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SPECIAL REPORT:
Small Arms and Light Weapons
Marking & Tracing Initiatives

FOCUS: CWD Emergency Response
FEATURE Sahel-Maghreb
Notes from the Field | Research & Development
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Small arms and light weapons collected for destruction in the Democratic Republic of the Congo.
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The Journal of ERW and Mine Action is a professional trade journal for the humanitarian mine action and explosive remnants of war (ERW) community. It is a forum for landmine and ERW clearance best practices and methodologies, strategic planning, mine risk education and survivor assistance.

The Journal Editorial Board reviews all articles for content and readability, and it reserves the right to edit accepted articles for readability and space, and reject articles at will.

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Dear Readers,

The mine action world keeps changing, and this is apparent in *The Journal* and in our other work at the Center for International Stabilization and Recovery (CISR) at James Madison University (JMU).

In June 2014, CISR successfully completed the first Regional Senior Managers’ Course in ERW and Mine Action (SMC) in partnership with the Tajikistan National Mine Action Centre in Dushanbe, Tajikistan. The three-week SMC was funded by the Office of Weapons Removal and Abatement in the U.S. Department of State’s Bureau of Political-Military Affairs (PM/WRA), and attended by 24 participants from five countries. Participants received business management instruction from four JMU College of Business professors and visited Norwegian People's Aid’s clearance project and Tajikistan’s first all-female demining team. High-level representatives from the U.S. and Japanese embassies, local and international implementing partners, and Tajikistan government officials joined the SMC’s Donors’ Forum, a highlight of the course. Using this model, CISR plans to hold future SMCs to meet training needs in other regions.

In May 2014, CISR staff spent two weeks with the Association for the Empowerment of Persons with Disabilities in Dong Hoi, Quang Binh province, Vietnam, providing capacity-building training for disabled people’s organizations (DPO) in central Vietnam. The training provided DPOs with the skills to conduct a public relations campaign promoting the rights of people with disabilities and the obligations of the government according to Vietnam’s landmark 2010 Disability Rights Law.

Expanding on topics in this issue of *The Journal*, the Focus section highlights the expansion of mine action to include small arms and light weapons (SA/LW) and conventional weapons destruction emergency responses. Retired U.S. Army Colonel George Zahaczewsky discusses the significant threat that ammunition depots present to surrounding communities in his article, “Conventional Weapons Destruction Response to Ammunition Depot Accidents.” In the Feature section, we look at mine action in the Sahel and Maghreb regions of Africa. Philippe Houliat from Handicap International and MAG’s Chris Loughran, Julie Wittig and Greg Crowther look at surplus SA/LW and arms management and destruction in the region, while Jin-Hee Heiu from UNMAS discusses building national explosive ordnance disposal capacity in Mali. And in our Special Report Section, Lourdes Rincón of the Organization of American States discusses the need for firearms marking in Latin America and the Caribbean.

Reflecting on other issues in the mine action community, the Notes from the Field section touches on a variety of topics such as disability rights, mine risk education, and training. Also of interest, Sean Moorehouse of Mine Action Consulting makes a case for “Liability in Land Release” in his editorial.

As always, *The Journal* aims to meet the evolving information needs of the global mine action community. We hope to hear from you about your work and any important topics you would like *The Journal* to cover.

Sincerely,

Ken Rutherford
Land Release Liability

Who should be responsible for any adverse events after clearance? The process of transferring liability from an operator to the state seems biased due to an inherent conflict of interest.

by Sean Moorhouse [ Mine Action Consulting ]

If a mine/explosive remnant of war (ERW) accident occurs in previously released land, who is liable for the damage caused? This is a question that many national mine action authorities (NMAA) ask and one that I was asked in Laos and Bosnia-Herzegovina during two recent workshops on liability in mine action, which were facilitated by the Geneva International Centre on Humanitarian Demining (GICHD).

