

Counter-IED Report

Autumn/Winter 2013

C-IED AS THE WEST REDUCES INVOLVEMENT IN OVERSEAS CONFLICTS

AFGHANISTAN IN TRANSITION: A GLOBAL REVIEW (2012 & 2013)
OF IEDs AND ERW IN AFGHANISTAN

HOW NATO CAN SUPPORT COUNTERING THREAT NETWORKS

RAPID INTERNATIONAL C-IED CAPABILITY DEVELOPMENT

EUROPOL'S ROLE IN THE IMPLEMENTATION OF THE EU STRATEGY
TOWARDS THE SECURITY OF EXPLOSIVES

HOMEMADE EXPLOSIVES PRECURSORS, ATTACKING THE CORE OF THE IED THREAT
A SIMPLIFIED AND EFFECTIVE CONOPS FOR DEFEATING IEDs

NATO ROUTE CLEARANCE (RC) PROJECT – FROM SMART DEFENCE TO SMART INITIATIVE

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FOREWORD

By Rob Hyde-Bales, Consulting Editor,
Counter-IED Report



The West passed a sombre anniversary earlier this year – that of ten years of continuous conflict, firstly in Iraq and latterly in Afghanistan. As they entered these conflicts Western politicians had no concept of the duration, loss of life or financial costs that they would incur. The bitter experiences of these two wars and in particular the 2003 Iraq War are certain to colour Western judgement on the question of any future participation in conflicts on these scales. This has been evidenced recently by Western confusion on how to get involved in the Syrian civil war, if at all.

The improvised explosive device (IED) will continue as the weapon of choice for insurgents, terrorists and increasingly criminals across the globe. Future Counter-IED (C-IED) operations will include humanitarian clearance operations in post- conflict areas and be undertaken increasingly by civilian organisations. In this respect it is good that the United Nations Mine Action Service (UNMAS) now sees C-IED operations as part of its remit.

This edition of Counter-IED Report contains an eclectic selection of articles covering key subjects across the C-IED spectrum. The NATO Civil-Military Fusion Centre provides an excellent scene setter for the Report with a detailed 2012 and First Quarter (Q1) 2013 IED and Mine/Explosive Remnants of War (ERW) Afghanistan review, based on open multi - source information. The review confirms that the IED remains the favoured weapon in the insurgents' arsenals. Significantly there has been a 47 per cent increase in insurgent activities in Q1 2013 compared with the same period in 2012, and Afghanistan remains the most dangerous country in which humanitarian organisations operate.

Optima Defence & Security Group Ltd. examines the requirement for Rapid International C-IED Capability Development. It points out that the UK is moving towards a concept of contingent operations; conflict prevention and post-conflict engagement. Such operations will face the ever present IED threat. Optima argues cogently for a partnership

approach between MOD UK and appropriately skilled and experienced contractors – in the main ex-military, for a rapid international C-IED capability, based on the existing US model.

NATO Allied Command Transformation (ACT) provides a thought provoking article on the need for effective international multi-agency information, intelligence and analysis sharing in support of a concept for Countering Threat Networks (CTN) to defeat the highly complex adversary global networks used by terrorists and criminals. Such networks with international reach depend on criminal financing together with terror attacks and other destructive capabilities – including cyber strikes and IEDs. The author points out that NATO already has an effective concept – Attack the Networks (AtN) – designed to neutralise IED and insurgent networks in theatres of war. He suggests that ACT champion the development of a CTN concept to support the in theatre AtN concept.

From the technical perspective the German simulation specialist szenaris GmbH has successfully designed and developed remote controlled EOD vehicle training systems that have been in use with the Bundeswehr since 2010. The systems have been integrated with existing remote controlled EOD equipment at two training levels - basic and continuation. This has resulted in a significant improvement in training quality and also a reduction in damage to this expensive equipment.

The article on the challenges of WW 2 mine clearance on the North West coast of Egypt is a potent reminder of the continuing explosive lethality of landmines 70 years after emplacement.

Given current international acute concern over the use of chemical weapons (CW) in Syria there is a very timely and comprehensive article by CBRNe Secure India on the significant accomplishments to date towards the global elimination of CW.

These and other excellent articles constitute Counter-IED Report Autumn/Winter 2013. ■

Rob Hyde-Bales biography

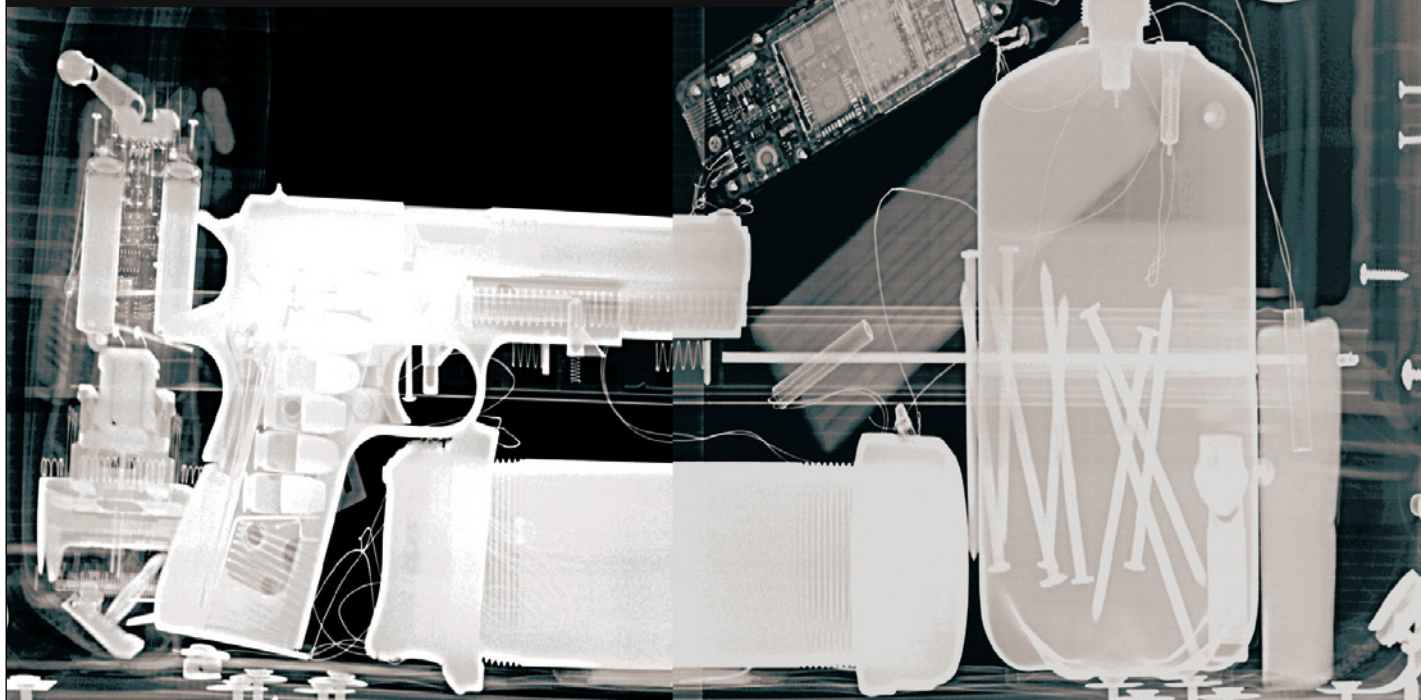
During his career in the UK Royal Engineers, Rob Hyde-Bales was responsible for landmine clearance in Libya and, more latterly, Afghanistan in the running of the first United Nations humanitarian landmine clearance training programme – Operation Salam. The programme trained Afghan male refugees in landmine clearance techniques, and Afghan women and children in mine awareness and avoidance training. More recently he set up the Caribbean Search Centre in Kingston, Jamaica. The Centre is designed to train security forces across the Caribbean in modern search techniques. After retiring from the army he joined Cranfield University at Shrivenham, near Oxford, and undertook a research project on behalf of the UK Ministry of Defence that examined ways to improve the sharing of IED threat information between the military and civilian organisations in hazardous areas.

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C-IED AS THE WEST REDUCES INVOLVEMENT IN OVERSEAS CONFLICTS

“In the 20th century, artillery was the greatest producer of troop casualties.

The IED is the artillery of the 21st century.” – Lieutenant General Michael Barbero Director, Joint IED Defeat Organization

By Rob Hyde-Bales, Consulting Editor,
Counter-IED Report

The UK Armed Forces are currently undergoing major changes to their operational modus operandi. Nowhere is this more apparent than in the British Army as it prepares firstly to withdraw from ten years of conflict initially in Iraq and latterly Afghanistan and, secondly to disband the erstwhile British Army of the Rhine after nearly 70 years in Germany. At the same time the UK Government is significantly reducing its Regular Army Force component and planning to replace the deficit with Reserve Forces. These changes are taking place against a backdrop of very substantial economic difficulties in Britain, mainland Europe and the United States, all of which will place increasing pressures on future defence spending.

Counter-Improvised Explosive Device (C-IED) operations will alter in nature and scope as these changes take effect. There is no doubt, however, that insurgents, terrorists and criminals will

continue to regard the IED as a proven weapon of choice in asymmetric warfare and, increasingly, crime. Thus, the military and also appropriate security and commercial organisations must ensure that the operational and technical emphases on C-IED are maintained. The UK Government also has a duty to ensure that the requisite C-IED resources are provided for this. It is likely that commercial organisations will become more involved in IED clearance operations in the future, as they have with demining operations over the past two decades, particularly in post-conflict and humanitarian situations. Long after we have left Iraq and Afghanistan, the IED will still pose a global threat.

FUTURE STRATEGIC ENVIRONMENT

In looking to a potential future strategic environment it is useful to consider the recent conflicts in Iraq and Afghanistan as they will surely shape future strategic

Photo above:
A victim of the 2013 Boston Marathon
IED explosions.

Photo credit: news.com.au



Afghan Border Police 1st Lt. Azim Noori, left, and 2nd Sgt. Abdul Khan, both explosive ordnance disposal technicians, conduct improvised explosive device disposal training with U.S. Air Force bomb technicians in the Spin Boldak district of Kandahar province, Afghanistan, Feb. 6, 2013.

thinking – particularly for the US and the UK. The West has just passed a sombre anniversary – ten years of continuous conflict, firstly in Iraq and then in Afghanistan. Certainly at the outset of these conflicts, it was not anticipated by Western governments that they would continue as long as they have, nor result in the military and civilian casualties that they have. The initial exuberance from US President Bush on board the USS Abraham Lincoln and his premature “Mission Accomplished” speech on 1 May 2003 were very wide of the mark, as US troops did not finally withdraw from Iraq until December 2011. In the case of Afghanistan, in 2006, as UK troops joined the ISAF mission in southern Afghanistan, the UK Minister of Defence, John Reid, declared that he hoped British troops would “fulfil their mission without a shot being fired”. These examples serve to show how politicians can seriously underestimate or ignore the difficulties

and complexities associated with armed intervention and, just as critically, its aftermath, and how difficult it can be to quit once entered.

The 2003 Iraq War has been described as the biggest UK foreign policy disaster since the Suez debacle of 1956. It is still mired in controversy. The total absence of the much vaunted Weapons of Mass Destruction – the UK rationale for the war, is now all the more pertinent during the current Chilcot Enquiry. This in the light of the recent admission from the US Iraqi source, “Curveball”, who stated that his information on alleged Iraqi Weapons of Mass Destruction, that was deemed to be so critical to the rationale for the war was, in fact, bogus – and produced by him solely to remove Saddam Hussein from power. The politicisation of intelligence to help justify the war and the total lack of any kind of plan for post-conflict operations, all combined to make this war the most unpopular in living memory. The UK still awaits the findings of the Chilcot Enquiry that has now been running for four years, into the run-up to the conflict, the military action itself and its aftermath. The much hoped for peaceful democracy in Iraq that would infuse the region has not occurred and the visceral sectarian violence that has increased dramatically this year shows no signs of abating. History is certain to judge the war and its architects harshly.

There is now the inevitable concern that the war in Afghanistan will follow the same course as that in Iraq, as it moves to a hoped-for conclusion, at least from the Western perspective, in 2014. There are still major questions over the quality and reliability of the Afghan Army and more so of the Afghan Police. It is on these two organisations that rest the hopes of ISAF for an orderly withdrawal from Afghanistan next year. Of note, Sir Sherard Cowper-Coles, the former British Ambassador to Afghanistan, with a detailed knowledge of the country is quoted as saying, “The idea that the country is going to be pacified or subdued by the Afghan forces is, I’m afraid, a delusion.”¹ The country continues to be one of the most corrupt in the world. The authority of the President certainly does not cover the country and the reaction of the Taliban and the warlords after Western departure remains questionable. Both Cowper-Coles and UK General Nick

Carter in Afghanistan lament the fact that the West has only just started hopefully serious talks with the Taliban. Time is very much on the side of the Taliban.

It is the bitter experiences of these two wars that will surely colour Western judgement on future involvement in foreign conflict. President Obama has made it clear that, as far as he is concerned, he was elected to end wars and not to start them. Western confusion on how to get involved in the Syrian civil war, if at all, is an example of this. The experience of arming opposition groups in recent conflict illustrates the inherent risks in this policy. In Afghanistan the US was forced to buy back shoulder-launched ground-to-air missiles given to the Mujahideen by the US for use against the Soviets in the 1980s. More recently, it is reported that the US ambassador to Libya, who was murdered in Benghazi in September 2012, may have been in the process of trying to buy back similar US-provided shoulder-launched missiles from the militias.

Most NATO countries, with the possible exceptions of Canada and Germany, currently face severe continuing financial difficulties as a result of the global economic meltdown of 2008. This will mean that defence spending in the near and medium term will be severely constrained. Military reductions have already manifested themselves in the UK and the US. In the UK the Government is reducing the size of its Regular Army force component from 102,000 to 82,000 and planning to make up the deficit by increasing the Reserve Forces from 19,000 to 30,000. Time will indicate the success or otherwise of this plan. The experiences in Iraq and Afghanistan coupled with these economic difficulties suggest that it is highly unlikely that either the UK or the US will get involved in conflicts such as these and on such scales for the foreseeable future.

The UK is also in the process of withdrawing its remaining forces from Germany – the erstwhile British Army of the Rhine – after nearly 70 years in that country. Once this withdrawal is complete, together with the withdrawal from Afghanistan, less a small Armed Forces contingent to assist with ANA officer training at an academy to be set up just outside Kabul the British Armed Forces will maintain no overseas bases



apart from small detachments in the Falkland Islands and Cyprus. This will be the first time for centuries that this has been the case and will require a major change in military mind-set, in particular for the Army.

MAINTENANCE OF C-IED SKILLS AGAINST THE CONTINUING THREAT

Despite the changes outlined above, the UK must maintain the overall C-IED capability in its Armed Forces, other security agencies and commercial organisations. Regardless of the cessation of UK involvement in Iraq and next year in Afghanistan, insurgents, terrorists and increasingly criminals will continue to view the IED as a most effective weapon in their arsenals. From January to November 2011 the US Joint IED Defeat Organisation (JIEDDO) reported that there were 6,832 IED events globally outside Iraq and Afghanistan in 111 countries resulting in 12,286 casualties.² It is easy and cheap to produce, transport and emplace, and can cause strategic effects out of all proportion to its cost and size. In both the Iraq and Afghan wars the IED has been the major source of military and civilian casualties. Today in Iraq, long after the departure of UK and US Armed Forces, IEDs continue to cause very high numbers of fatalities and serious injuries across the country.

Currently the UK is a world leader in C-IED operations. The combination of High Risk Search by the Royal Engineers, neutralising the devices by the Ammunition Technical Officers of the

Post - 2014 UK Armed Forces will lead a new Afghan National Army Officer Training Academy to be based just outside Kabul.

... FROM JANUARY
TO NOVEMBER 2011
THE US JOINT IED
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(JIEDDO) REPORTED
THAT THERE
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OUTSIDE IRAQ AND
AFGHANISTAN IN 111
COUNTRIES RESULTING
IN 12,286 CASUALTIES...



Afghanistan: Deminer in action.

Photo: © Jacob Simkin / UNMAS — in Afghanistan.

... IT IS GOOD TO SEE
THAT THE UNITED
NATIONS MINE ACTION
SERVICE (UNMAS) NOW
RECOGNISES THE C-IED
AS PART OF ITS REMIT ...

Royal Logistic Corps and IED tactical awareness of in theatre troops are key in this respect. Equally important are extensive technical research backed by multi-agency intelligence and state-of-the-art equipment. Every effort must be made to maintain this pre-eminence and to resist the calls for cost cutting. Of note in the US, Congress has already requested the Department of Defence to produce a plan for the closure of JIEDDO should that be deemed necessary.

It is good to see that the United Nations Mine Action Service (UNMAS) now recognises the C-IED as part of its remit.³ Hopefully, key C-IED roles for UNMAS in the future will include the conduct of IED Threat Awareness Training and the supervision of the clearance of legacy IEDs from post-conflict areas. Much of the global landmine threat and legacy has

now diminished, thanks in large measure to the work of UNMAS. Similar emphasis must now be placed on improving the awareness of people worldwide of the IED threat and clearance of legacy IEDs.

We must not repeat mistakes made in the past. At the end of the Cold War it was thought that landmines would become a thing of the past and UK emphasis on them dropped. As a result it was the UN Mines Reference Manual that was produced during the UN Operation Salam for Afghan demining and mines awareness that rapidly became the Mines Reference Manual for the first Gulf War. More recently, after Northern Ireland when investment in C-IED was cut the UK lost the mainstay of its C-IED capabilities as a result.

CORRUPTION AND CRIMINALITY IN C-IED

A recent development in the C-IED sphere has been a high profile UK court case involving corruption and criminality in both the UK and Iraq. The case concerned now-convicted British criminal James McCormick, who manufactured and sold worthless pieces of junk masquerading as explosive detectors. The prototype for his equipment was an American novelty device that purported to find lost golf balls. In court it was stated that this device sold for £ 13.00, but by the time that McCormick had repackaged the devices as explosive detectors they were reportedly being sold to the Iraqi Government for up to £ 27,000.00 each.⁴ They were also sold to the UN in the Lebanon and the



Worthless 'explosive detectors' manufactured and sold by British criminal James McCormick.

Hong Kong Prison Service. In the case of Iraq, senior Iraqi officials working with McCormick were convicted of corruption. This case serves to demonstrate the significant sums of money available in C-IED operations – very often foreign aid finance. In Afghanistan and many other IED affected countries corruption is in the national DNA and thus there will be the temptation for criminals such as McCormick to exploit a nation's well known tendency to corruption.

INFORMATION SHARING

Like charity, effective C-IED information-sharing begins at home. A homeland multi-agency approach to ensure effective information and intelligence sharing is essential within and between the UK, US and other allied nations.

Any future UK military operation is likely to be as part of a coalition force and traditionally information sharing has often been the Achilles heel in coalition operations – certainly in the initial stages. Too often information is shared on an *ad hoc* basis and dependent on individuals. The sharing of information between military and civilian organisations has also traditionally been problematic. The *sine qua non* of successful C-IED operations is timely, reliable and actionable information. It is essential that information sharing is effectively conducted both between the militaries of participating nations and also between the military and civilian organisations – international organisations and NGOs.

For the military there is an understandable wish to protect sensitive information and maintain operational security. The experience in Afghanistan with rogue Afghan soldiers and police will serve to reinforce this tendency. However, the military must move from the old Cold War “Need to Know” mindset to that of “Need to Share”. In conflict and post-conflict situations it is the civilian organisations – IOs, NGOs who spend longer in country than foreign military and thus often have a better understanding of the human terrain. The civilian organisations will also normally have a larger geographical footprint than their military counterparts. For the civilian organisations there is often reluctance to deal with the military, lest this be seen to impugn their neutrality.

There have been successful examples of effective information sharing firstly in Iraq – the Iraq Reconstruction Operations Centre and Logistics Movements Co-ordination Cell (IROC and LMCC) set up by the US, to provide operational information and information support to civilian contractors. In Afghanistan, a good example is the Afghan NGO Safety Office (ANSO) now known as the International NGO Safety Office (INSO). This highly respected organisation provides security information and analysis to more than 250 civilian organisations in Afghanistan.

CONCLUSIONS

The UK military *modus operandi* will undergo major changes during the next five years as it ends a decade of conflict and significantly reduces its regular force component and aims to build up its reserve forces. At the same time, the Army is leaving its overseas bases and will become almost totally UK based. There will be continuing financial pressure on military resources as Britain struggles to finally pull out of a long-standing recession.

Future military operations are likely to be more restricted in scope than recent forays into Iraq and Afghanistan and will be as part of a coalition. Hopefully the United Nations will take the lead more willingly and any future UN force coalitions will include “heavy lifting” nations from the military experience and quality perspectives.

The IED will continue as a weapon of choice for insurgents, terrorists and, increasingly criminals. As IED countermeasures improve, so will the quality of the IEDs. It is good to see that the UN now includes C-IED operations in its remit. It is likely that more C-IED operations will be undertaken by civilian companies in the future.

The UK must ensure that it maintains its pre-eminence in C-IED operations using an effective mix of high quality multi-source intelligence, a multi-agency approach, top quality military and civilian specialists, high quality training, first class technical research and state-of-the-art equipment – all this to be properly resourced.

The IED is here to stay. We must ensure that the best possible countermeasures remain in place to combat this very effective weapon of asymmetric warfare – the artillery of the 21st century. ■

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ABOUT THE AUTHOR



During his career in the UK Royal Engineers, Rob Hyde-Bales was responsible for landmine clearance in Libya and, more latterly, Afghanistan in the running of the first United Nations humanitarian landmine clearance training programme – Operation Salam. The programme trained Afghan male refugees in landmine clearance techniques, and Afghan women and children in mine awareness and avoidance training. More recently he set up the Caribbean Search Centre in Kingston, Jamaica. The Centre is designed to train security forces across the Caribbean in modern search techniques. After retiring from the army he joined Cranfield University at Shrivenham, near Oxford, and undertook a research project on behalf of the UK Ministry of Defence that examined ways to improve the sharing of IED threat information between the military and civilian organisations in hazardous areas.

AFGHANISTAN IN TRANSITION: A GLOBAL REVIEW (2012 & 2013) OF IEDs AND ERW IN AFGHANISTAN COMPREHENSIVE INFORMATION ON COMPLEX CRISES

By The Civil-Military Fusion Centre (CFC)

EXECUTIVE SUMMARY

This paper provides a summary and trend analysis of Improvised Explosive Devices (IEDs) and Mine/Explosive Remnants of War (ERW) incidents in Afghanistan. The analytical scope covers 2012 through first quarter 2013 by comparing incidents between these dates with older data. The report studies the IED & Mine/ERW issues in Afghanistan via three main criteria: the frequency of insurgent attacks; the volume of IED occurrences and the IED human casualty rates in the country. The report demonstrates that insurgent and IED-laying activities were concentrated in the southern, eastern and southeastern regions of Afghanistan. The report also shows clear correlations between the regional IED attacks volumes with the local casualty rates. This study makes use of several sources in order to conduct a broad assessment of recent IED and Mine/ERW activity. The Afghan NGO Safety Office (ANSO) is a non-military, non-government forum whose members include an array of non-governmental organisations. Its data collection benefits from its robust membership of over 250 NGOs in the field, and its analyses include quarterly and annual reports on casualty figures, IED activities and civilian fatalities. The report also incorporates figures reported by NATO's Centre of Excellence-Defence Against Terrorism (COE-DAT) and the Bundeswehr Counter-IED Centre. Finally, in-depth reports from major media outlets such as The Guardian, which have

conducted periodic reviews of IED-related violence throughout the conflict, are also included. These present an objective source, impartial to the interests of both humanitarian organisations and military agencies.

Since the start of the war, the majority of all ISAF fatalities occurred in southern and southeastern Afghanistan. In a given year, roughly 45 – 50 per cent of ISAF fatalities resulted from an IED incident, totalling 51 per cent of all ISAF fatalities since 2001. Tactics vary. Since at least 2010, insurgents have often used pressure plate IEDs (PPIEDs), which are victim-activated. Additionally, IED tactics involving suicide and complex attacks (combined attacks involving explosives and firearms) became more common in areas populated by civilians. The first quarter of 2013 (Q1 2013) marked intensified conflict activity. Statistics show an increase of 47 per cent of insurgent activities compared to the same period last year. Insurgency IED capability remained the biggest conflict-related threat to the lives of Afghan children, women and men in 2012. In 2012, UNAMA documented 782 IED incidents – more than two IEDs per day – which resulted in 2,531 civilian casualties. In Helmand and Ghazni, the insurgency has been emboldened by an aggressive ISAF posture ahead of their final “fighting” campaign; before the 2014 withdrawal and the full security hand over.

By considering datasets from a range of military, government and NGO sources, the paper demonstrates a correlation

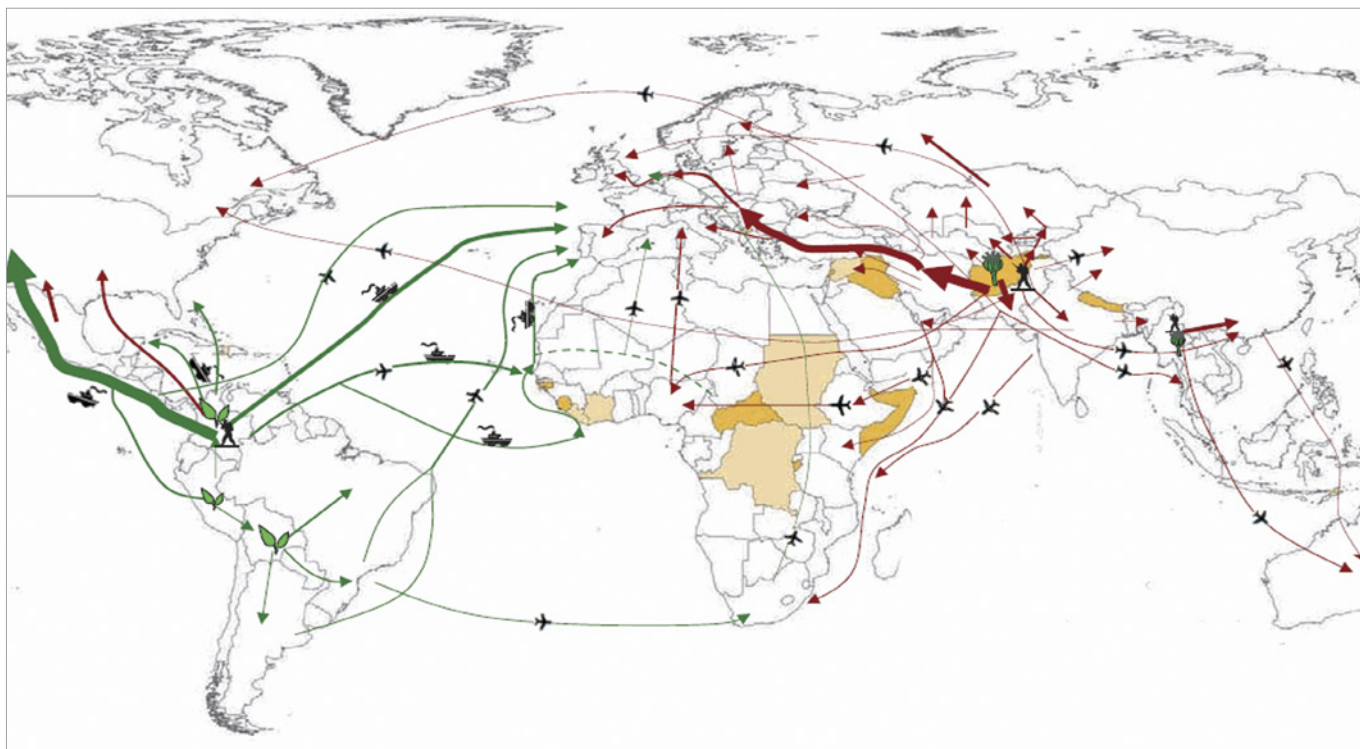
exists between insurgent presence in specific provinces and the registered volume of IED occurrences in those same provinces. Finally, civilian organisations and humanitarian groups suffered heavy casualties during the period analysed in this paper. In 2012, targeted IED NGO strikes rose by 78 per cent while IED incidents accidentally inflicting NGO casualties increased by 70 per cent. ■

ABOUT THE CIVIL-MILITARY FUSION CENTRE (CFC)

The Civil-Military Fusion Centre (CFC) is an information and knowledge management organisation focused on improving civil-military interaction, facilitating information sharing and enhancing situational awareness through the CimicWeb portal and our weekly and monthly publications. CFC products are based upon and link to open-source information from a wide variety of organisations, research centres and media sources. However, the CFC does not endorse and cannot necessarily guarantee the accuracy or objectivity of these sources. CFC publications are independently produced by Desk Officers and do not reflect NATO or ISAF policies or positions of any other organisation.

