

Joint Improvised Explosive Device Defeat Organization



Attack the Network – Defeat the Device – Train the Force



**Annual Report
FY 2008**



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Cover photo:

Smoke and dust rises after an IED explodes in front of a convoy. The IED detonated next to the convoy after Soldiers were heading back, following humanitarian missions. No one was injured in the explosion.

U.S. Army Photo, Sgt. Sean Kimmons

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Army Private First Class Villagomez stands next to a RHINO unit that took a direct hit from an explosively formed penetrator. Even after taking the hit, the unit was still functional. U.S. Army Photo, PM IED Defeat/Protect Force, December 2008

Message from the Director

In Iraq and Afghanistan, the most effective weapon employed against coalition forces during 2008 continued to be the Improvised Explosive Device (IED). Except when disrupted by U.S. or coalition operations to attack their IED networks, the enemy continued to adapt and produce IEDs with readily available, inexpensive, and evolving commercial technologies.

During 2006 and 2007, our first two years of operation, the Joint Improvised Explosive Device Defeat Organization (JIEDDO) learned that we must adapt and innovate faster than a resourceful enemy who is capable of continuously leveraging the \$3 trillion commercial technology investments made globally each year. In 2007, we formalized our rapid development and acquisition procedures by creating a transparent, analytically driven, rapid acquisition process called the Joint IED Defeat Capability Approval and Acquisition Management Process (JCAAMP). Through 2008, JCAAMP continued to be enabled by Congressionally directed financial agility, accommodating a necessarily high degree of technical risk and uncertainty.

With the support of the Combatant Commanders, the Department of Defense (DoD) decided in May 2008 to continue JIEDDO and our unique capabilities into the future. Internally, JIEDDO initiated a bottom-up review of the organization to ensure that the staff and components were appropriately tasked and aligned to accomplish an enduring mission. The structure of the organization was fine-tuned in July 2008. DoD now possesses a mature rapid acquisition organization that delivers counter-IED (C-IED) solutions to warfighters in months, versus the years associated with the conventional acquisition system.

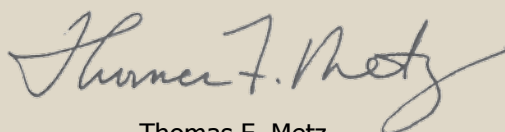
Notable highlights in FY 2008 included:

Iraq. Although IEDs continued to be the enemy's weapon of choice against U.S. and coalition forces in Iraq during 2008, we saw the number of effective attacks decline for the second straight year. Coalition force casualties in Iraq likewise decreased compared to the number experienced a year ago. Our warfighters in Iraq performed superbly, thanks to the improvements of C-IED technologies and more realistic C-IED training developments, which occurred over the past year.

Afghanistan. Although slower to develop in Afghanistan initially, the IED has become the weapon of choice over direct or indirect fire weapons. Incidents of IED attacks rose in 2008 above the level seen in 2007, and are most often used by the enemy in combination with conventional direct and indirect fire weapons as part of their complex attacks. Coalition force casualties in Afghanistan, caused by IEDs, are almost twice what they were in 2007.

Successes. Successes in the C-IED fight to date are directly attributed to the tireless support of DoD, U.S. Military Services (Services), Combatant Commands (COCOMs), and Congress. In June 2003, the enemy caused more than one coalition force casualty for every IED emplaced. At the end of 2008, more than nine IEDs had to be emplaced to generate one casualty. We continue to face a thinking, adaptive enemy who is motivated to respond to changing conditions with rapid technical and tactical innovation. Moving forward into 2009, we remain committed to saving lives and supporting our warfighters. We will aggressively continue to develop and deploy innovations to make IEDs too costly for the enemy to produce, and too risky to employ.

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. Over those years, the ambushes become more and more lethal. However, we can and we must defeat the systemic use of IEDs as a means to influence our citizens and leaders.



Thomas F. Metz
LTG, U.S. Army
Director

Background

Trends

Iraq. During 2008, IEDs accounted for almost 40 percent of the attacks on coalition forces in Iraq. By the end of FY 2008, the declining trend in IED incidents against coalition forces returned to 2004 levels and continued to fall (**Figure-1**). The overall number of IED incidents in September 2008 was about 33 percent of the September 2007, and 22 percent of the September 2006 levels. Coalition force casualties caused by IEDs dropped even more dramatically. By September of 2008, they reached 16 percent of the level a year earlier, and 9 percent of the September 2006 level.

Afghanistan. As shown in **Figure-2**, IEDs in Afghanistan became an increasingly large percentage of attacks against coalition forces. Prior to April 2008, the enemy preferred direct and indirect fire attacks over the IED – in most months by a factor of more than two to one. At the peak of enemy activity in September 2007, direct and indirect fire attacks outnumbered IEDs by nearly three to one. In January 2008, the enemy began to shift toward the use of IEDs. By August

2008, 350 IED incidents represented about 75 percent of all enemy initiated action.

Total IED incidents against coalition forces in Afghanistan began in FY 2008 from a winter low that was substantially higher than past years, and grew sharply into the summer fighting season (**Figure-3**). By September 2008, total IED incidents in Afghanistan for FY 2008 were roughly 25 percent higher than the number experienced during the previous year, and twice the number in 2006. Coalition force casualties also increased, nearly doubling from September 2007 to September 2008. As in Iraq, IEDs remained the prime killer on the battlefield, causing more than half the deaths due to enemy action.

Victim Operated IEDs (VOIEDs) have been the preferred initiation method in Afghanistan since March 2007. This method usually involved a pressure plate initiator buried in the road. During the past year, Command Wire IEDs (CWIEDs) and Suicide IEDs – Personal-Borne (PBIED) and Suicide Vest-Borne (SVBIED) – have proven to be the most lethal and effective weapons in the Afghan IED fight. Both of these devices caused a disproportionate number of coalition force casualties relative to their number of incidents.