The International Mine Action Standards (IMAS) guide mine action organizations by establishing principles and specifying international requirements in mine action. IMAS 07.11, Amendment No. 2, released 1 March 2013, contains important elements that help point the way toward answering questions on liability. Moreover, the amendment raises a few additional questions of its own, which require answers if IMAS is to be thoroughly implemented.

Land Release Clarification

Known for being difficult to translate into languages other than English, the term land release has become problematic over the years. In addition, although most people in the mine action community have a good understanding of land release, many continue to conflate land release (land determined as being safe to use) with land cancellation (land never contaminated). Combining the two concepts into one can cause confusion.

Land release—an evidence-based threat assessment determining where full clearance is or is not required—is only concerned with increasing the efficiency of mine action activities. Like anything in the dynamic world of mine action, land release is subject to constant refinements, which explains why the latest IMAS 07.11 came into being.

The new IMAS 07.11 describes land release as “... an evidence-based decision-making process that helps determine with confidence which land needs further action and which does not. It involves the identification of hazardous areas, the cancellation of land through non-technical survey, the reduction of land through technical survey and the clearance of land with actual mine/ERW contamination.”

What happens when released land is found to contain an unexploded device or an explosion occurs? IMAS 07.11 uses the term adverse event to describe such incidents. Unfortunately, these adverse events will occur from time to time. Although perfection is the goal, it cannot always be achieved; some mines/ERW might be missed during the clearance process.

IMAS 07.11 contains three key elements that determine liability in the event that any adverse event occurs:

- Reasonable effort
- Residual risk
- Transfer of liability from operator to state

IMAS 07.11 describes all reasonable effort as “… a minimum acceptable level of effort to identify and document contaminated areas or to remove the presence or suspicion of mines/ERW. ‘All reasonable effort’ has been applied when the com-
commitment of additional resources is considered to be unreasonable in relation to the results expected.”

NMAA should define what actions and parameters make up all reasonable effort for the different processes concerned. For example, in areas where clearance is deemed necessary, national standards determine a minimum clearance depth and target size for clearance. For metal detectors, the target size is determined as the smallest piece of metal the detector must be able to find, to represent the signal of the mines/ERW being cleared. For animal detection systems, it is the smallest explosive trace.

The second element, residual risk, is unavoidable. A residual risk of encountering mines/ERW in any post-conflict country will always exist, yet with every item found and destroyed, risk is reduced (albeit not entirely eliminated). Even in manually cleared areas, using all reasonable—or even unreasonable—effort, a chance always remains that an item was missed. Mine action’s goal is to reduce that risk to a tolerably low level. Each NMAA must determine its own risk-tolerance level.

The third and final element is the transfer of liability from the operator to the state. IMAS defines liability as “… any legal responsibility, duty or obligation that a country, organisation or individual may have. Liability in relation to an adverse event, such as an accident or the discovery of a missed item in an area, is normally linked to non-compliance with an agreed policy or procedure.”

Transfer of Liability

IMAS 07.11 assumes the operator is liable for any damages that may occur during clearance—which, although understandable, seems a little unfair. After all, the operator was not responsible for placing mines/ERW in the area. Worse, if the clearance organization had not taken all of the physical risks involved in clearing the devices, it would have assumed no liability and the land would still be contaminated. Yet in deciding to clear the devices—whether for profit or humanitarian purposes—the operator effectively becomes liable for any damages caused during clearance.

IMAS clarifies that the operator is liable if an accident occurs during the operation, but at what point does the state assume liability? In areas with no evidence of contamination, land is released to the community without executing any technical survey or full clearance. The non-technical survey process is specified according to national standards, implemented by the operator and quality managed by NMAA. Is there any difference in the operator’s liability if an adverse event occurs in an area released without being processed?

When land is released, regardless of the method used, a formal handover process should take place where the operator relinquishes liability to NMAA, an agent of the state. Therefore, the responsibility should immediately transfer to the state when a formal handover process occurs. Additionally, liability handover should be a clearly and explicitly identified moment in time.