Please download the full paper at:

<http://www.counteriedreport.com/articles/a-global-review-2012-2013-of-ieds-and-erw-in-afghanistan>



HOW NATO CAN SUPPORT COUNTERING THREAT NETWORKS

A growing danger to the international community consists of highly complex adversary networks with international span that employ criminal financing as well as terror attacks and other destructive capabilities. To effectively counter these dynamic and violent illicit networks NATO should champion the creation of an international and multifunctional framework to share information on these networks as well as collaborative multinational countermeasures.

By Jeffrey V. Gardner,
Lieutenant Colonel, U.S. Army (Ret)

THE THREAT

*"Governments are faced with a broad spectrum of national security threats that emanate from non-state actors as well as traditional nation-states. Illicit networks that include transnational crime organisations, drug traffickers, gangs, and terrorist groups are among these non-state actors...what is novel today is the pervasive, prolific, and converging nature of illicit networks around the world. These networks threaten the rule of law, government institutions, the economy, and society."*¹

These adaptive and amorphous threat networks operate locally, regionally, and globally and they have significant nefarious effects both inside and outside the traditional military Area of Operations.

"Violent non-state actors, including terrorist organisations and insurgent

*movements, seek to collaborate with criminal networks – and in some cases become criminal networks – in order to finance acts of terrorism and purchase the implements of destruction and killing."*²

Given the current trends, we can surmise that we will see an increased convergence of illicit groups of terrorists, insurgents, and transnational criminal organisations in the future. For example, several of the 2004 Madrid train bombers were drug dealers and funded the attack with criminal activities. Some terrorist and insurgent groups today such as the Revolutionary Armed Forces of Colombia (FARC) and al Qaeda in the Islamic Magreb in North Africa have turned significantly to illicit trafficking as well as kidnapping for ransom to fund their violent actions. The terrorist Abu Sayyaf Group in Southeast Asia often resorts to piracy, extortion, and



9/11 attack.

... MODERN ENEMIES
ARE MORE LIKELY TO
USE ASYMMETRIC
TACTICS AND
POSSIBLY EVEN
HAVE ASYMMETRIC
OBJECTIVES ...

other criminal enterprises. Other groups such as Iranian-backed Hezbollah have extensive global networks of both legal and illegal activities to finance their nefarious enterprises and prepare for future terrorist attacks.³

“Although the fields of diplomacy, information, military, and economic power have generally belonged to states since the 1700s, modern illicit transnational networks have expanded their operations into these areas.”⁴

The benefits of globalisation work both ways and make it easier for these threat networks to thrive. Terrorists, insurgents, and other adversary networks can recruit, train, finance, command, and control the globalised civil communications infrastructures, and they employ asymmetric weapons like Improvised Explosive Devices (IEDs), cyber-attacks, and other counter-alliance techniques.

“The use of advanced IED technology and sophisticated tactics, techniques, and procedures provide individuals and transnational networks with cheap and easily accessible means to achieve high visibility effect. The extremist networks that employ IEDs have proven to be resilient, adaptive, interconnected, and extremely violent. Globalisation, the Internet, and social media have extended the reach of these organisations, providing platforms for recruiting, technical exchanges, training, planning, funding, and social interaction.”⁵

THE CHALLENGE

Understanding and countering these complex threat networks will be the premier challenge for the North Atlantic Treaty Organisation (NATO) and the rest of the world for generations to come, and it is vital for global security. After the September 2001 Terrorist attacks (9/11) on the United States, that government worked hard to break down the agency “stovepipes” that inhibited effective information sharing and cohesive interagency action. Many interagency centres were created over the years such as the National Counter Terrorism Center (NCTC), the National Drug Intelligence Center (NDIC), the National Counter-Proliferation Center (NCPIC), International Organized Crime Intelligence and Operations Center (IOC-2), as well as many interagency efforts to counter threat finances. These efforts did improve inter-organisational data fusion and information sharing, but they just replaced the old agency stovepipes with new functional or topic stovepipes. Unfortunately, modern illicit networks are increasingly converging and span across all of these areas without boundaries, thus hampering government countermeasures with bureaucratic and jurisdictional firewalls. These problems are greatly compounded when you additionally consider the challenges of coordinating multiple nations and many international organisations.

“The problem is too large for any one government to solve. It requires a net-centric approach at the bilateral, subregional, regional, and global levels based on information-sharing and coordination to break the financial strength of criminal and terrorist networks, disrupt illicit trafficking networks, defeat transnational criminal and terrorist organisations...”⁶

NATO was originally set up by the Western powers to guard against a military threat from the Eastern Bloc and has historically focused, as an organisation, on traditional war-fighting. NATO needs to maintain the capability to act against a military aggressor and in this way remain a deterrent in itself reducing the likelihood that the capability will be needed. Much more likely operations, as witnessed in Afghanistan, Kosovo and

Ocean Shield, are in a different part of the conflict spectrum and require a quite different approach. Modern enemies are more likely to use asymmetric tactics and possibly even have asymmetric objectives; they are likely to be hidden amongst the populations. Consequently, the Alliance has less than optimal policies, procedures, or infrastructure in place to counter these dynamic threat networks across the continuum of conflict. More positively, NATO does have a military framework for Attacking the Networks (AtN) that is effective at neutralising adversary IED and insurgent networks in theatres of war.⁷ However, recent experiences have shown that the networks operating within a theatre of war will undoubtedly have further connection to regional and transnational networks which will be outside the reach and authorities of NATO Commanders to take action against. This will necessitate a comprehensive approach, through other governmental agencies and international organisations. Effectively countering these transnational illicit networks will therefore require synchronising actions across the many intergovernmental and primarily civilian international sectors such as diplomatic, intelligence, financial, and law enforcement. Unfortunately, NATO currently finds itself ill-configured organisationally or in terms of process to handle the complexity of these pan-Governmental issues. The challenge is how transformation can best be implemented to support these various civilian authorities to harmonise the actions of all the elements of international power against these dynamic threat networks.

“The resourcefulness, adaptability, innovativeness, and ability of illicit networks to circumvent countermeasures make them formidable foes for national governments and international organisations alike. Their increasing convergence gives them ever-improved ability to evade official countermeasures and overcome logistical challenges as well as ever better tools for exploiting weaknesses and opportunities within the state system, and attacking that system.

Since illicit actors have expanded their activities throughout the global commons, in the land, sea, air, and cyber domains, nations must devise

comprehensive and multidimensional strategies and policies to combat the complex transnational threats posed by these illicit networks.”⁸

THE RESPONSE

Effectively responding to these networked illicit groups and the challenge of effectively synchronising the actions of many nations and international organisations calls for a new approach to Countering Threat Networks (CTN). While each instrument of international power has its own individual role to play, such as law enforcement and financial controls, what is needed is a platform for systematic information sharing and effective collaboration. As an example, NATO has formally adopted a “Comprehensive Approach” framework to address security challenges:

“Our operational experience has taught us that military means, although essential, are not enough on their own to meet the many complex challenges to our security. Both within and outside the Euro-Atlantic area, NATO must work with other actors to contribute to a comprehensive approach that effectively combines political, civilian and military crisis management instruments. Its effective implementation requires all actors to contribute in a concerted effort, based on a shared sense of responsibility, openness and determination, and taking into account their respective strengths, mandates and roles, as well as their decision-making autonomy.”⁹

Future success in CTN requires that NATO and its security partners fully comprehend these adversary groups, and that national governments and inter-organisational agencies develop an international network of their own to counter these illicit groups that span from terrorists, to insurgents, and all sorts of transnational criminal organisations. An international CTN network could facilitate information sharing and thereby enable the harmonisation of all the elements of international power needed to fight these networks cohesively and effectively. NATO needs a truly comprehensive approach to Counter Threat Networks by proposing and supporting an international CTN network of civil and military entities that span the

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sectors of diplomatic, intelligence, law enforcement, financial, and informational entities.

*"A true network starts with robust communications connectivity, but also leverages physical and cultural proximity, shared purpose, established decision-making processes, personal relationships, and trust. Ultimately, a network is defined by how well it allows its members to see, decide, and effectively act."*¹⁰ - General Stanley McCrystal.

While NATO may not be the ideal organisation to effectively synchronise actions across the primarily civilian elements of international power, a NATO comprehensive approach framework for a CTN network could provide the necessary stimulus to initiate such a civilian led enterprise. NATO is a key stakeholder in countering threat networks and has significant international political and military stature in the security arena to offer such a suggestion. The implications for NATO itself are likely to be truly transformational and as such Allied Command Transformation could be the appropriate place to initiate this drive from within NATO. Law enforcement, intelligence, and financial control functions clearly fall within the primacy of nation states and other civil international organisations, but effectively countering threat networks requires that NATO play a part in supporting these civilian international security, financial, and legal agencies. A CTN network could ensure a shared understanding of these different illicit networks and enable effective collaborative countermeasures across the elements of international power. This is in alignment with NATO's priority to cooperate on "increasingly global threats, such as terrorism, the proliferation of weapons of mass destruction, their means of delivery and cyber-attacks."¹¹ NATO may also have a defence diplomacy role in enabling capability beyond the alliance to influence partners and friendly nations and gain their trust and support.

*"The old paradigm of fighting terrorism and transnational crime separately, utilising distinct sets of tools and methods, may not be sufficient to meet the challenges posed by the convergence of these networks..."*¹²

NECESSARY FIRST STEPS

Effectively countering these adversary networks starts with a shared international understanding of these threat groups and their linkages. The sharing of intelligence, criminal, and financial information about these illicit groups and it is the foundational element of any effective CTN network. Information sharing between agencies even within a single nation is challenging, as described earlier within the United States, but the lack of such sharing also results in tragedies such as the 9/11 attacks.¹³ Just because international information sharing will be challenging does not lessen the imperative of doing so for effective CTN. There are already widespread bilateral information sharing regimes in place for counter-terrorism, and many law enforcement agencies share information through frameworks such as EUROPOL and INTERPOL.¹⁴ NATO can begin CTN work in this area by expanding some existing information sharing initiatives already in place like those for Counterterrorism as well as exchanges of information gathered during maritime operations.

*"Current strategies to map and combat threat finance — criminal money laundering and terrorist financing — use the authorities of law enforcement, intelligence operations, public designation, and international cooperation with partner nations...all of these strategies are essential for fighting transnational organised crime."*¹⁵

A WAY AHEAD

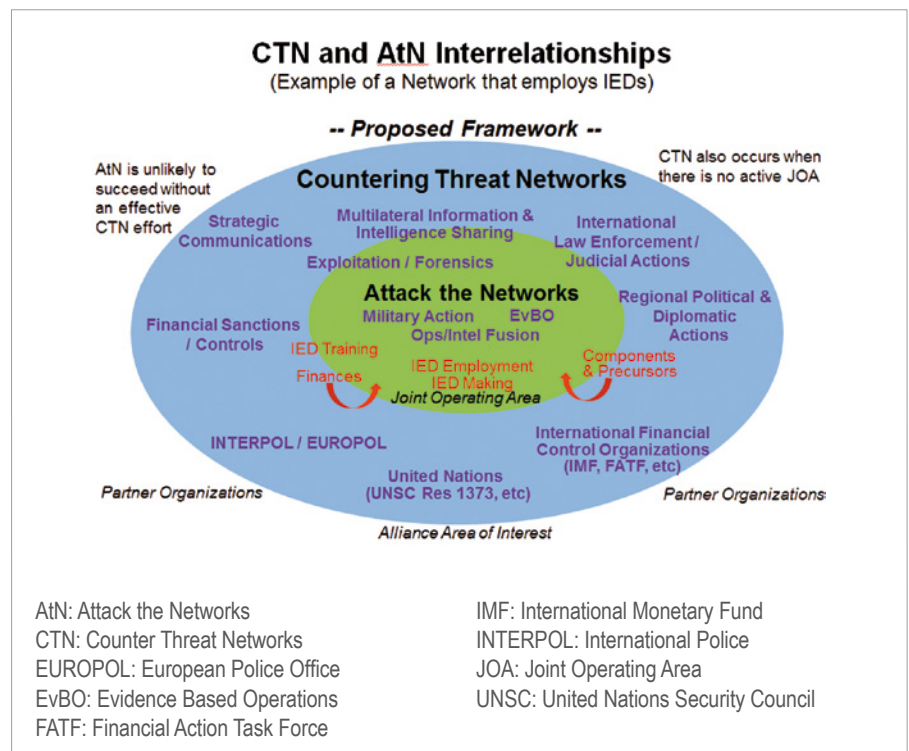
The international community needs a more cohesive, comprehensive, and proactive approach to counter these asymmetric illicit networks that threaten our security. CTN necessitates closer connections and effective collaboration between military, intelligence, law enforcement, financial and many other organisations. Effective multilateral information and intelligence sharing is only the first step. To truly harmonize actions, a framework that allows collaborative CTN countermeasures needs to be established. This article proposes that NATO offer an overarching concept to Counter Threat Networks (CTN) to facilitate dialogue between all appropriate agencies to catalyse

the development of a framework for an international solution.

The graphic on the right describes a proposed framework where tactical and operational AtN (an approved NATO concept) occurs in the Area of Operations (AO) while CTN (a proposed concept) is mutually supportive in the Area of Interest (AI) outside the Joint Operating Area or theatre of operations. ■

DISCLAIMER

"The views expressed in the article are solely those of the author and do not reflect the official views or position of NATO."



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RAPID INTERNATIONAL C-IED CAPABILITY DEVELOPMENT

The UK Government is committed to the stabilisation of 'fragile and conflict-affected states' through the application of power and influence.¹ To ensure successful delivery of the UK Government's counter-terrorism objectives, including specialist 'upstream prevent',² a strategy that includes the provision and deployment of C-IED capability development must be considered, with a UK Government-contractor partnership providing an agile solution that overcomes lag generated by current commercial barriers.

Andy Wakeling, Principal C-IED and SEARCH Consultant at OPTIMA Group, takes a look at the challenges facing the industry in developing adequate, agile and responsive counter threat capability. He also explores the potential for contractor-led training in overcoming this challenge.

BACKGROUND

The aspiration and growing demand for the UK Government to deliver specialist 'upstream prevent' counter-terrorism capabilities overseas is widely recognised and fully supported by the Ministry of Defence (MOD), the Foreign Commonwealth Office (FCO) and the Department for International Development (DfID). The Strategic Defence & Security Review (SDSR) committed the UK Government to an integrated approach to overseas stabilisation, one which includes diplomatic, development, military and other national security tools.³ The Building Stability Overseas Strategy (BSOS) that followed in 2011, informed by the events of the Arab Spring, set out the principles by which the Government would seek to influence earlier the factors generating conflict and instability by acting further "upstream" in the conflict cycle, improving our ability to respond rapidly to emerging crises. Added to this, the BSOS also highlighted the value of alignment with other cross-government strategies, including the CONTEST Counter Terrorism Strategy.⁴

In order to realistically reduce the risk faced by organisations that seek to live, move and operate in affected regions, the deployment and/or development of C-IED & Search capability must be a consideration, informed by the overall threat intelligence picture.

DIMINISHING RESOURCES

The ability for the MOD to deliver this requirement from within its own resources is likely to diminish given current restructuring and reduction in specialist capabilities following the 2014 drawdown from Afghanistan. The Army 2020 programme describes a 'change in emphasis to a more adaptable and flexible Army, capable of undertaking a broader range of military tasks'.⁵

The intent is that the structure of the Army will move away from one required to conduct an enduring operation, to one held at readiness for use on contingent operations that can deliver the full spectrum of upstream (conflict prevention) and downstream (post-conflict) engagement.

However, the questions of capacity amongst a shrinking force and the wider implication of the use of 'boots on the ground' where there may be political sensitivities, suggest that alternative means of producing an effect will also be required and potentially at short notice.

A VIABLE SOLUTION

In order for such an alternative to be considered it must be viable. Those appointed to develop counter threat capability must have the expertise to think ahead. The use of ex-military contractors with real and recent operational, frontline experience presents a solution – a cost effective use

of agile, flexible and available capacity from the commercial sector. It provides people with real-life experience who truly understand the challenges that exist.

Of course, as with any capability acquisition/deployment within compressed timelines, there are a number of areas that must be addressed:

- Detailed, fully scoped requirement(s)
- Clear, unambiguous governance
- Agility, responsiveness and flexibility within commercial/contracting processes
- Mechanisms to permit communication and agreement between key stakeholders
- Concurrent activity across lines of development.

Whilst the 'contractor option' is increasingly recognised and supported within the MOD, the unfortunate reality is that for a potentially urgent response of this nature, the current commercial processes may not be as responsive as they need to be to ensure project/programme success. The great opportunity that exists for the MOD to deliver on unforeseen, rapid requirements using a joint contractor/MOD led approach is equally hindered by commercial lag and a lack of dexterity.

For example, reliance on systems such as the Defence Contract Bulletin notices is of limited effectiveness in delivering short-notice requirements within scenarios likely to be encountered where there is an immediate or emerging IED threat.

If, however, the MOD were to select and contract a 'counter-terrorism capability development' partner or partners, sufficient agility and flexibility to ensure the delivery of short notice requirements could be provided by contractors who would de-risk the substantial investment required to maintain such a capacity at readiness.

The criteria for selecting contractors for such a partnership would require careful refinement. Proven ability to deliver capability for the MOD/FCO is a must. UK-owned companies could overcome the sensitivities around UK Defence diplomacy and Government objectives. The MOD needs to be certain their chosen partner can deliver.

MULTIPLE BENEFITS

From the partner's perspective, an initial contract could be based on a number of reasonable assumptions with regards to the MOD's requirements to develop specialist capabilities in nations as directed by the Government.

The immediate and sustained benefit would be to reduce the time consumed by commercial processes that would otherwise delay the response to such a requirement, as these will have been completed in advance.

As well as gaining increased, short-notice and specialist capacity, the MOD can build greater understanding and confidence in the Contractor and allow inclusion of the option earlier in the planning cycle.

The MOD/Contractor partnership model is already used extensively and successfully by the US Government, who favour enabling contracts with ex-military US contractors when and where US military are unable to resource.

In terms of operational delivery of the capability, modularity and scalability are key factors. Based on the specific requirement and threat, the best-fit option from a range of 'development roadmaps' would be selected and further refined in a short timescale. Immediate requirements are prioritised (for example the provision of freedom of movement to other agencies) whilst enduring capabilities could be generated sequentially or in parallel as necessary.

Ultimately, for Government or Contractor, the aim is the same – to create an effective response to the ever-emerging threats facing society today and provide confidence to those responsible for lives on the ground through anticipation and countermeasure. A way in which we can all, globally, think one threat ahead.

CONCLUSIONS

Taking a partnership approach to rapid international C-IED capability development will undoubtedly provide agile, cost effective and responsive support to the MOD and wider Government. It will alleviate defence capacity issues and support CONTEST initiatives, while at the same time enhancing national influence and reputation. The formation of a strong partnership between Government and the right contractor will set the conditions for success against a threat that is expected to endure across the globe. ■

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ABOUT THE AUTHOR



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TO PROVIDE THE WARFIGHTER & FIRST RESPONDERS WITH THE TOOLS NEEDED TO COUNTER THE ENDURING THREAT OF IEDs

Building on the previous Defeating IEDs Training workshops that took place for the past 5 years in Brussels (Belgium), MKDS Training Events division is pleased to announce that the 6th Annual Defeating IEDs Training Workshops and Technology Exhibition will be held once more in Brussels, Belgium on December 3 - 4, 2013. MKDS Events provides an interoperable symposium of classroom style training workshops conducive to information exchange to enhance global operator success in conflict areas and the home front.

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- Sharing intelligence between Law Enforcement and Military to tackle terrorist networks + protection of critical infrastructure: The Belgian experience with the EU & NATO
- CBRN forensics and attribution and relation to C-IED
- EDA Resilient Threat Management 2013, CIED Post ISAF and the latest technology development in Detection and Exploitation.
- Bomb Scene Investigation: Collecting Forensic and Biometric evidence in Pre-Blast & Post-Blast Environment
- Countering the Threat of IEDs and Protecting critical national infrastructure assets

THE IED IS NOT A WEAPON ON THE BATTLEFIELD IT IS THE BATTLEFIELD

Speakers Include

MAJ Craig BUTERA - US Army
Staff Officer
NATO Standardization Agency (EOD - CIED WG)

Cristian COMAN, PhD
Capability Development, JISR
NATO Communications and Information Agency

Mr. Jeffrey T. WICKETT
World Customs Organization (WCO)
Programme Global Shield

Mr. Doug Musgrave
Intelligence Security Cooperation
Biometrics, DOMEX, and MASINT
US Army Europe (USAREUR)

Col Vratislav OSVALD (CZE Army)
Director Training, Exercises and Education
Department
Joint CBRN Defence Centre of Excellence

Mr. Doug Musgrave
Intelligence Security Cooperation
Biometrics, DOMEX, and MASINT
US Army Europe (USAREUR)

Dt. Superintendent Joris De Baerdemaeker
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SHARING EXPERTISE AND INFORMATION – THE ORDNANCE CORPS IN THE INTERNATIONAL ARENA

By Lt Col Ray Lane,
School Commandant, Ordnance School,
Clarke Bks, DFTC, Curragh Camp

In 2007 the Defence Forces established a Counter-Improvised Explosive Device (C-IED) Steering Group under the chairmanship of the Director of Ordnance to manage the introduction and planning of C-IED within the Defence Forces and to design the Road Map for future developments. This coincided with the Ordnance Corps involvement in the initial European Defence Agency C-IED project.

With the input from the EDA and the Defence Forces key position in the ISAF C-IED Branch, significant strides have been made in developing C-IED Capability. The embedding of a C-IED Culture in the Defence Forces is a priority. The Defence Forces Strategy Statement 2011-2014, which lists the key strategies to be pursued to develop military capabilities, will lead to an operationally viable, sustainable, ready, interoperable and deployable force. One of these strategies is the “Further development of Special Operations

Capabilities; continued development of CBRN capabilities; further development of expert knowledge and understanding of Counter IED”.

THE EUROPEAN EOD NETWORK OF EOD EXPERTS (EEODN)

The criminal use of explosives, whether terrorism or organised crime-related, has been identified as a major concern for all EU Member States. Following the 2004 Madrid Bombings, the EU Commission, set up an Explosives Security Experts Task Force (ESETF) within the framework of the EU Action Plan on Enhancing the Security of Explosives. This Task Force reported in June 2007 with 50 recommendations regarding the security of explosives. Among those recommendations was the establishment of a Network of Explosive Ordnance Disposal (EOD) Experts. Europol agreed to facilitate the establishment of such a permanent and stable community of explosive experts from all EOD Units

Photo above:
NATO PRE-OPS International IEDD
course.



The further development of EOD capability is a Defence Forces priority in the 2011-2014.

... ONE OF THE MAIN OBJECTIVES OF THE EEODN IN CONJUNCTION WITH EUROPOL IS TO PROVIDE TRAINING AND EDUCATION TO EOD IEDD & CBRN OPERATORS IN THE MEMBER STATES ...

(law enforcement, governmental and military) dealing with explosives on their national territory. Competent authorities were invited to nominate English-speaking participants from their EOD units or Bomb Data Centres (BDC) to the European EOD Network. Member States with military EOD units competent under their national law to deal with explosive devices were to nominate a military representative with the required expert background. An official invitation was received from the Europol Section, Garda HQ for the Defence Forces to send an EOD representative. In parallel with this, Ballistics Section, Garda HQ nominated representatives as experts on the evaluation of forensic evidence collected from EOD operations in Ireland. The Defence Forces EOD and the Garda Síochána each provide a representative to the EEODN.

OBJECTIVES OF THE EEODN

As one of the competent bodies, Europol are responsible for implementing several of the 50 recommendations of the Explosives Security Experts Task. The following were prioritised as requiring immediate attention.

- **Establishment of a European EOD Network.** The establishment of a European EOD network was considered to be a high priority by the EU Commission. The objectives of this network included the facilitation of information sharing and trust building, the contribution

to the identification of best practice, the organisation of joint training exercises and keeping EOD units up to date concerning the latest developments of relevance to the sector. The network would be made available to all EOD units (police, governmental and military) dealing with explosives and IEDs within the Member States.

- **EOD/IEDD and CBRN Network of Experts.** The EOD/IEDD Network of Experts was established in May 2008. To date there have been 14 plenary meetings of the network, with all member states in the EU being represented. The majority of these EOD Units are Police EOD units who have the responsibility for EOD, C-IED and CBRN IEDD within their respective States. Currently, in respect of 5 of the 27 EU Member States, the national EOD IEDD service providers are military – [Ireland, Netherlands, Belgium, Malta and UK (with the exception of London Metropolitan Area)]. The participation by Defence Forces EOD personnel with this European Explosive Ordnance Disposal Experts Network offers a unique opportunity for the Defence Forces to interface and network with the principle EOD/IEDD Experts (Police and Military) of other Member States on EOD technical information, equipment development and advancements in render safe procedures in dealing with IEDs. In Oct 2011, the European EOD Network established a CBRN Network of Experts under the existing title of EEODN. It was proposed that each Member State would provide a CBRN expert who is an IED/IDD (Improvised Dispersal Device) Disposal expert to the bi-annual plenary meetings. The Defence Forces continues to provide an Ordnance Officer to both networks, as Ordnance EOD Officers are professionally qualified and trained in both disciplines.