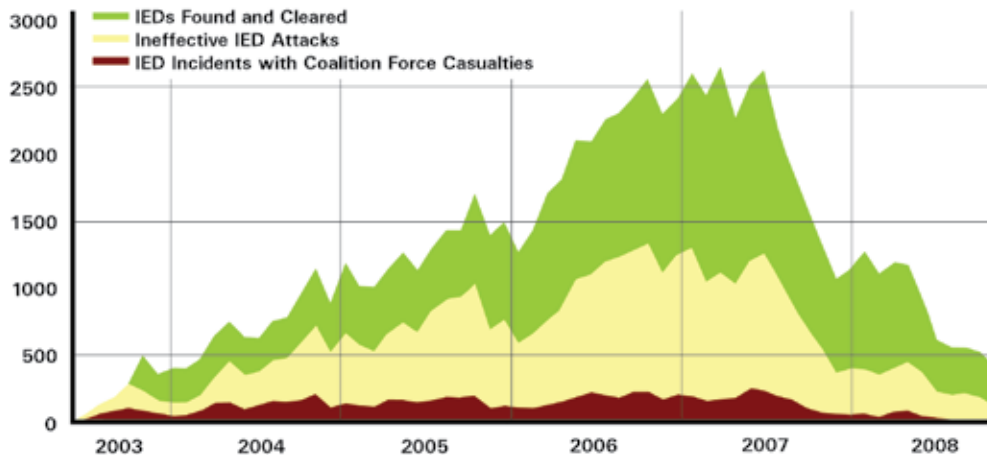


Figure-1: IED incident trends against coalition forces in Iraq

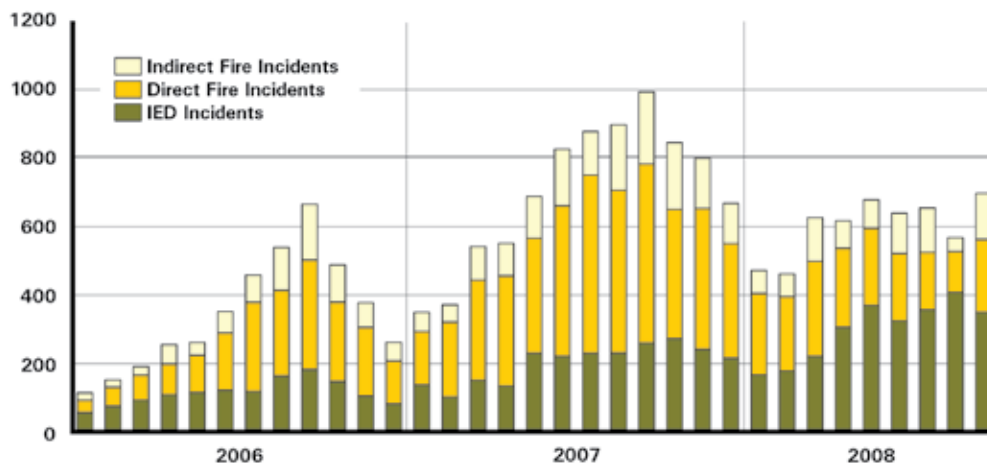


Figure-2: Afghanistan – direct fire, indirect fire and IED incidents

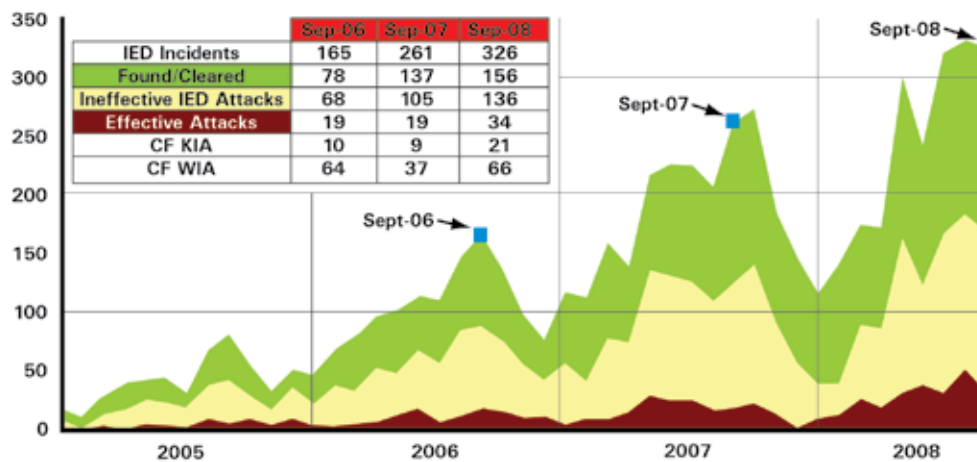


Figure-3: Afghanistan – IED incident trends

Threat

IEDs remain the weapon of choice for terrorists worldwide in 2008 requiring limited skills and giving them the ability to conduct spectacular attacks for a relatively small investment. Terrorists, from insurgent groups to anarchists, have discovered that the public relations benefit of explosive attacks far outweigh those of attacks using more conventional weapons. With easy access to commercial technologies, training via the Internet, and the ability to either manufacture or otherwise procure explosive materials, IEDs continued to provide the enemy with inexpensive, stand-off, precision weapon systems that often provide the attacker with near total anonymity.

In Iraq, the use of IEDs steadily declined during the last several months of 2008, reaching their lowest levels since October 2003. The decline is attributed to a number of factors including: C-IED efforts, the coalition "surge" operations, a more capable and confident Iraqi Security Force apparatus, Muqtada al Sadr's cease-fire order to the main Shi'a insurgent groups, and the Sunni awakening movement known popularly as the "Sons of Iraq." These factors converged to create a more stable operational environment where coalition and Iraqi Forces concentrated their collective efforts on eliminating al Qaeda in Iraq as a threat to an enduring and stable Iraq.

In Afghanistan, coalition forces faced a much different battle space than in Iraq. Here, the threat was not sectarian in nature, but more of a traditional insurgent battle where the enemy used IEDs as one of many weapons in its arsenal. The use of IEDs in Afghanistan dramatically increased in FY 2008, steadily climbing since 2005. They tended to be less sophisticated than those found in Iraq. They were used more as an initiator for complex attacks involving small unit ambush tactics and conventional weapons. Taliban, Taliban-affiliated warlords, and al Qaeda fighters continued to use IEDs to discredit coalition forces and the central government as a means to control terrain and the populace.

IEDs will continue to threaten security forces throughout the world, growing in sophistication and frequency as more enemies of peace share information and realize the potential psychological, social, and political impact of this weapon. No other widely available terror weapon has more potential for mass media attention and strategic influence as does the IED.

JIEDDO Mission

JIEDDO's mission is to focus (lead, advocate, coordinate) all DoD actions in support of the Combatant Commanders' and their respective Joint Task Forces' (JTF) efforts to defeat IEDs as weapons of strategic influence. This remains JIEDDO's mission and it defines our clear focus to defeat IEDs and attack IED networks.

Lines of Operation (LOO)

Attack the Network (AtN). This effort includes actions and activities against IED networks designed to interrupt the enemy's chain of IED activities by identifying and exploiting the networks' vulnerabilities and enabling offensive action against them. Offensive action removes network members and IED component caches from the battlefield and disrupts the enemy's innovation cycle. It often provides valuable insights into IED network membership, supply sources and methods of operation. Successes our warfighters experienced in 2008 were accomplished with the help of improved intelligence analysis tools, persistent surveillance, reconnaissance, information operations, technical and forensic exploitation of the IED devices, and counter-bomber targeting directed toward defeating IED networks.

Defeat the Device (DtD). In order to enhance coalition forces' freedom of action and safe operations, DtD actions and activities detect IEDs, neutralize them before they can

be detonated, or mitigate the effects of detonation at the point of attack. C-IED capabilities in this line of operation are developed, acquired, and deployed for route clearance, IED device detection, neutralization, explosive ordnance detection and disposal, and vehicle and personnel protection.

Train the Force (TtF). During FY 2008, JIEDDO supported: multi-echelon and multi-component C-IED training; training on new equipment; C-IED tactics, techniques and procedures; and information management and dissemination. This work influenced C-IED doctrine and institutional training changes within the Services. It provided support to unit mission rehearsals directed by U.S. Joint Forces Command (JFCOM) and unit predeployment exercises accomplished at Service combat training centers. In FY 2008, JIEDDO increased its investment in training tools, techniques, and technologies that enable warfighters to attack IED networks.

Organization Structure

During 2008, JIEDDO reviewed and revised its internal organization, which was motivated by several considerations. The organization needed to be structured for an enduring effort. Management oversight of JIEDDO-funded initiatives and internal controls required the efforts of government staff dedicated to these functions. The organizational design of JIEDDO needed to be easily recognized and leveraged by our external customers and stakeholders. As depicted in

Figure-4, JIEDDO's functional staff is aligned with the joint staff construct of DoD.

