.
- Flurry, B.G. "The MRAP: A Bad Rap for the Marine Corps." *EWS Contemporary Issue Paper*. Marine Corps University, Marine Corps Command and Staff College, 19 FEB 2008.
- Gates, Robert M. *Duty: Memoirs of a Secretary at War*. New York: Alfred A. Knopf, 2014.
- Gray, Colin S. "Weapons for Strategic Effect: How Important is Technology?" *Occasional Paper No. 21, Center for Strategy and Technology, Air War College*. (Maxwell Air Force Base: Air University, January 2001).

- Hedges, Stephen J. "Pentagon: All vehicles armored by June." *Chicago Tribune*, 16 December 2004. http://articles.chicagotribune.com/2004-12-16/news/0412160201_1_armored-vehicles-armor=plates-defense-secretary-donald-rumsfeld [accessed on 19 NOV 2014]
- Icasualties.org, "Operation Iraqi Freedom and Operation Enduring Freedom Casualties." <http://www.icasualties.org/> (accessed 10 December 2014).
- Kim-Mitchell, Elena. "The Inevitability of Military Force." National Defense University, National War College. 2002.
- Knox, Macgregor and Williamson Murray, ed. *The Dynamics of Military Revolution: 1300 – 2050*. Cambridge: Cambridge University Press, 2001.
- Krepinevich, Andrew F. and Dakota L. Wood, *Of IEDs and MRAPs: Force Protection in Complex Irregular Operations*. The Center for Strategic and Budgetary Assessments, 2007.
- Lamb, Christopher J., Matthew J. Schmidt, and Berit G. Fitzsimmons. "MRAPs, Irregular Warfare, and Pentagon Reform." *Occasional Paper*. National Defense University, Institute for National Strategic Studies, June 2009.
- McCormick, David. *The Downsized Warrior: America's Army in Transition*. New York: New York University Press, 1998.
- McLeary, Paul. "Majority of US MRAPS To Be Scrapped or Stored." *Defense News*, 5 January 2014. <http://www.defensenews.com/article/20140105/DEFREG02/301050007/Majority-US-MRAPs-Scrapped-Stored> [accessed on 19 NOV 2014]
- Murray, Williamson and Allan R. Millett, ed. *Military Innovation in the Interwar Period*. Cambridge: Cambridge University Press, 1996.
- Odeirno, LTG Raymond T. "Counterinsurgency Guidance." Headquarters Multi-National Corps-Iraq. Baghdad, Iraq, June 2007, <http://smallwarsjournal.com/documents/mncicoingguide.pdf> [accessed 8 FEB 2015].
- O'Donnell, Norah and Ted Savaglio. "Bush: Soldiers' equipment gripes heard." *NBC, MSNBC.COM and News Service*. 9 DEC 2004. http://www.nbcnews.com/id/6676765/ns/world_news-mideast_n_africa/t/bush-soldiers-equipment-gripes/ [accessed on 19 November 2014].
- Parsons, Dan. "Repurposed MRAPs Find New Life in Police Agencies." *National Defense Magazine*, April 2014. <http://www.nationaldefensemagazine.org/archive/2014/April/Pages/RepurposedMRAPsFindNewLifeinPoliceAgencies.aspx> [accessed 9 FEB 2015].

- Peters, Ralph. *Fighting for the Future: Will America Triumph*. Mechanicsburg, PA: Stackpole Books, 1999.
- Pew Research Center. "Public Attitudes Toward the War in Iraq: 2003-2008. 19 March 2008. <http://www.pewresearch.org/2008/03/19/public-attitudes-toward-the-war-in-iraq-20032008/> (accessed on 18 March 2015).
- Prospective Technology Incorporated. "Army Programmatic Environmental Assessment of the Mine Resistant Ambush Protected (MRAP) Vehicle Program." Report prepared for U.S. Army TACOM Life-Cycle Management Command. December 2010.
- Rohlf, Chris and Ryan Sullivan. "The MRAP Boondoggle: Why the \$600,000 Vehicles Aren't Worth the Money." *Foreign Affairs*. 26 July 2012. <http://www.foreignaffairs.com/articles/137800/chris-rohlf-and-ryan-sullivan/the-mrap-boondoggle> [accessed on 6 August 2012]
- Schmitt, Eric. "Troops' Queries Leave Rumsfeld on the Defensive." *New York Times*. 9 December 2004. http://www.nytimes.com/2004/12/09/international/middleeast/09rumsfeld.html?_r=0&pagewanted=print&position [accessed on 19 November 2014].
- Sisk, Richard. "Pentagon shuts MRAP production line." *DoD Buzz: Online Defense and Acquisition Journal*. 1 October 2012. <http://www.dodbuzz.com/2012/10/01/pentagon-shuts-mrap-production-line/> (accessed 20 FEB 2015).
- Smith, Andrew. "Improvised Explosive Devices in Iraq, 2003-09: A Case of Operational Surprise and Institutional Response," *The Letort Papers*. Strategic Studies Institute, U.S. Army War College, Carlisle, Pennsylvania, April 2011.
- Suarez, Ray. "Troops Question Secretary of Defense Donald Rumsfeld about Armor." *PBS Newshour*. 9 December 2004. Transcript of television show. http://www.pbs.org/newhour/bb/military-july-dec04-armor_12-9/ [accessed on 19 November 2014].
- 3d Sustainment Command Expeditionary Public Affairs. "Army fields new MRAP rollover trainers," *WWW.Army.MIL: The Official Homepage of the United States Army*. May 11, 2009. http://www.army.mil/article/20897/Army_fields_new_MRAP_rollover_trainers/ (accessed 10 February 2015).
- Ullman, Harlan and James Wade Jr. "Shock and Awe: Achieving Rapid Dominance," National Defense University. Institute for National Strategic Studies: Advanced Concepts, Technologies, and Information Strategies, November 1996.
- United States Army Field Manual No. 3-24. *Counterinsurgency Field Manual*. Chicago: University of Chicago Press, 2007.

Wikipedia, the Free Encyclopedia. “Improvised vehicle armour.”
http://en.wikipedia.org/wiki/Improvised_vehicle_armor [accessed on 19 November 2014]

Zinni, Tony and Tony Koltz. *Before the First Shots are Fired: How America can Win or Lose Off the Battlefield*. New York: Palgrave Macmillan, 2014.

VITA

Lieutenant Colonel Charles S. Armstrong graduated in 1993 from the United States Military Academy with a degree in International Relations and was commissioned as an Armor Officer. He served in a number of leadership positions in the United States and Korea to include Tank Platoon Leader, Mortar Platoon Leader, Tank Company Commander, Brigade Reconnaissance Troop Commander and Combined Arms Battalion Commander. He served in a number of staff positions from battalion through division level to include battalion S1, Maintenance Officer, and S-3 (Operations Officer), brigade S3 (Operations Officer and Executive Officer, and division maneuver planner, G5 (Chief of Plans) and G3 (Operations Officer). He served three tours of duty in support of Operation Iraqi Freedom (I, 06-08, and 08-10) and one tour of duty in Afghanistan (12). LTC Armstrong is a graduate of the Armor Basic and Career Course, Command and General Staff College, and the School of Advanced Military Studies where he earned a Masters Degree in Military Arts and Science.