- **Coordinated Training.** One of the main objectives of the EEODN in conjunction with EUROPOL is to provide training and education to EOD IEDD & CBRN operators in the Member States. These training occasions allow for the exchange

and detailed discussion of tactics, techniques and technical intelligence of terrorist organisations. The most recent training (October 2012) occurred in the C-IED Centre of Excellence in Madrid where the principle topic was homemade peroxide, nitrate and chlorate explosives and lecturers included world authorities on this subject.

- **European Bomb Data System (EBDS).** The EBDS provides a common EU instrument to enable authorised governmental bodies at EU and Member State level to have 24/7 access to relevant information on incidents involving explosive and CBRN devices. The objective of the EBDS is to provide an effective and current database of technical information and intelligence on Improvised Explosive Devices and CBRN Improvised Explosive/ Dispersal Devices encountered by EOD units in the Member States. The European Bomb Data System went 'Live' on the 22 Oct 2010.

- **Establishment of an Early Warning System (EWS) on Explosives & IEDs.** The establishment of an Early Warning System on Explosives & IEDs is considered to be a priority. Such a system would be used in order to exchange information concerning: immediate threats, theft of explosives (any kind), theft of detonators, and theft of precursors, suspicious transactions and the discovery of new subversive modus operandi. This remains to be developed further, but it is expected that it will be incorporated into the EBDS.

- **Development of Specialised Threat Assessments on Explosives.** It is envisaged that such a system has to be devised as a matter of priority for EOD/IEDD/CBRN experts. The lack of knowledge on the current situation in the Member States about the existence of National Threat Assessments on Explosives, and the absence of this kind of assessment at European level, requires the involvement of experts of the EOD Units to cover this need. This remains to be developed further, but it is expected that it will be incorporated into the EBDS.



A student on The International NATO Pre-operational IEDD Course at Kilworth Camp in Cork.

The network of Explosive Ordnance Experts is an initial step in establishing a framework for an effective response to the use of IEDs by terrorists and criminals. In time, this will provide detailed information via the network of EOD officers, Law Enforcement Officers and the EBDS, which will prevent potential attacks, save lives, and enhance the EU and Global C-IED Effort. In the future, it is envisaged that EUROPOL will become the de facto centralised hub of Law Enforcement EOD/IEDD/CBRN activities in the EU, and recognised as the Primary Law Enforcement agency in Europe with responsibility for EOD/IEDD/CBRN Technical Intelligence. The assistance of Military EOD/IEDD/CBRN specialists to establish, standardise and maintain EOD/IEDD/CBRN safe operating procedures will be required. The major benefits for Defence Forces Military EOD/IEDD/CBRN, IEDD Teams will be the capability to network officially with European Police EOD units who are the Primary Responders (as opposed to Military EOD units) to EOD and CBRN incidents in Europe and internationally, and to have immediate access to IED/CBRN Technical Intelligence (furnished from actual Operational incidents in Europe) currently not readily available via military channels.

EUROPEAN DEFENCE AGENCY DEVELOPMENTS – COUNTER- IMPROVED EXPLOSIVE DEVICES

The European Security Strategy (2003) identified the threats facing Europe as

... THE LACK OF
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ABOUT THE EXISTENCE
OF NATIONAL THREAT
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EXPERTS OF THE EOD
UNITS TO COVER
THIS NEED ...



A NATO guest of the Defence Forces run course said that he had “not seen a better IEDD course anywhere in the world.”

... COUNTER-IED WAS IDENTIFIED AS A CAPABILITY IN NEED OF COMPREHENSIVE ATTENTION. THE CAPABILITY DEVELOPMENT PLAN (CDP) HAS BEEN REVIEWED UP TO 2025 AND C-IED REMAINS A PRIORITY ...

Terrorism, Proliferation of Weapons of Mass Destruction, Regional Conflicts, State failure and organised crime. These threats are organised by Networks that are often interwoven and interdependent with terrorism and strongly associated with organised crime in areas of drug and human trafficking. The Improvised Explosive Device (IED) has now become the persistent weapon of choice for these Networks. They are a tactical weapon with a potential strategic effect, that are key enduring elements of the modern asymmetric/hybrid battle space. The threat is complex and transnational in nature, representing layers of interdependent, inter-connected global threat networks and support systems. Lt Gen Barbero (rtd) of the US Joint IED Defeat Organisation (JIEDDO) refers to IEDs as the Artillery of the 21st Century.

Ireland joined the European Defence Agency (EDA) when it was established in 2004. The mission of the EDA is to support the Member States and the Council in their efforts to improve European Defence capabilities in the fields of crisis management and to sustain the Common Security and Defence Policy as it stands now and develops in the future. From this mission statement the agency is allocated 4 tasks:

- Development of Defence capabilities
- Promotion of Defence Research and Technology (R&T)
- Promotion of armaments co-operation
- Creation of a competitive European Defence Equipment Market and strengthening the European Defence Technological and industrial base.

The EDA developed, in consultation with the Member States and the Military Committee, the first Capability Development Plan (CDP). This plan addressed the key capability shortfalls. Counter-IED was identified as a capability in need of comprehensive attention. This CDP has been reviewed up to 2025 and C-IED remains a priority.

Following the development of the CDP, a mandate for the establishment of a C-IED Project Team was approved and a plan for its development was established. In 2008, under Irish leadership “Guidelines for Developing National C-IED Capabilities” were produced and accepted by all member states. These guidelines elaborate the functions which compose a C-IED capability and act as a menu from which Member States, depending on their level of ambition and operational perspective, may select those capabilities that should be developed to allow a better prepared participation in future operations with an existing or potential IED threat.

The Guidelines list the baseline capabilities a nation requires to operate effectively in an IED environment:

- C-IED training (Tactics/techniques and Procedures)
- IEDD capability
- Technology (Detection Equipment)
- Search Capability
- Force Protection measures.

The Ordnance Corps has taken the lead in Europe on a number of C-IED capability development areas:

- Ground Sign Awareness
- Combat Tracking
- Manual Neutralisation techniques
- Home made Explosives.

The Ordnance School will undertake an Advanced Situational Awareness course for the EDA in February 2014.

On the 26 April 2010, EDA was directed by EU Ministers to develop a Level 2 Exploitation capability for deployment into Afghanistan. A budget of 1 million Euros was allocated. At the time, the project was called Theatre Exploitation Laboratory (Demonstrator) (TEL-D). In just 14 months, under Irish leadership, the project was advanced from concept to full deployment. The personnel designated to man the facility were trained in C-IED in the Ordnance

School Defence Forces Training Centre, Curragh. Once validated by NATO, designation changed to Multi National Theatre Exploitation Laboratory, (MNTel). Baroness Ashton referred to the development of the MNTel capability as the “Flagship of the EDA”. Ireland played and continues to play a major active role in the continued development of this capability.

The Ordnance Corps has now produced a ‘Food for Thought’ paper on Developing EDA C-IED capability development up to 2018. A New Vision and mission statement has been developed in tandem with Work Programme. This is now with Member States for approval.

THE INTERNATIONAL NATO PRE-OPERATIONAL IEDD COURSES

The Ordnance School, Defence Forces Training Centre, completed the 2nd NATO Pre-Operational Improvised Explosive Device Disposal (IEDD) Course in September 2012. The School has a long and proud history of running international courses dating back to the 1970s. In 2010 the Ordnance School devised, developed and conducted an International Counter IED/IEDD course based on its own assessment of what was required to fill an identified capability gap in the C-IED/IEDD field. This course was a prototype – integrating the core C-IED areas in a holistic manner. A second such course was observed by NATO Allied Command Transformation (ACT) representatives who were seeking a nation with the necessary expertise to plug an identified capability gap relating to ISAF Troop Contributing Nations. Following their assessment of the course, NATO ACT made a formal request that Ireland run a similar course on their behalf through the voluntary national contribution fund (VNCF). Ireland acceded to this request agreeing to run two courses in 2012 with an option of a further two courses in 2013. The first of these courses was conducted in May this year with the second taking place in September.

The purpose of the course is to train and assess qualified personnel in the concepts, principles and techniques of IEDD in a C-IED operational environment in order to safeguard life and support national capability development for current and future operations.



The culmination of this course is an exercise and assessment week, called ‘Operation Green Zone’. This is designed, by the Ordnance School, to be a high tempo and robust practical assessment phase. The exercise narrative, augmented by regular intelligence Summaries, increases in intensity as the week progresses with the addition of ever-increasingly complex tasks. The realism of this exercise is an essential component dependent on the coordination of many supporting assets which will be reflected in a High Threat Operational Theatre.

Examples of the assets deployed for the exercise include dedicated Intelligence and Surveillance assets such as unmanned aerial vehicles and close target Reconnaissance teams, infantry fighting vehicles, force protection, search and insertion assets such as helicopters and rigid inflatable boats, a dedicated WIT representing CEXC L2 and a Command and Control (C2) cell to act as the control centre and tasking authority. There was also a huge variety of physical task locations involved including Cork Airport, Cork City Train Station, Fort Davis and Fort Templebreedy, Kilworth Camp and Ranges, a factory in Fermoy town, Fermoy Reserve Defence Forces Barracks and Glen Imaal.

To date, the Ordnance School has trained 45 IEDD operators from 17 different countries on the first, second and third NATO Pre-Operational IEDD courses. The response from the students and the international assessment panel from both courses have been overwhelmingly positive regardless of rank, experience or nation. One

The interoperability which the Defence Forces are gaining with the pan-European EOD initiative is of major benefit.

... THE ORDNANCE CORPS HAS NOW PRODUCED A ‘FOOD FOR THOUGHT’ PAPER ON DEVELOPING EDA C-IED CAPABILITY DEVELOPMENT UP TO 2018 ...

... IRELAND, THROUGH THE DEFENCE FORCES ORDNANCE SCHOOL, WILL CONTINUE TO CONTRIBUTE TANGIBLY TOWARDS THE DEVELOPMENT OF IEDD CAPABILITY IN NATO/PFP NATIONS WELL INTO THE FUTURE, THUS SIMULTANEOUSLY SAVING LIVES AND HELPING TO DEFEAT THE IED THREAT ...

distinguished guest from NATO HQ who observed the entire exercise week left with the parting words “what you guys have got here is a fantastic instructional product that any nation would be proud of. I have not seen a better IEDD course anywhere else in the world”. Plans are at an advanced stage for the final course to be held in September. A detailed AAR will then take place – it is envisaged that a new course based on the Adversary Network concept (incl C-IED) will take place in 2014.

IEDD operations viewed solely through the prism of ISAF have the potential to distort friendly Tactics, Techniques and Procedures (TTP), distilling them to a collection of quick fix Render Safe Procedures (RSP), developed in reaction to in-theatre threats. Theatre specific RSPs, although expedient and safe in that theatre, can only ever be designed to counteract previously seen devices. Theatre-specific training alone, does not equip the operator with the tools necessary to adapt and amend TTPs to changing environments/theatre or to large shifts in device evolution. The Ordnance Schools approach of focusing on not only training operators in practical IEDD techniques and procedures but educating them holistically in the philosophy, principles and procedures of IEDD conducted in a wider C-IED environment, prepares IEDD operators for their challenging, complex and constantly evolving role regardless of theatre. Due to the huge success of the first two courses, the Ordnance School has been requested to run a further two courses in 2013 on behalf of NATO ACT. This means that Ireland, through the Defence Forces Ordnance School, will continue to contribute tangibly towards the development of IEDD capability in NATO/PfP nations well into the future, thus simultaneously saving lives and helping to defeat the IED threat. This, allied with the Ordnance Schools’ pro-active participation in EDA projects, will ensure that all future courses have global relevance as the threat changes. It is planned to further develop the current IEDD course into a more holistic course with the application of the C-IED strategy into dealing with accessory threat network warfare. This is planned for 2014. ■

ABOUT THE AUTHOR



Ray Lane is the Commanding Officer of the Irish Defence Force Ordnance School. He graduated from Military College and the National University of Ireland (Bsc Hons in Chemistry). Ray has 30 years experience in the EOD/IEDD/CBRNe ID fields and has served overseas in many missions including Lebanon/Bosnia and most recently as Chief Operations Officer of the C-IED Branch ISAF. Since 2001, Ray has developed the Defence Forces CBRNe (IDRS) Improvised Device Render Safe Capability, with the implementation of appropriate policy/training and equipment acquisition.

Ray Lane is an original member of the EDA C-IED Project team. In 2007, he authored the EDA document “Guidelines for developing a National C-IED Capability”. This document was accepted by all member states and laid down a roadmap for future EU C-IED Capability development. Most of the recommendations have been achieved. In 2013, Ray authored the EDA’s “Food for Thought Paper” on the Future of C-IED. This is presently being assessed by all Member States.

ABOUT THE ORDNANCE SCHOOL

The Ordnance School has trained personnel from over 30 counties and since 2010 has trained international personnel from 27 Countries. The School is responsible for running the NATO Pre-Ops IEDD course for deployment to ISAF and in addition runs the NATO Weapons Intelligence Training Courses. The School has also conducted EDA sponsored courses on Ground Sign Awareness/Combat Tracking.



EUROPOL'S ROLE IN THE IMPLEMENTATION OF THE EU STRATEGY TOWARDS THE SECURITY OF EXPLOSIVES

By Victor Perez Sañudo
Counter Terrorism Unit
EUROPOL

During the last decade there has been a general awareness, among the global population, of the problems related to improvised explosive devices (IEDs). Multiple theatres of operations worldwide, with multinational battalions fighting asymmetric wars, where IEDs have been the weapon of choice, have increased not just the amount of knowledge about this kind of weapon but also the military capacities and capabilities on countering IEDs (C-IED). Traditional law enforcement specialities, like post-blast investigations, have been progressively incorporated and further developed within military units.

C-IED strategies and the different fields of expertise related to this fight have been part of the daily work for multiple law enforcement agencies and some military units within the European Union (EU) for decades, as the phenomenon

of domestic terrorism has been a permanent threat for some EU Member States. However, it wasn't until recently that the EU recognised the need to adopt a comprehensive approach towards the global threat imposed by terrorists using IEDs.

After the terrorist attacks of 11 March 2004 in Madrid (Spain) and 7 July 2005 in London (United Kingdom), the EU as a whole identified the need of a joint response to this phenomenon, establishing the European Commission an Explosives Security Experts Task Force (ESETF) in January 2007.

THE EXPLOSIVES SECURITY EXPERTS TASK FORCE (ESETF)

The ESETF, which included experts from law enforcement agencies, military competent authorities and other stakeholders, both from public and

Photo above:
July 2003 - VBIED at Airport of
Santander (SPAIN).



ESETF Report.

private sector, was mandated to identify the existing gaps and required actions which could help to improve the current situation with regard to the security of explosives. This group of around 100 experts held a series of meetings and workshops during year 2007 in order to produce a report that would include a series of recommendations for enhancing the security in the field of explosives in the European Union. The Task Force produced its final report in June 2007.

This report included a total of fifty recommendations on four distinct topics: precursors, distribution chain (storage, transport, use and traceability), detection, and public security aspects.

EU ACTION PLAN ON ENHANCING THE SECURITY OF EXPLOSIVES (EUAPESE)

At the end of 2007, taking the fifty recommendations of the ESETF Report as a benchmark, the European Commission produced a first draft of what would become the EU Action Plan on Enhancing the Security of Explosives, which was approved by the EU Council of Ministers of Justice and Home Affairs on 18 April 2008.

The EU Action Plan on Enhancing the Security of Explosives (EUAPESE) divided the different actions to be implemented in four main groups: Horizontal Measures, Prevention Measures, Detection Measures and Preparedness, and Response Measures.

Two of the main actions of this plan, where Europol was identified as the

competent body for their implementation, are as follows:

- The establishment of a European Explosive Ordnance Disposal Network; and
- The creation of a European Bomb Data System.

EUROPEAN EXPLOSIVE ORDNANCE DISPOSAL NETWORK (EEODN)

After the approval of the EU Action Plan on Enhancing the Security of Explosives, the Slovenian EU Presidency requested that Europol proceed with the implementation of the European Explosive Ordnance Disposal Network (EEODN). The kick-off meeting of the EEODN was held at Europol (The Hague, The Netherlands) on 29 May 2008. Since then, the EEODN has met on a regular basis twice per year.

The EEODN initially was directed towards enhancing the sharing of information on terrorist or criminal attacks involving the use of explosives between the Member States' competent authorities and trust building among the different communities. After the approval of the EU Chemical, Biological, Radiological and Nuclear (CBRN) Action Plan on 30 November 2009, it was decided to make use of the already existing EEODN and instead of creating a new network on CBRN, two working groups were created under the EEODN framework – the EEODN WG on Explosives and the EEODN WG on CBRN.

In 2010, recognising the need to improve the exchange of best practices, including operational procedures and training activities, the EEODN started the implementation of training activities for EU experts in the fields of explosives and CBRN, incorporating the expertise of third agencies. Law enforcement agencies, like the US ATF and FBI under the Department of Justice, have cooperated in the implementation of EEODN training activities and participate in the network's activities on a regular basis.

Other third parties that have participated in the EEODN activities include the Colombian National Police, the Australian Federal Police, the Spanish Centre of Excellence on C-IED, Interpol, the International Atomic Energy Agency (IAEA), and the Organisation for the Prohibition of Chemical Weapons (OPCW), among others.

EEODN Training on CBRN and Explosives in Denmark, May 2012.





EU BOMB DATA SYSTEM (EBDS)

The EU Bomb Data System (EBDS) is another of the EUAPESE main actions whose implementation was entrusted to Europol. Historically, EU-competent authorities dealing with incidents involving explosives lacked a common database to share information and intelligence for investigative and research purposes. The EU Bomb Data System (EBDS) came along and filled this gap.

The EBDS was a need identified by EU explosives experts. Whenever an EOD/CBRN related incident occurs anywhere, specialist units start the long process of gathering the necessary technical intelligence and information on that incident, which will ensure they are up-to-date on the latest terrorist and criminal developments in this area, alongside the measures used for countering them. Until the arrival of the EBDS, access to such information was possible on a mainly bilateral basis, but most of the time it was based on unofficial, not-fully trusted sources like the media, and required a lot of time, effort and research.

The EBDS is a dual system which includes two powerful databases: one for explosive-related incidents and another for chemical, biological, radiological and nuclear (CBRN) ones. It also provides users with specific libraries, where the experts can upload and access any kind of file, in the most commonly used file formats.

The EBDS includes forum capabilities, allowing experts to interact directly, in real time, exchange questions, thoughts and any other issues with the experts from authorities in EU Member States.

Europol contributes to the EBDS with information and intelligence produced by the agency, but also with data originating from third parties with cooperation agreements, as the EU member states are responsible for the direct loading of their contributions. Europol is the interface between third parties and the system, although it is foreseen that third parties will have direct access to the EBDS in the near future.

EEODN Training on IEDs in Hungary, June 2011.

EEODN Training on Homemade Explosives at the Spanish Centre of Excellence C-IED, October 2012.





EBDS logo.

The EBDS became a reality in 2010 and it is a system that can really make a difference in the EOD and CBRN fields, potentially becoming a day-to-day tool for thousands of bomb, CBRN and counter terrorism (CT) experts across the European Union, as well as a worldwide reference in those fields. Since its implementation, it has been successfully used as support in several investigations, not only within the EU but also in third countries.

CBRNE AGENDA

On 11 December 2012, the Council of the European Union adopted the conclusions on the new CBRNE Agenda to be implemented, aiming at developing a more strategic and overarching approach to the CBRN and explosives policy field, involving internal and external safety and security aspects.

The CBRNE Agenda, as developed by the EU Commission in cooperation with the EU member states and EU agencies like Europol, aims at using the Action Plans on Explosives and CBRN as a foundation for creating a revised policy, which is intended to be presented to the Council in 2013 and will become the new EU CBRNE Agenda, substituting the current Action Plans.

CONCLUSIONS

Fighting terrorism requires a holistic approach, with multiple variables being considered and addressed.

In recent years, the EU has invested large amounts of resources and efforts in addressing the gaps identified by the experts at tactical and operational level, improving the decision processes at strategic level.

Europol, as the EU Law Enforcement Agency, through the work developed at the Counter Terrorism Unit, has ensured that all EU Member States have access to information/intelligence related to explosive or CBRN related incidents and could improve their own tactics, techniques and procedures (TTPs) upon understanding the ones in use by their neighbouring countries or third parties. Additionally, Europol has provided operational and tactical support whenever required by the EU member states and third parties with cooperation agreement.

The support so far provided by Europol, at strategic level, in the C-IED strategy of the EU includes the participation in policymaking groups and decision bodies, such as the EU Standing Committee on Precursors.

In 2012, terrorist attacks within the EU where mainly executed with firearms and incendiary devices, in contrast to previous years were IEDs where the weapon of choice. This reduction may be attributed to multiple factors; however, at Europol we believe that the work so far done in the European Union by all the stakeholders is going in the right direction.

Procuring chemical precursors for the production of homemade explosives in the EU is today harder than it was before. The EU member states' cooperation and exchange of information/intelligence on C-IEDs has improved considerably in the last years.

Europol's mission is to support the EU member states in preventing and combating all forms of international serious crime and terrorism. As the illicit use of explosives and CBRN materials is the most dangerous means that criminals and terrorists might use to achieve their goals, Europol will continue directing its efforts towards supporting the EU member states in their C-IED initiatives, strengthening the links with our counterparts worldwide and ensuring that our citizens enjoy a safer and more secure Europe. ■

ABOUT THE AUTHOR



Victor Perez Sañudo joined the Spanish National Police in 1993, becoming Technician Specialist in Explosive Devices (TEDAX) in 1998 and Technician Specialist in CBRN devices in 2007. During his career he has worked for the Spanish Government and different international organisations in Kosovo, Uganda, Bangladesh, Egypt, West Bank and Gaza, Ecuador, Sri Lanka and The Netherlands.

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HOMEMADE EXPLOSIVES PRECURSORS, ATTACKING THE CORE OF THE IED THREAT A SIMPLIFIED AND EFFECTIVE CONOPS FOR DEFEATING IEDs

Nitrate Fertilisers and Potassium Chlorate are common Homemade Explosives (HME) Precursors, aka bomb making ingredients, that comprise the main charge in most Improvised Explosive Devices (IEDs) today. Targeting these bulk materials is required to defeat this proliferating threat and lessen the devastating casualties they inflict.

By Grant Haber, Vice President,
American Innovations, Inc.

Photos Above:
Nitrate Fertilisers and Potassium Chlorate represent 93% of the Homemade Explosives (HME) Precursors used in Afghanistan today. Their innocuous appearance makes it hard for law enforcement and military to differentiate from the Non-HME bulk materials also featured in the photos above; yet their effect once converted into HME is exponentially devastating. Effective identification tools are essential to counter the IED threat that has proliferated into 112 countries worldwide.

The use of IEDs is steadily increasing and proliferating worldwide for two very simple reasons. First and foremost, the HME Precursors (aka bomb making ingredients) needed to construct IEDs are inexpensive to acquire, easy to obtain, and can be converted into a wide variety of Improvised Explosive Devices. Secondly, once HME precursors are converted into explosives and incorporated into IEDs they are extremely effective. They have been successfully used against the military, police, security forces, civilians or high profile facilities around the globe with devastating results. **They have become the Weapon of Choice by Terrorists and groups waging asymmetrical warfare.** The only way to reduce the threat that IEDs pose are proactive Interdiction Missions that aggressively target these HME Bulk materials.

To defeat the IED threat it is important for everyone to first understand its core, the bomb makers and the homemade explosives precursors used to manufacture HME for an IED's main explosives charge. Even though the techniques being employed to build,

conceal and trigger IEDs continue to evolve, the HME precursors used in the main explosives charges have remained relatively constant for decades. Since bomb makers do not clearly identify themselves as a "bomb maker", interdiction missions worldwide targeting HME precursors need to become a higher priority for any Counter IED strategy to be successful. Fact: Dealing with the problem at source is always more effective than dealing with its aftermath.

In Afghanistan, for instance, it is equally important to understand that trust and confidence building with host nation tribal leaders and civilians must go hand in hand with HME Interdiction Missions. The same remains true for every other country where terrorism has taken a hold of everyday life. Without an ability to earn the trust and confidence of tribal leaders and civilians, their support will likely be extended to the bomb makers as a response to their own fears. Before discrediting such a bold statement, know this, the mere act of saying nothing or turning a blind eye is all the support bomb makers need to maintain a tactical edge.



Interdiction and Destruction of Bulk amounts of Bomb Making Precursors before they're converted into Homemade Explosives (HME) for use as a main explosives charge in IEDs is vital for reducing IED attacks and casualties, and increasing freedom of mobility for Military, Police, and Civilians.

... INTERDICTION AND DESTRUCTION OF BOTH NITRATE FERTILISERS AND CHLORATES MUST BECOME AN ENDURING REQUIREMENT FOR AFGHAN NATIONAL SECURITY FORCES (ANSF) IN ORDER TO DEFEAT THE ENDURING IED THREAT IN AFGHANISTAN ...

Defensive countermeasures employed to mitigate the harmful effects of IEDs has proven effective for reducing fatalities; however, these costly investments have done little to slow down IED proliferation. A balance between proactive and reactive countermeasures is required for effective Counter IED strategy.

For the purpose of this article, Afghanistan will be the primary focal point; however, I must reiterate: the recommendations to be conveyed are applicable virtually in any location where IEDs are an enduring threat.

In Iraq and Afghanistan, post-commencement of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), approximately two-thirds of all fatalities and casualties of United States and Coalition Forces are attributable to IED attacks. Host Nation Military and Police, and civilians (men, women, and children) are being killed and wounded at alarmingly high rates. In Afghanistan, currently more than 93 per cent of IEDs utilise HME for the main explosives charge. In Iraq, the country is on the brink of a civil war as a result of enduring IED attacks that have taken more than 1,000 lives per month since April 2013.

Calcium Ammonium Nitrate (CAN) fertiliser, Potassium Chlorate, among other Nitrates and Chlorates (oxidizers) remain the primary HME precursors used in the manufacture of IEDs in Afghanistan today. As long as these ingredients are readily available

and easy to convert into powerful explosives, the bomb makers will continue to use them; especially when they are so inexpensive.

In 2010, approximately 90 per cent of the Afghanistan IEDs utilised Ammonium Nitrate- based fertilisers. Potassium Chlorate use represented a low single digit percentage, though when considering 15,000+ IED events averaged annually in Afghanistan since 2010, a single digit percentage still represented a high number of IED events for Explosives Ordinance Disposal (EOD) to deal with. Needless to say, EOD is working overtime given the scope and magnitude of this enduring threat.