To get ahead of rapid threat IED development, JIEDDO created the Competitive Strategies Group (CSG) in FY 2008. The CSG seeks to develop and provide JIEDDO with a continuous competitive advantage in the C-IED fight by anticipating second and third order effects of adversary adaptation in the use of IEDs in order to defeat IEDs as weapons of strategic influence.

The Acquisition Oversight Division (AOD) was established in early FY 2008 to improve program management oversight for C-IED initiatives across all phases of the JCAAMP, including oversight of cost, schedule, performance, and test activities. AOD's efforts to facilitate transitions and transfers (T2) of C-IED initiatives to the Services have resulted in enhanced transparency of T2 activities, closer coordination with the Services, and better synchronization with established DoD organizations and processes.

JIEDDO established an Internal Review Office in FY 2008 as an independent assurance and consulting activity designed to: standardize and monitor internal controls for financial management, assist in developing policy for managing information technology, define and monitor management roles and responsibilities of JIEDDO's component organizations, and improve standardization of JIEDDO's process for publishing Broad Area Announcements (BAAs).

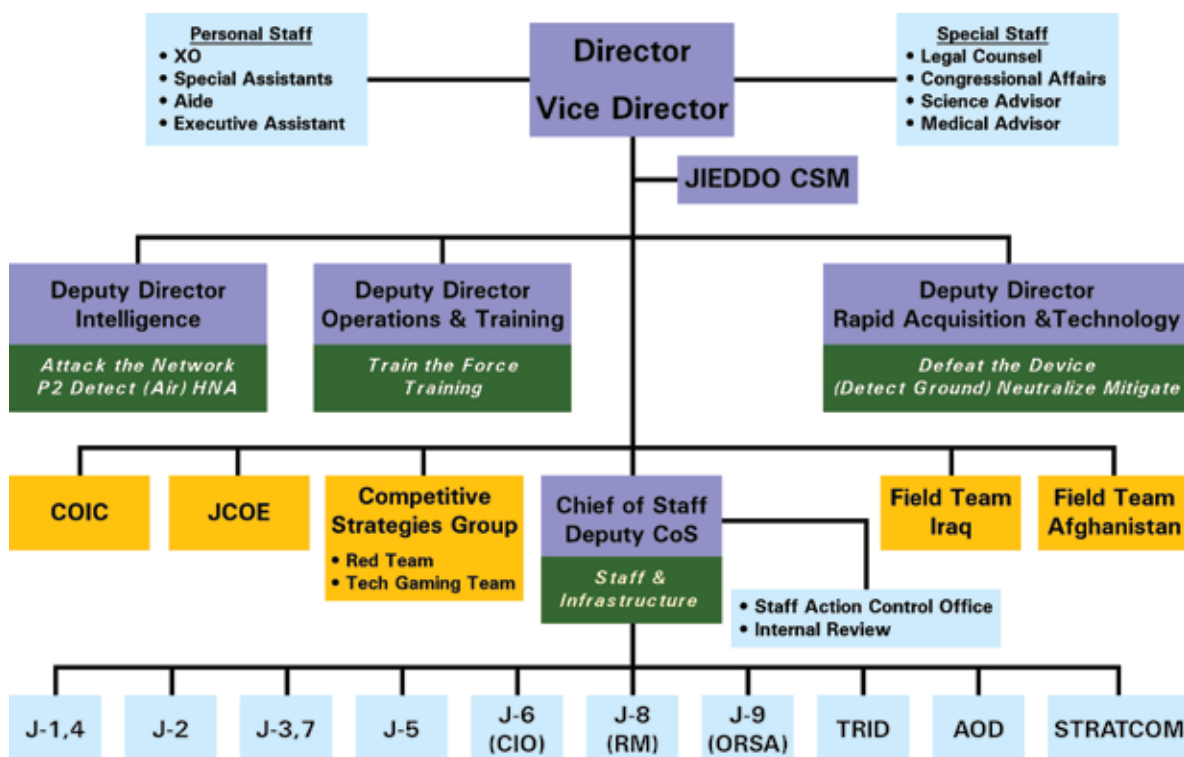


Figure-4: JIEDDO organization chart

Resources

Funding

In FY 2007, Congress established a new appropriation to provide DoD with the flexibility and agility necessary to counter IEDs and attack the IED networks that employ them against U.S. forces. Entitled the Joint Improvised Explosive Device Defeat Fund (JIEDDF), this unique funding account is segregated from such appropriations as: Operations and Maintenance; Procurement; and Research, Development, Test and Evaluation, and makes these funds available for a three-year life span. By establishing this account, Congress enabled JIEDDO to respond rapidly to changing IED threats and technologies – a significant advantage in the C-IED fight. In FY 2008, JIEDDO obligated a total of \$4.1 billion and disbursed a total of \$3.5 billion. **Figure-5** displays the cumulative obligations and disbursements that occurred in FY 2008. This funding allowed JIEDDO to maintain an immediate response capability to address unknown, emerging COCOM C-IED requirements. It also provided the necessary resources to invest in promising future technologies and improvements on existing IED network attack initiatives.

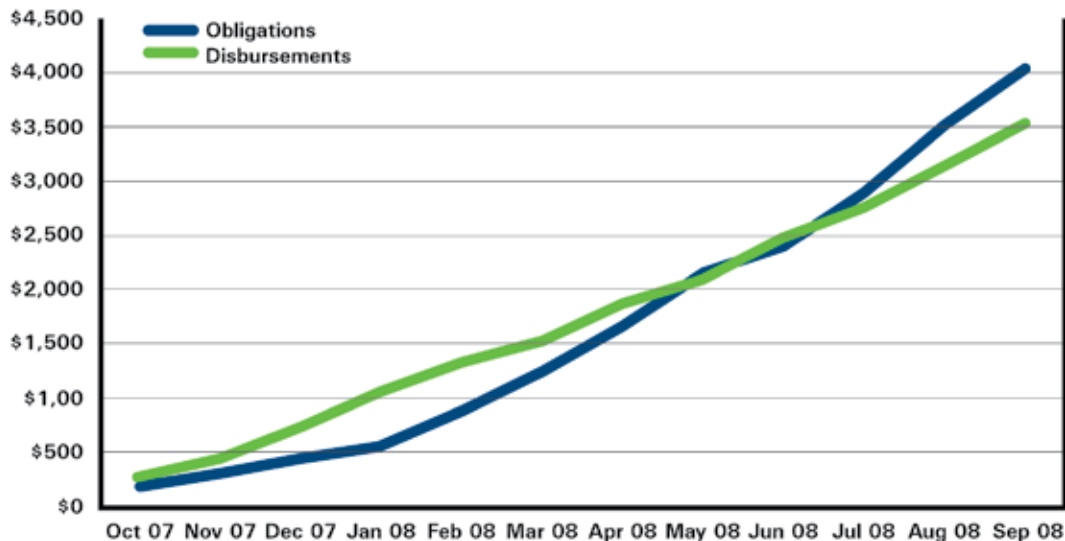


Figure-5: JIEDDO FY 2008 obligations and disbursements (\$ millions), which reflect funds appropriated in FY06, FY07, and FY08

