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The task assigned to the Joint Improvised Explosive Device Defeat Organization (JIEDDO), to defeat the improvised explosive device (IED) as a weapon of strategic influence, was an impossible and poorly-defined task. It was the insurgency, not the IED that was strategically important, and the best solution was a counterinsurgency.

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MASTER OF MILITARY STUDIES

Defeating the IED: JIEDDO's Mission Impossible, the Lure of Technology, and the Emergence of the COIN Solution

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
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Executive Summary

Title: Defeating the IED: JIEDDO's Mission Impossible, the Lure of Technology, and the Emergence of the COIN Solution

Author: Major Walter Carr, United States Marine Corps

Thesis: The task assigned to the Joint Improvised Explosive Device Defeat Organization (JIEDDO), to defeat the improvised explosive device (IED) as a weapon of strategic influence, was an impossible and poorly-defined task. It was the insurgency, not the IED that was strategically important, and the best solution was a counterinsurgency.

Discussion: This paper will explore the nature of the IED problem, the creation and evolution of various Counter-IED organizations into the Joint Improvised Explosive Device Defeat Organization (JIEDDO), the development of the strategy being pursued by JIEDDO to counter the use of IEDs, and will attempt to analyze the effects of these efforts in the current conflicts in Iraq and Afghanistan. The Joint Improvised Explosive Device Defeat Organization (JIEDDO) was given the poorly defined task to "defeat the IED as a weapon of strategic influence." The term "IED" is likewise a very imprecise and ambiguous term. The organization sought to accomplish the assigned task via a three-pronged strategy: "defeat the device," "attack the network," and "train the force." Heavily armored wheeled vehicles, electronic radio jammers, persistent surveillance systems, and other high technology solutions were developed. Additional intelligence organizations were created to focus on the human networks responsible for making IEDs. The technical improvements in counter-mine training and technology were implemented very quickly, and there was an overall decrease in the number of casualties per attack, but the number of attacks remained quite high. Eventually, the conflict in Iraq began to turn around due to political reasons, and IEDs declined dramatically. At around the same time, IEDs in Afghanistan began to increase. Due to the terrain, the heavily armored vehicles used in Iraq could not be used effectively in Afghanistan. This caused the casualty rate per attack there to climb much higher than had been the case in Iraq in 2009. Suddenly the IED was back, influencing policy at the strategic level.

Conclusion: The efforts of JIEDDO resulted in rapid and important changes in force protection against explosive hazards. The woeful vulnerability of U.S. tactical vehicles to mine threats was quickly addressed and rectified with additional armor kits and totally new mine-resistant vehicles. In this regard, JIEDDO was very successful. However, the mission of defeating the IED as a weapon of strategic influence is akin to being assigned a mission to stop insurgencies from using AK-47s. It was an impossible task. IEDs ceased to be of strategic influence in Iraq because the insurgency was defeated, not because of the efforts of a bureaucratic body.

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THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENT AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

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Preface

In the counter-IED community today, it has become popular to vilify the tendency of the U.S. military to rely on high technology to solve problems. I have occasionally indulged in this activity myself. With my background as a combat engineer officer and as a Counter-IED operations officer in Iraq, I had a front row seat for the handling of the IED problem in that conflict. I chose to write about this topic because of the many opinions I have heard about the wastefulness and ridiculousness of many counter-IED efforts. I have seen some of these crazy ideas myself—from attempts to train bees to locate IEDs, to a man who thought that we could use transcendental meditation and positive thinking to remove the enemy's desire to make IEDs (I am not making either of those up). A lot of money was thrown at the IED problem, and there did not seem to be very much in the way of oversight. As I conducted my research, I began to understand why things were the way they were. I hope that this paper will serve to shed some light on how the Department of Defense attempted to correct the institutional learning disability with regards to mine warfare.

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INTRODUCTION

"Defeating the IED (Improvised Explosive Device) threat is absolutely central to winning the Global War on Terror, and it is definitely essential for protecting the homeland..."

- Marvin Leibstone, Colonel, USA (retired)
IED Defeat Technologies and Implications

Improvised explosive devices (IED) have emerged as the principle weapon of choice by America's adversaries in Iraq and Afghanistan. Beginning in June 2003, IED incidents targeting coalition forces began to escalate from 22 per month to over 600 per month by June of 2004. In June 2006, these events reached more than 2,000 per month; and at one point that year, coalition forces in Iraq experienced almost 100 IEDs per day.[1] Greater than 50 percent of all United States military personnel casualties were attributed to the IED. Although the idea of constructing a bomb and detonating it near an adversary is hardly a new combat tactic, its application in Iraq in such large numbers took the United States military by surprise and exposed the American military forces' vulnerability to such threats. As a result, the U.S. Army and Marine Corps began several counter-IED organizations to address the problem, identifying several shortfalls in technology, personnel, training, and funding. This paper will explore the nature of the IED problem, the creation and evolution of counter-IED organizations, the strategy pursued by those organizations to counter the use of IEDs; and it will attempt to analyze the effects of these efforts in Iraq and Afghanistan.

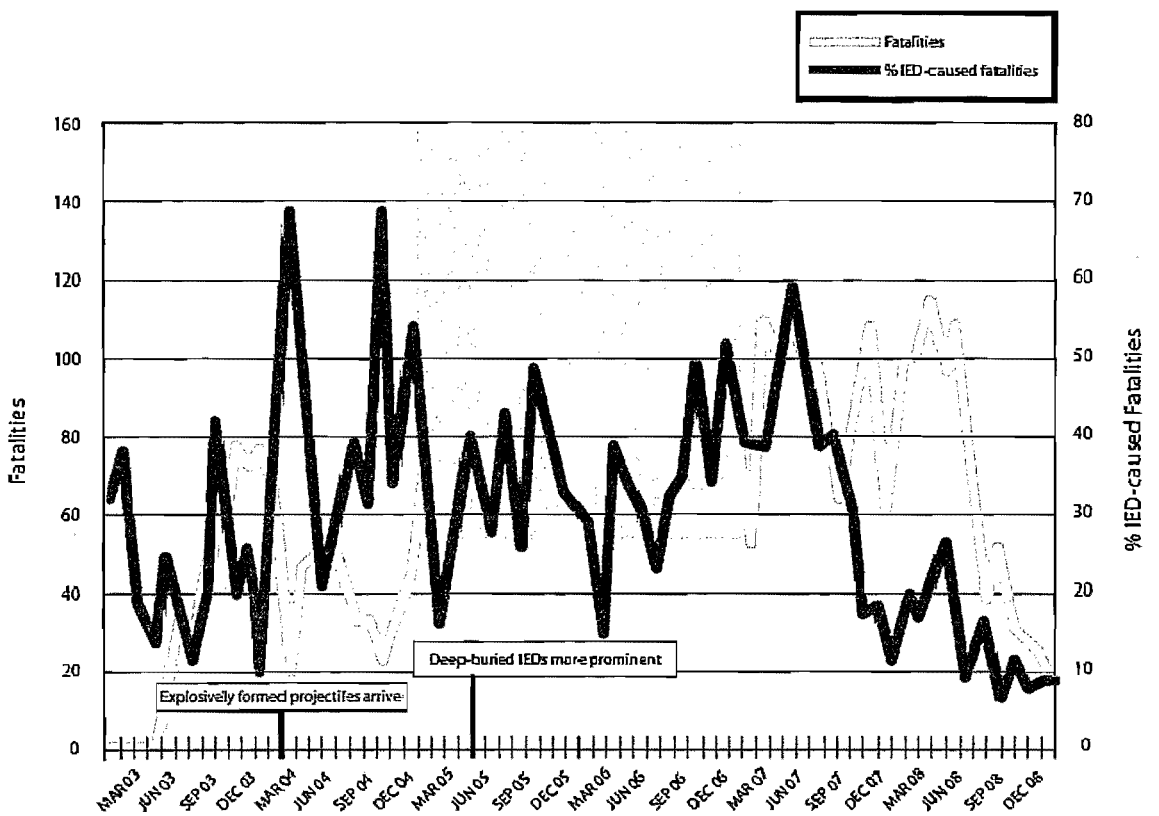
The political pressure to do something about IEDs was intense. With casualties mounting, there was a pressing need to find a way to rapidly field new equipment, which was not possible with the existing acquisition process, a process developed during the Cold War and notorious for its bureaucratic quagmires and long timelines. Furthermore, numerous programs running simultaneously across all four services resulted in much duplication of effort and wasted