On the other hand, NMAA may wish to delay this handover for as long as possible, so that the operator retains liability. This delaying tactic should not be allowed, because if there are concerns about the quality of the work, NMAA would require that the operator solve the problems and certify the work’s completion.

Holding an Operator Liable

However, IMAS 07.11 states that an operator will, at least in principle, retain some liability in cases of incidents caused by suspected missed mines/ERW in four circumstances. Specifically, some liability is retained if an investigation shows that

“i) the accident was caused by wilful or criminal misconduct, gross negligence, reckless misconduct or a conscious, flagrant indifference to the rights or safety of the individual(s) harmed;

ii) the organisation was not properly accredited, licensed, certified or authorised to carry out acts leading to the erroneous land release decision;

iii) the organisation wilfully infringed prevailing national policy or standards;

iv) the organisation had conducted gross procedural errors or grossly deviated from an agreed land release concept.”
While these conditions on liability transfer make sense in theory, they do not in practice. Although IMAS 07.11 does not specify which organization would be responsible for conducting an investigation into any adverse event after land release, in practice, the relevant NMAA would be responsible. This creates an inherent conflict of interest, as NMAA is one of the parties that could be found at fault in any investigation. Therefore, it should not be investigating itself.

The State Must Accept Responsibility

A potential way around this conflict of interest would be to have a supranational body, perhaps the United Nations Mine Action Service or GICHD, that would be responsible for investigating adverse events worldwide. Currently, this is unlikely to happen. Until it does, the humanitarian mine action community is left with the uncomfortable status quo of NMAA determining whether it itself is liable or if that liability should be placed on the operator.

As to the original question: If there is a mine/ERW accident in previously released land, who should be liable for the damage caused? The answer is: The state should be liable prior to and after land release, because it owes a duty of care to its citizens and visitors. It is a conflict of interest to have a national mine action authority investigating an accident that could determine that the state it forms part of is liable. In the final analysis, I posit the state is liable both prior to land release and after land release. ☐

See endnotes page 50
CWD Response to Ammunition Depot Accidents

While casualties inevitably occur during wars as a result of hostilities, munitions explosions are far more dangerous because they can injure or kill thousands of civilians and military personnel in a single incident. These detonations are not a new occurrence; they have happened as far back as World War I.

by COL. George Zahaczewsky [ U.S. Army, Retired ]

On 6 December 1917, during World War I, nearly 2,000 people were killed and an additional 9,000 were injured in one accident, when a French ammunition ship, the SS Mont Blanc, collided with a Norwegian cargo vessel, the SS Imo, in Halifax Harbor, Nova Scotia, Canada. The collision sparked a fire that ignited over 2,500 tons of munitions aboard the Mount Blanc. The cargo included 2,325 tons of picric acid, 225 tons of TNT, 21 tons of guncotton (nitrocellulose) and 35 tons of benzene. Until the advent of nuclear weapons in 1945, this was the largest man-made explosion to date, with a force equivalent to 2.9 kilotons of explosives.

During World War II, on 5 June 1941, several thousand people were killed in a single instance in the city of Smederevo, on the outskirts of Belgrade, when 400,000 tons of ammunition stored in the city center by German occupation forces detonated. Additionally, during the war period (1939–1954), there were at least six other major events involving munitions being transported or stored that were not directly attributable to hostile action, which resulted in nearly 2,000 deaths of military and civilian personnel.
Between 1995 and May 2010, nearly 218 incidents involving ammunition depots occurred, resulting in at least 4,700 fatalities and 5,700 injuries. These instances can have the same detrimental effects on populations, infrastructure and development as landmines and explosive remnants of war. Arguably the largest one of these catastrophes took place in Lagos, Nigeria, on 27 January 2002. An explosion at the Ikeja ammunition depot in the center of Lagos resulted in more than 1,100 civilian and military deaths with an additional 5,000 injured. The accident also displaced 20,000 people and destroyed much of the northern part of the city. A fire near the depot reportedly initiated the explosion; however, other reports attribute the accident’s cause to the aged and deteriorated condition of the stored ordnance.