Ninety-eight percent of JIEDDO's FY 2008 budget authority was provided through the Global War on Terrorism (GWOT) supplemental, and was used to fund its three LOOs (AtN, DtD, and TtF) to support warfighter needs in Iraq and Afghanistan. Notably, the proportion of obligations for AtN increased from 32 percent in FY 2007 to 38 percent in FY 2008. This shift in funding allocation was made possible by JIEDDO's prior year successes in developing and deploying technologies that defeat IED devices. Two percent of obligations were

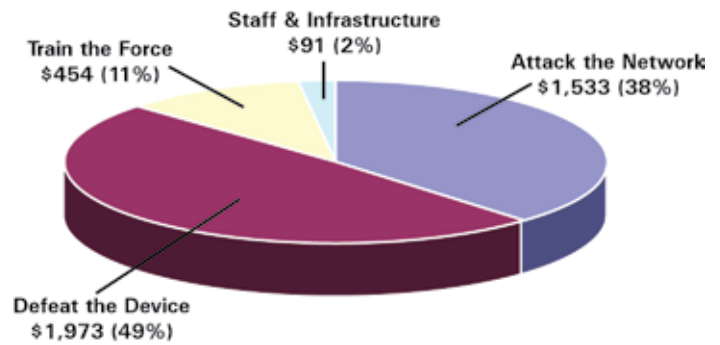


Figure-6: JIEDDO FY 2008 obligations by line of operation (\$ millions). Obligations reflect funds appropriated in FY06, FY07, and FY08

used to provide JIEDDO's staff and infrastructure. FY 2008 spending breakdown is displayed in **Figure-6**.

Personnel and Staffing

In FY 2008, JIEDDO retained 75 percent of its Joint Manning Document (JMD) authorized personnel. Hiring actions in FY 2008 to fill permanent government civilian billets approved in FY 2007 continued throughout the fiscal year, though complicated to an extent by the loss of several term-appointed civilians and an evolving organizational structure.

Effective solutions to urgent C-IED needs of warfighters engaged with a thinking, adaptive enemy often required the temporary services of uniquely qualified engineers, scientists and subject matter experts. To acquire these services quickly, JIEDDO continued to rely heavily on service contracts, which provided people with talents and experience not easily found in the Services or through the government civilian recruiting process.

Major Accomplishments During FY 2008

Highlights

Tactical IED Supply Chain Network Attack. Developing technologies, analytical tools, and training support to enable effective attacks on IED networks was a JIEDDO focus in FY 2008. In 2008, a joint and multinational investigation into supply sources of electronic components for IEDs culminated in the detention of several members of the Iraq-based Sea Sun Company. This effectively shut down an 'al Qaeda in Iraq' (AQI) front company and major source of supply for these components in Iraq. Following this roll-up of individuals associated with the Sea Sun Company, coalition forces saw a significant decrease in IEDs that used these electronic components.

RECCE I (Self Contained Reconnaissance Vehicle). JIEDDO delivered RECCE I as a proof of concept that combined IED detection and neutralization capabilities on a single vehicle platform, the Joint Explosive Ordnance Disposal Rapid Response Vehicle, or "Cougar." RECCE I uses the integrated Vehicle Optics Sensor System as its primary IED detection capability. Neutralization capabilities include the Kongsberg Remote Weapon Station and the Talon III B robot, which allows the robot to be deployed without requiring the handler to exit the vehicle. RECCE I was deployed with a full suite of Blue Force Tracker, communications, and the latest generation of Counter Radio-Controlled IED Electronic Warfare (CREW) technology. Initial success of this vehicle prompted U.S. Central Command's (CENTCOM) request for over 100 additional systems.

Deployed Unit Requests for Support. JIEDDO's C-IED Operations Integration Center (COIC) analysts, alongside interagency partners, provided an increasing number of responses to requests for IED network analysis products generated from forward deployed units. The results of JIEDDO funded, top-tier training and increased awareness of COIC capabilities were evident in FY 2008. The number of requests for reach-back support more than doubled from 805 in 2007 to 1,746 in 2008. There was a five-fold increase in requests from brigade and lower level commands, from 137 in 2007 to 696 in 2008. The COIC's secure Web portal also experienced a significant increase in visits: 182,000 in 2008, up from 1604 in 2007. It provided deployed units with unique, fused analysis products, training and easy access to data and tools for conducting IED network analyses and targeting.

C-IED Strategic Planning. A major goal for JIEDDO in FY 2008 was to mature C-IED strategic planning

processes with the COCOMs, and strengthen planning and information sharing relationships with interagency and international partners. This goal was assigned to a newly formed Plans, Policies and Interagency Division (J5) in JIEDDO. By the end of FY 2008, this division had begun to formalize already established C-IED planning and coordination relationships with the COCOMs, defense, and other government agencies contributing to the C-IED effort. During September 2008, JIEDDO's Director completed initial visits to U.S. European Command (EUCOM) and U.S. Africa Command (AFRICOM).

More detailed explanations of JIEDDO's initiatives and accomplishments are provided in the following sections.

Attack the Network

JIEDDO's focus in 2008 on efforts attacking IED networks was designed to improve the deployed units' success at disrupting the enemy's innovation cycles by attacking their ability to fund, develop, deliver, and emplace IEDs. To this end, JIEDDO continued to develop and deliver initiatives to the warfighter designed to support C-IED intelligence, persistent surveillance, reconnaissance, information operations, counter-bomber targeting, IED technical and forensic exploitation, and disposal of unexploded and captured ordnance.

C-IED Operations Integration Center. JIEDDO's COIC became fully mission capable in 2007. During 2008, the COIC continued to fulfill the original vision to break through stove-piped information sources, access national-level intelligence data, conduct analysis within a requesting organization's available timeframe, and push the best possible fused analysis to warfighters to enable them to attack IED networks. The COIC's architecture of partnerships continued to develop with more than 20 intelligence agencies and other federal agencies supporting this effort. Several key COIC initiatives include:

Technology Insertion Process. The following COIC applications were developed or procured, installed in a development environment, integrated with other COIC tools, data sets, and algorithms, and moved to Secret Internet Protocol Router (SIPR) Network for operational use by warfighters in theater.

Identity InstaCheck. It is a Web-based application that assists users in locating and confirming identities in Iraq. Using this application, a person of interest may be located by specifying one or more search criteria such as name, address, or civil affairs card information. Photos contained in the database are used for identity resolution for intelligence and targeting teams in

Iraq. Over 8,000 searches have been conducted since deployment in April 2008 by over 200 users. The number of off-site users and searches increased exponentially.

Palantir. Developed to provide C-IED network analysts with a collaborative link analysis tool, Palantir is used for identifying patterns and relationships between entities and events, and assists with advanced document analysis and information discovery. It fills two important requirements of C-IED network analytical workflow: collaboration among analysts and the use of a data dictionary that enables them to share data between teams and between other link analysis applications. Palantir outputs portray linked nodal networks, histogram data, and timeline views. During FY 2008, the Palantir system was accessed by over 160 people investigating IED networks. Analyses by these people supported over 600 investigations into IED network activities and members. Using the collaborative ability of this knowledge base, analysts were able to identify IED network targets of interest being worked across multiple investigations. In 2008, Palantir was also extended to COIC personnel deployed to the National Media Exploitation Center, U.S. Special Operations Command (SOCOM), and AFRICOM, allowing remote users to access, in real-time, the analytic products of their colleagues.