resources. In response to this, the Joint Improvised Explosive Device Defeat Organization (JIEDDO) was created and evolved through a series of attempts to focus and coordinate the Counter-IED efforts within the Department of Defense. JIEDDO was tasked to "focus (lead, advocate, coordinate) all Department of Defense actions in support of the Combatant Commanders and their respective joint task forces' efforts to defeat IEDs as weapons of strategic influence."[2] The term "strategic influence" was not precisely defined, but it was taken to mean that it affects the decision-making of leaders at the strategic level.

JIEDDO has experienced some success in coordinating the counter-IED fight, but the IED remains as a weapon of strategic influence despite billions of dollars spent in the fight against it. The two main reasons for this failure are the focus on high technology as the solution and a poor understanding of the nature of the problem. High technology has proven less than effective, since each IED is essentially constructed on-site at the battlefield and it can be altered and updated much more quickly than high-tech countermeasures can be developed, placing the enemy at an advantage. In fact, the most effective JIEDDO programs were lower-technology in nature (i.e. upgraded armor protection, mine rollers, closed-circuit cameras). The greater problem is a basic lack of understanding of how IEDs are actually employed, which makes creating effective programs and technologies problematic.

Determining the effectiveness of so many simultaneous and widely varied programs against such a subjective metric as "defeating a weapon of strategic influence" is difficult if not impossible. 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. Though JIEDDO has demonstrated tremendous success at rapidly developing and fielding new technologies, it is difficult for an objective observer to determine whether any of its specific

programs or initiatives is effective. The nature of warfare, especially counter-insurgency, means that all of the different parts of the environment react with each other in unexpected ways. The task assigned to JIEDDO, to defeat the IED as a weapon of strategic influence, was an impossible task. It is akin to assigning this bureaucratic body the task of making the insurgents cease using Kalashnikov rifles.



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.

Figure 1

Figure 1: Percentage of IED-caused Fatalities in Iraq

From: Lamb, Christopher J., Matthew J. Schmidt, and Berit G. Fitzsimmons. *MRAPs, Irregular Warfare, and Pentagon Reform*, 2.

IMPROVISED EXPLOSIVE DEVICES

The first difficulty in framing the problem of improvised explosive devices is in defining exactly what is meant by the term IED. An improvised explosive device is defined in the Joint Publication (JP) 1-02 as "a device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic, or incendiary chemicals and designed to destroy, incapacitate, harass, or distract. It may incorporate military stores, but is normally devised from nonmilitary components."[3] This comprehensive definition is of little use at all, since it seems to include virtually everything that explodes.

Instead, a better way to approach IEDs is to look at them as a family of capabilities for the insurgent warfighter. First, there is the traditional use of a placed explosive as a terror weapon. In this role, the explosive devices are transported to a target and left to explode at a later time, such as the familiar car bomb or a brief-case bomb detonated in a crowded marketplace, or perhaps left on an airplane or a bus. Another capability is the use of the IED as a guided weapon, by the addition of a "martyr" to steer the car or wear the bomb as a vest. Using a "suicide bomber" allows for precise targeting and timing of the detonation and it allows the use of the IED as an offensive military weapon against hardened targets.

A third capability is the use of the IED as a landmine. This is the role in which the vast majority of IEDs are used. JP 1-02 defines the land mine as "an explosive or other material, normally encased, designed to destroy or damage ground vehicles, boats, or aircraft, or designed to wound, kill, or otherwise incapacitate personnel. It is designed to be detonated by the action of its victim, by the passage of time, or by controlled means."[4] The fact that the device was manufactured for this purpose at a factory somewhere or constructed in a kitchen in Fallujah is of

no consequence to its employment. Another similar means of employing explosives is the creation of a booby trap, which differs from a mine only in the concealment technique. That is, a booby trap is activated when a seemingly innocuous object is disturbed, such as a telephone or a closet door, and a land mine is usually completely concealed from view. Of all of the possible employment methods, it is the use of the IED in the land mine role that is the primary threat posed to U.S. forces.

None of this is new. Rather, IED is a new acronym for an old phenomenon. For example, during the Second World War, guerrilla fighters attacked German trains using artillery shells which were rigged with delayed time fuses. Che Guevarra, the Argentine communist revolutionary figure, describes in his writings from 1960 the use of IEDs, including radio-controlled, command-detonated types, for ambushes.[5] In fact, during most of the counter-insurgency conflicts since 1945, guerrilla fighters have often sought to reduce the ability of the dominant military force to move through their terrain through the use of booby traps and mines. The reasons for this are principally that such devices reduce the risk of the guerrilla being killed or captured, which is virtually guaranteed in a stand-up fight, given the firepower and armor of most modern conventional military units. Whether manufactured or improvised, mines have proven to be one of the most cost-effective ways for an under-equipped and poorly trained force to attack the mobility and morale of a superior opponent.[6]