According to the U.S. Department of State (DOS), the U.S. has provided assistance in promoting the safe disposal of surplus weapons and aging munitions since 2001. Recognizing the need to respond immediately to emergency situations involving conventional weapons destruction (CWD), the Office of Weapons Removal and Abatement in the U.S. DOS Bureau of Political-Military Affairs (PM/WRA) awarded DynCorp International (DI) a five-year contract in September 2008 to cover recruitment, equipment, training and deployment costs of a quick reaction force (QRF) with worldwide availability.

DI provided the necessary support infrastructure, as well as a team of highly qualified and certified weapons removal and abatement technical specialists, in order to swiftly destroy conventional weapons caches and remove potentially deadly explosive munitions. From September 2008 through September 2013, QRF responded to 25 urgent situations involving CWD, including three post-accident clearance operations in ammunition storage areas in Bulgaria, Democratic Republic of the Congo and Tanzania.

**Bulgaria, January 2009**

On 3 July 2008, a series of 11 unexplained explosions at the Chelopechene ammunition depot near Sofia, Bulgaria, rocked Chelopechene and the surrounding area. The explosions forced the evacuation of 1,700 of the 2,500 residents that lived in the town, and the airport was temporarily closed. Most of the approximately 1,600–2,500 tons of obsolete munitions and 15–20 tons of explosives stored at the depot were damaged, constituting a danger. At the request of the Bulgarian government, a two-person QRF team was sent to Sofia on 22 November 2008 to assess the Chelopechene facility. Following discussions with Bulgarian officials, an
additional 12 personnel were dispatched to conduct surface clearance operations only to eliminate the immediate hazard to the civilian population. On 29 March 2009, QRF concluded all site operations and demobilized after clearing 62,022 sq km (38,539 sq mi), recovering 110,416 pieces of ordnance and disposing of 1,079 munitions items. The total deployment time was 96 days.

**Tanzania, February 2011**

On 16 February 2011, several explosions destroyed 23 munitions storage structures at the Gongola Mboto army depot in the Ilala district, a few kilometers from the international airport in Dar es Salam, Tanzania. The detonations killed at least 20 people, wounded more than 100 and displaced thousands of nearby residents. After receiving a request from Dar es Salam, PM/WRA directed the deployment of a six-person QRF team to assist the Tanzanians in conducting CWD operations at the Gongola Mboto army depot. During the course of the 150-day operation, the QRF team destroyed 13,843 items of hazardous ordnance, collected 349.4 tons of scrap, and identified and consolidated more than 14,000 pieces of ordnance for future disposal by the Tanzanian army.

**Republic of the Congo, March 2012**

On 4 March 2012, a suspected fire initiated at least five separate explosions at the Regiment Blinde munitions depot in the Mpila neighborhood in the center of Brazzaville, the Republic of the Congo’s capital. The explosion scattered thousands of munitions and other weapons stockpiles across an area of 4 to 6 sq km (1.5 to 2.3 sq mi). The blast left 20,000 people homeless, and an estimated 220 people were killed and 2,300 injured. The area where the detonation hit hardest also contained two of the most populous districts in the city: Ouenzé and Talangai. Upon receiving a request from the Republic of the Congo’s government, PM/WRA directed the deployment of a six-person QRF team on 7 March 2012 to conduct an assessment of the explosive hazards in the area, make recommendations for the clean-up, and provide assistance for unexploded ordnance clearance. Each QRF team member supervised a five-man crew in picking up and moving items that were deemed safe to move, and initiated protective works and disposal of items that could not be moved. During its 55-day deployment, the QRF team worked in close coordination and cooperation with U.N. personnel, as well as several non-governmental organizations.