Data Tracker. The Data Tracker software application was developed to assist analysts by quickly and effectively processing classified [Alternative or Compensatory Control Measures (ACCM)] data, (originally portrayed in a Microsoft Excel format), into a Google Earth™ format for pattern analysis, cross referencing, geo-spatial data plotting, and intelligence tracking. This development was a key capability in rapid data sharing between C-IED network analysts. It was also used by warfighters to display data from ground sensors in near real time, allowing them to quickly focus on potential threats and areas of concern. By the end of FY 2008, Data Tracker was being used successfully by the COIC's Division Support Team aligned with the Multi-National Division-Baghdad and operations planners for both 4th Infantry Division and 1st Cavalry Division.

Other COIC Accomplishments. JIEDDO's COIC further exploited their capabilities and analytical products to enhance targeting of IED networks with several AtN initiatives developed and employed during 2008. These initiatives provided additional capacity to support C-IED network analytical requests from the National Police Transition Team and Baghdad Fusion Cell in Iraq and focused an effort to close

C-IED network intelligence gaps identified by forces conducting Operation Look South in southeast Iraq that provided analytical products directly to units conducting operations against IED networks. COIC successfully exploited collections of captured C-IED documents and material held at the National Media Exploitation Center. Through their forensic and technical analysis of these materials, COIC identified and disseminated to warfighters previously unknown IED triggering methods, suicide bomber's names, and homemade explosive production methods.

Forensic Exploitation Team (FOX). FOX was a proof of concept deployed to Baghdad in 2008 to provide the warfighter with enhanced weapons intelligence, forensic exploitation, and information fusion capability. This effort supports U.S. Forces targeting, interdiction, and suppression of high-threat IED networks. FOX support was integral to dismantling a number of EFP networks in Baghdad. Their work helped end Improvised Rocket Assisted Mortar (IRAM) attacks. Operational assessments of FOX demonstrated that it was directly responsible for enabling units to conduct offensive operations against IED networks.

Keyhole. As a C-IED reconnaissance kit of enhanced surveillance equipment, the Keyhole kit provides snipers with an increased capability to visually detect the enemy emplacing IEDs.

Weapons Technical Intelligence (WTI). WTI is a forensic and technical analysis process, which exploits IEDs, their components, and physical characteristics of their emplacement. Using these forensic and technical analysis tools, WTI works to: identify geo-spatial trends in the location where IEDs are discovered, manufacture trends from analyses of the devices and their components, and develop IED maker signature profiles from forensic evidence. By applying pattern analyses to these results, geographical areas of interest and specific human targets can be recommend for follow-on operations. The intelligence products derived from the WTI process directly support force protection planning, targeting and tracking of bomb makers. They provide evidentiary support to prosecution and are a key capability in the AtN LOO. During FY 2008, JIEDDO invested \$46.2 million in the agencies responsible for conducting WTI missions.

Information Operations. JIEDDO continued to partner with the U.S. Army and SOCOM in FY 2008 in developing and deploying External Information Programs (EIP) in Afghanistan, Iraq, and the U.S. Pacific Command (PACOM). Using non-attributable information from television, radio and print media, these programs were designed to eliminate support for the use of IEDs by local, regional, and

international populations. In FY 2008, JIEDDO funded the following EIP efforts:

JIEDDO invested in the C-IED Support and Information Operations Target Folder Support initiatives developed by the U.S. Army's 1st Information Operations (IO) Command (Land). These initiatives assisted in developing strategies to influence and neutralize the networks.

Information gaps at the tactical level led IO to seek out assistance from the Naval Post Graduate School, Department of Security Affairs to leverage a counter-narratives program in support of operations in Afghanistan.

Defeat the Device

JIEDDO continued to make robust investments in initiatives to detect and neutralize IEDs at safe standoff ranges, and to reduce the effects of IED detonation at the point of attack. Major Defeat the Device accomplishments in FY 2008 included:

Ahura. The Ahura provides warfighters with the ability to rapidly identify suspicious solids and liquids, and was specifically requested to assist units in Iraq and Afghanistan. In response to a CENTCOM Joint Urgent Operational Need (JUON), JIEDDO worked with DoD agencies, the national test and evaluation community, and Navy Explosive Ordnance Disposal (EOD) Technology Division to deliver Ahuras to Iraq and Afghanistan. The Ahura represents the first viable capability to identify Home Made Explosive (HME) and precursor components on the battlefield. Since its fielding, EOD, Weapons Intelligence Teams (WIT), and Combined Explosive Exploitation Cell (CEXC) Teams are successfully using Ahura to identify HME during C-IED operations in Iraq and Afghanistan.



Ahura: The portable, cutting-edge Ahura provides effective HME identification for warfighters in Iraq and Afghanistan. *JIEDDO Photo*

Lapeer and Terrapin (Culvert Denial). In Iraq, coalition forces were attacked with IEDs emplaced out of sight in the road culverts that support the transportation system. Lapeer and Terrapin, developed by the Army as culvert denial systems, block un-authorized access to culverts of various dimensions. During FY 2008, JIEDDO funded 666 Lapeers and 990 Terrapin systems in response to a CENTCOM JUON.



Terrapin: The Terrapin denies the enemy prime roadside locations for IEDs emplacement. *JIEDDO Photo*

Calilgo. JIEDDO funded Calilgo systems, which were successfully integrated into High Mobility Multipurpose Wheeled Vehicles (HMMWVs) in Iraq. Based on the Calilgo system's success on Continental United States (CONUS) testing ranges, JIEDDO funded additional systems, which were deployed as they were being manufactured and tested.

Husky Mounted Detection System. This IED detection kit for Husky vehicles in Afghanistan includes a ground penetrating radar system that can detect metallic and non-metallic objects. The operational assessment of this system began in Afghanistan in the fourth quarter of FY 2008. This system successfully identified victim operated IEDs before they detonated. Based on the success of this operational assessment, JIEDDO funded additional Husky Mounted Detection System kits for the Services in Afghanistan to satisfy one of the CENTCOM JUON. Additional systems were funded for the C-IED training base.

MARCBot/XBot. Combat patrols and logistics convoys previously had no organic robotic capability to confirm or deny the presence of IEDs during their mission. They frequently called for EOD support when no IED existed. In response, JIEDDO procured a man transportable, remotely controlled robotic platform that enables soldiers on mounted patrols and convoys to perform stand-off, visual inspections of suspected IEDs both on and off the road. These robots are highly regarded by the warfighters.



MARCBot/XBot: Omnipresent on the battlefield, military robots like the XBot continue to serve a vital role in IED detection and neutralization. *JIEDDO Photo*

In debriefings after returning from Iraq, members of three brigade combat teams rated these robots as one of the top C-IED capabilities. By the end of FY 2008, 322 of the 700 JIEDDO funded systems were delivered to the Warfighter in response to a CENTCOM JUON.

Rhino II & III. The Rhino system is a passive counter-passive infrared tool that joint forces have come to rely on due to its simplicity and effectiveness. JIEDDO funded an expedient solution developed in the field to defeat PIR-triggered IEDs utilizing a boom-mounted glow plug that causes PIR-initiated IEDs to detonate prior to their intended targets entering the kill zone. The first systems were developed in Iraq in May 2006. At the end of FY 2008, more than 16,000 JIEDDO-funded Rhino II systems were in Iraq. Upgrade kits were provided to include heat monitoring systems with safety and performance improvements to the heating elements. JIEDDO continues to fund an effort to develop and deliver Rhino systems (Rhino III) that will meet the unique terrain requirements of the Afghanistan theater of operations.