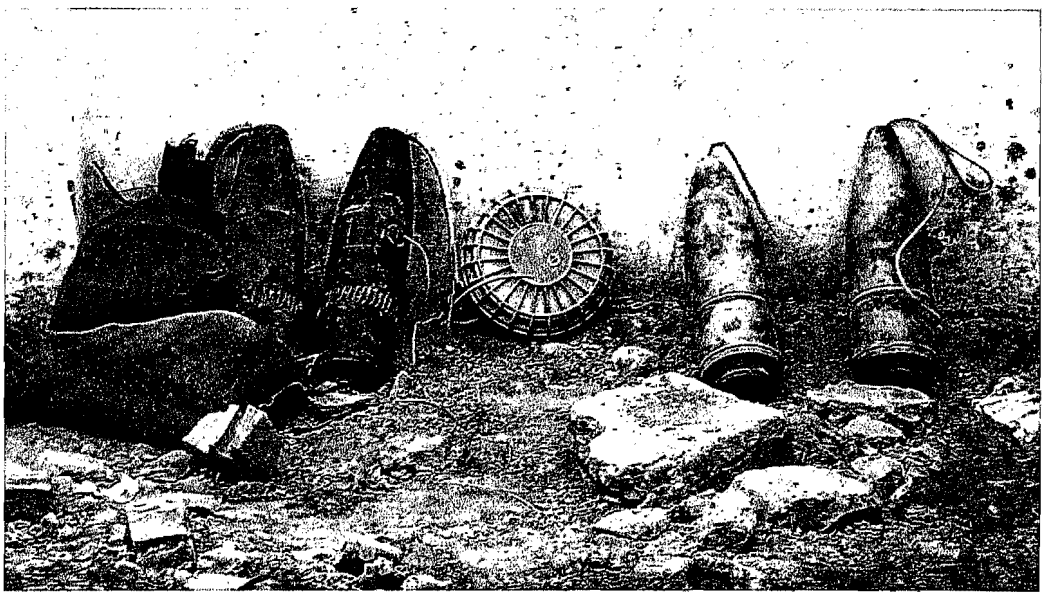


Figure 2

Figure 2: IEDs Found in Baghdad, Iraq

http://ca7science.wikispaces.com/file/view/IED_Baghdad_from_munitions.jpg/34526521/IED_Baghdad_from_munitions.jpg

Contemporary conflicts, such as those in Vietnam, Northern Ireland, Lebanon (1982, 2006), Afghanistan (post 1979), and Chechnya, all saw these types of improvised devices used by guerrilla fighters. So why is the IED approached as a new threat today? The principal reason is political in nature. American public and political tolerance of military casualties has been driven down by recent overwhelming successes, such as the 1991 Gulf conflict where only a handful of coalition forces' lives were lost to enemy action and the conflict in Kosovo, where air power forced the enemy to capitulate with almost no ground action. In addition, the relative ambivalence of the average American citizen towards the Iraq and Afghanistan conflicts makes the public notice when an IED destroys a vehicle,[7] often killing several soldiers at a time, especially when this spectacular event is captured on video by the insurgent and broadcast on the internet. Politicians and senior military officials needed to present the problem as a new one, or

accept the blame for failing to predict the enemy's exploitation of the U.S. vulnerability to mine warfare.

The improvised explosive device is the primary weapon of the modern guerrilla fighter in Iraq and Afghanistan. In Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF), IEDs are the number one cause of death and injury for U.S. service men and women. As of 2010, in Afghanistan 619 of 1,118 total hostile-fire deaths and 5,822 of 9,971 hostile-fire wounds were attributed to IEDs. In Iraq, the numbers are 2,195 of 3,483 total deaths and 21,584 of 31,935 total wounds, making the IED responsible for 66% of all combat casualties in that theater of operations. [8] These figures suggest that the enemy located a weakness in U.S. force protection, and exploited it to great effect. This weakness the enemy identified was the almost total lack of mine resistant vehicles within the American military's inventory in 2003.

The lack of mine resistant vehicles was a critical vulnerability to U.S. forces for several reasons. Traditionally, U.S. military doctrine depended upon its high mobility and unpredictable nature to avoid mines. In counter-insurgency, the military force is relatively stationary, and it is easy for the enemy to predict which roads the military will use. IEDs are employed to attack "iconic" heavily armored military vehicles, to demonstrate, often through the dissemination of video clips of attacks, the ability of overmatched irregular fighters to inflict damage on conventional military forces.[9] Land mine survivability has not often been the primary performance characteristic these "icon" vehicles, such as main battle tanks, were designed for. Additionally, the U.S. military is dependent on wheeled vehicles and roads for almost all combat support and logistics in any given theater of operations. Logistical support vehicles have traditionally been completely unarmored in the U.S. armed forces.

For years within the military, little training on how to defeat land mine threats or to reduce the effect of a mine strike was provided. The attitude was a cocky "...we'll go where the mines ain't;" and, if this could not be accomplished, the minefields could be quickly overcome with a mine-field breaching battle drill.[10] Recent combat experience in Iraq and Afghanistan has exposed the folly of such thought, as the enemy refused to conform to any of the conventional military's preconceived notions, stubbornly refusing to mark his minefields or to place them in easily discoverable positions. Overall, the enemy was just not conforming to existing military doctrine.

Figure 3: HMMWV Destroyed by IED in Iraq, 2005
http://www.flickr.com/photos/aliveinbaghdad/66846711/sizes/z/in/photostream

The use of IEDs has effects beyond inflicting casualties. According to U.S. Army Lieutenant General Thomas Metz, Director of JIEDDO, "IEDs are weapons of strategic influence because they attack the U.S. national will and try to undermine and eliminate Western influence."[11] The impact of IED casualties on the victim's psyche can cause hesitation and even a paralysis of a unit's tactical mobility. The loss of American lives to faceless "roadside bombs" and no enemy losses to focus on can have a powerful effect on the other troops involved and on

public opinion. In this way, an asymmetric foe can use landmine-IEDs as an economical way to wage a war of attrition against the United States and to shape American public support and political will. [12] The United States found itself on the receiving end of these tactics in Iraq in 2004.

THE CREATION AND EVOLUTION OF THE JOINT IMPROVISED EXPLOSIVE DEVICE DEFEAT ORGANIZATION

Faced with an asymmetric war against an enemy using IEDs and guerrilla mining tactics, the United States was compelled to create new organizations to address the newly-exposed vulnerability. In October 2003, the Army created the IED Task Force (IED-TF) to lead the development of counter-IED (CIED) tactics and equipment. This task force was headed by Brigadier General Joseph L. Votel, U.S. Army, and included a group of twelve former Special Operations soldiers. These men were primarily infantry officers, and they did not have much training in counter-mine warfare or in explosives technologies. Because of this, they did not fully appreciate the complexity of the IED threat. BGen Votel estimated the IED threat could be mitigated within six months.[13] This ambitious timeline would prove inaccurate.