**Lessons Learned**

Of the CWD responses mentioned previously, lessons learned include:

- **Large stores of ammunition should be located away from population centers.**
- **Fire and ammunition do not mix.** Human negligence caused many of the fires involving ammunition, but a large number also involved the spontaneous combustion of unstable artillery propellant.
- **Ammunition does not age well.** A significant percentage of accidents over the years involved old and deteriorated ordnance.
- **There should be minimal movement of old or deteriorated ammunition.**
- **Disassembly of stockpiled ammunition should only be undertaken by highly qualified technical personnel.**
- **Deteriorating ammunition should be stored separately from serviceable munitions.**
- **Recycling of old ammunition to recover precious metals should only be done following a thorough risk assessment.**
- **Artillery propellant or projectile fuzes should not be underestimated, as they commonly cause serious ammunition accidents.**
- **White phosphorous munitions should be stored separately from high explosive ordnance.**

These lessons can help prevent ammunition depot explosions and the subsequent loss of lives, injuries and property. Preventing ammunition accidents saves lives and is far less expensive than cleaning up the aftermath.

All views and opinions expressed in this article are the author’s and do not necessarily represent the U.S. Government or any previous employer.

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George Zahaczewsky was the director and program manager for DynCorp International’s (DI) Weapons Demilitarization, Destruction and Disposal efforts from 2004 to 2013. In that capacity, he oversaw DI’s implementation of two PM/WRA program contracts (2005–2012 and 2008–2013), including the QRF program. Previously, between 2003 and 2004, Zahaczewsky was employed in the implementation of the U.S. Government’s Captured Enemy Ammunition Program in Iraq. He retired in 2002 from the U.S. Army as a colonel after 30 years of service, having spent his last six years on active duty in the Pentagon where he was the Defense Department’s lead for humanitarian demining research and development. He now works as an independent explosive ordnance disposal, demining and defense consultant.

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Surplus SA/LW Destruction Project in Mauritania

Handicap International, in partnership with the NATO Partnership for Peace Trust Fund for Mauritania, implemented a multiphase ammunition and conventional weapons destruction project to help the Mauritanian government achieve its security objectives and reduce the risk of unplanned explosions.

by Philippe Houliat [Handicap International]

Handicap International (HI) was founded in 1982 to bring assistance to victims of anti-personnel (AP) landmines living in the refugee camps on the border between Cambodia and Thailand. In 1997, HI was chosen as co-laureate of the Nobel Peace Prize for its role in the international campaign to ban AP landmines, and HI is a key international player in the field of armed violence reduction. Among other projects, HI is lending its experience in ammunition and conventional weapons destruction (CWD) to a project in Mauritania aimed at increasing civilian security by improving the management of the country’s weapons and ammunition stores.

Mauritania has experienced more than 30 years of political instability, including 13 successful or attempted coups and other internal armed conflicts. During this time, poor security at weapons and ammunition depots and the illicit proliferation of small arms and light weapons (SA/LW) heightened instability in the country and surrounding region.

International Cooperation and Assistance

Since joining the Mediterranean Dialogue in February 1995, Mauritania has secured international assistance for its CWD project through the NATO Partnership for Peace Trust Fund. The NATO Maintenance and Supply Agency (NAMSA)—now the NATO Support Agency (NSPA)—launched the NATO Trust Fund for Mauritania in 2010. Governed by a framework agreement, the project has three main goals:

- Increase the security of Mauritania’s civilian population by reducing the risk of ammunition and weapons theft from government depots
- Strengthen the skills of the personnel in charge of ammunition storage management
- Provide training on reintegration for Mauritanian army personnel returning to civilian life

Under Italy’s leadership, the project is also financed by several other NATO countries—Luxembourg, Spain, Turkey, the U.K. and the U.S. Although not a part of the Trust Fund, Germany’s financial support for HI is critical to the project’s mission: safe destruction of ammunition and weapons identified as decommissioned or obsolete by the Mauritanian army. The project’s total budget is €2.25 million (US$3,111,302 as of 23 April 2014), and it will be completed before the end of 2014.