Following the publishing of the Government of the Islamic Republic of Afghanistan (GIROA) Presidential Decree prohibiting Ammonium Nitrate fertilisers for import, production, transportation, use, sale, and storage due to its use as an explosives precursor, the bomb makers slowly began shifting to an alternative HME precursor to reduce the risk of capture and interdiction of their bomb making materials. In 2010 after this Presidential Decree was published and interdiction missions targeting Ammonium Nitrate fertilisers became a higher priority, bomb makers began using Potassium Chlorate. Less than 3 years later about 60 per cent of the IEDs utilise Chlorates and about 35 per cent are utilising Nitrates in the HME manufacturing process.

Given the 15,000+ IED events per year in Afghanistan, regardless of the fact that Potassium Chlorate has taken the lead as the HME precursor of choice, Ammonium Nitrate fertiliser interdiction should not become less of focal point as its use in IEDs is sharply reduced. When focusing on Ammonium Nitrate fertiliser interdiction almost exclusively, Potassium Chlorate use surged. This was by design, not by chance.

Interdiction and destruction of both Nitrate fertilisers and Chlorates must become an enduring requirement for Afghan National Security Forces (ANSF) in order to defeat the enduring IED threat in Afghanistan.

If President Karzai expanded the Presidential Decree banning Ammonium Nitrate fertilisers to also include Potassium Chlorate, with the help of NATO's 28 member nations alliance serving in an advisory capacity to help prepare Afghan

National Security Forces (ANSF) for post 2014 operations, ANSF's gains against Afghanistan's Number One Threat, "The IED" would rapidly increase. The Afghanistan Ministry of Defence (MOD) and Ministry of Interior (MOI) should then inform both the International Security Assistance Forces Joint Command (IJC) and NATO Training Mission – Afghanistan (NTM-A) of their requirement to employ standard issue interdiction tools for Nitrates and Chlorates.

Now that you understand which HME precursors make up the core of the IED threat and why targeting these bomb making ingredients must become an enduring requirement, let's discuss trust and confidence building between host nation security forces (military and police) and local tribal leaders. Without an effective strategy to establish much needed trust and confidence, it is absurd to expect tribal leaders to help ANSF defeat an insurgency who utilises IEDs as their weapon of choice and a weapon of strategic influence. Maintaining this trust and confidence is vital to combatting an enduring IED threat. Local civilian groups are crippled by the fear that is echoed with every terrorist interaction; an effective strategy understands this and strives to provide a balance of justice and safety.

To establish trust, a balance between cultural considerations and an effective screening Concept of Operations (CONOPS) is required to enable ANSF to inspect people and vehicles in a manner that will yield measurable gains without violating trust. The desired outcomes include increases in interdiction and destruction of HME precursors, increases in lawful detentions, increases in freedom of mobility, decreases in IED events, and decreases in IED related fatalities and casualties.

In Islamic cultures making physical contact with an individual using your left hand is offensive and violates trust, as is, having men touching women. What further violates trust is the uneasiness that results when individuals being screened for trace explosives residues do not understand what is being done to them when an Afghan Soldier or Police Officer grabs their wrist with one hand and with the other hand starts swabbing their hands, fingers, clothes, etc. Keep in mind, many of the people being screened



are unfamiliar with the capabilities employed in airports or at government buildings for explosives trace detection screening.

Consider: How helpful would you be if someone was doing something to you deemed outright offensive by yourself and everyone around you? How helpful would you be if a tribal leader, family member, or someone you looked up to was detained because a foreign test concluded there was invisible explosives residue on their hands, clothes, or a personal belonging? How long do you think it will take before Afghan tribal leaders and civilians learn that explosives residue can transfer from person to person or surface to person unknowingly in environments contaminated from IED events?

To effectively build trust requires a screening CONOPS that delivers on the desired outcomes without violating trust in the process. By advocating and implementing bulk material identification requirements for primary screening and shifting away from trace detection for primary screening, a foundation for trust becomes easier to establish in an Islamic culture. If you are unfamiliar with the difference between bulk identification and trace detection, this is what it is:

When interdicting Bomb Making Precursors (Oxidizers) that are in the presence of Fuels (Automatic Transmission Fluid, Diesel, Aluminium Powder, etc.) used to convert Homemade Explosives (HME) Precursors into actual HME, Military and Police know they are closing in on Bomb Makers.



When interdicting caches of Improvised Explosive Devices (Suicide Vests, Potassium Chlorate Bombs, etc.) Rocket Propelled Grenades (RPGs), Ammunition, and so forth, Military and Police know they are closing in on the insurgents involved with carrying out the Attacks.

trace focuses on detection of invisible residues, whereas bulk identification focuses on samples of unknown yet visible materials, aka bulk.

A person in possession of a bulk material that tests positive for targeted homemade explosive precursors would then be subject to secondary screening (trace analysis) which includes physical contact with their skin, clothes, personal belongings, etc. This secondary screening would enable Military and Police Officers to determine if the individual they detained for possession of HME precursors also came in contact with explosives. By following a bulk first, trace second HME screening CONOPS, the detained individual will have a hard time pleading innocence or drumming up sympathy support from local tribal leaders and civilians when a non-invasive (non-offensive) screening method was utilised to determine that they were in possession of bomb making precursors.

As IED attack frequency sharply decreases as a result of successful HME Interdiction campaigns that reduce the amount of HME precursors reaching the bomb making factories, tribal leaders will slowly begin to advocate support for an ANSF that employs bulk material identification as their primary screening methodology. With tribal leader's support, comes trust. YES, in the short term bomb makers may gain freedom of mobility if they are not subject to a trace detection analysis. However, as ANSF starts

earning the trust of tribal leaders and civilians, bomb makers, facilities used to store bomb making materials, locations where suicide bombers are trained, and the vehicles used to transport these materials will start being exposed.

Trust between ANSF and Afghan Civilians is vital for attacking the core of the IED threat.

Of course, for any interdiction CONOPs to be effective, the capabilities employed must be reliable. Bulk material identification tools must only indicate on targeted HME precursors, not legal fertilisers or other bulk materials not classified as targeted bomb making ingredients. They must also effectively detect the targeted precursors even if they are masked with other ingredients or already converted into HME. The trace detection tools to be employed for secondary screening must reliably detect trace amounts of a broad array of explosives without false alarming on lotions, colognes, perfumes, detergents, fuel, or other common ingredients an individual may apply to their person or clothes, or come in contact with.

Without effective tools to attack the core of the IED threat, TRUST cannot be earned.

Detaining individuals who are not possessing bulk HME precursors because of false alarms will instantly kill trust with tribal leaders and civilians. Destroying legal fertilisers or other non-HME, non-targeted bulk materials because of false alarms will also kill trust with tribal leaders and civilians. It's that simple.

Confidence on the other hand needs to start from within the Afghan Military and Police forces. Only after confidence is established from within, can it effectively be conveyed outward toward tribal leaders and civilians. In Afghanistan, IEDs are delivering the greatest percentages of fatalities and casualties to ANSF therefore it is understood why ANSF's confidence in defeating this enduring threat is low. Civilians are being killed and wounded at an alarming high rate; therefore, it is understood why tribal leaders and civilians do not have confidence in ANSF's ability to defeat the IED threat. Many argue the IED threat is unbeatable; however, it is easy to speak on behalf of ongoing failures when the strategies employed remain primarily

...TRUST BETWEEN
ANSF AND AFGHAN
CIVILIANS IS VITAL FOR
ATTACKING THE CORE
OF THE IED THREAT ...

reactive and relatively unchanged for more than a decade.

Equipping and training the entire ANSF with a standard issue tool to interdict the bulk HME precursors used in more than 90 per cent of the IEDs is vital for building ANSF's confidence. With more than 15,000 IED events annually since 2010, it is understood why confidence within ANSF is low. Especially when the United States and Coalition Forces have been unable to defeat or slow down the IED threat for 12 years.

Fortunately, there are now simple to use bulk material identification kits capable of bridging literacy gaps with picture instructions. Detection of the Nitrates and Chlorates (oxidizers) are now possible in seconds without false alarming on legal fertilisers or other non-HME bulk materials. If the Afghan MOD and MOI create requirements to leverage their 352,000 Soldiers and Police Officers to interdict these targeted bomb making ingredients: IED attacks will decrease, fatalities and casualties will decrease, lawful detentions will increase, freedom of mobility will increase, and the long term support needed from both tribal leaders and civilians will increase too.

By aggressively ramping up proactive efforts to interdict HME precursors and detain members of the growing bomb maker's networks, the enduring IED threat can be defeated.

Given ANSF's size (Soldiers - 195,000, Police 157,000) and knowing their literacy challenges, the primary screening tool selected for bulk material identification must be simple to train and use, effective at detecting and identifying the leading threats in the shortest amount of time, and sustainable over long periods of time (1 or 2 years minimum) by unskilled operators. Fielding tools that target bulk materials beyond the scope of the leading threats creates complexities that prolong learning curves which in turn slows the pace of the desired outcomes that can be achieved. To effectively build confidence from within ANSF requires detection and identification tools that are simple to use, effective, and sustainable.

As Interdiction efforts targeting bulk HME precursors become more successful, confidence from within ANSF can quickly and effectively be conveyed outward to tribal leaders and civilians.



As the supply of bulk HME materials is choked by an effective interdiction strategy, IED attack frequency will decrease and explosive charge sizes will also decrease. All of which is required for confidence building. As the enemy's footprint gets smaller, IED attacks will decrease further and faster, and freedom of mobility will increase exponentially. These outcomes are instrumental in reducing fatalities and casualties.

Bridging Literacy Gaps and providing ANSF enablers to interdict Nitrate and Chlorate HME Precursors without false alarming on legal fertilisers or other non-targeted bulk materials needs to become a higher priority if defeating the IED threat is a desired outcome for Afghanistan.

In closing, defeating the IED threat ultimately requires Leaders with a desire to win, Leaders with the integrity to accept failures and move on from what is not working, and Leaders with the willingness to ensure what is working is ramped up and employed across the fighting forces. It requires effective communications up and across chain of commands to enable informed and timely decisions. With strong leadership, effective communications, and a Counter IED strategy focused on Attacking the Core of the IED threat (Bomb Makers and Homemade Explosives Precursors), defeating the IED threat is achievable in relatively short order and at minimal expense. ■

U.S. Troops (Marines, Sailors, and Soldiers) are being equipped and trained in Afghanistan to analyse unknown Bulk Materials. With the featured Ai-HME Bulk Material Identification kit, Nitrates and Chlorates (bomb making precursors and their resulting HME) are detected within 15 seconds. Legal fertilisers and other Non-HME bulk materials are not detected by design.



ABOUT THE AUTHOR

Grant Haber has been involved with explosives detection, blast mitigation, and bomb containment technologies since 1998, and serving the law enforcement/first responder community since 1995. As VP of American Innovations, Inc. (Ai) Mr. Haber works with government and military labs, military EOD, civilian bomb squads, explosives manufacturers, subject matter experts, and elected officials to ensure the materiel solutions and train the trainer programs developed by Ai will effectively Counter current and evolving IED threats.



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EXPANDING CAPABILITIES – THE IRISH DEFENCE FORCES ORDNANCE CORPS IN PEACE SUPPORT OPERATIONS

By Lt Col Ray Lane,
School Commandant, Ordnance School,
Clarke Bks, DFTC, Curragh Camp

The Ordnance Corps has provided vital EOD support in the form of Conventional Munitions Disposal (CMD) in virtually every defence forces mission abroad. Thousands of rounds of unexploded ordnance varying from air-dropped cluster bombs and hand grenades to Katusha rockets and heavy artillery rounds have been cleared or made safe reducing the risks to the local populations and contributing to a return to normality. However, as the variety and complexity of these missions evolved over the years, one of the most significant threats to emerge has been the Improvised Explosive Device (IED). Often referred to as a tactical weapon with strategic effects, the use of IEDs has now become the norm in many theatres across the world. Because of this emerging threat it became necessary to develop and deploy fully equipped and trained Improvised Explosive Device Disposal (IEDD) teams capable of dealing with the full spectrum

of devices unique to each mission area.

For the Ordnance Corps, although experienced in dealing with an IED threat at home, it represented a major challenge to develop the capabilities to operate in diverse theatres where different tactics, techniques and procedures were required to deal with seemingly similar threats. New equipments, such as light-armoured four-wheel drive vehicles, were required to enable operations in battlefield conditions where small arms fire and shrapnel posed an additional threat. New considerations about the handling of evidence arising from IED incidents also needed to be developed in accordance with the mission mandate and local national laws.

To date IEDD teams have been deployed to Lebanon, Kosovo, Liberia, Chad and the Arctic Circle on standby exercises with the Nordic Battle Group. The development of such capabilities, expertise and participation in international

Photo above:
Long walk, Dublin 2013.



The team conduct a post blast investigation after an attack on the Pristina police.

IEDD operations has enhanced the reputation of Ireland and the Defence Forces. Ordnance Corps personnel are now in demand internationally and have contributed to a number of high profile operations such as:

- Providing weapons inspectors monitoring facilities used to produce Weapons of Mass Destruction to the UN Special Commission (UNSCOM) in Iraq.
- The preparation, post- Operation Cast Lead, of a technical document and briefing for the UN Fact Finding Mission on the Gaza Conflict. This document was a comprehensive assessment of the capabilities of both sides. Subsequently, Lt Col Lane gave verbal evidence to the Commission and was questioned in detail on the document.

Finnish EOD students check out the robot their own way!



- The provision of expert testimony at the “International Criminal Tribunal for the former Yugoslavia (ICTY)” in the case of Prlic & Co (IT-04-74-1) and Lukic and Lukic (IT-98-32/1). In both cases successful outcomes were achieved by the prosecution.

THE UNIFIL EXPERIENCE 1978 TO DATE

Ordnance Corps EOD teams have formed part of the Irish contribution to UNIFIL since troops were first deployed in 1978. Their task was the clearance of unexploded conventional ammunition. In 1988, however, following the killing of four Irish personnel by an IED, a fully equipped and trained EOD/IEDD team was deployed with the task of clearing all IEDs within the Irish battalion’s area of operation.

The types of devices encountered included roadside bombs containing artillery rounds and anti-tank mines acting as the main explosive charge and triggered by command wires from a vantage point some distance away behind cover and with a direct line of sight to the charges. Also encountered were radio-controlled devices and Katusha 122 mm rocket launch sites. The rugged nature of the terrain often prevented the Hobo bomb disposal robot from accessing the devices and the risk of coming under fire during the render safe procedure was very real.

A secondary task for the team was, fortunately, somewhat more relaxing and consisted of conducting training courses for suitable personnel from other UNIFIL contingents. This proved to be a very useful exercise as the professional and personal friendships made on these courses proved critical when it came to building up a comprehensive picture of the IED threat across the whole UNIFIL area.

EOD personnel were also requested to provide expert technical assistance to the UN investigation team in the 1996¹ Qana massacre.

THE UN SPECIAL COMMISSION (UNSCOM) IN IRAQ 1998

Ireland was first asked to provide a technical officer to the UNSCOM weapons inspection teams in September 1997. The mission had been ongoing

since the end of the first Gulf war in 1991 with the aim of monitoring Iraq's remaining chemical, biological and nuclear facilities which had been associated with the production of weapons of mass destruction (WMD). This entailed the inspection of hundreds of military, civilian and government sites throughout the country on a "no notice" basis and the analysis of technical documentation, dual use production equipment and military hardware to ensure compliance with UN Security Council Resolutions on the cessation by Iraq of all activities related to WMD.

Irish involvement was principally within the Chemical Inspection team, providing advice on EOD and NBC decontamination matters and later within the multidisciplinary inspection teams and finally with the missile team. Due mainly to the sensitivity of its work and its frequent clashes with the Iraqi Government over its deliberate concealment programme, the mission was extremely "high profile" at times and closely watched by members of the Security Council. The withdrawal of the teams from Iraq in August 1998 ultimately resulted in the second Gulf War in 2003 and the destruction of the Saddam Hussein regime. Four Irish Officers served in the mission with the current Director of Ordnance Col. Brian Dowling being among the last to leave prior to cruise missile attacks being initiated by both the US and UK on suspected WMD sites.

THE KFOR EXPERIENCE

Ordnance Corps EOD personnel have been deployed to KFOR since 2003. Initial deployments were as Specialist EOD/IEDD Advisors to the Multi National Task Force (Centre) (MNTF(C)) Commander. It became apparent early on in the mission that there was added value to having an active EOD/IEDD Team in theatre. A fully trained and equipped Irish EOD/IEDD Team was deployed in the latter half of 2003 to KFOR and was initially stationed in Camp Silvermines in Pristina, co-located with the British Army Forces. The Team later moved to Camp Ville in Lipijan in 2004, a Finnish Camp and the then location of MNTF(C) HQ.

Early deployments saw a fair degree of IED activity, with IEDs varying in sophistication from the very crude to the



highly evolved. As the security situation stabilised in Kosovo the frequency of IED attacks lessened; however, the activity of the EOD/IEDD teams did not. The work of the EOD/IEDD team diversified during the near eight years of deployment from providing solely and EOD/IEDD response function, to training the Kosovo Police Service (KPS) and the Kosovo Protection Corps (KPC) and to providing Dangerous Area and Explosive Remnants of War (ERW), awareness briefs to UN Staff, schoolchildren and Civil Agencies.

During the 8-year deployment in more than 100 EOD/IEDD operations no Ordnance personnel were injured. The Ordnance Corps has gained a wealth of experience from operating in

You break it – you fix it –yourself!

A not too happy Ordnance Officer inspecting damaged chemical weapons bunkers near Muthanna, Iraq.





Destruction certification is verified by AMM, the Indonesian Army and GAM representatives.

a multinational environment and in turn has added greatly to the establishment of the safe and secure environment now existing in Kosovo.

DISARMAMENT, DISBANDMENT AND REINTEGRATION (DDR) MISSION IN ACEH PROVINCE, INDONESIA (2005)

After the destructive Tsunami of December 2004 struck the war-torn province of Aceh in Indonesia, both sides of a separatist dispute which had waged there for over 20 years finally agreed a peace agreement under the framework of the EU European Security and Defence Policy (ESDP). The Aceh Monitoring Mission (AMM) was established to implement the agreement and commenced immediate operations. In brief, both the Indonesian Government and the indigenous separatist movement, GAM, agreed to further autonomy for the region after a verifiable sequence of events which entailed the surrender and immediate decommissioning of GAM weapons to be followed by withdrawal of non-indigenous Indonesian Armed Forces personnel. Four mobile decommissioning teams, drawn from both the EU and ASEAN², were deployed across the province to set up sites where weapons were to be received, verified as serviceable, recorded as such and then destroyed. Defence Forces Ordnance Officers provided advice on disputed weapons where their serviceability was in doubt and thus threatened to disrupt the troop withdrawal process. This technical capability was noted by the other decommissioning teams and was subsequently availed of by the Finnish Chief of Decommissioning to solve other higher priority disputes amongst the parties. Invariably, ammunition and explosives were also turned in and needed to be disposed of safely. These events were watched on live national TV by an audience of millions and the atmosphere was generally one of quiet celebration despite some frantic behind the scenes technical disputes. The decommissioning phase was complete within three months and thousands of troops had been redeployed. After one year the monitoring mission ceased and the ensuing peace has proved enduring to date.

ISAF³ C-IED BRANCH

The Counter IED (C-IED) Branch in HQ ISAF, Kabul comprises twelve personnel and is subdivided into three individual cells:

- Strategic Partnering and Outreach (SPO)
- Plans and Policy
- Strategic Intelligence and Information Fusion.

Presently, a Defence Forces Ordnance Corps officer holds the appointment of Chief (Lt Col) Strategic Partnering and Outreach (SPO) and a Sergeant is employed as a Weapons Tactical Intelligence (WTI) NCO in the Strategic Intelligence and Information Fusion cell. The role of the C-IED Branch, which reports directly to Deputy Chief Of Staff Operations ISAF, is to assist in the development, coordination and implementation of Government of the Islamic Republic of Afghanistan (GIROA) strategies and policies, across the C-IED spectrum of activity. The SPO cell is directly responsible for the strategic development and the implementation of the Afghan National Security Forces (ANSF) C-IED capability. The functions of Chief SPO include but are not limited to:

- Coordination and implementation of GIROA C-IED related strategies and policies
 - GIROA C-IED Strategy
 - GIROA Exploitation, Forensics and Biometrics Capability
- C-IED Information sharing
- Key Leader Engagement C-IED engagement
- C-IED Engagement with International Communities
- Support to Information Officers
- Assist in the development of explosives related policy & legislation
- Maintain 'over watch' on Coalition Forces C-IED functions.
- Provide answers to the commander of ISAF, C-IED Requests for Information.
- Provide C-IED Subject Matter Experts.

Since Oct 2011, SPO has been working in close cooperation with the Office of the National Security Council (ONSC) following their request for ISAF's support in the development of a National



C-IED Strategy. Following months of detailed meetings and discussions with the Ministries of Defence, Interior and Justice and the National Directorate of Security, President Karzai signed the GIRoA C-IED Strategy into law on 26th June 2012. This was a major achievement by all who worked in the development of the Strategy for Afghanistan as it is only one of very few countries to have a C-IED Strategy in existence.

The GIRoA C-IED Strategy comprises five pillars; Rule of Law, Security, Governance, Diplomatic Engagement and Public Awareness and it details the National Unified Vision, defines objectives, and lays out a pragmatic approach on how to achieve them. It will serve as a blueprint for a unified and coordinated effort across the whole of the government through the development of a consistent and coherent policy. This strategy supports the functions and regulations of other governmental agencies including legislative and law enforcement.

The Weapons Technical Intelligence (WTI) Sergeant's appointment is currently located within the Strategic Intelligence and Information Fusion cell within the C-IED Branch now more commonly referred to as the Forensics and Biometrics Cell. This cell is responsible for the development of a GIRoA Forensics and Biometrics strategy which provides for the framework of investigation and prosecution within the C-IED fight. Such a strategy will develop the necessary linkages to provide support to existing criminal justice actors to include investigators, prosecutors and judges at provincial and district level, with existing and future Ministry of Interior and National Directorate of Security Forensic capabilities, the General Directorate of Customs laboratories and Afghan National Security Forces C-IED teams to deliver a coordinated effort. The experience of the WTI is utilised by HQ ISAF to ensure that best international practice is adhered to in crime scene management, exploitation practices and the principle of attacking a network with logical, sustainable systems in place.

Future Battlespace - conventional and asymmetric warfare.



A weapon or not? Identification on the spot was sometimes difficult.

As ISAF moves rapidly towards transition at the end of 2014, the Ordnance Corps through its experience and education continues to make a very significant contribution to GIRoA's C-IED approach which encompasses strategic, operational and tactical measures aimed at the early detection, identification and neutralisation of networks. This significant contribution is helping the International Community to provide the necessary support to GIRoA in providing protection of the Afghan population and the rightful prosecution of insurgents, thereby leading to a lasting peace and prosperity for Afghanistan and its people. ■

REFERENCES

- 1 On April 18 1996 near Qana, South Lebanon, the Israeli Defence Forces shelled a Fijian UNIFIL Post, killing 106 Lebanese civilians who had taken refuge there, during the Israeli Operation Grapes of Wrath.
- 2 The Association of Southeast Asian Nations (ASEAN) is a geo-political and economic organisation of ten countries; Indonesia, Malaysia, The Philippines, Singapore, Thailand, Brunei, Burma (Myanmar), Cambodia, Laos and Vietnam.
- 3 The International Security Assistance Force (ISAF) was created in accordance with the Bonn Conference in December 2001 to assist the Afghan government in the establishment of a secure and stable environment.

ABOUT THE AUTHOR



Ray Lane is the Commanding Officer of the Irish Defence Force Ordnance School. He graduated from Military College and the National University of Ireland (Bsc Hons in Chemistry). Ray has 30 Years experience in the EOD/IEDD/CBRNe ID fields and has served overseas in many missions including Lebanon/Bosnia and most recently as Chief Operations Officer of the C-IED Branch ISAF. Since 2001, Ray has developed the Defence Forces CBRNe (IDRS) Improvised Device Render Safe Capability, with the implementation of appropriate policy training and equipment acquisition.

Ray Lane is an original member of the EDA C-IED Project team. In 2007 he authored the EDA document "Guidelines for developing a National C-IED Capability". This document was accepted by all member states and laid down a roadmap for future EU C-IED Capability development. Most of the recommendations have been achieved. In 2013, Ray authored for the EDA's "Food for Thought paper" on the future of C-IED. This is presently being assessed by all member states.

ABOUT THE ORDNANCE SCHOOL

The Ordnance School has trained personnel from over 30 countries and since 2010 has trained international personnel from 27 Countries. The School is responsible for running the NATO Pre-Ops IEDD course for deployment to ISAF and in addition runs NATO Weapons Intelligence training courses. The School has also conducted EDA-sponsored courses on Ground Sign Awareness/Combat Tracking.



TRAINING: INITIAL SUCCESS, OR TOTAL FAILURE

By Andy Oppenheimer AExpE MIABTI

Along with 'Defeat the Device' and 'Attack the Network', the third – and arguably most vital – leg of the EOD (Explosive Ordnance Disposal) triad is 'Train the Force'. The many types of equipment used in EOD-ROVs (remotely operated vehicles – robots), detectors, disruptors, jamming systems and protective kit – are vital to protect EOD squads and enable them to do their highly dangerous work. Much of the equipment has been developed rapidly to respond to TTPs (tactics, techniques and procedures) of terrorists and insurgents' development and deployment of IEDs. For every countermeasure, a newly designed or more powerful device can appear, often within days or weeks – requiring rapid training on the countermeasure equipment. And in the Afghan and Iraq theatres, despite all the new equipment and great advances in technology, dealing with IEDs in place still involves finding them through dangerous foot patrols and using handheld tools – and taking The Long Walk.

The equipment is only as good as the operator. And it is expensive – the US Joint IED Defeat Organization (JIEDDO) has spent around \$40-50 billion on jamming systems alone. New ROVs are among the most complex pieces of kit in

military use – including on-board system diagnostics with advanced detectors, with which EOD squads must quickly identify and analyse the explosive and other aspects of the IED, and hand-held control units which can display four camera angles with multiple picture-in-picture views. The equipment can be tested, but measuring effectiveness of training is often less clear.

MEETING NEW DEMANDS

Increase in IEDs required the rapid procurement and distribution of new equipment and consequently training for general users. Evidence from Afghanistan suggests that a well-trained private soldier utilising an appreciation of atmospherics, ground sign awareness (GSA) and threat assessment is often more capable of detecting an IED than any single piece of technology.

Heavy demand continues for EOD assets to cope with IEDs deployed by terrorists and criminals in civilian settings. As well as rendering safe IEDs, prime EOD tasks include search operations for explosives secreted in large caches within urban areas and rural hideouts, often in booby-trapped premises containing highly unstable materials and, possibly, armed occupiers. The EOD operator also

Photo above:
Allen Vanguard Counter-Threat Training courses incorporate both JIEDDO lines of operations and NATO Counter-Threat doctrine.