Concurrent with the efforts of the IED-TF, the Army also established the Asymetric Warfare Group (AWG) to advise operational units in order to enhance combat effectiveness and defeat the IED threat. Purportedly, the advisory teams understood counterinsurgency theory and could train the operating forces on the latest CIED lessons learned.[14]

These two organizations were the first created, but they were Army-only; therefore the other services (primarily the Marine Corps) began developing similar solutions. No coordination between the services occurred, which sometimes resulted in parallel and conflicting programs. A prime example of this lack of coordination was the development of electronic jammers, with the Marines favoring an active system and the Army favoring a passive system. An active jammer is

constantly transmitting radio-frequency (RF) energy. A passive jammer is reactive, waiting to sense a target radio transmission before transmitting a jamming signal. When used side by side, the active Marine jammer activated the passive Army jammer constantly, causing it to overheat. These kinds of compatibility failures were common, and illustrated the need for a joint agency to control the efforts of the services.

Therefore, in 2004, General John P. Abizaid (U.S. Army), the commander of Central Command (CENTCOM), wrote a memo to the Secretary of Defense, Donald Rumsfeld, and to the Chairman of the Joint Chiefs of Staff, General Richard Myers (U.S. Air Force) requesting greater assistance in countering the IED threat. Abizaid stated 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.[15] The reference to the Manhattan Project was meant to convey the need for a large-scale, focused effort, combining the nation's best scientific minds with nearly unconstrained resources to develop technical solutions to the problem.[16] Concurrently, CENTCOM established two task forces, TF TROY in Iraq and TF PALADIN in Afghanistan, to address the CIED fight within each theater of operations.

Department of Defense civilian leaders agreed with General Abizaid, and further felt that the military efforts were far too slow and fragmented; speed and agility were required, and money was no object. Then-Deputy Secretary of Defense Paul Wolfowitz declared that "the battle against IEDs exceeded the management capacity of a single service" and recommended the creation of a task force to streamline the process.[17] Secretary of Defense Rumsfeld directed the creation of the Joint IED Defeat Task Force (JIEDD TF) in June of 2005 as "the focal point for all efforts in the Department of Defense to defeat improvised explosive devices (IEDs)."[18]

The new task force was created and was then immediately mired in bureaucracy. According to Newsweek magazine:

> The first meeting was chaired by an Army two-star general and attended by a Navy two-star admiral, many one-star Army and Air Force generals, and "more colonels than you could count," according to a participant who requested anonymity because he was discussing a secret meeting. "About an hour and a half was spent discussing the transfer to the Army of four bomb-sniffing dogs belonging to the Air Force. The cost of flying the dogs to Iraq was $35,000, but at the end of that time, there was not a soul in the room who could say, 'I will give you the money'," a participant recalled. It was a harbinger. "We were hamstrung from the beginning by an inability to actually do anything," said another participant in the meeting.[19]

This outcome was not the one hoped for when the task force was created. The counter-IED effort required the Joint IED Defeat Task Force to deliver timely IED solutions to the warfighter. However, to accomplish this speed required a paradigm shift in business practices that were traditionally tightly controlled by the services, including research, development, testing, and evaluation (RDT&E), budgeting, and acquisition. Unfortunately, that paradigm shift resulted in significant friction from the services.[20] A budget of more than $3 billion did a lot to assuage that friction, however.

The rapid expansion of a small (12-person, single service) task force into a large (four star-led, multi-service, multi-agency, and multi-national) Department of Defense organization in little more than two years presented numerous challenges that had to be overcome. To address some of the organizational and interservice friction, JIEDD TF was re-designated as the Joint IED Defeat Organization in February 2006 by DoD Directive, and the Army was tasked to lead the administration of the organization.[21] This directive formalized the organization of JIEDDO and codified the organization into DoD policy, but did not provide the organization the authority to control or to influence the actions of the services or the CIED task forces in CENTCOM, TF Troy and TF Paladin, other than through the control of the purse strings of its substantial budget.

This lack of authority remains a weakness within JIEDDO and permits the services to continue to pursue acquisition programs that may not be mine survivable, such as the Marine Corps' Expeditionary Fighting Vehicle program. The politics and economics of such large military programs can sometimes drive actions that are not necessarily in line with the actual requirements in the field. JIEDDO's inability to directly influence ongoing acquisitions means that the military could again lapse into complacency towards explosive hazards on the battlefield.

JIEDDO's STRATEGY

JIEDDO has 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. JIEDDO divides its activities into four primary mission areas, which correspond roughly to the three lines of operation. The first mission area focuses on purchasing and rapidly fielding IED countermeasures or technologies. Most of the activities for this mission correspond to the Defeat the Device line of operation, although some fall under Attack the Network. The next mission area provides intelligence support for tactical level operations. This mission area is primarily aligned with JIEDDO's Attack the Network operations. The third primary mission is training, which corresponds to JIEDDO's Train the Force line of operation.[22]

Defeat the Device

Defeat the Device was the most obvious approach to reduce IED-related casualties, and it was the approach that enjoyed the greatest success. This line of operation is concerned with mitigating or negating the effects of an IED against personnel and equipment. As such, it is primarily technology-focused and reactive in nature; the enemy fielded an IED variant, and then the technology to mitigate it was developed by JIEDDO. Defeat the Device includes the

development of material solutions, such as new vehicles and "after-market" armor kits to increase the survivability of U.S. forces in the event of an IED attack. Principal among these was the rapid development and acquisition of a family of MRAP (mine resistant, ambush protected) vehicles, such as the Cougar, the JERRV, the RG-33, the MaxxPro, and the Caiman. These vehicles were purchased in large numbers by all four services.