Destruction Campaign: Preparatory Phase

HI seconded an expatriate technical adviser to work alongside the Mauritanian army’s explosive ordnance disposal (EOD) technicians to foster capacity building through the systematic and continuous transfer of skills.
The preparatory phase of HI’s destruction campaign involved setting up the NAMSA office, making initial contact with military authorities, finalizing procedures to access military depots and integrating the international expert into the Mauritanian destruction team. As no national regulations were in place, standard operating procedures (SOP) were drafted and included specific procedures for destroying man-portable air defense systems (MANPADS) and for cutting weapons. These documents were based on prevailing international standards (the International Ammunition Technical Guidelines and International Small Arms Control Standards), and the government of Mauritania approved them on 1 June 2011.

Because of the distances between the 20 separate ammunition depots that needed clearing, destruction operations were grouped to 12 sites. This reduced transport costs and optimized available logistical resources. Additionally, the four EOD technicians in charge of destruction organized two weeks of refresher training and focused on security measures to be applied during destruction and burning activities.

Ammunition Destruction Phase

The destruction phase lasted from June 2011 to March 2012 and eliminated 1,963 tons of ammunition of all calibers. In the course of these activities, the EOD team covered 19,534 km (12,138 mi) while traveling to the 12 destruction sites located throughout Mauritania. A mechanical digger created 335 demolition pits, and with supervision of an HI expert, the Mauritanian military hand-dug the pits when the destruction zone was too isolated to allow transport of the mechanical digger.

Detonation destroyed ammunition calibers greater than or equal to 20 mm, including MANPADS, because other techniques were unavailable in the country. To optimize priming of explosions, the EOD team used obsolete anti-tank landmines. The concurrent- and post-recording processes used during MANPADS destruction corresponded with NATO operating procedures.

As no available incinerator could destroy the 820 tons of ammunition of 14.5 mm caliber or more within a reasonable timeframe, an open burning technique was employed. SOP was to dig 1 m x 2.5 m x 1.5 m (1 yd x 2.7 yd x 1.6 yd) burn pits in which large quantities of cartridges could be destroyed at once. The metallic waste after combustion was recycled.

SA/LW Elimination Phase

SA/LW elimination activities began with identifying suitable premises for destruction operations, which were then rehabilitated to align with international standards. The specific destruction equipment, including an oxyacetylene cutting system, a metal-cutting chainsaw and personal protective equipment, was then purchased and installed.

Cutting operators were trained in
- Identifying and recording SA/LW for destruction
- Using cutting tools
- Drafting destruction reports consistent with SOPs
- Recycling metallic waste

Lastly, with the assistance of HI’s expert, a dismantling plan was drawn up for the 2,300 SA/LW; the Mauritanian army then implemented it.

Overview of the NATO Project

Constructing NATO-standard ammunition depots. In western Mauritania, two new depots were built in Aleg and Akjoujt to international standards in order to replace the 20 storage sites spread across the country, one of which used to be located in the capital, Nouakchott. These can store approximately 750 tons of ammunition.

Training in ammunition depot management. This training’s purpose was to provide 20 storekeepers and six managers of ammunition depots with the technical knowledge needed to manage ammunition safely and efficiently. The training was delivered in Arabic and French over a period of three weeks and focused on storage procedures, management and accounting, as well as the safe handling, maintenance and elimination of ammunition.

Reintegrating military personnel. Intended to help former military and internal security personnel return to civilian life, this component is an important step in strengthening relations between the army and civil society. HI helped set up training courses in five trades: carpentry, electricity, masonry, plumbing and welding. By the end of 2013, 145 former soldiers, aged 23 to 62 years old had participated in training sessions.
Conclusion

The technical support HI provided to Mauritania enabled this project to reach its objective of improving the security of the country’s civilian population. Destroying decommissioned ammunition stored in army depots and training specialists in storage management optimized security and considerably reduced the risk of uncontrolled explosions. The Mauritanian army must now ensure that managers can maintain their recently acquired skills and that the rules governing the management of ammunition and SA/LW conform with international standards and are consistently implemented.