Tactical battlefield effect simulators from Cyalume Technologies produce high-realistic conditions for training. The intense audible shock effect and visible shock effect replicate real detonation.

“US ARMY AND MARINE CORPS PERSONNEL EXPRESSED THE DESIRE FOR MORE TRAINING IN HOMEMADE EXPLOSIVES AND ARMY AND NAVY PERSONNEL REPORTED THAT THEY NEEDED ADDITIONAL ACCESS TO TRAINING RANGES.”

- US GAO, APRIL 2013

must ensure the safety of his team and know how to assimilate information from a number of sources.

A variety of skills is also needed to deal with hostage situations, suicide threats or possible hoaxes involving IEDs. Specialised training has been developed for EOD teams attached to police and fire departments as well as with military forces. It is hugely demanding and only those who have shown practical and mental abilities to cope with the many demanding environments where IEDs are encountered will become an EOD Operator or High Risk Searcher in their units, or on deployed operations.

While government spending is on equipment and technocentric solutions, there is often less expenditure on training despite its relatively low cost. In April 2013, a report by the US General Accountability Office (GAO), Explosive Ordnance Disposal: DOD Needs Better Resource Planning and Joint Guidance to Manage the Capability, said that constant deployment of (EOD) personnel on counter-IED missions is eroding training: “Meeting the demands for EOD forces in combat operations has negatively affected EOD units’ personnel and ability to train for other missions.” According to the GAO, EOD personnel said they were satisfied with the quality of their training but wanted more training. But some

participants were concerned about not being able to train with the same types of equipment, such as robots, as they would be using when deployed. Both US Army and Marine Corps personnel expressed the desire for more training in homemade explosives and Army and Navy personnel reported that they needed additional access to training ranges.

TRAINING ON EQUIPMENT

Private companies providing EOD training to UK/US military and civilian standards employ time-served instructors with a wealth of high-threat experience from operational theatres in Northern Ireland, the Balkans, and more recently Afghanistan and Iraq. Repeated training is necessary as the threat changes and new technologies are brought in, sometimes half-way during pre-deployment training or when troops are already deployed. Annual generic C-IED training is now mandatory for all Coalition personnel; specialist C-IED equipment requires more training. Training also increasingly focuses on weapons intelligence, to gather evidence from IEDs that have been rendered safe, or from detonated ordnance for forensic investigation – which in turn helps to shut down the supply chains providing the materials for terrorist bomb-making.

An example of speedy training on a specific piece of equipment was the UK Ministry of Defence (MoD) outsourcing of training for a new handheld detector to 700 soldiers for a 10-week relief-in-place period in Afghanistan. This left seven weeks to design the course, organise logistics of delivering a course to a large audience, and supply trained operators. OPTIMA Defence & Security Ltd was contracted to train the personnel, with 690 deemed competent at the end of the training – with the knowledge and expertise to use a new piece of C-IED kit. Brigadier Duncan Capps, Commander Joint Forces Support, Op HERRICK, who watched the training first-hand, said: “The training has played a key role in preparing the force; helping to deliver life-saving capability to the soldiers deployed on Op HERRICK 18.” The course won the award for Best Counter-IED/Successful Deployment Initiative at the 2013 Counter Terror Expo Excellence Awards. The partnership with MoD demonstrated the benefits of contractor-delivered C-IED capability development.

ENHANCING REALISM

As with all military and first response training, making the scenarios realistic is vital. At the US Naval School of Explosive Ordnance Disposal (NAVSCOLEOD), which provides advanced EOD training to 2,100 selected US government personnel each year, the IED Division has increased realism in its EOD training. This includes robot training lanes, a structure to simulate night operations for training with the EOD robot, and an obstacle course for students to manoeuvre through while wearing the bomb suit – which with blast plates can weigh up to 26 kg. Multiple updates were also made to simulated scenarios to provide additional realism. The three new obstacle courses, three emplacement lanes, including roadways, culverts and five test lanes are meant to familiarise the students with manoeuvring robots over and under obstacles, up staircases, down ramps and through tunnels. The students operate the robots in search procedures, device location, render-safe procedures and evidence collection. According to US Army Capt. Nicholas Drury, IED Division officer in charge, “Until recently, the area that now contains the robot training lanes



was covered with trees. Staff, trainees and instructors volunteered to construct training lanes from material that wasn't being used.”

From one training day on the previously makeshift training lanes, trainees now spend three days working with the robots. A bomb suit familiarisation obstacle course is constructed using excess materials and provides the opportunity to don a bomb suit and learn its capabilities, limitations, and to improve on dexterity and situational awareness while in the bomb suit. Suited-up trainees traverse through low and high bars, walk up and down a flight of stairs, and continue through a culvert to place a designated tool – and a chief learning objective is to learn when it is safe to remove the suit. The course syllabus requires trainees to consider multiple factors, including rendering safe ordnance and minimising explosive effects on the surrounding areas and personnel – to consider the property and the safe evacuation of people, as well as how to interact with local witnesses and law enforcement.

One scenario features a bus depot complete with ticket counter, luggage, computer, phones, lockers – and a bus. A training site representing a mud-hut village is complete with vehicles, fake animals, sleeping quarters and a room used to construct home-made IEDs. Other sites have a bank, church, petrol station, coffee shop, post office, restaurant, pub, hardware store in a mall setting, and also a homemade explosives laboratory – which provides multiple

Cyalume suicide vest simulator can be worn during a training scenario and detonated without any injury to the wearer or other trainees. The ‘bomb’ consists of two reservoirs – one of compressed air and one of powder – attached to a rubber diaphragm. Electromagnetic valves allow the diaphragm to be rapidly filled with air and powder when detonation is simulated. The result is a loud bang and a lot of simulated smoke. The simulators are reusable.

Training at Allen Vanguard with inert explosives and other materials for IEDs.





Navy Chief Petty Officer Zach Holzhausen (right) watches a member of the Yemen EOD team place a portable X-ray machine near a simulated IED during training in Sana'a, Yemen. Members of the U.S. Navy's EOD team attached to the Combined Joint Task Force-Horn of Africa from Camp Lemonier, Djibouti, are training with members of Yemen's Ministry of the Interior EOD team.

DoD photo by Staff Sgt. Stacy L. Pearsall,
U.S. Air Force.

**“OUR TEAM HAVE BEEN
ON THE FRONTLINE,
AND CAN THEREFORE
UNDERSTAND THE
CHALLENGES FACING
SOLDIERS AND THE
IMPORTANCE OF BEING
PREPARED AND READY
FOR ANYTHING.”**

– KEITH HAMMOND, OPTIMA

The UK MoD outsourced training for a new handheld detector C-IED training to 700 soldiers for a 10-week relief-in-place period in Afghanistan. OPTIMA Defence & Security Ltd trained 697 personnel in the knowledge and expertise to use the new piece of C-IED detection kit.

Photo credit: Optima Defence & Security Ltd

challenges for EOD search teams (such as the Escondido Incident in California in November 2010). Students are also trained how to observe not only the items in the rooms they enter, but to respond to booby traps. This level of training may of course be repeated in other countries or have already been instigated in other militaries.

The UK Centre for Homeland Security (CHS) incorporates the International School for Security & Explosives Education (ISSEE), which delivers commercial explosives and counter-terrorism training at its bespoke training facility near Salisbury. Facilities for EOD training scenarios are simulated in 55 acres of hard-standing, grass and woodlands, search houses, railway

carriage, buses and cars. A search centre replicates offices, kitchens, living areas, bathrooms and attics for Search and IEDD training and the sand pit is used for EOD Clearance practical exercises. Small and medium-sized derelict buildings have wild surroundings suitable for practice search operations. Search training involves simulation of hostage situations and other emergency incidents.

HIGH THREAT DISABLEMENT, HAZMAT AND CBRN

Clearance and disposal operations that include high-threat disablement (HTD) require training in hazardous materials, firearms and hostage situations, operations with CBRN, advanced diagnostics, hostage handling, and integrated operations with aviation, fire-fighting, transit and canine teams. Gas monitors, for instance, are employed when tactical teams enter a facility or areas where there could be a chemical release. They must identify volatile organic compounds, oxygen, lower explosive limit and toxic industrial chemicals. Importantly, the team must know how to interpret the data. If the explosive level rises too far, the use of automatic weapons could have fatal consequences.

Such personnel have to be available almost at any time to respond to an emergency, and cross-training and maintenance training are also required. Such training is, however, expensive, so may not be adequately funded.



And as there are fortunately relatively few CBRN incidents involving EOD teams, they must gain much of that specific experience through training sessions.

TRAINING MATERIALS

As well as offering EOD training courses, a select number of companies produce 'Hollywood'-level realistic materials and devices for Counter-IED training. These include whole IEDs in multiple disguise and packaging, suicide belts, and every imitation explosive and initiation mechanism known to man and beast. Inert Products and Explosive Risk Management make an array of realistic educational tools, training and devices which are certified as Free From Explosives (FFE) -- from inert simulated explosives and demolition devices, inert IEDs and detonators, customised IED training kits, replica dummy weapons, and materials such as large classroom posters, diagrams, books, and videos. Training aids are based on real IEDs -- some totally handmade for authenticity but safety is paramount. Trainees also learn how to make their own devices as terrorists are constantly changing their TTPs.

Tactical Electronics provides its own MicroAXE® circuitry to provide arming delay for ease of setup, a triggered tone if the device functions during the exercise, and will re-arm automatically so the exercise can continue uninterrupted. If the device is 'triggered', the MicroAXE® provides a 'chirp code feedback' to



indicate why it functioned. Training aids test an operator's ability to recognise and deal with booby-trapped devices and situations, and how to deal with VBIEDs -- how to access the vehicle compartments without causing detonation. The company also provides fully functional CBR training aids designed to dynamically disperse a liquid or powdered agent on being triggered.

Above all combining the technologies with experience is the prime aim, and being able to spot 'the presence of the abnormal' -- oddities and anomalies in a scene or area which indicates possible IED emplacement or terrorist activity. So the EOD tech also needs to have something that is absolutely vital which may not be trainable: intuition. ■

The Ammunition Technician is the British Army's expert in explosives, counter-terrorist bomb disposal, and everything associated with ammunition.

"ON DAY 16 OF TRAINING, I HAD TO WEAR THE BOMB SUIT AND INVESTIGATE SUSPICIOUS ITEMS AT A MOBILE HOME PARK. IT WAS A PRETTY REALISTIC SCENARIO DRAWN FROM A REAL-WORLD SITUATION."

— US ARMY SPC. NATHANIAL PEKARSKI, STUDENT AT THE NAVAL SCHOOL OF EXPLOSIVE ORDNANCE DISPOSAL (NAVSCOLEOD) IMPROVISED EXPLOSIVE DEVICE (IED) DIVISION



C-IED training delivered to personnel as part of in-theatre training in Afghanistan. Photo credit: Optima Defence & Security Ltd



The International School for Security & Explosives Education (ISSEE) delivers commercial explosives and counter-terrorism training for students from military, police and civil agencies to study for qualifications in EOD.

ABOUT THE AUTHOR



Andy Oppenheimer AIEExpE MIABTI is an independent consultant in counter-terrorism. He is Editor of CBNW (Chemical, Biological & Nuclear Warfare), an Associate Member of the Institute of Explosives Engineers, a Member of the International Association of Bomb Technicians & Investigators, and author of *IRA: the Bombs and the Bullets* (Irish Academic Press, 2008) and the IEDs and CBRN Modules for St Andrews University's Certificate of Terrorism Studies course.

ATO COURSES

The Army School of Ammunition premier courses are for Ammunition Technical Officers (ATO) and Ammunition Technicians (AT) of the Royal Logistic Corps (RLC).

The ATO course trains officers of the RLC and associated NATO and Commonwealth countries partly at the College of Management and Technology at Shrivenham (part of the Defence Academy), UK. The ATO short course is outlined here:

<http://www.cranfield.ac.uk/cds/shortcourses/ammotechofficers.html>

ISSEE COURSES

Improvised Explosive Devices (IEDs) Awareness

This course is intended to raise students' awareness of IEDs, their components, effects and associated hazards, and to be able to assess effective cordon and evacuation distances.

Improvised Explosive Devices Disposal (IEDD) Technician

This 20-day intensive course has been designed to provide the requisite skills to participants who are responsible for the safe disposal of Improvised Explosive Devices.

Post- Bomb Scene Management

This 10-day course is to provide the student with the knowledge required to recover evidence from a scene, working to multi-agency working practices.

Weapons Intelligence Team Training (Joint IED Exploitation)

A 15-day course to enable a team member to conduct post-blast scene examination, recover evidence and provide analysis of methodology.

IEDD Refresher Training Course

This 10-day course is to update the student in the skills required to operate in a competent manner when disposing of an IED.

Remotely Operated Vehicle (ROV) Course

This 3-day course is to instruct the student in the safe deployment of Remotely Operated Vehicles during Render Safe Procedures, and to conduct Explosive Ordnance Reconnaissance (EOR).

Introduction to Manual Techniques

This 10-day course is to introduce the student to the techniques required to manually neutralise Improvised Explosive Devices in a competent manner.

Booby Trap Devices Course

This 10-day course is designed to prepare students to be able to identify and deal with booby-traps and to carry out the necessary first response to ensure the safety of others.

CBRN IEDD Course

This course prepares students in the theory of CBRN materials, introducing them to CBRN equipment and practising them in the render safe procedure options.



‘REMOTE CONTROLLED VEHICLE’ TRAINING EQUIPMENT

Dr. Uwe Katzky, Managing Director
szenaris GmbH

INTRODUCTION

In December 2010, simulation specialist szenaris GmbH in Bremen delivered the ‘remote controlled vehicle’ training equipment to the German Armed Forces (Bundeswehr) Explosive Ordnance Disposal Centre in Stetten am kalten Markt. The equipment supplemented the training of the Bundeswehr’s Explosive Ordnance Disposal on the two remote-controlled vehicles tEODor and packBot EOD and elevated it to a new, higher level. The virtual-reality-based simulation system offers a practical, economical alternative to traditional training on the original vehicles.

For explosive ordnance disposal in land-based operations, threat scenarios from bombs, improvised explosive devices (IEDs) and many other explosive

ordnances are no longer rarities. The disarming of IEDs in water and on land is therefore among the most dangerous jobs of the Bundeswehr’s and police’s special forces.

The Bundeswehr’s special units are relying increasingly more frequently on high-performance technical equipment, i.e. remotely controlled vehicles that can also operate in narrow spaces and overcome obstacles such as steep stairways between the storeys of buildings, for threat-situation clarification and the disarming of explosive charges. The operator can use gripper arms from a safe distance to collect suspicious objects and bring them to a non-hazardous location. There they can be brought to controlled explosion or disarmed. High-resolution video cameras on the robot

Photos above:
tEODor and PackBot EOD.



RCVs in the virtual world.

... LEARNERS
DON'T GUIDE THE
VIRTUAL ROBOTS
USING TRADITIONAL
JOYSTICKS OR A
PC KEYBOARD, BUT
EXCLUSIVELY USE THE
ROBOT'S ORIGINAL
CONTROL UNIT ...

ensure that explosives experts have a full overview of the situation at all times, enabling them to optimally navigate the vehicle.

MINIMISING HAZARDS, REDUCING MATERIAL WEAR

Explosive ordnance disposal experts are faced with special challenges during training and continuing education for these sorts of hazardous situations. In addition to the most urgent tasks, i.e. ensuring the wellbeing and protecting lives of soldiers, costs also play a role with the increasing use of highly sensitive technology. Remote-controlled vehicles such as the tEODor developed in Germany or the American PackBot EOD robot are packed full of high-tech components and various high-quality camera systems. Moreover, various weapons such as a disruptor (shooting with water jet) or shotgun can be installed on the robotic vehicles.

A single incorrect navigational instruction with the remote control, for instance in steep terrain, can lead to total loss of the approximately 400 kilogramme tEODor already costing about 150,000 euros basically equipped. However, trainers were on the lookout for innovation training options for creating realistic training situations while minimising robot wear.

Remote-controlled vehicle operation can be optimally practised with modern virtual-reality simulations. That's why

szenaris GmbH in Bremen developed virtual worlds that enable hazard- and wear-free but realistic training for the Bundeswehr's Explosive Ordnance Disposal.

The activation of various sensory pathways is important for ensuring effective information communication especially in learning processes. This is because even in daily life people don't just use visual but auditory, olfactory, haptic, and gustatory senses. However, while it is mainly the sense of sight used in traditional self-study with books, virtual reality simulations also address the senses of hearing and touch. This multimodal information assimilation and processing enables comprehensive experiences having a positive effect on learning motivation and success in the training context.

LEARNING SUCCESS IMPROVED

This principle of comprehensive sensory-perception integration was consistently implemented in virtual-reality simulation for the two remote-controlled vehicles. For this reason, learners don't guide the virtual robots using traditional joysticks or a PC keyboard, but exclusively use the robot's original control unit. The highest priority lies on the system's fidelity to the original during development of the virtual scenarios as well.

Training can occur in 13 different scenarios such as in the passenger car, bus, aeroplane, air terminal, or on the runway as well as in commercial buildings. The trainer selects one of the scenarios before the exercise starts and also has options for further configuring the training conditions. The users then encounter exercises in which the virtual vehicle reacts with absolute fidelity. Parameters such as standing and tipping behaviour, vehicle dynamics and acceleration, braking behaviour, management of inclines or slopes, and the gripping or shooting of objects are simulated true to life.

STANDARD TOOLS AND CUSTOM APPLICATIONS

In the first step, szenaris relies on development tools already established on the market that aid with the realisation of training systems to develop these sorts of complex virtual-reality simulations and training systems. Thus Autodesk's



The training room in Stetten.

3ds Max® is used during the modelling of three-dimensional objects and scenes. The developers use a programming tool from Dassault Systèmes to further realise the behaviour and functionalities of virtual realities. A physics engine is also employed here to ensure that the training systems' behaviour also conforms with physical laws.

But not all applications can be realised with standard developer tools. Special applications are programmed in a higher-order programming language like C++ for special problems such as coupling real operating devices with training simulations. The software infrastructure that supports communication and data exchange among several work stations in training scenarios is also a custom development.

The corporate philosophy of szenaris's experts is to reduce the application's complexity to program code and to keep the system as easily manageable as possible for the users. All applications are thus designed for standard PCs.

The shipment contains both two permanently installed training systems

and 14 mobile training units that allow on-site training – for instance in foreign deployment. The Bremen developers have successfully implemented team-work in a simulation solution for the Bundeswehr before. That's how all participating soldiers learn all of the work steps in the step-by-step assembly of military engineering bridges, used by the Bundeswehr to cross bodies of water, on the computer with the aid of 'virtual-reality team trainers'.

THE 'REMOTE CONTROLLED VEHICLE TRAINING EQUIPMENT' FROM THE USERS' PERSPECTIVE (the Bundeswehr's Explosive Ordnance Disposal Centre)

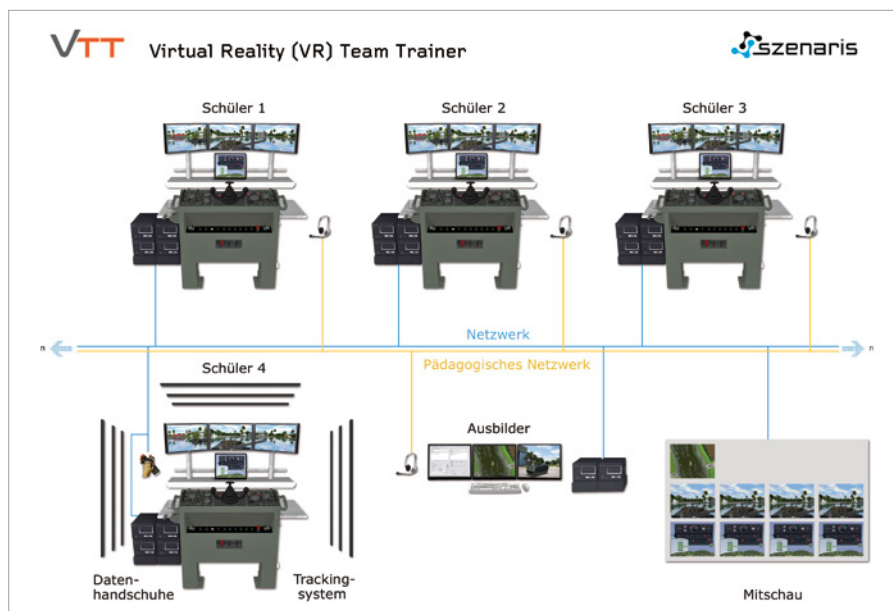
The training systems described have been used since December 2010 in the training and continuing education of the Bundeswehr's Explosive Ordnance Disposal personnel. The system is deployed in two versions:

Version 1: training system

Permanently installed training systems are employed in parallel with training

Learner workplace.





Virtual reality team trainer - system layout.

on the original device in basic training to achieve improved co-ordination of robots' movement in space (open terrain, urban surroundings).

Thirteen different training scenarios with varying degrees of difficulty are available to training personnel for this. The remote-controlled vehicle's handling and ride-dynamic capabilities in particular are represented true to the original in the training scenarios. Various situations from the area of remote-controlled vehicle-driving physics and mobility are reproduced with the simulation system for this purpose.

The use of the original control unit in the simulation system (consistent operation) is also very important from the user's perspective. Just as important are the recording function and observation from various viewing angles so that incorrect or correct handling can be evaluated quite well from didactic-methodological points of view.

Version 2: single-user system

Above all, the single-user system comes into use in the area of continuing and proficiency training of already trained explosive ordnance disposal personnel. The training level can only be maintained with the single-user system due to temporarily restricted availability of the original device.

The fully mobile single-user system offers the same scenarios as the training system, but it can be operated anywhere without additional devices or equipment being necessary.

In particular, deployment of explosive disposal ordnance forces with a minimal number of original devices, i.e. with minimal availability on site, makes use of these virtual training devices indispensable.

SUMMARY

Both systems have been in use now since the end of 2010 and have provided significant improvement in training quality, especially in basic training. In addition, routine damage to the original devices during training has declined considerably. These effects also manifest themselves in connection with the single-user system.

In summary, use of the remote-controlled vehicle training system must be viewed as the proper way to maintain, and even improve, the existing level of training.

The very good co-operation with the manufacturer, szenaris GmbH, during development of the scenarios and vehicle simulations must be cited once again at this point.

The use of simulation systems for this application area has completely proven itself the correct decision from the user's perspective. ■

ABOUT THE AUTHOR

Dr Uwe Katzky, born 1962 in Bonn, Germany, started his professional career as an officer in the German Navy. From 1993, when he left the Navy after 12 years, until 2009, he was responsible for the development of e-Learning and simulation programs in diverse functions. In 2009 he founded the German company szenaris GmbH. Since then, Dr Katzky has been the Managing Director of szenaris.

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CIED TRAINING - LESSONS IDENTIFIED

By Robert Shaw, Director of Optimal Risk EOD Services.

When we look at the suggested nature of future conflict, we see that C-IED will take place in both the homeland and during expeditionary operations. We can expect to face adversaries using IEDs that range from home grown and experienced international terrorists through Special Forces units to conventional armies seeking to offset the symmetrical advantage offered by the enemy's superior ISTAR and kinetic effect capabilities. Operations will not only involve a higher proportion of reservists and a wide range of units and skills from our own forces, but also other Government departments, NGOs, and other countries' military forces. This not only brings challenges for the interoperability of equipment but shows we need to have a deep understanding of our allies as well as our adversaries. No matter who they are, we all agree that there will be a continued use of the IED as a weapon system, although it will evolve in terms of technology and the countries in which we have to operate, not only to remove the causes of terrorism and displace terrorist resources but to build the capacity of the state to defeat the network using the IED. What does this mean to us? C-IED is not just

about technology, but also training. There is no 'silver bullet' that will defeat IEDs as a standalone technological system; C-IED is a mix of 30 per cent technology, 60 per cent training and 10 per cent luck. In fact one of the basic blocks of defeating the device is 'prepare the force', which encompasses C-IED training.

So what is training? Training is not only about teaching a specific skill set but also understanding and knowledge as an organisation. The organisational knowledge is built up over time and developed with experience in operations. Once operations stop, it is quickly lost as personnel leave and replaced by new people. Added to this is the eternal military 'chicken and egg' problem of whether the development of our tactics drives equipment design and procurement or if our equipment procurement and its limitations drive our development of tactics.

The speed at which the organisational understanding is lost can be shocking. British troops that had not operated in Northern Ireland during its busiest periods were obvious in Iraq once the IED threat increased and had to 'catch up' very quickly to prevent sustaining excessive casualties. That's not to say that all the

Photo above:
Demolitions training.



Stockpile Management.

...THERE IS STILL SOME RELUCTANCE BY THE MILITARY TO OUTSOURCE TRAINING TO CIVILIANS, BUT WE HAVE ALREADY SEEN THIS HAPPEN TO GOOD EFFECT, ESPECIALLY IN THE FIELD OF SIMULATION...

organisational or individual knowledge is relevant in a new campaign. IEDs are weapon systems and as such there will be similarities between the way in which they are used and the technology of them from one country to another. But each individual country will generate differences based on the training and capabilities of the terrorist network itself, its logistics, its culture and its levels of education.

Understanding our adversary and the IED threat is based not only on the acquisition of knowledge but being able to pass it on to individuals and organisations through training. No one can afford to train for the sake of it, or train for the last conflict, we must have training that is pertinent, cost effective and that evolves as sustained operations to meet changes in technology and tactics. The system used throughout NATO and most of the commercial sector is the Defence System's Approach to Training (DSAT) which ensures that training meets the criteria of being specifically what the recipient needs to perform his role and extraneous activities. Therefore, costs are minimised.

Whether it is in the homeland or on expeditionary operations, some form of pre- deployment training (PDT) takes place. Military personnel train for 'a war' and once their individual and group skills are practised, they need to train for the specific environment in which they are to operate; this will include specific tactics, equipment, climate, language, culture and topography. Not all training

areas in the homeland can replicate the environments to be found abroad, in which case most NATO countries quickly build towns representative of Iraq and Afghanistan in the same way that they build German towns on training areas during the Cold War.

Throughout this training system, there needs to be a robust link with the operational theatre to ensure that all lessons identified during combat are rapidly passed back and integrated into the training. This can include instructors deployed to visit and study units in theatre and/or a second period of PDT in country whilst troops acclimatise.

With most forces now being stretched due to financial constraints and being reduced in size, there is pressure to outsource as much training as possible to commercial companies. There are opportunities for this to be done, both in the homeland and on operations and to integrate the use of reserves, which are to increase in number. There is still some reluctance by the military to outsource training to civilians, but we have already seen this happen to good effect, especially in the field of simulation. It comes down to the military feeling they have control and that there will not be 'mission creep' and spiralling costs by the contractor, along with the contractor providing the best value for money and shouldering the burdens, which free up military manpower for more operational tasks.