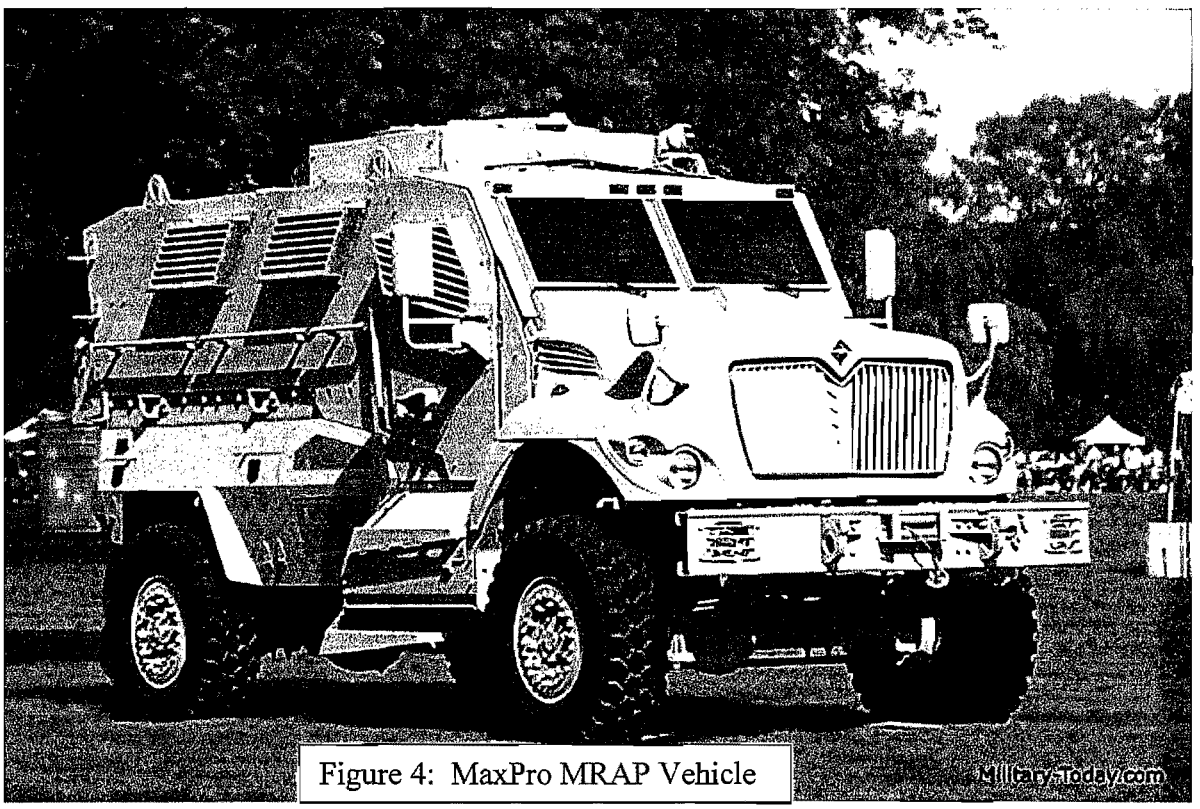


Figure 4: MaxPro MRAP Vehicle

Figure 4

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. Counter Radio-Controlled IED Electronic Warfare (CREW) was developed to combat the use of radio-controlled devices, and soon every convoy in Iraq was rolling under a "bubble" of electronic jamming. Pressure-initiated IEDs were mitigated with the re-invention of mine rollers (an idea from World War II) that could be pushed in front of trucks. Persistent surveillance systems, such as GBOSS (Ground-Based Operational

Surveillance System), were developed to keep watch on IED "hot spots," or areas where IED attacks were common. GBOSS was a sophisticated camera system mounted to a tower and linked to a computer monitor at a combat outpost. Similar systems mounted cameras and other sensors to balloons. Many types of airborne sensors were developed, designed to notice changes along a roadway through sophisticated software or to pick up the gleam of copper command wire along the desert floor, leading to IEDs on the roadway.

Not all innovation came from the industrial sector. When the enemy began to use infra-red (IR) motion detectors to detonate IEDs, soldiers in the field developed a countermeasure by placing a glow plug (a heating element used to aid in starting diesel engines) in an ammunition can suspended in front of the vehicle to detonate the device at a greater distance from the target. This idea was picked up by JIEDDO and refined into the Rhino counter-IR device.

The Defeat the Device line of operation also has a more offensive side. A family of vehicles was developed to permit the detailed searching of entire routes without dismounting from the armored vehicles. These vehicles include the "Husky" vehicle-mounted mine detector (VMMD), designed with a V-shaped hull and break away parts for mine survivability and low ground pressure tires to safely pass over antitank mine pressure plates without activating them. The Husky has a magnetic mine detector and an automatic marking system mounted to it that alerts the operator to the location of any large metallic objects. It can also be fitted with an MDT, or mine detonation trailer, which is composed of a series of closely-spaced wheels to "proof" a cleared route for victim-operated devices. That is, if there were any remaining undetected pressure-activated IEDs on the roadway, the MDT would be very likely to detonate them, due to its great weight and ground coverage.

Another example of a specifically-designed route clearance engineer vehicle is the "Buffalo," based on a large, six-wheeled V-hull design and outfitted with an articulating arm to manipulate suspicious debris and handle ordnance. The massive truck is also outfitted with numerous cameras and lights to aid in the search for IEDs, and it has enough room inside for a team of combat engineers and EOD technicians, and all of the tools they require.

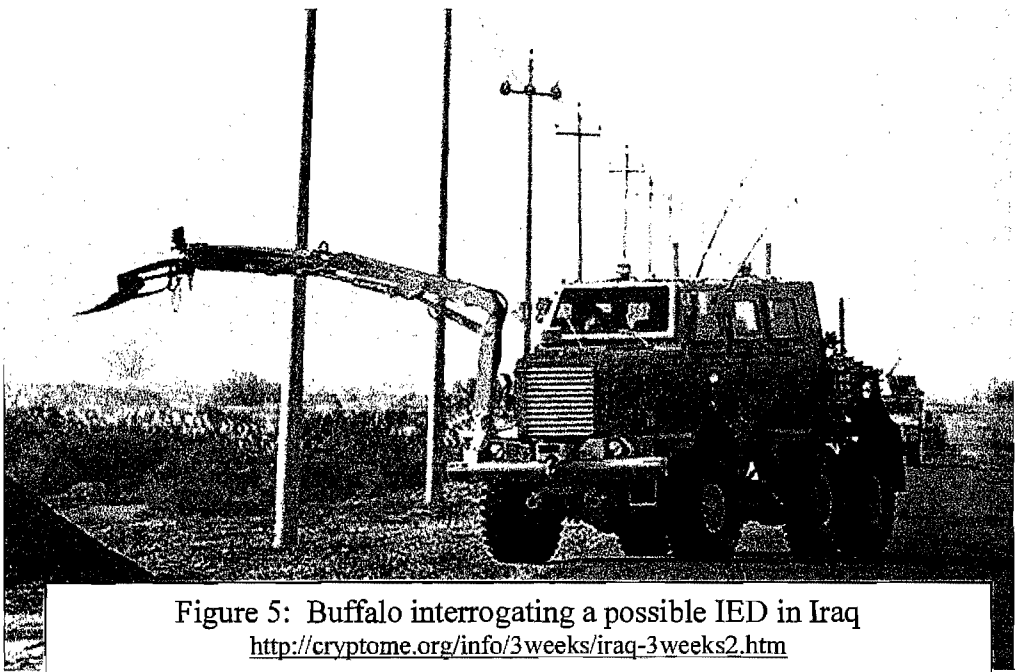


Figure 5: Buffalo interrogating a possible IED in Iraq
http://cryptome.org/info/3weeks/iraq-3weeks2.htm

Figure 5

There are also numerous robotic platforms of a variety of sizes and levels of complexity that have been fielded. Some of these, such as the PackBot, are redesigns of existing explosive ordnance disposal (EOD) robots, intended for use only by highly-trained EOD technicians. Others, such as the MARCbot, were designed to be used by regular troops on convoys to investigate suspicious-looking objects from stand-off distances.