Counter Radio-Controlled Electronic Warfare. A family of vehicle-mounted, man-portable, and fixed site C-IED jamming systems, CREW systems are designed to prevent radio-controlled IEDs from detonating. On-going fielding and enhancement to CREW systems continue. JIEDDO funded over 5,000 CREW jammers for forces deployed in theater in FY 2008, bringing the number of IED jammers purchased to over 47,000.

Current CREW Systems. Mounted and dismounted spiral improvements were developed and tested during 2008 to enhance current CREW systems. These improvements included the Combined Vehicle Radio Jammer (CVRJ). By the close of FY08, over 8,000 CVRJ's were built and 5602 were installed on Mine Resistant Ambush Protected (MRAP) vehicles and other legacy vehicles.

Joint CREW (JCREW) 3.1, 3.2, and 3.3. JIEDDO funded development and testing of three separate JCREW initiatives, all of which will increase coverage of the RCIED frequency spectrum. These new versions include the next man-portable system (3.1), the next vehicle mounted system (3.2), and family of JCREW systems (3.3).

Vehicle Optics Sensor System (VOSS). This vehicle-mounted stabilized day-and-night camera, mounted atop a 25-foot mast, was designed to enhance situational awareness during day and night operations. The system allows the operator to scan for IED indicators while on the move, as well as interrogate suspected targets from a safe standoff range while stopped in a security halt. Route Clearance Teams reported that the VOSS enhanced their situational awareness after they found IEDs, enabling them to detect secondary IEDs, triggermen, and sources of small arms fire. In FY 2008, the system detected at least four IEDs prior to detonation. JIEDDO funded 538 systems during 2008 in response to four CENTCOM JUONs.

Route Clearance Teams. U.S. Army and U.S. Marine Corps combat engineers and Joint Service EOD personnel thwart ambushes, clear natural or fabricated obstacles, and defeat IEDs. They use mechanical devices and specialized robotics to increase their standoff range from an IED threat. Working closely with the Army's Rapid Equipping Force, JIEDDO evaluates, funds and deploys a number of devices designed to enhance these teams' capability to detect and defeat IEDs. The following examples highlight significant JIEDDO-funded improvements provided to Route Clearance Teams during FY 2008:

Interrogation Arms. This vehicle-mounted assembly provides a smaller scale version (26-foot standoff capability) of the highly successful arm on the Buffalo Mine Protected Clearance Vehicle. The Interrogation Arm is equipped with a claw for digging, and a metal detector used to probe suspected IEDs. In FY 2008, a camera was added to the RG-31 and Husky vehicles. Twenty Interrogation Arms were mounted on RG-31s in Afghanistan providing an interrogation capability to Route Clearance Patrols operating in terrain inaccessible to the 23-ton Buffalo. JIEDDO funded the procurement of additional Interrogation Arms for both Operation Iraqi

Freedom and Operation Enduring Freedom in response to three CENTCOM JUONs.

Healy Beacon. In response to a JUON, this commercial off-the-shelf system was purchased rapidly in FY 2008, and delivered to U.S. forces in Afghanistan. It was used to detect common threats in the Afghanistan area of operation.

Combat Tracker Dogs. As of publication, there are 10 dog teams deployed to Iraq. In response to a CENTCOM JUONs in FY 2008, JIEDDO funded approximately 20 more teams scheduled to arrive in the first quarter of FY 2009.

Train the Force

During FY 2008, JIEDDO invested \$454 million in training support. Investments were informed by technical data and tactical insights drawn from units returning from Iraq and Afghanistan, as well as JIEDDO personnel deployed in each theater. Pre-deployment C-IED training emphasized understanding current enemy IED technical capabilities, tactics, techniques and procedures, and increased the realism of C-IED training across the Services.

Joint Center of Excellence. The Joint Center of Excellence (JCOE) is the execution arm of JIEDDO's C-IED training program. JCOE is located at Fort Irwin, Ca. and has been operational since April 2006. Together with the four Service-specific centers of excellence (COEs), JCOE provides deploying forces with training on rapidly fielded C-IED equipment and capabilities. JCOE and the Service COEs facilitate individual, collective, and unit C-IED training; develop and publish IED defeat tactics, techniques and procedures; and make available to deploying units C-IED lessons learned from those returning from theater. JCOE funded more than \$180 million in FY 2008 across the Services for programs and equipment to ensure that service members were trained and competent in C-IED procedures prior to deployment. JCOE introduced 16 new C-IED training initiatives and resourced 11 different types of C-IED equipment in FY 2008 to fulfill Service tactical C-IED training gaps. Additionally, \$29.3 million in C-IED nonmateriel training investments were made in FY 2008. Two of these training initiatives – Insurgents on the Battlefield and Company Intelligence Support Teams – are hosted at the National Training Center. These initiatives will expand in FY 2009 to include the remaining Army Combat Training Centers and the Marine Corps Air/Ground Combat Center.

In FY 2008, JIEDDO invested \$51.4 million to enhance and add more C-IED training realism for deploying units. The C-IED Interactive Set Design initiative provided realistic texture

to existing buildings, giving them a more authentic Iraqi look. The Insurgents on the Battlefield initiative provided a realistic insurgent network to track and neutralize. The High Order Effects initiative provided IED detonation shock effects without causing physical harm to Service members. The C-IED Search Props initiative provided items needed for search training such as portable buildings, "local documents" for exploitation and authentic Iraqi furniture.

During FY 2008, the JCOE emphasized and improved training on attacking IED networks. JCOE invested \$1.9 million to expand the Opposing Forces (OPFOR) Command and Control (C2) Network, and one million dollars on a Mobile Training Team initiative to provide an Independent Cell Phone Network. Designed to provide realistic intelligence scenarios to help the Services plan for and conduct free role-play in OPFOR training, this initiative enhances the Services' ability to provide realistic C-IED training to deploying forces.

Recent additions or expansions to JCOE training included:

Tactical Site Exploitation (TSE). JCOE, with the National Training Center, produced an initial IED search capability in FY 2008 that included the construction of a small Iraqi "type" village complex. Consisting of four houses that allow training for formal IED search training, JCOE began certifying TSE instructors lead by a Search Advisor from the United Kingdom. In response to the CENTCOM Commander's guidance in March 2008, "each maneuver battalion will have a squad size element trained in search," JCOE expanded its TSE capability to seven additional locations including: Camp Shelby, Camp Atterbury, Fort Hood and Fort Bliss for the Army; and at the home station locations of Marine Corps Base Kaneohe Bay, Camp Pendleton and Camp Lejeune for the Marines. In FY 2008, JCOE invested more than \$7 million in its TSE initiative.

Training to Identify and Report Home Made Explosives (HME). In early 2008, JIEDDO's Joint Task Force Paladin in Afghanistan identified a training gap in an emerging enemy practice of using HMEs or Unknown Bulk Explosives (UBE) in IEDs. JCOE assisted the Services in training their deploying units to recognize HME/UBE by bringing together a Training Assistance Team with joint military representatives, coalition experts, a representative from the Bureau of Alcohol, Tobacco, Firearms, and Explosives, and trained contractors. In May 2008, \$270,000 was approved for this initiative. By June 2008, the Training Assistance Team began travelling to and training various Combat Training Center staffs in the basics of identifying HME. By the end of FY 2008, 14 HME "labs" had been constructed, scenario developers were trained to incorporate HME scenarios into the field exercises

at each training venue, and more than 150 observer-controllers successfully conducted this training for deploying units.