The training burden for recent counter insurgency campaigns grew hugely across all the nations involved, as not only did the nature of the operations change with the evolving threat and technology, but most NATO forces simply did not have the capacity to perform all the C-IED tasks as these skill sets had been performed by other entities such as police and intelligence agencies back in the homeland. During the opening years of the Iraq and Afghanistan campaigns, militaries were initially still designed to operate within the realm of national survival or expeditionary war of a high intensity and therefore did not have the skill sets that are the cornerstones of counter terrorism/insurgency.

In addition to countries having to implement C-IED training down to the lowest level so that all troops in theatre start to understand the threat posed by

the IED and how/where they are likely to be targeted by them, even specialists have to 'up their game'. The IEDD Operators were a case in point. Most IEDD Operators were trained to operate in scenarios where the first responders were not necessarily the target. The changes in the nature of global terrorism and their capacity to communicate, led to improved targeting methods and IEDD forces quickly realised they had to change the way they trained to meet the challenge. The operators training had to be intensified to ensure that they were carrying out an improved question technique and threat assessment. It was also to ensure that the operators didn't carry out actions during their RSP that could lead them to being targeted by a secondary device. IEDD teams were used to dealing with tasks utilising a heavy team kit with the use of large remote means and the teams had to be trained to operate in a more 'lightweight role' with insertion becoming more likely by helicopter than by EOD van. Tools and equipment have had to be developed that are more lightweight and able to cope with the climate and terrain and operators trained to render safe devices with minimal equipment and what they have 'on the man'. Due to the harsh conditions encountered on operations, training has not only had to weed out those not able to complete a satisfactory threat assessment but also those not fit enough to work for prolonged periods in such a challenging environment. This then leaves an even smaller number of IEDD operators able to be used in a high threat environment from an already small pool.

Training for IEDD Operators also had to encompass other, attached personnel as teams became larger. A high threat IEDD team expanded to include elements of search, ECM and post-blast scene investigation known as weapons intelligence. Due to some IEDD teams having to move by helicopter rather than road, a balance had to be found where all capabilities could be deployed while at the same time having space on the airframe for them. This added to the training burden as teams would now train individuals in a wider range of skills to make them more eligible for selection when space was tight. An example of this might be training an infantryman to collect



forensics, carry out level 1 weapons intelligence and then also to be a medic. Ultimately, he would then be more likely to secure a space on an operation than individuals with one skill set.

Assembling larger teams also means training them to work together as well and adding a realistic demanding environment. This has meant some PDT being held in other countries with similar terrain and conditions.

Since forensics collection and weapons intelligence was a skill set normally carried out by agencies in the homeland, most military forces simply did not have the capability within their organisation and training had to be run in theatre until it was created. The same applied to route clearance; where there was once a capability gap, training was rapidly put into place, equipment fielded and a force created to good effect. The challenge now will be to maintain these capabilities once troops finish their latest counter insurgency campaign – especially in the face of such financial pressure and forces worldwide focussing their training on 'a war' not 'the war'.

We all know that the C-IED battle is a balance of technology, luck and, most importantly, training. Training has improved continuously and evolved in line with new equipment and the tactics of both ourselves and our adversaries. The hardship is now going to be keeping those capabilities alive in an age of fiscal difficulty although training has proven to be the most cost effective way of saving life and defeating the IED. ■

WIT Training.

ABOUT THE AUTHOR



Robert Shaw is the Director of Optimal Risk EOD Services. He is an ex-British Army IEDD ATO who retired in 2006 and subsequently managed training for the UN and NATO. Considered a C-IED SME, he has spent his career in a wide range of EOD, security and intelligence appointments that have ensured a broad range of experience and knowledge. His operational experience includes Northern Ireland, Iraq, Afghanistan, the USA, Libya and most recently, Nigeria. Robert has a Masters degree from Cranfield University in Global Security. He has three children.

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NATO ROUTE CLEARANCE (RC) PROJECT – FROM SMART DEFENCE TO SMART INITIATIVE

By Lieutenant Colonel Florin Obreja,
Military Engineering Centre of
Excellence (MILENG)



Rapidly developing crises will require a rapid response by Alliance forces, and some crises will take place in areas with little or no friendly presence having relatively undeveloped or limited land transport infrastructure. The lack of infrastructure will impede rapid forcible entry and freedom of movement within the area of operations. Furthermore, anti-access and area-denial measures could impair such infrastructure as exists and cause significant limitations on friendly forces mobility.

It is essential that NATO and partners have a clearly articulated concept and doctrine for the conduct of route clearance, in order to protect the force and maintain freedom of movement. The current efforts to achieve this dissipate the effect, lead to possible overlap and are potentially wasteful, which is unacceptable in the constrained financial situation

being experienced by NATO and partners. Route Clearance (RC) is a continuum that should not be focused on one aspect of the threat or countermeasures, and should recognise that many force elements have a part to play.

The Military Engineering Centre of Excellence (MILENG COE) NATO RC Project is about creating an effective consultative framework and a set of principles leading to the production of a robust RC doctrine. It is not about TTPs which are temporary and theatre-specific and therefore not an enduring solution. Once decisive elements are achieved (a solid conceptual framework) the RC Project will facilitate technical demonstrations and industrial input.

The project will last for 30 months ending in summer 2015; it is built on four pillars: consolidation, development, validation and exploitation.

Photo above and inset:
Route clearance patrol team in
Afghanistan.



Route Clearance equipment opening for logistic convoy.

heavy maneuver forces could face the challenge of rapid deployment to defeat a well-resourced, -controlled and -prepared opponent.

Experience from recent theatres of operations has emphasised the need to generate an adaptable force capable of conducting full spectrum operations under conditions of uncertainty and in the presence of an adaptable adversary. The Alliance and partners must apply lessons collected and assume solutions that will increase its competency in future conflicts.

INTRODUCTION

The military operating environment will continue to evolve, presenting Alliance and partners with an ever-increasing challenge to defeat irregular and hybrid opponents. The future has unlimited scenarios, lack of predictability for potential adversaries, uncertainty and volatility of the operating environment. Regular forces engagements will include adversaries ranging from well-led, -trained and -equipped conventional military formations, experienced in close fighting, to irregular and hybrid forces.

The Alliance's most likely opponents will continue to be asymmetrical, extending from insurgents focused on regional criminality to lawbreakers and tribal groups focused on maintaining power within their local areas for economic reasons. The adversary will be even more adaptive and networked, engaging a variety of conventional and improvised weapons and technologies. The most common assessments are that the overriding operating conditions in the near future will be similar to recent experiences encountered in Iraq and Afghanistan, while the possibility of high-tempo major combat operations remain. In this situation,

BACKGROUND

Mobility is a vital component of freedom of movement that enables the projection and sustainment of forces necessary to achieve campaign objectives within an acceptable degree of risk. The objectives of military operations — seize the initiative, defeat the enemy and restore secured environment — place extraordinary demands on the reaction, synchronisation, and readiness of mobility forces and assets.

Irrational actors engaged in activities ranging from catastrophic terrorism to economic, religious, and civil wars are the most likely threat to Alliance security and interests. Conventional armies cannot prevent terrorists and insurgents without costly deployments. The most dangerous threats to the Alliance and partners are those for which we cannot prepare conventional responses.

The amorphous nature of the terrorist threat is forcing the Alliance to constantly challenge and reevaluate the basic assumptions upon which our security framework is based. The terrorists' campaign to target routes does not only affect military forces on operations but

... ROUTES ARE
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TERRORIST TARGET,
A REALITY THAT IS
UNLIKELY TO CHANGE
ANY TIME SOON ...

Freedom of movement - KFOR convoys.



also has a profound economic impact on the host nation by crippling the mobility of its workforce along with imposing dreadful conditions on the local population.

In recent operations, the Alliance's mobility has been one of the most preferred terrorist targets. This trend is highly concerning, particularly in light of the fact that attacks against routes or convoys have been extremely lethal when compared to other terrorist targets.

In short, routes are an attractive terrorist target, a reality that is unlikely to change any time soon. On the contrary, attacks against Alliance's freedom of movement become more and more prominent, especially with the declining capability of terrorist organisations to successfully launch attacks against static hard targets.



CONTEXT

Terrorist organisations generate numerous ideas and attack plans. Their ability to translate these plans into action is very much constrained by the operational capability of the given organisation; however, the magnitudes of these attacks and consequences can be mitigated by the Alliance's commitment to seize the initiative.

In basic terms, we have to consider some critical factors: the intent of a potential perpetrator to attack a route and his capability to carry out a successful attack, the commitment of our Alliance to alleviate the threat and the capabilities available to mitigate a potential attack.

To evaluate the intent we have to understand the leaders in the given groups' decision-making process, particularly when deploying forces to a new theatre of operations where little is known about the adversary.

In assessing the capability of a terrorist group to carry out an attack, we need to look at a combination of factors such as: What types of weapons and tactics have been used in the past? Are there any indicators of possible changes in the adversary's established TTPs? Are these TTPs usable in an attack on the route considered? How does the specified route relate to other routes in terms of difficulty and probability of success? All of these factors along with many others must be taken into consideration when investigating the possible threat.

The commitment of the Alliance and partners to deal with the threat is beyond question and from the conceptual framework to technical solutions, a variety of initiatives have been proposed and/or developed.

Understandably, capability development has shaped RC concepts based solely on recent experience in a C-IED

Route Clearance tasks on high terrain environment.

... RC IS NOT ABOUT
ELIMINATING THE
RISK BUT RATHER TO
UNDERSTAND THE
CONCEPT AND WHERE
APPROPRIATE TAKE ALL
NECESSARY ACTIONS
TO BRING THE RISK TO
AN ACCEPTABLE
LEVEL ...



Route clearance Detachment in Afghanistan.



U.S. Army Soldiers with Company A, 4th Brigade Special Troops Battalion, 4th Brigade Combat Team, 101st Airborne Division wait as a mine clearing line charge is prepared on Route Dodge in Paktika province, Afghanistan on February 10th, 2011.

context, limiting the technical response to RC packages or teams. Given the relevance of RC in an IED environment, multiple communities have been engaged in the development of RC concepts and technologies. These efforts were not always fully coordinated and this resulted in suboptimal solutions.

RC developments are conditioned by the availability of a common understanding of concepts and doctrine. In order to develop solid and consolidated conceptual frameworks nations' efforts should be coordinated and supported by Alliance's agencies and organisations.

RC Smart Defense initiatives are undertaken by nations and are driven by the Alliance and partners' aspiration

to project suitable forces to specific operations, but are also constrained by budget considerations and short-term commitments. These initiatives can be better developed by improved coordination and collaboration and by agencies and organisations sharing resources, knowledge and other related information to achieve the required collective end state.

RESOLUTIONS

Ensuring mobility and protecting friendly forces from explosive hazards have always been key MILENG responsibilities.

It is essential that the Alliance and partners have a clearly articulated concept and doctrine for the conduct of RC, in order to protect the force and maintain freedom of movement. RC is a continuum that should not be focused on one aspect of the threat or countermeasures, but should recognise that many force elements have a part to play.

The aim of future RC is ensure a route is available within reasonable protection boundaries, by detecting the presence of and removing/destroying threats; where necessary a RC capability will need to be capable of remediating the route to allow continued freedom of movement.

RC is not about eliminating the risk but rather to understand the concept and where appropriate take all necessary actions to bring the risk to an acceptable level. It is also not only about neutralising explosive hazards along pre-existing routes; it includes limited area clearance, integrated investigation support, movement control procedures and route repair and/or improvement.

INTENTION

RC Project is designed to provide collective understanding of NATO RC fundamentals and principles and set conditions for the comprehensive and enduring doctrinal development. The overall success of the project will be measured on how it can improve Alliance's RC capabilities. Undoubtedly, there will be major advantages when each key player has a clear vision of RC capability development goals and not just a specialised perspective.

A project developed involving a wide community of interest is the basis for understanding the critical factors influencing concepts and doctrine

KFOR Engineers and Freedom of Movement.



development. Involving all key players from the beginning and harmonising providers' perspectives with the users' requirements ensures success and moderates later alterations.

RC Project is supposed to challenge current processes and procedures in order to improve them, look for the common factors in different situations and use/modify previously successful approaches to meet the needs of a general situation, listen to new ideas and recognise their value in solving problems, integrate and apply different ideas and approaches to accomplish objectives.

PLAYERS

For the reasons given above, and to have the best possible chance of a successful outcome, the RC Project is a multinational, multiagency and multi-branches initiative. The MILENG COE is the lead agency and is sponsored by the Emerging Security Challenges Division (ESCD), which is the liaison between the International Staff and International Military Staff. NATO Communications and Information (NCI) Agency is supporting in building a robust framework for the project. ESCD, through the framework of the Defence against Terrorism Programme of Work (DAT PoW) offers opportunities for nations to undertake projects that help fill Alliance shortfalls, as specified in the Bi-SCs Defence against Terrorism Military Requirements and Priority Shortfall Areas of the NATO Defence Planning Process. By providing seed money to Allied Lead Nations and agencies, DAT PoW supports the delivery of short-term capability solutions, building on existing and near mature technologies and fostering interoperability and doctrine consolidation. The programme's capability-based approach to the support of expeditionary operations in a civil-military context is vital to addressing urgent operational requirements, such as gaps in RC capability.

The acceleration of science and technology developments continues to influence how we do business; access to technological advancements and developments is keenly sought by nations. The ability to acquire this knowledge is also improving with modern, highly motivational educational systems and adaptive learning models. However, history has taught us that each



MILENG COE Industry Day.

technology development can eventually be defeated. Therefore, while it remains important to continue to improve the technology we have, it is naïve to think the solution will be purely technological. That said, and in a comprehensive approach, the RC Project fully embraces industry, which is strongly encouraged to participate and contribute to the debate; this in order to ensure every effort is made to exchange information about technological developments and to assess them within a conceptual framework.

PILLARS

Consolidation

The Alliance and partners are well aware of the importance of freedom of movement and there appears to be a variety of initiatives, projects and concepts proposed or managed by different parts – engineers and all-arms, military and civilian – although these seem to be shaping RC as a concept based merely on current experience in a C-IED environment. Basically, RC is a MILENG mobility task in support of countering IED threat but not limited to the explosive devices presence; however, there are many important contributors such as force protection (FP), EOD, intelligence, forensics, logistics, and civilian agencies. It is essential to establish a robust community of interest and a framework of RC key players as well as consolidate all the various RC initiatives and projects currently under development.

... IT IS NAÏVE TO
THINK THE SOLUTION
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IN A COMPREHENSIVE
APPROACH, THE
RC PROJECT FULLY
EMBRACES INDUSTRY,
WHICH IS STRONGLY
ENCOURAGED TO
PARTICIPATE AND
CONTRIBUTE TO THE
DEBATE ...



NATO Route Clearance Project - Doctrine Writing Team.

Development

RC doctrine will be covered in land component tactical publications; however, its application will often reach the joint level; it is therefore important that higher level doctrine takes account of this requirement. MILENG capstone documents must be written/revised with the input of all key players, who must be identified in a consultation process organised by the Military Committee Land Standardization Board Military Engineering Working Group, with the support of ESCD. In order to develop concepts and doctrine, representatives from each key player group will be required to participate in writing teams and workshops. The aim is to review standard agreements, develop and integrate concepts and doctrine.

Validation

It is not easy to determine the appropriate methods for carrying out validation of concepts and principles. The task is complicated by the many specific factors that may require attention and the absence of any quantifiable results to be assessed. However, the intention is to validate the effectiveness, applicability and suitability of the developed RC doctrine by means of a computer assisted exercise. The exercise will be designed to demonstrate how commanders and staff can effectively coordinate and integrate route clearance into operations

to facilitate Mobility/FOM. The developed RC concepts procedures will be tested/validated within an appropriate scenario.

Exploitation

Exploitation and evaluation are key aspects in the framework of the RC Project. They aim to assess the functioning of the conceptual framework and seek to establish whether procedures put in place enable and support the achievement of the stated objectives, facilitating adjustment when necessary and therefore mitigating against possible failures. This process tolerates enhancement in the current processes at the operational level, as well as the reshaping of strategic aims. It allows for further development of RC concepts through lessons learned and supports the development of route clearance capabilities across the Alliance. Exploitation goes further than only giving information about the results of a project; it is also about making its influence extend as far as possible.

EXPECTATIONS

While we preserve the development of the technical solutions, the pace must also be kept on shifting intellectual process from a virtually doctrinaire perspective to a conceptual thinking. Exploring the ability to identify patterns or connections between situations that are not obviously related, and identification of key or underlying issues in complex situations is not only a multifaceted course but also a process that involves all key players. The conceptual framework is not to be developed by the specialists just because they know the job and principles but by the key players because they will all be using it.

The Alliance and partners' organisational mechanism from lesson identified to lesson applied and solution implementation is too time consuming to be effective. It is even more difficult to acclimatise current standard agreements, in a timely manner, to the operational reality. The conceptual outline has to provide just the framework and principles not only to better employ our capabilities but also for flexibility and rapid reaction on

adjusting tactics and procedures to the volatile contemporary environment. We need a collective knowledge system to track conceptual development, forecast consequences, and document a range of assessments so that decision makers can understand the potential costs of keeping the same pace when adversaries are permanently adapting.

The modern and, especially, the future operations environment is multi-disciplinary and joint by definition. We have to realise that to ensure the tactical level would consider the outputs valuable to them, the concepts need to be directly relevant and a sense of collective ownership need to be installed. RC Project is intended to collect experience, resources and knowledge in order to produce viable operational doctrine with strategic inputs applicable at the tactical level. ■

ABOUT THE AUTHOR



Lieutenant Colonel Florin Obreja joined the Romanian Army in 1984 at the age of fourteen and graduated from the Military Engineer School in 1991.

In 1997 he was deployed, as a Road Platoon Commander with the 96th ENGR Battalion in Bosnia where he came again in 2002 as an EOD team Leader. In 2003 he was deployed as an EOD and Demining staff officer with the Multinational Division Central South in Iraq.

He has been appointed, since 2011, to the Military Engineering Centre of Excellence in Ingolstadt, Germany.

His training and knowledge cover different areas of military engineering. Lieutenant Colonel Obreja has extensive national and NATO experience in EOD, C-IED and training of military engineers, his background relying from individual and collective training to concepts, doctrine and lessons learned.

As a Project Manager for RC Project he's leading Route Clearance concept development and synchronisation with Military Search progress (he is also SME for Military Search and coordinator for related standards).

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4 Day Agenda Snapshot

Day 1 Demonstration and icebreaker reception, 29th October
Thai Capability Demonstration followed by the icebreaker reception at the St. Regis Hotel.

Day 2 Conference, exhibition and reception, 30th October
Conference topics will include Asia-Pacific Update, Landmine Detection in the Region, Roadside and Vehicle Borne Explosives. The conference is followed by a networking reception in the exhibition area.

Day 3 Conference and exhibition, 31st October
Conference topics will include Winding- Down in Afghanistan, International Perspective on C-IED, IED Exploitation, Forensics, Intelligence and Robotic Vehicle Initiatives and Technologies.

Day 4 Training sessions, 1st November
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RF JAMMERS: ADVANCED MILITARY TECHNOLOGIES IN HOMELAND SECURITY

By Eduardo Serantes,
Director of Electronic Warfare,
TECNOBIT

INTRODUCTION

Current jammers must progress to become capable of neutralising any IED activated by a RF transmitter in any situation. Nowadays, the high number of different bands where the IED transmitters can work and the new frequencies allocation for cell phones make this target more and more difficult as time goes by.

Threats are evolving and growing rapidly with new technologies and frequency bands for remote activation of IEDs constantly appearing. This fast evolution makes the classical frequency jammers working with fixed programmed jamming sequences and in many cases, with no possibility of changing the frequency bands covered without adding new modules or changing the electronic circuits totally unfeasible. Modern jammers must be powerful and flexible, so that they can easily be reprogrammed in area of operations without any added electronics.

Moreover, the current economic situation has caused a drastic cut in defence budgets that requires it to be even more efficient in the rationalisation of investments made in security. It is highly expensive to fit out vehicles with jammers in the area of operations and likewise with soldiers carrying man-pack jammers. This scenario requires the use of versatile jammers capable of working as vehicular extractable inhibitors capable of employment as portable jammers (man-packs).

This paper explores the main technologies and techniques used in RF jamming, and makes some proposals for future developments. Currently existing jamming strategies are not suitable to work in the high numbers of bands where IED activators could work nowadays. Moreover, frequencies re-allocation for cellular phones in an urban scenario makes that task more difficult. Advanced military technologies like Active/Reactive Sequence Generation and Smart Jamming are proposed as the future of RF jammers.

JAMMING TECHNIQUES AND TECHNOLOGIES

The aim of this section is to collect some concepts and techniques used in jamming that will serve as a reference in the following sections. Although there are many ways of classifying, we use two of them not mutually exclusive: according to the “intelligence” of jamming and according to the form of generating the countermeasures for inhibition.

• Classification attending to the “intelligence” of jamming signals:

- **Brute-force:** This type of jamming is based on generating noise (FM sweep, pseudorandom noise) in the frequency band in which the receiver attached to the IED works, so the signal to noise ratio (SNR) is decreased. IED inhibition occurs when the SNR is worse than the minimum required by the receiver

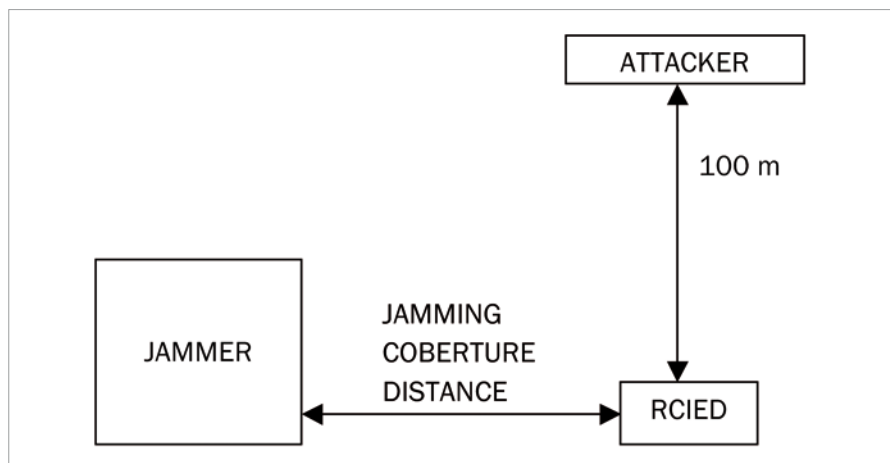


Figure 1: Diagram for jamming distance calculation.

... GLOBALISATION AND THE INCREASING EASE OF PURCHASING ELECTRONIC EQUIPMENT AND COMPONENTS ARE LEADING TO RF FREQUENCY BANDS COVERED BY JAMMERS BECOMING MORE AND MORE COMPLEX ...

to decode the signal transmitted by the attacker.

- **“Smart” jamming:** Sequences used for jamming are not only based in noise generation. There are some technologies that are highly immune to noise (UMTS for example), and “smart” signals must be used to perform an effective receiver block. In the UMTS case, jamming based on some specific channels generation is much more effective than a pure noise jamming sequence transmission. For other technologies, the objective is to improve the efficiency of power transmitted vs. bandwidth covered for inhibition. In other words, a wider bandwidth can be covered using the same radiated power.
- **“Spoofing”:** Primarily used for jamming IEDs activated by technologies that need additional network elements: GSM telephony. In this case, a false BTS is used transmitting with more power than the real BTS of the area, so the cellular terminals try to connect to it and communications are handled completely.

• **Classification attending to the way of generating jamming sequences:**

- **Active:** Inhibition sequences are fixed, including the covered frequency bands and the power emitted in each of them. Jammer is continuously transmitting these repetitive sequences.
- **Reactive:** Jammer radiates noise only if a threatening frequency is detected. Jammers scan the spectrum, analysing and detecting

the threats and generating the countermeasures needed to block them.

- **Mixed Active/Reactive:** Jammer radiates low power active fixed sequences of inhibition to create a minimum security bubble, and analyses the spectrum looking for potential threats. If a threat is detected, it generates and radiates reactive countermeasures against it.

JAMMING IEDs ACTIVATED USING REMOTE CONTROL DEVICES

Typical frequencies used to activate an IED with a remote control system (point-2-point) are in the range of 20 MHz to 870 MHz. There are more technologies that could be included in this section (Wi-Fi for example), but the ease of jamming them and the similarities in operation ensure that the points discussed in this section can be extrapolated to them.

Traditionally, the frequency bands susceptible of being jammed were clearly defined and the occurrence of new threats was slow and controllable. Globalisation and the increasing ease of purchasing electronic equipment and components are leading to RF frequency bands covered by jammers becoming more and more complex.

In the past, jammers generated active sequences to cover these threats, but the growth of bandwidth to cover is being so high that, as the output power is finite, the Noise Spectral Density (dBm/Hz) becomes low which means a reduction in the effective protection distance. Let us analyse the problem with an easy example:

Let's suppose an IED activated [LJ1] by DTMF using as receiver a walkie-talkie tuned to a single channel of 15 kHz in a typical low frequency band (See Figure 1).

To simplify the example, we assume that we use a brute force technique for jamming. In this type of inhibition we can estimate the distance of effective coverage of jamming knowing the SNR needed by the receiver to decode correctly the DTMF sent by the attacker to activate the IED.

For this example we'll perform calculations using Friis's equations for propagation in free space. The

approximation can be used because the attacker and the jammer have approximately the same propagation conditions and the measures are relative. The propagation equation is

$$Pr = Pt + Gt + Gr + 20 \log \left(\frac{\lambda}{4\pi R} \right)$$

Where

Pr = Received power (dBm)

Pt = Transmitted power (dBm)

Gt = Gain of transmitter antenna

Gr = Gain of receiver antenna

λ = Wavelength of used frequency (m)

R = Distance from transmitter to receiver (m)

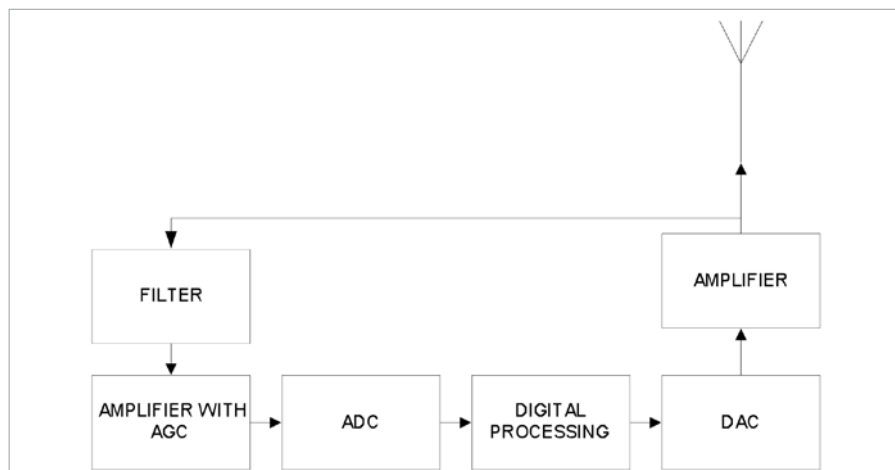
Let's suppose that the receiver of the IED requires an SNR > 6dB to decode the DTMF sent by the attacker. To simplify the calculations we can assume that the received power from the attacker is the useful signal, and the received signal from the jammer is the only noise of the chain. That is, we directly calculate the SNR as the power received from the attacker less the power received by the jammer (in logarithmic units). For this example we'll use the following data:

- Attacker Transmitting Power = 5W
- Jammer Transmitting Power = 100W
- Jammer Covered Bandwidth = 10MHz
- Antennas gain = 0dBi

Applying the equation of propagation, and subtracting the required SNR to the needed jamming power at the IED, we find that the jammer will have an effective jamming coverage distance of 35 meters for all the frequencies within the 10 MHz covered bandwidth.