Other IED countermeasures that were explored include technology that detects IEDs from afar, and then generate a pulse of directed high-power electromagnetic energy to prematurely detonate them, or to destroy their circuitry. An example is the Neutralizing

Improvised Explosive Devices with Radio Frequency (NIRF) which produces a very high-frequency field at very short range that can neutralize an IED's electronics.[23] A Pentagon microwave project, code-named PING, reportedly has been successful at helping locate insurgent weapons caches. The machine, which fits inside a truck, sends out electromagnetic waves that can penetrate the walls of a building to detect IEDs.[24] Other sensors, such as the Laser-Induced Breakdown Spectroscopy system (LIBS), are being developed to detect traces of explosives used for IEDs from as far away as 30 meters.[25]

There are many other examples of material solutions, hundreds in fact. Some are classified, some are rather ludicrous, but there can be no doubt that there was no shortage of American ingenuity in this line of operation. It is beyond the scope of this paper to address all of the technologies developed.

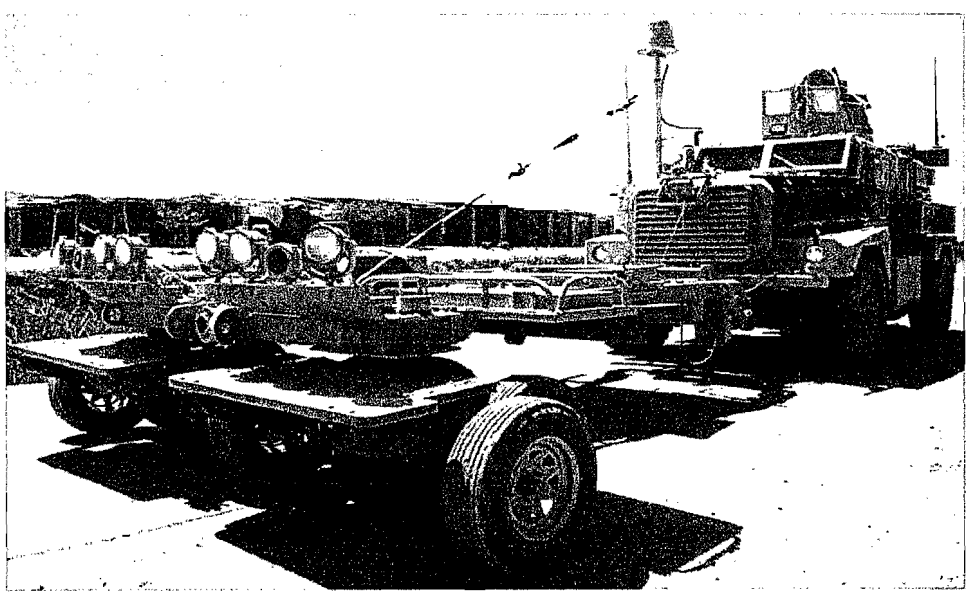


Figure 6

Figure 6: Mine Roller attached to an MRAP vehicle
(U.S. Marine Corps photo by Staff Sgt. William Greeson)
http://cryptome.sabotage.org/info/afpak-archive

The most interesting part of this flurry of new technology was the speed with which it occurred. Consider the MRAP program. Though there was a serious delay in the request for MRAP vehicles, caused mainly by reluctance within the services to expend funds for vehicles

that might not be of much use in other theaters in the future. With the creation of JIEDDO, the funding was provided, the request was made, and the vehicles were flowing to theater quickly. The MRAP family of vehicles was the first major Department of Defense acquisition to go from request to production in less than a year since World War II.[26]

Attack the Network

Attack the Network refers to the actions taken to interrupt the chain of events from the time the enemy begins to plan an IED attack until the IED is successfully detonated on a target. Attack the Network (AtN) is commonly referred to as getting "left of the boom" in CIED circles. The idea is that it takes a team of people, a network, to successfully emplace and employ a functioning IED. This network includes the explosives supplier, the financial supplier, the bomb maker, and the "trigger man." This line of operations is based primarily in the intelligence community and is the source of the most controversy surrounding JIEDDO, as some of the intelligence apparatus subsequently developed encroaches upon the dominions of existing intelligence organizations. A certain amount of technology is involved in the AtN concept as well, especially in the area of persistent surveillance; however, the main effort of JIEDDO along this line of operations is the development of actionable intelligence at the tactical level through the use of forensic investigation, police techniques, and intelligence collection. The pursuit of tactical-level intelligence using strategic means, which is then delivered to the tactical commander in the field, is the main improvement JIEDDO offers.

To provide intelligence support, JIEDDO relies on its Counter-IED Operations Integration Center (COIC). The COIC supports Coalition Force movement and attacks against enemy IED networks by collecting and analyzing available intelligence and operations data and providing a summary of that information to personnel in the field for use in tactical operations.

Although the COIC's efforts may often be redundant with those of other intelligence organizations, JIEDDO reports that its greatest strength is its ability to focus narrowly on the IED threat and to provide IED information on operationally-driven timelines. The COIC actively develops new tools to analyze and synthesize available data more effectively and to present it in user friendly form to tactical units.[27] The COIC reached full operational capability in 2007, and it maintains a joint common operational and intelligence picture of worldwide IED networks. This common picture is critical to the C-IED fight as it allows all intelligence organizations to see and share the same information wherever they are located. These common pictures and other COIC-provided products are derived from highly classified intelligence, but COIC makes the resultant products available at the SECRET level for tactical units.[28]

Although the COIC does provide value, there is considerable concern in congress and in the other intelligence organizations that there is a lack of coordination of the COIC's efforts, and that the COIC's role is not clearly defined. For instance, hostile human networks do not exclusively deal in IEDs. Networks that move IED related components also move other contraband or engage in other forms of hostilities.[29] The Global Innovation and Strategy Center (GISC) of U.S. Strategic Command conducted a study in 2008 of all efforts by the U.S. government to disrupt hostile human networks. The study found that there were 185 separate Attack the Network efforts that were not consolidated, centralized, or coordinated. The study's authors referred to this structure as "ad-hocracy."[30]

Combined Explosives Exploitations Cells (CEXC, pronounced "sexy") are another example of a program in JIEDDO's Attack the Network line of operation. CEXC units are often called the "CSI" teams of the IED fight. Intelligence, law enforcement, explosives, and technical experts form into mobile teams to investigate IED incidents and to collect evidence for

intelligence exploitation. CEXC teams may survey a post-blast site to collect fingerprints, search for signature techniques of a particular IED maker, and look for unique aspects of how the device was deployed. JIEDDO supports CEXC by funding civilian electrical engineers, information technology specialists, and intelligence analysts for these teams.[31]

There are many programs meant to bring the other agencies of the government into the fight. For example, the Law Enforcement Program (LEP) which brings law enforcement professionals from the Drug Enforcement Administration, Federal Bureau of Investigation, and police departments to operational units in theater to assist in understanding how criminal organizations operate and how to successfully prosecute suspects when apprehended. Another program is the Weapons Intelligence Team (WIT), which assists in the collecting, handling, and tracking of forensic evidence following IED attacks. These types of programs met with varying degrees of success, but overall were difficult to put into practice.