Because the need for better stockpile security and management remains in Africa, HI continues to provide its expertise to other Sub-Saharan countries. For instance, in Niger, HI recently began a regional program to support the Nigerien government in armed violence reduction. Funded by the U.S. Government and implemented in partnership with MAG (Mines Advisory Group), this project aims to improve the main components of physical security and stockpile management: elimination of unserviceable ammunition and obsolete weapons, rehabilitation and construction of storage areas, training of managers and warehousemen, and setting up centralized management of weapons and ammunition.

See endnotes page 50
Building National EOD Capacity in Mali

Since January 2013, the United Nations Mine Action Service has worked to build Mali’s national capacity in explosive ordnance disposal.

by Jin-Hee Dieu [ UNMAS ]

Recent and ongoing armed conflicts in Mali have resulted in small arms and light weapons proliferation and explosive remnants of war (ERW) contamination, threatening civilians and impeding stabilization efforts. In the northern affected communities, ERW contamination increases risks of accidents and injury, and hinders the safe return of more than 170,000 refugees and 187,000 internally displaced persons.

The United Nations Mine Action Service (UNMAS) has operated in Mali since January 2013 with the principal goal of enhancing Mali’s national capacity to mitigate the explosive threats that emerged following the outbreak of armed conflict in 2012. UNMAS coordinates training activities with the Malian Defense and Security forces and operates under the U.N. Multidimensional Integrated Stabilization Mission in Mali (MINUSMA), which the U.N. Security Council established in April 2013.

Historical tensions in northern Mali and border fighting between Tuareg tribes created thousands of refugees. The instability and conflict progressed until Alpha Oumar Konaré
became president in 1992 and issued a peace agreement alleviating ethnic disputes. However, the political stability in Mali was disturbed again during a 2012 rebellion within the northern region. At the start of 2012, insurgents gained control of the Malian army’s weaponry, leaving civilians and militants at risk. Fatalities of Malian armed forces during Islamist insurgent attacks yielded a military coup ousting former President Amadou Toumani Touré in March 2012. The administration and military were then reorganized. UNMAS continues responding to these changes and providing assistance to Malian authorities as they work to restore peace and security.

Addressing the Explosive Threat in Mali

Improvised explosive devices, ERW and landmines affect livelihoods—especially agricultural activities—restrict freedom of movement and inhibit economic recovery within northern Mali. ERW contamination also limits the deployment of national and international forces tasked with stabilizing the north and consolidating security. UNMAS technical assistance enhances awareness of this threat and equips units to address this danger.

UNMAS aims to build Mali’s capacities to plan, lead and conduct explosive ordnance clearance. To this end, UNMAS and various partners provided explosive ordnance disposal (EOD) training for Malian military engineer units, gendarmerie, national police, civil protection force, national guard and air force. The Swedish Civil Contingencies Agency (MSB in Swedish) provided the initial training, which ran from February to March 2013, and taught 36 participants about EOD methodologies, safety procedures, and types of ammunition and their components. MSB coordinated the second training session in
August 2013, and coached 32 members of the Malian Defense and Security Forces staff in equipment maintenance, first aid, preparation, demolition and search methods, among other topics.

After completing their first EOD training in August 2013, 20 students were sent to the Centre de formation au déminage humanitaire-Afrique de l’Ouest (Humanitarian Demining Training Center) at the Centre de Perfectionnement aux Actions post-conflictuelles de Déminage et de Dépollution (Center for the Development of Post-Conflict Actions in Demining and Remediation, or CPADD) in Benin to pursue EOD Level 3 training from September to November 2013.8

In March 2014, 20 additional students graduated from a fourth training, the CPADD EOD Level 1 course, funded by the U.K. Foreign and Commonwealth Office. Sgt. Idrissa Coulibaly, member of the Directorate of Military Engineering and participant in the March 2014 CPADD training, testifies, “My only wish is for Mali to have such a center [like CPADD], so that more people could benefit from it. In our own infrastructure, we could train the military, but also the civilians, and educate them about the risks.”9 These 20 students will next undergo EOD Level 2 training in conjunction with the EU Training Mission before deployment to northern Mali in support of stabilization efforts.