In a practical application, it's considered that the minimum distance of jamming coverage must be at least 30 meters, so in case of an explosion on an armoured vehicle the personal damage can be minimised. We can estimate the power that the jammer should transmit to fully cover a 500 MHz bandwidth at a distance of 30 meters (using the same data of the example above): MORE THAN 3.5 KW! It isn't useful (and it's expensive) to install jammers with this power in vehicles, so it becomes necessary to explore other techniques more effective for jamming.

Reactive jammers are a pseudo-solution to active jammers limitations,



as they concentrate all the output power only in the active frequency channels detected previously as a threat, so the distance that they can cover in relation to active jammers is much greater. But this technology has other inherent problems:

• **Decoys (Fake Frequencies):**

Terrorists can use one or more high power fake frequencies as decoys to over saturate jammers and therefore reduce their sensitivity. At the same time, the attacker will use the real frequency to activate the IED: a low power frequency channel that the jammer will not detect as its dynamic range is reduced, and receiver sensitivity of the signal analyser is greater than the power of this threat.

• **Bandwidth:** Most reactive jammers work in a narrow band, so it is necessary for a great number of them to cover all the desired bandwidth. This is a blocking barrier to install a set of jammers in a vehicle or man-pack configuration where the space and weight are limited. Multiplexing techniques have been developed to increase the covered bandwidth, but this solution generates some additional problems like processing speed.

• **Speed:** Signal analysers should be fast enough to detect a threatening frequency, analyse it and react producing an adequate noise sequence to block the original one at the IED receiver.

Let us concentrate on the problem of "decoys" described above. The figure below shows a highly simplified block diagram of a reactive jammer that we will use as reference for the analysis.

Figure 2: Simplified block diagram of a reactive jammer.

... REACTIVE JAMMERS ARE A PSEUDO-SOLUTION TO ACTIVE JAMMERS LIMITATIONS, BUT THIS TECHNOLOGY HAS OTHER INHERENT PROBLEMS...

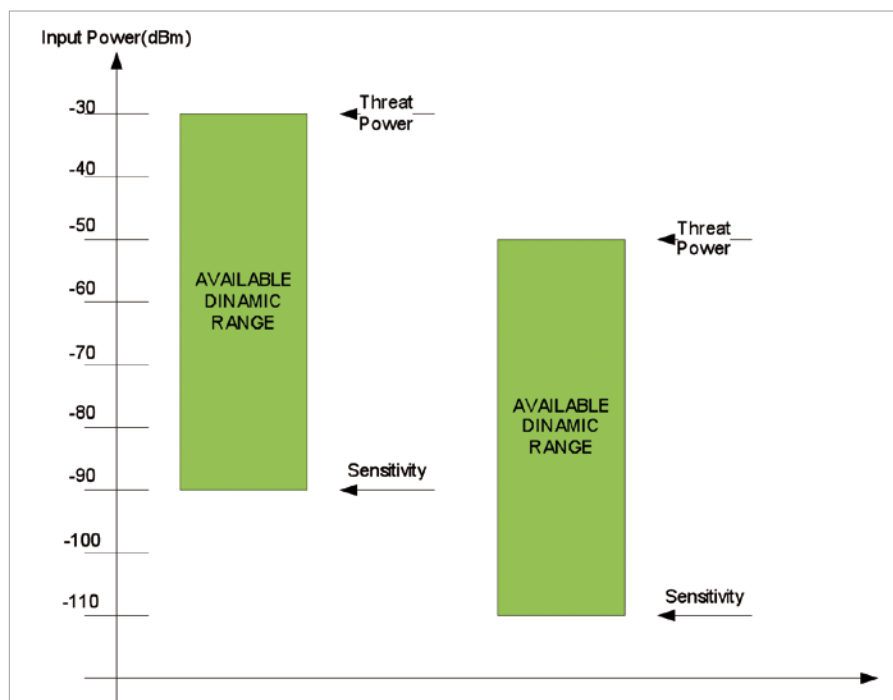


Figure 3: Reactive jammer sensitivity vs. Threat power.

To clean the diagram, the part used for multiplexing the input frequency bands has been removed (See Figure 2).

The basic theory of operation is simple: the antenna captures the existing spectrum signal in the air and it is filtered to delimit the signal analysis band. A signal is passed through an amplifier with AGC incorporated (automatic gain control) and the signal is sampled for the subsequent digital analysis. The digital processor generates the necessary countermeasures, and

they are converted again to analog and finally they are transmitted to the antenna.

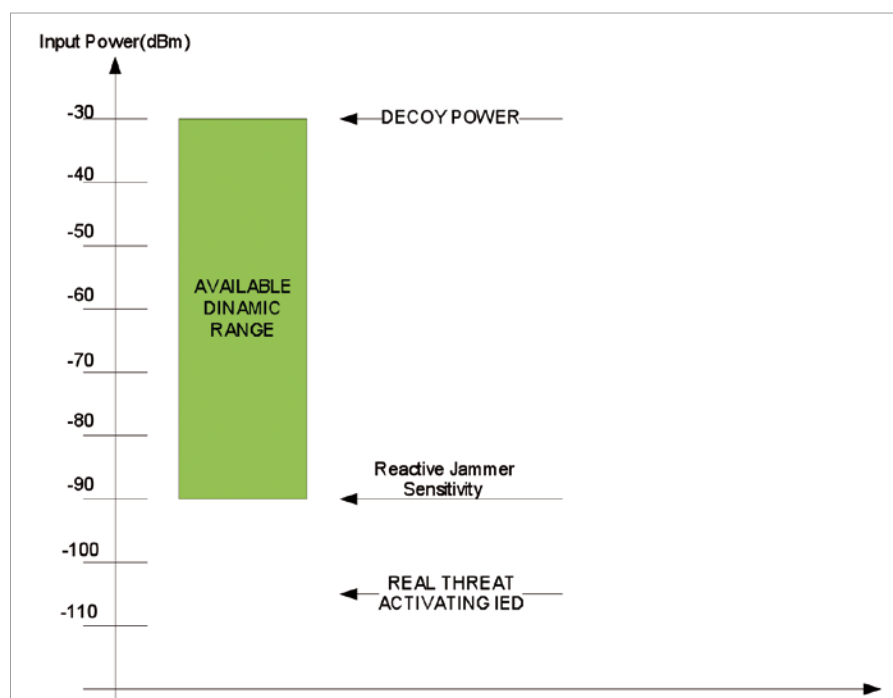
The process of digitising the signal and the subsequent analysis limits the dynamic range available for the input signal. In this example the AGC is responsible for measuring the power of the captured signals and it varies the amplification gain of the input. If we consider, for example, that our input dynamic range is 60dB, the higher the automatic gain of the amplifier, the lower the receiver sensitivity. We can see an example graphically (See Figure 3).

The use of decoys exploits this vulnerability of the system: the attacker uses a high power signal to decrease the receiver sensitivity of the reactive system (it increases the minimum detectable power) and at the same time the attacker transmits a low power signal (below the threshold of sensitivity). This low power signal activates the IED. Graphically (See Figure 4).

A solution to this problem is to develop a mixed jammer ACTIVE + REACTIVE working together (See Figure 5):

- **ACTIVE MODULE:** Working in full band configuration, to block the low power frequencies
- **REACTIVE MODULE:** Working in full band configuration, to block the high power frequencies (dangerous and decoys).

Figure 4: Decoy vulnerability in a reactive jammer.



The active part of the jammer generates the power required to inhibit the threats working below the receiver power sensitivity of the reactive part. This active part will eliminate the problem of decoys, while the reactive part works to jam the higher power threats. The aim is to create a minimum safety bubble around the vehicle using the active technology, and extend this bubble with the efficient use of the available power that performs the reactive part of the system. The final result is a greater jamming distance than a pure active jammer. (See Figure 6).

To avoid the active module saturating the reactive one, it is necessary to use a switching technology to turn off the active module while the reactive one is working and vice versa. Other solutions such as adaptive filtering for echo cancelling are also under study, so all the available power can be continuously radiated.

JAMMING IEDS ACTIVATED WITH CELL PHONES

In most parts of the world, cell phones work in specific frequencies: 800-900-1800-1900-2100 MHz, and within these different frequencies; there are also different communications technologies: GSM, UMTS, etc.

The same noise sequence used to block remote control devices can also be used to block GSM cell phones (frequency sweep plus different types of modulation for example), but this is highly ineffective to jam UMTS devices. "Smart" sequences are required for an efficient UMTS jamming, for example to trick the cell phone simulating some specific channels

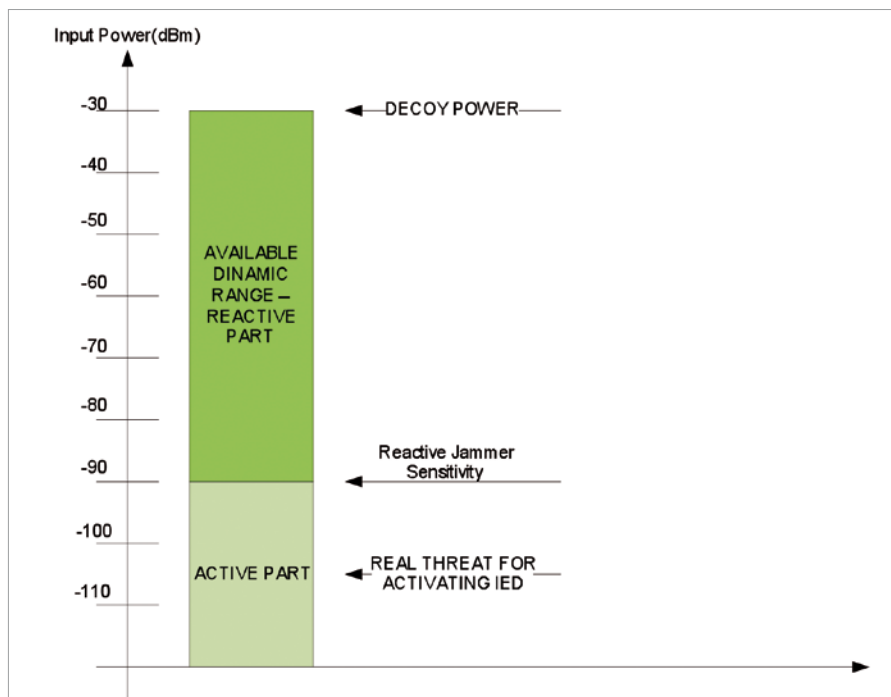
Reactive jammers for GSM phones have been operating for many years and its efficiency has been highly tested, but radio electric spectrum in some countries has been divided and changed so different technologies can coexist in the same frequency bands. For example, in 900MHz, GSM and UMTS can operate together. With the imminent establishment of the LTE technology in 700 MHz and 2600 MHz, the problem will be even more complex. To date, the development of reactive jammers for UMTS technology is not ready to be used, so active techniques combined with "smart" sequences generation is the best solution we can select (today) for jamming 3G and 4G technologies.

It is necessary for a jammer with a very agile noise signal generator defined by software that allows the synthesis of specific noise sequences to block together every current and future technology.

FUTURE OF JAMMERS (VERSATILE JAMMERS)

We have detailed some jamming technologies, active and reactive techniques, and although some of the most requested features and specifications demanded for new generation jammers have been commented upon, there are some of the main requirements that have not been addressed. Let's try to list these requirements orderly:

- Wide bandwidth of jamming generation
- High distance of jamming coverage: combined use of mixed active/



reactive jammer plus "smart" sequences

- Flexibility for generating jamming sequences at Operations Theatre. Modern jammers must be powerful and flexible so that they can easily be reprogrammed in the operating area without added electronic
- Events Recording. Attempts to attack must be detected and recorded so Intelligence Departments can use this information. The use of jammers with reactive part makes possible this functionality.

Figure 5: Threats Management in an Active+Reactive Jammer.

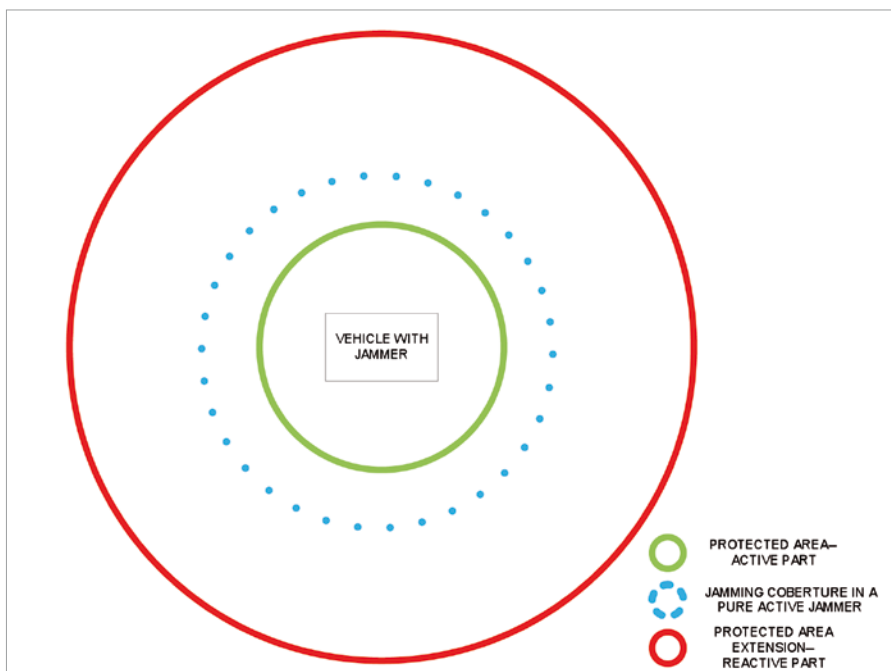


Figure 6: Protected area using an active + reactive jammer.

... WE FACE A MAJOR CHALLENGE, WHICH SHOULD PERFORM NOT ONLY A BIG TECHNOLOGICAL LEAP IN THE PRODUCTS, BUT ALSO A REDUCTION IN COSTS ...

- Electromagnetic compatibility with on-board instruments and tactical communications. Use of reactive systems makes it possible to clean the emitted RF spectrum and reduce the distortion generated on tactical radios
- RF Specific Absorption Rate (SAR). The power emitted by jammers should be limited to avoid the effects of radiation on the vehicle crew. Reactive systems reduce the radiation because they are only emitting power to the air when a threat is detected
- Low Cost and Versatility. It is highly expensive to fit out vehicles with jammers in operating areas and to do the same with soldiers carrying man-pack jammers. Versatile jammers are requested, capable to work as vehicular inhibitors and that can be extracted for use as portable jammers (man-pack).

These features lead to the development of a versatile system (one system: vehicular jammer easily convertible to a man-pack jammer) so the whole investment in jammers should be lower. Jamming capabilities should be based on mixed active plus reactive techniques, and the design of new jamming sequences and their inclusion in jammers should be as simple, flexible and powerful that it can be done in operations area.

CONCLUSION

To solve all the detailed current problems related to jammers and jamming, it's necessary to produce Active+Reactive jammers, with a powerful software and hardware core capable of synthesising specific noise sequences to block every communication system and sufficiently versatile to convert a vehicle jammer in a man-pack one.

We face a major challenge, which should perform not only a big technological leap in the products, but also a reduction in costs. This challenge invites more and more to the collaboration between companies and the sharing of experience and knowledge, so development time can be reduced and companies can become more competitive. ■

ABOUT THE AUTHOR



Eduardo Serantes

A telecommunication engineer at the Polytechnic University of Madrid, specialising Digital Communications and Robotics, Eduardo Serantes started his professional career in Hewlett-Packard and Agilent Technologies as Application Engineer for RF & Microwaves. He has been entrepreneur, Hardware Manager in a company oriented to gases detection and industrial control, Hardware Manager developing GPS devices and, for the last few years, he has been working in the jamming sector, first in Retemsa as CTO, and from November 2012, as Director of the new Electronic Warfare Department created in TecnoBit.



EMERGENCY LIGHTING HELPS MARINES EGRESS TO SAFETY

By Matt Nienow, Booz Allen Hamilton
Engineering Services

Photo above:
Mine-protected, ambush-protected
vehicles sit on Forward Operating Base
Tagab, Kapisa province, Afghanistan,
March 18, 2013.

(U.S. Army photo by Spc. Andrew Claire Baker/
Released).

The acquisition timelines of traditional, major technology development programs are failing to match the accelerated pace of evolving needs. To quickly respond to the most urgent of threats, engineers have turned to rapid development processes; these include rapid prototyping, concurrent engineering, or integrating tasks to reduce total time and collocated fabrication, allowing engineers to quickly respond to issues during the development phase.

Rapid prototyping, a process that allows government and operators to quickly and cost-effectively obtain vital warfighter tools, is countering threats such as those resulting from improvised explosive devices (IEDs). An example of the power of rapid prototyping is the Emergency Egress Lighting (EEL) System developed for the United States

Marine Corps Buffalo Mine-Resistant Ambush Protected (MRAP) vehicle.

The 78,000 pound MRAP vehicle has proved invaluable in route clearance and explosive ordnance disposal operations, but the massive vehicle is an iconic target for enemy forces and can be difficult to maneuver on smaller or poorly maintained rural roads. Significantly, even though its armored hull effectively protects Marines inside the vehicle, the MRAP can experience dangerous roll-over events following IED blasts. The growing concerns of military leaders about Marines' post-blast safety sparked interest in the development of a dedicated lighting system to assist with orientation and exit after a roll-over event.

To solve this, engineers looked to rapid prototyping, creating an Emergency



The EEL System went from concept to production in 12 months. The standalone kit, which has been installed in the USMC Buffalo MRAP, illuminates following a roll-over or water immersion event, providing warfighters with a guided path to safety.

Egress Lighting (EEL) System. The system, a dedicated and illuminated path for escape in the event of an IED blast or roll-over event, is a standalone kit consisting of a system controller, sensors, egress lights and an alarm. Instead of taking the standard approach – concept, model, evaluate and deploy – developers prototyped and delivered this life-saving innovation to the U.S. Marine Corps in less than 12 months.

BUILDING A RAPID PROTOTYPE

Engineers from the Naval Surface Warfare Center Panama City Division (NSWC PCD) teamed up with Booz Allen Hamilton Engineering Services to rapidly develop a prototype emergency lighting and warning system, integrated it into the vehicle, and made installation kits for the USMC Buffalo fleet. Rapid prototyping capabilities at Booz Allen Hamilton and test facilities at NSWC PCD allowed parallel testing efforts for different system components to occur. This was essential to maintain the project's timeline and budget.

This collaborative industry and government effort culminated in the design and fielding of the Buffalo MRAP EEL System. A battery-operated micro-power system controller acts as the 'brains' of the system – constantly monitoring vehicle orientation, processing sensor inputs and providing 'always on' power outputs to egress lighting and its alarm in case of an emergency. If the vehicle rolls over, the system will illuminate vehicle doors and hatches with color-coded lights to help Marines orient themselves and find their way out. If the vehicle is approaching unsafe road conditions or detects an IED in its path, the EEL System will alert the crew with an audible early warning signal.

NSWC PCD Buffalo MRAP Capability Insertion Project Manager Robert Moore echoed the need for the rapid delivery of

warfighter tools: "the close collaboration and communication within the team and vendors allowed the EEL System to be developed from initial requirements and preliminary concept into a final fielded kit in under 12 months."

NAVIGATING TO PROJECT SUCCESS

The Buffalo MRAP was designed and armed with tools to protect its occupants from threats like IEDs, but blast events remain a constant threat. At the time the need was identified, existing industry solutions were available, but no single system met the specific design requirements based on the unique operating environment of the Buffalo MRAP.

The team applied a vendor-agnostic approach using a mixture of commercial-off-the-shelf (COTS) and custom-designed components. This approach ensured the greatest flexibility during the EEL System development process and maintained the aggressive development schedule while addressing budget constraints. The standalone aspect of the design also allowed engineers to focus primarily on the development of the EEL System, without concern for triggering more comprehensive vehicle-system integration and installation issues that could arise.

The team's approach to the design of the system controller during development addressed some of the traditional technical hurdles. The system controller was designed with the ability to adjust variables built into the programming to allow for changes in system features or sensitivity. This allowed the system to change functionality quickly during testing and to be adapted for use on other platforms with minimal configuration changes. The use of battery power was important to isolate the system from the vehicle power source which could be unavailable during a rollover or blast event.

A micro-power approach to 'sip' battery power was employed in the system controller to maintain enduring system operation and ensure the longest battery life possible. Processing the information from the system controller was also a challenge due to the sensitivity of the sensors employed and the rough terrain of the Buffalo MRAP's typical operating

environment. Sensor input from the vehicle was filtered and refined through the system controller and was successful in maintaining system sensitivity while greatly reducing 'nuisance' alarms.

Communication was essential to project success. A highly integrated government-industry team was in constant contact to initiate new design elements to ensure successful completion of extensive environmental, electromagnetic interference, and vibration testing. Co-location of engineers, designers, project management, and test and fabrication personnel was important to quickly identify potential problems. Early interaction between the team and industry partners dealing in battery power and sensor design allowed seamless integration of long-lead or specialised hardware into the system.

Custom components were designed using 3D modeling and simulation software to reduce the need for multiple prototype iterations and to reduce test burdens. This early development effort allowed the team to identify potential problems early on instead of out in the test field.

MOVING FORWARD

The Buffalo MRAP EEL System has been successfully fabricated and installed in the USMC Buffalo MRAPs. The hybrid approach to integrating custom components with COTS hardware, and the parallel development of several subsystem components was the key to the successful development of the system. This approach minimized concept-to-delivery times while ensuring the delivery of a robust safety system for US Marines. This design and implementation approach has led to similarly successful follow-on efforts for the NSWC PCD-Booz Allen Hamilton Engineering team, such as additional capability insertion kits for the Marine Corps Buffalo MRAPs like the Rear Door Assist System and the Rifle Rack Replacement kit.

Rapid prototyping is speeding up the delivery of mission-critical tools – like the EEL System – to U.S. warfighters. From providing convoys in warzones with the ability to detect IEDs during vehicle transit with small, unmanned aircraft to man-portable electronic gear used to



locate enemy electronic emitters; such examples of rapid prototyping at work continue to emerge.

In the face of a challenging budget environment and an outmoded acquisition system, rapid prototyping and the tools that come with it make for accelerated innovation to keep pace with continually emerging threats. ■

The micro-power design of the system controller (shown above) allows for continuous operation. It uses internal battery power to run for more than one year and still has sufficient energy to illuminate all egress lighting for 45 minutes.

ABOUT THE AUTHOR



Matt Nienow is an Engineering Manager at Booz Allen Hamilton Engineering Services and Contractor Task Lead on the project responsible for the Buffalo MRAP Emergency Egress Lighting System.

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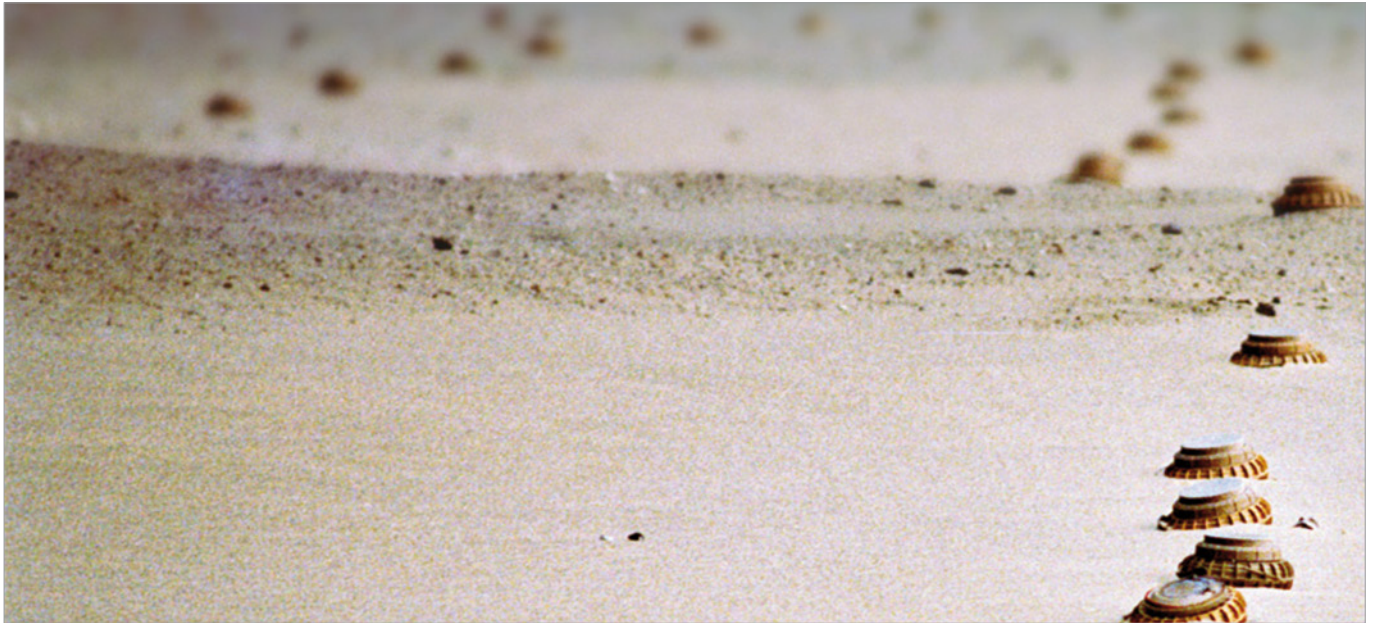
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CHALLENGES OF MINE CLEARANCE AT THE NORTH WEST COAST OF EGYPT

By Ambassador Fathy El Shazly,
Director of the Executive Secretariat for
Demining and the Development
of the North West Egypt,
Ministry of International Cooperation

INTRODUCTION

On June 25th 1942, General Sir Claude Auchinleck, Commander of the British Forces in the Middle East, decided that the withdrawal of the Eighth Army, the British main force in Egypt and North Africa, after its defeat at the hands of the Germans at Tobruq, Libya, would run all the way eastward to El Alamein and not only to Marsa Matrouh, as had previously been planned by Major-General Neil Ritchie, Commander of the Eighth Army. Auchinleck's decision saved the Eighth Army and probably foiled the Axis' planned seizure of Egypt and the whole Middle East including its rich oil fields.