The biggest criticisms regarding the Attack the Network line of operation are the extent of the reach of COIC and of JIEDDO. This line of operation gives JIEDDO and COIC a nearly limitless scope of influence in the intelligence world. One could take the point of view that "attack the network" can just mean "win the war," and such a point of view allows JIEDDO to encroach on the missions and responsibilities of several other intelligence operations. This lack of a clearly defined limit of the organization's scope is also a source of concern to the Government Accountability Office, since this reasoning has been used by the services to use JIEDDO funds for purposes other than counter-IED operations.[32]

Train the Force

The third main line of operation in the JIEDDO strategy is Train the Force, which is the total of all the attempts to educate and train personnel prior to their deployment in the dangers of

and the countermeasures against IEDs. JIEDDO supports each of the services and combatant commands by providing training tools, expertise, and the latest adversary IED tactics, techniques, and procedures (TTP) to aid in preparing personnel for the threats they will face. The Train the Force effort is coordinated primarily through JIEDDO's Joint Center of Excellence (JCOE), which is headquartered at the Army's National Training Center at Fort Irwin, California. The JCOE ensures that the most current C-IED TTPs and equipment are available to the Combat Training Centers and the home station training areas. The COIC supports the JCOE's mission to incorporate real-time changes in enemy TTPs into the training syllabus as rapidly as possible. The JCOE's goal is to make sure that deploying units have the most up to date information when they arrive in theater. The JCOE also ensures that fresh information is continuously factored into the development, fielding, and testing of new training equipment and concepts.[33]

If money is an indicator of priority, then JIEDDO takes training seriously. JIEDDO's budget for training was $410 million in Fiscal Year 2007 and $710 million in FY 2008.[34] In 2009, it was lowered to $500 million, but the overall budget had also decreased, due mainly to the reduced commitment in Iraq.[35] In FY 2008, JIEDDO provided nearly $194 million for constructing 29 home station training lanes at active and reserve component training stations.[36] The JCOE has also funded specialized training, such as C-IED search dog team training and Counter Radio-Controlled Electronic Warfare (CREW) training. In addition, the JCOE funded the Knowledge and Information Fusion Exchange (KnIFE) at Joint Forces Command, which provides an authorized setting for military personnel to exchange C-IED data and lessons learned. Also, the JCOE provides more than 1,000 C-IED training devices, such as electronic jammers and route clearance vehicles, to various training locations. Finally, the JCOE provides Tactical Advisory Teams (TATs) and Joint Expeditionary Teams (JETs) with recent combat

experience to advise and mentor deploying units on various aspects of the C-IED fight. These teams provide training on the most current TTPs to counter IEDs. Similarly, the JCOE provides training on newly fielded equipment, such as jammers and robots, and it provides role-players to act as "opposition forces" and local populations.[37]

JIEDDO has been regarded as very effective in the area of training. The availability of high-quality and well-funded and resourced training teams and mentors, who are knowledgeable on the most current C-IED practices is widely appreciated in the operating forces.[38]

FUNDING

JIEDDO's budget is appropriated through the Joint IED Defeat Fund (JIEDDF) and the entire budget is available for three years from the date of the appropriation. Congress also gave the Secretary of Defense special authority to transfer these funds between military personnel; operations and maintenance; procurement; research, development, test, and evaluation; and defense working capital funds accounts without the normal requirement to obtain prior approval from the congressional defense committees.[39] Essentially, JIEDDO's money is "colorless" in the language of acquisitions, meaning that it may be spent on almost anything, for any service, with almost no oversight from congress. JIEDDO officials maintain that this "colorless" funding and the ability to spend funds over a three-year period is critical to develop and field new countermeasures rapidly. This statement may be true, but it is also a recipe for fraud, waste, and abuse. To balance the need for rapid acquisition with some sort of oversight, Congress requires JIEDDO to report on each of its obligations and transfers of funds on a monthly basis.[40]

It is important to note that JIEDDO does not bear the cost of CIED programs completely. For example, the fielding of vehicle armor upgrade kits and new vehicles, such as the MRAP

family, was not paid for out of JIEDDO funds. Instead, these programs are begun by JIEDDO, and when they prove successful, they are turned over as "programs of record" to the services to be managed and funded in the traditional fashion.

ANALYZING THE EFFECTS

"I am often asked if the IED threat can be removed from the battlefield, and my answer is, 'No.' In its most fundamental form, the IED is a lethal ambush, and men have been ambushing their enemies for thousands of years."

Lieutenant General Thomas Metz, U.S. Army
Director, JIEDDO[41]

All of these CIED programs sound great, but do any of them work? It is extremely important to evaluate the success of JIEDDO against the IED, especially considering the high casualties caused by IEDs and the large amounts of treasure the government has spent trying to counter them. The Department of Defense broadly defines success in its CIED effort, by saying that when IEDs are no longer a weapon of strategic influence, then JIEDDO is successful. That is a very subjective idea to be used as a metric in a practical sense. The idea expressed by General Metz was that "systemic use of the IED as a strategic weapon can be defeated by making it so risky to those in the network, to their life, limb, or capture, and to keep the cost of the network constantly going up—that [the enemy] will move onto something else."[42] This quote shows his recognition that the IED can never be removed from the battlefield entirely, but fails to define what exactly is meant by the term "strategic influence."

Despite the complexity and difficulty of its mission, JIEDDO and its predecessor organizations have undoubtedly made numerous contributions to the CIED effort, which include enhanced CIED training for U.S. troops; the rapid development and acquisition of electronic jammers and other technological countermeasures; the fielding of a wide variety of mine

survivable vehicles; and the formation of the COIC, the Law Enforcement Program, and other Attack the Network initiatives. Anecdotal feedback about JIEDDO from across the military, including the COCOMs, the services, and veterans of Operations IRAQI FREEDOM and ENDURING FREEDOM is generally positive.[43] Many of the favorable comments are regarding money being made available and JIEDDO's ability to rapidly field solutions. Other favorable reports point to the benefit of having a high-level Department of Defense organization that is focused solely on the most lethal threat to troops in the field. Tactical units state that JIEDDO's COIC provides valuable intelligence support to tactical operations—both to transit the battlefield safely and to kill or capture the bombers and their networks.