C-IED Mobile Assistance Training Teams (C-MATT) Proof of Concept. C-MATT was developed to improve pre-deployment C-IED training for units that did not receive the Combat Training Center experience. C-MATTs provided coaching, teaching, mentoring and training unit leaders and battle staffs on their execution of CENTCOM's IED-Defeat Tasks. During FY 2008, JIEDDO approved \$8.11 million to fund the C-MATT as a proof of concept for testing and assessment during FY 2009.

Other Training Initiatives in FY 2008

Simulation Training Technology. JIEDDO invested \$5.5 million in developing a prototype system that helps recognize coalition personnel, who can identify potential IEDs in a stressful complex environment, from a moving vehicle. JIEDDO also partnered with JFCOM in the Joint Capabilities Technical Demonstration, "Future Immersive Training Environment," to improve simulations for small units in ground combat. The goal was to maximize the live, virtual, constructive and gaming programs by creating an environment necessary for decision-making factors of survivability and "combat hunter" skills.

Home Station Training. JIEDDO, in concert with the Services and JCOE, identified 63 essential requirements at home stations for C-IED training. Following on the success of the Home Station Training Lanes – Phase I initiative, JIEDDO invested \$196.7 million in Phase II of the Home Station Training support effort during FY 2008. The intent of this investment was to build on the C-IED training lane projects approved, supplied and constructed in order to optimize the training value for troops preparing for their capstone Combat Training Center exercises. This effort supports all of the Services in 57 locations throughout the United States, Korea, and Europe, including Army National Guard installations.

C-IED Initiative Transitions, Transfers and Terminations

JIEDDO transitions C-IED initiatives to a Service or agency when the initiatives are expected to provide an enduring capability for the joint force. Initiatives that transition to a Service are expected to become a program of record with funding in the base budget. The initiatives that are transferred to a Service or Agency are those C-IED solutions that are not expected to provide an enduring capability, but

will continue to be sustained and used in the current conflict. Initiatives, that are transferred to a Service are sustained with funding through that component's supplemental request.

FY 2008 Transitions: In FY 2008, JIEDDO transitioned 12 C-IED capabilities as directed in Joint Programming Guidance (JPG) IV, which was signed by the Deputy Secretary of Defense in April 2006. The C-IED capabilities and their supporting initiatives that were transitioned to the Services in FY 2008 are shown in **Figure-7**.

Transfers of JIEDDO initiatives to the Services in FY 2008 under the authority of Memoranda of Agreement and Memoranda for Record are shown in **Figure-8**.

Terminations. While many C-IED initiatives proved to be successful, a number of initiatives proved ineffective and were terminated by JIEDDO during FY 2008. These included:

Trailblazer II. Trailblazer II, a high power Radio Frequency transmitter used to neutralize IEDs, failed during testing and was terminated.

Rabbit 2.0A. This remote control kit enabled and unmanned HMMWVs. The initiative was developed by the Army's Rapid Equipping Force with development and testing of two competing designs: Rabbit 2.0A and Rabbit 2.0B. Rabbit 2.0A demonstrated poor performance early in its testing and the effort was terminated during 2008. Rabbit 2.0B, however, was continued and is undergoing operational assessments.

Improvised Ordnance Disruptor. This electrical discharge system was designed to neutralize IEDs. It was terminated due to poor performance during testing.

JIEDDO Field Teams

JIEDDO field teams are stationed in Iraq and Afghanistan to influence the C-IED fight in both theaters across all JIEDDO LOOs. During 2008, they supported the development and fielding of a wide array of technology-based, C-IED initiatives, such as mine rollers, CREW, pre-detonation systems, and route clearance equipment. They also supported corps, division, and Marine Expeditionary Force support teams integrated into the C-IED cells at the respective commands. As planning supports the anticipated expansion of forces in Afghanistan, JIEDDO field teams will be instrumental in liaising with forward deployed senior commands to help anticipate the warfighters' requirements for C-IED training and technology solutions in that unique theater.

FY 2008 Transitions to Army	Description
Global Anti-Terrorism and Operational Readiness Course (GATOR)	Training support system to improve C-IED training for individual soldiers and small units.
Counter Radio-Controlled IED Electronic Warfare (CREW 2):	
1. Duke Band B Frequency Upgrade	Duke System upgrade for JCREW compatibility.
2. Production of Duke and Spares	Provide Depot Level repair services and Lowest Replaceable Unit (LRU) spares to facilitate replacement of failed LRUs in theater.
3. CREW Requirements	
4. Training Device Upgrade	CREW Training and Surrogate system upgrade for Joint Center of Excellence C-IED training efforts.
5. Duke Upgrades & Requirements	Duke System upgrade to enhance system to requirements.
6. CREW – 2 (Duke) Production & Spares	Sustainment effort for Duke systems.
7. Duke Field Service Representative (FSR) Contract	FSR contract for Duke System.
8. Duke Production	Production effort to field Duke.
Robotic Systems (MARCBot/XBot):	
1. Combat Engineers Robotics: FIDO Packbot	EOD miniature robots used for dismounted operations.
2. TF Troy Robotics	Robotic systems.
3. CJTF EOD Robotics	Man Transportable Robotic System.
FY 2008 Transitions to Navy	Description
Robotic Systems: CJTF EOD Robotics	Man Transportable Robotic System.
Convoy Planning Tool	Software application designed to assist convoy commanders and planners in the employment of CREW systems in support of convoy operations.
Counter Radio Controlled IED Electronic Warfare:	
1. Channel Systems FSR	Provide Depot Level repair services and Lowest Replaceable Unit (LRU) spares to facilitate replacement of Failed LRUs in theater.
2. Spruce	High power scanning and jamming electronic countermeasures system designed to prevent detonation of a wide range of radio controlled improvised explosive devices.
3. CREW Modeling and Simulation	Modeling and simulation to aid in development of the next generation J-CREW and upgrades to legacy CREW systems.
4. LX Sustainment	Sustainment of Integrated ACM Systems for Warlock.
Combined Explosive Exploitation Cell Support (CEXC)	The CEXC integrates Joint and interagency exploitation efforts by consolidating IED related intelligence on current threats and providing vital information regarding IED threats to ongoing operations.
FY 2008 Transitions to Marine Corps	Description
Counter Radio Controlled IED Electronic Warfare:	
1. High Power (HP) Jammers	USMC CREW System.
2. Hunter	USMC CREW System.
3. Chameleon	Latest generation vehicle mounted CREW Systems augmenting CREW 2.0 (Chameleon, Duke).
Robotic Systems: CJTF EOD Robotics	Man Transportable Robotic System.
FY 2008 Transitions to Air Force	Description
Specialized Search Dogs	Dogs will detect and track terrorists from IED sites; indirect fire points of origin, sniper positions, points of egress and the location of safe houses.
Robotic Systems: CJTF EOD Robotics	Man Transportable Robotic System.
FY 2008 Transitions to COCOM	Description
Counter Radio Controlled IED Electronic Warfare: Mobile Multi-Band Jammer (MMBJ)	SOCOM CREW System.