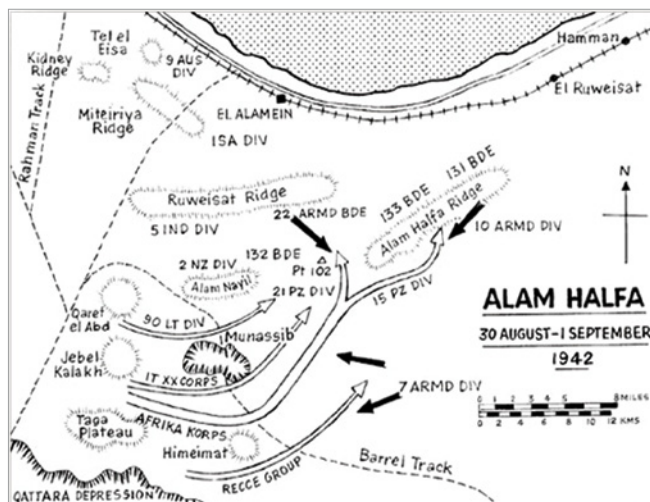
The German Afrika Korps Commander, Field Marshal Erwin Rommel, nicknamed "The Desert Fox" was able to read Ritchie's mind. So, the following day, he succeeded in occupying Marsa Matrouh by launching a blitz attack in which he encircled and seized it. This could have been enough to wipe out the Eighth Army or force it to surrender had it followed the course originally set up by General Ritchie.

The intolerable fatigue suffered by both sides forced them to stop at the lines they had reached by the end of

June. The fighting between them turned into a kind of mutual war of attrition: skirmishes, ambushes, and firing with all sort of weapons including artillery and air-dropped bombs. During this "relative" truce, both armies focused on fortifying their positions using intensive minefields, reinforcing their forces and making up for their loss of equipment. This period of the North Africa war in July 1942 was called the "First El Alamein Battle".

Due to Auchinleck's insistence on postponing his major counterattack to September 1942, he was relieved from his duties by Prime Minister Churchill and replaced by General Sir Harold Alexander, while the command of the Eighth Army was entrusted to Lieutenant General Sir Bernard Montgomery who, upon taking up his post, realised that he was unable to launch his counterattack before September!

During August, both sides received reinforcements which enabled the British to increase the number of their tanks to around 700, 160 of which were American manufactured "Grant" tanks armed with 77mm guns, which were the best tanks of the Allied Forces at that time. On the other hand, Rommel was unable to obtain the



reinforcements he had requested except for a limited number of infantry forces. When he decided to resume his attacks against the British forces, he did not have in the first line of readiness more than 200 main battle tanks, including 74 Panzer III tanks and 26 Panzer-IV tanks, as well as 240 Italian outdated tanks.

CHALLENGES FACING MINE CLEARANCE IN THE NWC REGION OF EGYPT

Political and administrative

After the end of WWII, huge amounts of used military equipment and Explosive Remnants of War (ERW) were visible everywhere on the North West Coast. The region soon became the preferred destination of used arms and scrap metal traders. According to American and Egyptian sources, mines and other explosive remnants of WWII were estimated in the 90s as having been around 19.7 million pieces ranging from air-dropped 2000 pound bombs to rounds of machine guns and small weapons. However, official efforts to address this diabolical threat that immediately started take a heavy toll of the local population, didn't start until much later. To understand the late response of the Egyptian government we have to take into consideration that it was widely believed that the explosive remnants were spread along areas scarcely populated with very limited impact. Sixty five years after El Alamein, in 2007, the total population of the Matrouh governorate, which represented about 16.6% of the national territory, was less than 0.4% of Egypt's population. Under those conditions, competing for the attention of the national authorities at the capital was extremely difficult; especially in the hyper-centralised polity which has always been Egypt with a national agenda charged with internal and external very demanding challenges, and with politicians claiming that the responsibility of clearing the mess created by WWII combatants in the NWC should be cleaned by those who caused it to exist in the first place.

Only a few years after the end of WWII Egypt found itself in 1948/1949 party to the first War of Palestine. This war started a series of military confrontations with Israel that monopolised national attention and efforts.

On 23 July 1952, the Army, mostly moved by the humiliating outcome of the "Palestine War" that revealed the corruption of the regime, intervened in national politics spearheading the July revolution which introduced sweeping changes in the political orientation of the country and its scale of priorities. After

"ALAM HALFA" BATTLE

Rommel decided to try his famous Blitzkrieg on the allied forces on the night of August 30, 1942. His aim was to transcend the minefields in the southern section of the allied front lines, then to push eastwards with his armoured forces for 30 kilometres, which would have enabled him to place his forces behind the Allies' defensive lines, then move northwards, confronted with hardly any resistance to seize the supply depots of the Eighth Army at the coast, encircle that army and put it at his own mercy.

However, the German forces were shocked by the extent of the depth and intensity of the British minefields. Consequently, at dawn, the German spearhead was only 8 kilometres behind the minefields, which forced Rommel to cut short the penetration distance eastwards and to instruct his Panzer divisions to change direction and push north at a point much closer than originally planned. This led to the collision of these units with the British "22 Armoured Brigade", thus causing the gates of hell to open on them from both land and air (the number of British aircraft at that front was estimated to be 1000). This brought Rommel, whose forces were suffering an acute shortage in fuel and ammunition, to take the decision on September 2nd, 1942 to withdraw. Rommel's decision which put an end to what was later known as the Alam Halfa Battle marked the beginning of the recession of the tidal wave of the Axis advance in North Africa.

Alam Halfa was instructive about the role minefields could play in passive defence; and illustrative of the intensity and depth of the minefields laid by the allies.

... ALAM HALFA WAS INSTRUCTIVE ABOUT THE ROLE MINEFIELDS COULD PLAY IN PASSIVE DEFENCE; AND ILLUSTRATIVE OF THE INTENSITY AND DEPTH OF THE MINEFIELDS LAID BY THE ALLIES ...

several rounds of wars, Egypt and Israel signed a peace treaty on 26 March 1979 ending the state of hostility between the two countries. Only afterwards, systematic national efforts to address the issue of the existence in the NWC of ERW of WW-II were embarked upon.

In 1981 the decision was taken to form a field command for the Corps of Military Engineers in El Alamein to actively start the clearance exercise. Between 1983 and 1999 around 3 million pieces of ERW of WWII were cleared with the Armed Forces funding this exercise from its own budget. It was then established that 75% of the contamination were UXOs, 22.5% were anti-tank mines and 2.5% were anti personnel mines.



Mine Clearance activities in Egypt.

Information

To start its clearance efforts, the Armed Forces formed groups of researchers that studied the course of military events during the North African campaign, conducted extensive general surveys and established an approximate sketch of locations and extent of contamination.

The North West Coast region was among the first areas identified as promising for the prospecting of oil and gas. Companies active in this field conducted mine clearance operations by themselves without bothering to share the relating information with authorities. This same behaviour was repeated at the beginning of the eighties by construction companies when building seaside resorts became fashionable. Both oil and gas companies as well as construction companies collected huge quantities of ERW in collection sites, which in many cases they didn't disclose.

After the launching in 2007 of Egypt's Mine Action Project, by virtue of an agreement signed on November 9th, 2006 between the Egyptian Government and UNDP, the Executive Secretariat for Mine Clearance and the Development of the North West Coast, Exec Sec, was created. The same lack of information faced Exec Sec. However, soon after its establishment, Exec Sec was able to get maps of areas suspected from a variety of sources, national and international. Records of minefields were never found. Information obtained was digitalised and an approximate data base on contamination was created.

Natural

Compiling detailed information about the NWC was among the first activities of Exec Sec. Some institutions were approached and valuable information compiled. The Desert Research Centre and the Remote Sensing Authority were among the most important early partners. It was consequently established that most of the Western Desert was rocky land covered by a very soft sandy layer of 50 centimetres on average. We also found early in the life cycle of the project, that even if we had the most detailed maps and minefield records, the value of the information would have been only indicative. Recurrent floods caused by the rain waters when disgorged from valleys' mouths towards the sea are usually strong enough to dislocate ERW. Especially to the South of the international coastal highway, the movement of sand dunes, is another natural factor that could easily render any records or detailed information valueless.

One of the first activities of Exec Sec was to conduct a mine detection test trial. On that occasion, we found out that the softness of the sand was another impediment that required extra efforts on behalf of the de-miners.

Contrary to the findings of the study commissioned by the USA State Department in 2011 that discovered the life cycle of most mines and other explosive remnants was some 30 years after which they become harmless, we found out that the dryness of the milieu in which ERW of WWII along the NWC would keep them intact, a kind

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of mummification, and still capable of inflicting the damage they were designed to cause. In certain areas, i.e. el Salloum, the exposure of anti-tank mines was found to increase their sensitivity making them liable to explode when stepped on by a much lighter human being or animal.

Adverse weather conditions: very cold in winter and extremely sunny and hot in summer, negatively impacted the demining operations, limiting the working hours of de-miners.

Economic

The existence of ERW in the NWC, resulted in driving away investors from developing the immense resources known to exist in the desert hinterland of the coast. Scarcity of labour opportunities resulted in the local population turning to the explosive remnants themselves as a potential source of income through attempting to dismantle them to extract explosives for the use of the important mining industry and to sell the metal to scrap traders. This behaviour resulted in increasing the number of mine victims.

After the expansion of seaside tourism in the NWC to the extent of becoming the most important source of labour especially during the summer season, conducting Mine Risk Education activities has to be handled with extreme care in order not to scare the visitors away.

Consequences of the local context

The population of Matrouh Governorate is made of tribes that sometimes have rivalries. This state of affairs would extremely complicate the demining efforts and the subsequent development plans. In a recent relevant incident, a plot cleared by Exec Sec was (illegally)

taken by a certain local Bedouin family. A few weeks later, another branch of the same tribe attacked those and casualties were reported in the ensuing quarrel.

In the first conference I had with tribal leaders in 2007, I was shocked by a statement made by an elderly chief who confessed that the mines were actually guarding their property rights against the infringement of the authorities (who refuse to admit the conventional property rights of locals) and against the “alien” investors and real estate developers who would come to the area in order to build summer resorts. A great deal of lobbying and persuasion had to be made in order to create a collaborative atmosphere between Exec Sec and the local population.

The exchange of mistrust between locals and central authorities built along centuries of alienation and marginalisation had also to be addressed by us, especially when dealing with survivors of mine incidents.

Lack of adequate infrastructure, and extremely bad quality official information and records, compelled Exec Sec to conduct a very demanding survey to build a reliable, comprehensive and actually inclusive data base of survivors. Conducting that survey had to be done very cautiously in order not to create expectations with the victim population that couldn't be properly met. Trying to extract benefits for mine victims from local and central authorities was another exercise that had to be done within our victim assistance efforts and also helped us acquire the very important trust of the local population. ■

ABOUT THE AUTHOR



Ambassador Fathy El Shazly

A veteran diplomat (1965 - 1999) with postings at Bamako, Caracas, Stockholm, Addis Ababa. Ambassador of Egypt to the Kingdom of Saudi Arabia and Turkey. Assistant Foreign Minister 1995-1999. With more than 65 published works in African, Arab, European Affairs & Strategic Affairs. Director of Egyptian Mine Action Project since its inception Jan 2007.



ACCOMPLISHMENTS IN THE ELIMINATION OF CHEMICAL WEAPONS A FACT SHEET

Colonel (Retd.) H R Naidu Gade –
Chief Consultant, CBRNe Secure India
(Former Member International Civil
Service & Chief CW Inspector, OPCW)

INTRODUCTION

The Chemical Weapons Convention (CWC) on 'the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction' was signed in January 1993 at Paris. The Convention Entered in to Force (EIF) on 29 April 1997. The Convention is unique as it provides for a stringent verification regime, provisions for challenge inspections in case of non-compliance concerns and investigations of alleged use of Chemical Weapons (CW). The Organisation for Prohibition of Chemical Weapons (OPCW) in The Netherlands is responsible for the effective implementation of CWC.

KEY COMPONENTS OF CWC

Demilitarisation of CW

The most important obligation under the Convention is the destruction of all CW. This includes Chemical Warfare Agents

(CWA), filled and unfilled chemical munitions, old and abandoned Chemical Weapons.

The destruction of CW is the most expensive and time-consuming aspect of the implementation of the Convention. Most of the destruction costs are generated by the investment in state-of-the-art technology to ensure that the risk to people and to the environment is kept to a minimum at every stage in the transport and destruction of munitions, as well as during the removal and destruction of chemical agents. Destruction, therefore, has to be carried out at highly specialised facilities under stringent verification regime.

Non-Proliferation of Toxic Chemicals and their Precursors: Each State Party shall adopt the necessary measures to ensure that toxic chemicals and their precursors are only developed, produced, otherwise acquired, retained,

Photo above:
Secretary-General Ban Ki-moon opens
the Third Review Conference of the
States Parties of the Chemical Weapons
Convention in The Hague.

UN Photo/Rick Bajornas

... THE CONVENTION EXPLICITLY STATES THAT ALL STATE PARTIES HAVE THE RIGHT TO CONDUCT RESEARCH INTO, DEVELOP, PRODUCE, ACQUIRE, TRANSFER AND USE MEANS OF PROTECTION AGAINST CHEMICAL WEAPONS...

transferred or used within its territory or in any other place under its jurisdiction or control for purposes not prohibited under this Convention.

Assistance and Protection against CW

Every State Party to the CWC has the right to request assistance from the OPCW in any of the following circumstances:

- The State Party considers CW to have been used against it;
- The State Party considers riot control agents to have been used against it as a method of warfare; or
- The State Party considers itself to be threatened by actions prohibited by the Convention taken by another country.

The Convention explicitly states that all State Parties have the right to conduct research into develop, produce, acquire, transfer and use means of protection against chemical weapons.

International Cooperation

Commitment to work together to promote the peaceful application and use of chemistry for the purposes of economic and technological development of countries.

Universality

Goal that all countries in the world become parties to the CWC. Adherence to the CWC demonstrates a state's commitment to disarmament and international co-operation, and helps to reinforce its position in the mainstream of international politics.

National Implementation Measures

The State Parties to meet their obligations under article VII of the Convention. This includes establishing national authorities for effective liaison with the OPCW; taking the necessary steps to enact legislation, including penal legislation and to adopt administrative measures to implement the Convention; identifying declarable chemical-industry and trade activities and submitting accurate declarations.

STATUS OF IMPLEMENTATION OF CWC

Participation in CWC

As of 15 July 2013 the number of countries (State Parties) participating in CWC:

- Number of State Parties – 189 or 98% of global population.
- Number of signatory states that had not yet ratified the Convention – 2 (Israel and Myanmar)
- Number of States that had neither signed nor acceded to the Convention – 5 (Egypt, DPR Korea, Syria, South Sudan and Angola).

Submission of Declarations

Total of 180 of the 189 State Parties had submitted initial declarations to the OPCW eight State Parties (Albania, India, Iraq, the Libyan Arab Jamahiriya, a State Party, the Russian Federation and the United States of America) had between them declared as CW 71,196 metric tonnes of CWA and precursors, as well as 8,679,150 munitions and containers. In total, 5,327 industrial facilities and plant sites in 86 States Parties were declared in connection with the chemical-industry verification regime.

Verifications CW

Hundred percent of the declared CW stockpiles have been inventoried and verified. From the time of Entry into Force (EIF) of the CWC (29 April 1997) the OPCW has conducted 5,124 inspections on the territory of 86 State Parties, including 2,677 inspections of CW-related sites. All the 223 CW-related sites declared have been inspected.

CWA Destroyed

A total of 55,939 metric tonnes, or 78.57 per cent, of the world's declared stockpile of 71,196 metric tonnes of CWA, have been verifiably destroyed. Albania, India and a State Party have completed destruction of their CW. A total of 3.95 million, or 45.56%, of the 8.67 million chemical munitions and containers covered by the CWC have been verifiably destroyed.. Iraq is yet to commence destruction of their declared CW. A destruction deadline has yet to be established for Iraq, which acceded to the Convention in 2009. Three possessor State Parties, namely Libya, the Russian Federation, and the United States of America, have been unable to fully meet the final extended deadline of 29 April 2012 for the destruction of their CW stockpiles.

In accordance with the 'Detailed Plan

for the Destruction of Chemical Weapons Remaining After the Final Extended Deadline of 29 April 2012' submitted by these State Parties:

- g. Libya plans the destruction of the remaining Category 1 CW by December 2013, Category 2 CW by December 2016 and Category 3 CW by May 2013.
- h. Russian Federation plans the destruction of remaining Category 1 CW by December 2015
- i. United States of America Plans the destruction of the remaining Category 1 CW by September 2023.

Declared and Destroyed/Converted CWPFS

Thirteen State Parties have declared CWPFS: Bosnia and Herzegovina, China, France, India, the Islamic Republic of Iran, Iraq, Japan, the Libyan Arab Jamahiriya, the Russian Federation, Serbia, the United Kingdom of Great Britain and Northern Ireland, the United States of America, and another State Party.

One hundred percent of the declared Chemical Weapons Production Facilities (CWPFS) have been inactivated. All are subject to a verification regime of unprecedented stringency. A total of 64 of the 70 CWPFS declared to the OPCW by 13 States Party have either been destroyed (43) or converted for peaceful purposes (21). A total of 453 inspections were carried out on all the declared CWPFS.

Declared and Verified Chemical Weapons Storage Facilities (CWSFs). Total of 468 inspections were carried out of 35 CWSFs belonging to 7 States parties.

Declared CWDFs (Operational & Under Construction). Thirty Five Chemical Weapons Destruction Facilities (CWDFs) belonging to 6 States Parties were involved in the destruction of CW stockpiles. A total of 1562 continuous monitoring inspections were carried out at these facilities.

Declared and Destroyed ACWs/OCWs. From the time of EIF of the Convention, 114 inspections of 49 Old Chemical Weapons (OCW) sites in 15 States parties and 80 inspections of 34 Abandoned Chemical Weapons (ACW) sites in 3 states parties were inspected.

Fifteen State Parties had declared a total of 60,398 OCWs produced before

1925 and 71,822 OCWs produced between 1925 and 1946. About 20,000 pre-1925 OCWs and 18,000 OCWs produced between 1925 and 1946 are yet to be destroyed.

Destruction of 25,974 CW abandoned by Japan on the territory of China was verified as destroyed on the ongoing operations at the Abandoned Chemical Weapons Mobile Destruction Facility (ACW-MDF) at Nanjing, China. States Parties had achieved so far the destruction of 35,931 items of ACW.

Declaration of Riot Control Agents. 179 States Parties that had submitted initial declarations under Article III, 176 States Parties submitted information on riot control agents (RCAs), while the information on RCAs was missing from three States Parties' declarations. Of the 176 States Parties that provided information on their RCAs, 130 declared possession of RCAs, while 46 States Parties declared that they did not possess RCAs.

Declared and Inspectable Schedule Chemicals Facilities

From the time of EIF of the convention, the OPCW has conducted 2477 inspections of 1865 industrial sites of a total of 5327 sites declared by 86 States Parties. 4,913 of these industrial facilities are liable to inspection:

- j. Schedule 1 Chemicals – 27 declared facilities - 243 inspections carried out.
- k. Schedule 2 Chemicals – 500 declared facilities - 625 inspections carried out.
- l. Schedule 3 Chemicals – 433 declared facilities - 373 inspections carried out.
- m. DOC/PSF Chemicals – 4367 declared facilities - 1206 inspections carried out.

According to declared information, 80 States Parties maintained at least one declarable facility pursuant to article VI of the Convention.

Challenge Inspections

No challenge inspections were requested since EIF of the Convention. It only reflects on the confidence of the member states on the implementation & verification regime of the CWC.

Investigations of Alleged Use of CW

No requests received from States Parties for investigations of alleged use (IAU) since EIF of the Convention.

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Assistance and Protection

The OPCW Technical Secretariat organises courses aimed at providing training to first responders, government experts and emergency response units in building and developing national and regional capabilities and emergency response systems against the use, or threat of use, of chemical weapons. Over 2,200 participants have benefitted from these courses.

Seventy Eight State Parties have pledged assistance under paragraph 7 of Article X. One hundred and forty-six State Parties have provided information on national programs related to protective purposes under paragraph 4 of Article X. Forty-five States have contributed to the Voluntary Fund for Assistance.

International Cooperation

From the time of EIF of the CWC, the International Cooperation programmes had 3,502 beneficiaries, including 315 analytical chemists, 265 Associate Programme participants, 1,966 Conference Support participants, 115 interns, 239 conferences, 92 laboratories, 437 research projects, and 73 transfers of used and functional equipment.

The OPCW has developed an internationally unique, peer-reviewed, and certified analytical database, containing information on over 3,400 chemical weapons-related compounds. This database is essential for on-site verification activities of OPCW inspection teams, and is also made available to States Parties.

National Implementation Mechanisms

A total of 186 of the 188 State Parties have designated or established their National Authorities. A total of 141 State Parties have submitted information on their legislative and administrative measures in accordance with article VII of CWC. Only 91 State Parties have fully enacted legislation and/or adopted administrative measures to fully meet the obligations under the Convention.

Since 1997, nearly 3,000 participants, including more than 1,500 sponsored participants from all geographical regions have received support in the CWC's effective national implementation through OPCW meetings, workshops and training courses.

CONCLUSIONS

The success of the First International Disarmament Treaty (CWC) is reflected in the fact that within 16 yrs of Entry Into force, nearly 8 per cent of the worlds CW stockpile has been destroyed under strict international supervision. All the CWPFS were either inactivated/destroyed or converted for peaceful purposes. Effective measures have been put in place to prevent proliferation of toxic chemicals around the globe. No requests for Challenge Inspection or Alleged Use of CW have been received by the OPCW up to date. The Third Review Conference of The States Parties held from 08-19 Apr 2013, noted with satisfaction that implementation of the Convention makes a major contribution to international peace and security. ■

ABOUT THE AUTHOR



**Colonel (Retd.)
H R Naidu Gade,**
(Former Member
International Civil
Service, Chief CW
Inspector OPCW).

Commissioned into the Indian Army, Corps of Combat Engineers. A civil engineer, management and security professional, with 39 yrs of experience (8 years international) in the field of combat engineering, chemical, biological, radiological, nuclear and explosives (CBRNE), defence, security and disaster management. A qualified CBRN and EOD specialist and trained in Hazardous Waste Operations (HAZWOPER) in the USA.

Graduate of Defence Services Staff College and Army War College; commanded an Armoured Engineer Regiment, prior to taking up an assignment with a UN Agency in 1997. Held important Command, Staff and Instructional appointments in the Army.

As the Joint Director for CBRN Defence, the Ministry of Defence (Army), was responsible for evolving, planning and executing CBRN defence measures for the Indian Armed Forces

related to operational concepts, training, organisations and equipment.

A member of the International Civil Service, and served on a senior diplomatic assignment with the 'Organisation for Prohibition of Chemical Weapons (OPCW)', The Netherlands (created under the Chemical Weapons Convention in 1993).

As Chief CW Inspector OPCW, led teams of international professionals on a large number of verification missions to various member countries, to verify the inventory of Chemical Weapons and monitor their destruction. Logged many hours operating in heavily contaminated environments at the CW Destruction Facilities around the globe.

Presently the Chief Consultant – CBRNe Security and Disaster Management with 'CBRNe Secure India' a 'platform for bringing in awareness in the general public, government and corporate entities on the threats arising from the use of CBRNe material and their disastrous consequences'.

Also the Technical Consultant for Bluecher GmbH, Germany – World leaders in CBRN Individual Protection Technologies.

CALL FOR PAPERS - SPRING/SUMMER 2014 EDITION

Counter-IED Report editorial team would like to invite government bodies, army personnel, researchers, academics, industry experts to contribute their articles, case studies, white papers to the Spring/Summer 2014 edition of the report.

We are actively looking for both theoretical and practice-based non-promotional editorial contributions. If you have an interest in any of the areas listed below we would encourage you to make a submission:

- Intelligence information sharing and analysis
- Intergovernmental cooperation
- Civil-Military cooperation
- C-IED and CBRNe forensic exploitation
- Future solutions to close current and emerging capability gaps
- Rapid acquisition programs
- Cost-effective procurement and interoperability
- Proliferation of IED/HME
- Asymmetric and emerging threats
- Airborne IEDs
- Training and capability development
- Explosive detection and screening technologies
- IEDD/EOD/UXO/ERW
- Post-conflict IED, mine/ERW clearance
- Homeland security
- Border security.

Suggestions for additional topics for the report are also encouraged.

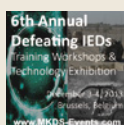
Abstract submission deadline: 20 December 2013.

Final article submission deadline: 10 February 2014.

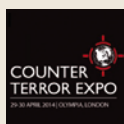
Enquiries and articles should be submitted by email to: editorial@deltabusinessmedia.com

**MEET THE COUNTER-IED REPORT TEAM AT THE UPCOMING EVENTS****NCT: C-IED Asia, 29 October - 1 November 2013, Bangkok, Thailand**

The second edition of Asia's leading Counter IED event, the Non-Conventional Threat: Counter IED Asia 2013, will take place on 29 October - 1 November 2013, in Bangkok, Thailand. Building on the highly successful 2012 conference and exhibition, NCT: C-IED Asia 2013, will expand its scope by including focused interactive training-workshops and a live capability demonstration day.

**6th Annual Defeating IEDs, Training Workshops & Technology Exhibition, 3 - 4 December 2013, Brussels, Belgium**

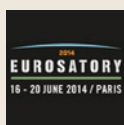
MKDS's flagship Defeating IEDs Training Workshops and Technology Exhibition returns for its 6th edition providing an unrivalled platform for Military, Government and Industry experts and the opportunity to examine the latest developments in the on-going fight against IEDs and the use of comprehensive Approach to countering the Threat Networks.

**Counter Terror Expo, 29-30 April 2014, Olympia, London, United Kingdom**

Counter Terror Expo is the premier international event delivering over 9,500 buyers and specifiers from the entire security sector within Government, Military, Law Enforcement, Emergency Services, Private Sector and the Security Services. The event offers your company a perfect platform to showcase the most comprehensive display of technology, equipment and services designed to protect nations, borders, crowded places, critical national infrastructure, companies, assets and individuals from the threat of terrorist attack.

**9th Annual Counter IED Training Forum, January 27-29, 2014, Washington D.C., United States**

IDGA's 9th Counter-IED Training Forum will provide a unique and intimate opportunity to focus on the pertinent aspects of this tremendous issue. This event will bring together the most influential and knowledgeable counter-IED experts, in order to discuss the future measures and strategies for protecting troops and civilians at home and around the world.

**EUROSATORY 2014, 16-20 June 2014, Paris, France**

Eurosatory, the largest exhibition of Land and Air-land Defence and Security in the world. All aspects of Land and Air-land Defence linked to a significant Security section, both integrated in a technology continuum.



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