Measuring JIEDDO's success beyond anecdotes, however, remains complicated. JIEDDO's work certainly contributes to the protection of troops from IEDs, but JIEDDO's efforts are not the only reason for this increase in protection. Other battlefield conditions and political factors are also factors. Counter-IED success is difficult to quantify through data. An often-quoted metric is the number of IEDs it takes to inflict one U.S. military casualty, noting that this number has been rising in Iraq. The claim is this increased attack to casualty ratio shows that the insurgents have to work harder to kill or wound Americans. Correlation does not equal causation, however. This ratio is influenced by all sorts of factors that may be unrelated to JIEDDO, such as the Iraqi populations acceptance of the IED emplacers and their networks, better ISR (intelligence, surveillance, and reconnaissance), or more effective personal and vehicular armor. More importantly, if the enemy is able to use a greater number of IEDs to inflict the same or even higher casualties, then this ratio of IEDs per casualty is arguably not a good indicator of success.

Additional metrics to attempt to monitor the use and effectiveness of IEDs include the overall number of incidents, the ratio of found and cleared IEDs to IEDs detonated, the number of vehicles damaged or destroyed by IEDs, and by the number of actions that disrupt an IED network (capture or killing of the IED emplacer or bomb maker, explosives cache found, interdiction of IED materials). Taken as a whole, these types of data can provide an idea of how the CIED fight is going, but it is still difficult to distinguish JIEDDO's impact on this fight from the impacts of other combat operations. All of these statistics also need to be normalized against the number of troops in theater at the time, to provide perspective in comparing the relative risks faced in Iraq and Afghanistan.[44]

Current data suggest that the trends in Iraq and Afghanistan are very different. The total number of IEDs either exploded or found and disarmed has recently dropped significantly in Iraq. Of the incidents in which an IED was detonated on its target, the rate of troops wounded or killed in the attack is drastically reduced. Thus, there are signs of success against the use of IEDs in Iraq. Overall, however, all forms of violence in Iraq have decreased, and civilian deaths are also down. Perhaps this decrease in IED attacks had more to do with winning the counter-insurgency fight than with JIEDDO.

As discussed above, IED trends cannot be attributed solely to JIEDDO efforts. They could also be attributed to decreases in violence in general, brought about by changes in counterinsurgency strategy, the Anbar Awakening, the increasing effectiveness of the Iraqi Security Forces, and other political reasons.[45] On the other hand, the opposite is occurring in Afghanistan. IED attacks in Afghanistan are increasing in frequency and lethality,[46] though they remain much lower overall than in Iraq at its peak. This may be due to the fact that most of the

technological solutions fielded in Iraq were vehicle-based, and Afghanistan's rough terrain negates this somewhat. It is difficult to tell.

Another method JIEDDO has used to demonstrate effectiveness has been the utilization rate of its services. For example, it points to the increase in RFS (requests for support) from the field, the amount of COIC intelligence products used in support of tactical operations, and the number of "hits" or visits to the JIEDDO web-based portal seeking IED data and analytical tools.[47] However, these metrics do not inform JIEDDO or stakeholders about the effect the agency's efforts have on combating IEDs as a weapon of strategic influence.[48] COIC also claims to have supported hundreds of missions that have resulted in the death or capture of a significant number of high value individuals.[49] While these statistics may be related to the counter-IED fight, they are only ultimately meaningful as a measure of JIEDDO's success in the counter-IED fight if they can be directly related to an actual decrease in effective IED attacks.

In general, it is difficult to relate any of JIEDDO's specific programs to the metrics it measures to demonstrate effectiveness. Without a clear relationship between a program or initiative and the measure used to judge its success, it is impossible to demonstrate which of the specific initiatives and programs supported by JIEDDO are effective and to what degree.[50] This is important because without a means of measuring effectiveness, programs cannot be managed and realigned according to their relative value, and resources cannot be allocated to the highest priorities.

In late 2008, the Vice Chairman of the Joint Chiefs of Staff held a Senior Warfighter Forum on the functions and capabilities of JIEDDO with the Deputy Commanders of the COCOMs.[51] This is of particular interest because the combatant commands are the primary

customer for JIEDDO. The Joint Forces Command (JFCOM) Deputy Commander, Lieutenant General Bob Wood (U.S. Army) gave the following opinion:

> The JIEDDO model appears to be a good fit for rapidly addressing a specific problem across the Joint Force, but the recent shift in [the] focus of JIEDDO indicates that it may have outlived its intended purpose. JIEDDO has also offered agile funding, which is critical in time of war. Additionally, the JIEDDO model as an organization has merit. In a dynamic world we need the ability to rapidly establish Task Forces or organizations for a purpose, and then absorb them as they serve their need. Based on this, consideration should be given to transitioning C-IED capability management to the appropriate Capability Portfolio Managers who can integrate, coordinate, and synchronize the C-IED efforts by providing the strategic advice necessary to maintain Department focus.[52]

This quote appears to give the impression that although the separate parts of JIEDDO have great value, there are some within DoD who believe the organization has perhaps outlived its usefulness.

The Governmental Accountability Office (GAO), in its reports blames JIEDDO itself for the lack of a satisfactory set of performance measures to gauge JIEDDO's effect on achieving DOD's counter-IED mission.[53] GAO states that JIEDDO must design its programs with objective feedback loops so that the efficacy of individual initiatives can be evaluated. JIEDDO has not been able to do this, but it is not the fault of the organization.

The root of the problem in deciding JIEDDO's effectiveness and appropriate scope of influence lies in its ambiguously defined mission, "to defeat IEDs as weapons of strategic influence." Whether or not a particular weapon or means of attack has a strategic influence is determined more by the political situation and by the perceptions of those who make strategic decisions than by the actual battlefield effects. It is in the eye of the beholder, so to speak. An abstract idea such as "strategic influence" is not a very good yard stick to measure effectiveness.

A better way might have been to task JIEDDO to reduce the vulnerability of U.S. installations and tactical vehicles to the effects of explosive hazards, and to improve the capability of the military to locate and destroy the hostile human networks who use IEDs. Such a mission statement would still have allowed the technological and intelligence improvements that were necessary without the subjective idea of strategic influence.

CONCLUSION

JIEDDO was formed in the heat of the moment and assigned a poorly defined mission against a poorly defined foe. This ad-hoc organization developed an operational plan and proceeded to provide what was really needed—a way to rapidly spend dollars to find ways to reduce the effectiveness of improvised land mines against U.S. troops. It was initially very successful, primarily by rapidly developing armor kits for vehicles and by fielding high-tech devices to protect the troops. Once that initial period was over and the vulnerability of American equipment to mine warfare was reduced, it was difficult to determine if the organization had anything else to offer. Measuring the effectiveness of such an organization against an elusive and unorganized enemy was difficult at best. That JIEDDO has had an effect seems obvious; whether its strategy was an efficient use of resources cannot be measured. The mission assigned to JIEDDO of defeating the IED as a weapon of strategic influence is akin to being assigned a mission to stop insurgencies from using AK-47s. It was an impossible task. The strategic influence of the IED was only reduced by defeating the insurgency, and that should not be the job of JIEDDO.

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