Figure-7: C-IED capabilities and their supporting initiatives

FY 2008 Transfers to Army	Description
Airborne Reconnaissance Multi-Sensor (ARMS)	Full motion video surveillance quick response capability.
Persistent Threat Detection Systems (PTDS)	PTDS is a tethered aerostat equipped with a high resolution EO/IR sensor.
Constant Hawk	Pixel-based imagery collection for forensic backtracking of vehicles.
FY 2008 Transfers to Navy	Description
P-3C Airborne Survivability Equipment (ASE)	Modifications to 15 P-3C aircraft to include aircraft survivability equipment.

Figure-8: Transfers of JIEDDO initiatives to the Services

Science and Technology Challenges in FY 2008

In 2008, JIEDDO revised the C-IED Science and Technology Master Plan. The plan identifies 15 C-IED technology gaps derived from COCOM JUONs, feedback presented directly from operational commanders to JIEDDO at semi-annual cross-briefs, and from the JIEDDO field teams in Iraq and Afghanistan. One hundred and thirty-nine science and technology programs conducted with the cooperation of 52 industry partners and 31 government organizations currently seek to address these gaps. Priority efforts in FY 2008 included:

The sensor fusion program, begun in 2007 to develop data engines for IED detection through multiple sensors, progressed to developmental testing in 2008. This multi-year effort is scheduled to continue developmental testing through the first quarter of FY 2009.

During 2008, a standoff-explosives detection program proceeded along several parallel lines, which included:

- An Army research office-managed BAA resulted in the funding of research into three candidate technologies for optical detection of explosives at standoff ranges.
- A JIEDDO BAA was developed and released to evaluate existing optical, infrared, or other sensor technologies for suicide vest detection.
- Explosives signature development work continues through the Army Research Laboratory and other DoD labs.

JIEDDO Solutions Network

In 2008, JIEDDO improved its solutions network partnerships by increasing its outreach to technical communities including nearly 300 corporations, two dozen universities and research centers, and 37 government labs. These partnerships brought C-IED initiatives to the front end of JIEDDO's rapid acquisition process,

JCAAMP, represented by the 139 funded science and technical programs mentioned above. Hundreds more were submitted for evaluation, but not found suitable for funding. JIEDDO also leveraged our solutions network to apply unique technical expertise that resides in the service laboratories and engineering centers in order to do research, development, testing, and evaluation for many C-IED initiatives.

Way Ahead

Resolving C-IED Initiative Transition Challenges.

During 2009, JIEDDO will support DoD's challenge of improving the Services' and defense agencies' ability to program and fund C-IED initiatives approved for transition. The JIEDDO Transition Working Group will provide early notification of our intent to transition or transfer C-IED initiatives in order to increase the time that the Services and Agencies have to develop funding strategies for these initiatives. JIEDDO will participate in the Office of the Secretary of Defense Capability Portfolio Management Process to oversee transition of initiatives into programs of record and enduring Service capabilities. We will continue to provide visibility of C-IED initiatives to the Services and agencies through quarterly briefings to the Joint Staff's Protection Functional Capabilities Board and annual briefings to the Senior Resource Steering Group and Joint Requirements Oversight Council. Periodic updates to the Deputy Secretary of Defense will include the status of C-IED initiatives transitioning or transferring to the Services and agencies.

JIEDDO Enterprise Management System (JEMS) Implementation.

Early in JIEDDO's organizational development, we recognized a need for an affordable information technology architecture that could support our unique rapid acquisition management processes, and evolve to incorporate new functional requirements. Planning to develop and implement JEMS began in 2007 and continued in 2008. The JEMS Web-based architecture is intended to be the umbrella IT solution to support collaborative staff action workflow and the JCAAMP. The initial effort to implement JEMS will focus on creating and maintaining an authoritative information repository for each C-IED initiative

through all phases of JCAAMP. In its final form, JEMS will incorporate the major processes in all functional areas of the organization, and enhance decision making necessary to rapidly provide effective portfolios of C-IED solutions to the warfighter.

Summary

For the foreseeable future, the United States will continue to respond to the challenges posed by enemies who undermines our will and our way of life. Their weapon of choice will continue to be the IED and they will continue to improvise new and dangerous ways to employ IEDs to overcome our technology advantage and achieve strategic influence.

During FY 2008, JIEDDO continued to evolve and improve on the C-IED capabilities we offered to the warfighter. Funded

and developed by JIEDDO and our interagency partners, critical capabilities were provided to assist forward deployed forces in analyzing and ultimately targeting key elements of IED networks. As we enter 2009 and begin to refocus on a very different and potentially expanding theater of operations, JIEDDO remains committed to rapidly placing effective C-IED capabilities in the hands of our warfighters wherever they are in harm's way. We will continue to balance IED network attack initiatives with continued investment in high-priority, high-payoff technologies to defeat the IED in its present and anticipated forms. We will continue to support DoD's mandate to deploy the best trained forces in the world.

(U) Acronyms

ACCM	Alternative or Compensatory Control Measures (for DoD classified info)	IRAM	Improvised Rocket Assisted Mortar
AFRICOM	U.S. Africa Command	JCAAMP	Joint IED Defeat Capability Approval and Acquisition Management Process
AOD	JIEDDO: Acquisition Oversight Division	JCOE	JIEDDO: Joint Center of Excellence
AQI	al Qaeda in Iraq	JEMS	JIEDDO: Enterprise Management System
AtN	JIEDDO LOO: Attack the Network	JFCOM	U.S. Joint Forces Command
BAA	Broad Area Announcement	JIEDDF	Joint Improvised Explosive Device Defeat Fund
C2	Command and Control	JIEDDO	Joint IED Defeat Organization
CENTCOM	U.S. Central Command	JTF	Joint Task Force
CEXC	Combined Explosive Exploitation Cell	JUON	Joint Urgent Operational Need
C-IED	Counter (or Countering) Improvised Explosive Device	LOO	Line of Operation
C-MATT	C-IED Mobile Assistance Training Teams	MRAP	Mine Resistant Ambush Protected (vehicle)
COCOMs	Combatant Commands	OPFOR	Opposing Forces
COE	Center of Excellence	PACOM	U.S. Pacific Command
COIC	JIEDDO: Counter-IED Operations Integration Center	PBIED	Personal-Borne IED
CONUS	Continental United States	PIR	Passive infrared (type of switch)
CREW	Counter Radio-Controlled IED Electronic Warfare	RCIED	Radio-controlled IED
CSG	Competitive Strategies Group	Services	U.S. Military Services
CVRJ	Combined Vehicle Radio Jammer	SIPR	Secret Internet Protocol Router
CWIED	Command Wired IED	SOCOM	U.S. Special Operations Command
DoD	Department of Defense	SVBIED	Suicide Vest-Borne IED
DtD	JIEDDO LOO: Defeat the Device	T2	Transitions and Transfers
EFP	Explosively Formed Penetrator	TSE	Tactical Site Exploitation
EIP	External Information Programs	TtF	JIEDDO LOO: Train the Force
EOD	Explosive Ordnance Disposal	UBE	Unknown Bulk Explosive
EUCOM	U.S. European Command	VOIED	Victim operated IED
GWOT	Global War on Terrorism	VOSS	Vehicle Optics Sensor System
HME	Home Made Explosive	WIT	Weapons Intelligence Teams
HMMWV	Highly Mobile Multipurpose Wheeled Vehicle	WTI	Weapons Technical Intelligence
IED	Improvised Explosive Device		



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