Throughout the trainings, the Comité Européen de Normalisation (European Committee for Standardization, or CEN) Workshop Agreement and the U.N. International Mine Action Standards were incorporated into Malian mine action standards.10,11 The Malian authorities approved the standards and will accordingly draft their own standard operating procedures. This guarantees that Malian clearance efforts meet international standards in the field and ensures safe and efficient demining and ERW demolition operations.

Recent Activities
In March 2014, UNMAS tasked six trainees to prepare a demolition of 85 missiles, which required about 270 kg (595 lbs) of net explosive quantity in total. Between April and May 2014, the Malian army demolished its own obsolete and non-serviceable surface-to-air missiles (SAM). After dismantling the missiles, the propellants were burned, and the rest was destroyed. The demolition’s closing ceremony took place 6 June 2014. This was the first instance in which the Malian army demolished SAM in such a large quantity. In the future, UNMAS will proceed with demolishing an additional 60 tons of obsolete ammunition.

One challenge for the participants who have trained as EOD experts is using their skills in everyday work. According to Malian Military Engineering Deputy Director Col. Boubacar Diallo, the 2014–2018 national reform of the Malian army will have among its interarmy tactical groups 30 deminers and six EOD personnel. Some of the trainees will subsequently be deployed in the north.12

Keeping all trainees up to date in EOD developments, especially new threats in the field, is challenging. UNMAS plans to train more personnel and institute a train-the-trainer approach.

UNMAS Mali Programme Manager Charles Frisby states that “UNMAS is very pleased to be working in partnership with the Malian Defense and Security Forces to strengthen national capacities. There is a need to mitigate explosive threats, and it is important that a range of defense and security institutions have broad capabilities based on the very extensive geography of Mali and the need to work on joint operations.”13

Setting up a training plan for the newly reorganized Malian military is also challenging for UNMAS. The process begins with the Directorate of Military Engineering developing a list of potential candidates for EOD Level 1 training. From there, UNMAS proceeds to a written test, ranking candidates based on capability. The frequency of the trainings and the number of students involved varies based on CPADD’s availability. Once the Malian participants are EOD Level 1 certified, the army deploys them to different regions where the students gain practical skills. UNMAS is in the training’s first phase, EOD Level 1. UNMAS aims to train a base of EOD Level 1 students in order to select the top ranking individuals and train them into EOD Level 2 and EOD Level 3. See endnotes page 50

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Arms Management and Destruction in Sahel and Maghreb

Human security in the Sahel and Maghreb regions in Africa has deteriorated in recent years as a result of armed violence. The prevalence of non-state armed groups that often operate regionally has exacerbated weak state control over remote and border areas. For actors operating in the arms management and destruction sector, addressing fragility in this context requires innovative and integrated approaches to building stability and resilience.

Instability and state fragility contributes to and enables the growing proliferation of weapons and ammunition in the Sahel and Maghreb regions. The increased availability of weapons to non-state armed groups allows them to engage more effectively with poorly equipped and poorly trained national armed forces, particularly in border areas, and to consolidate control over large swaths of countries such as Mali and Niger. Similarly, arms are more likely to be diverted to the illicit market when responsible institutions lack capacity and accountability. Criminal groups may seize weapons or security sector personnel may sell them.

In this complex and dynamic environment, considering fragility, stability and resilience at a regional level is increasingly important when analyzing the context and need for arms management and destruction in project design. Programs also have increased value when they link to security sector reform initiatives and complement civil society efforts to develop community based solutions to armed violence and illicit weapons.

Conflict, Fragility and Proliferation

The flow of illicit weapons and ammunition across the Sahel and Maghreb regions is not a new phenomenon. Criminal groups have long exploited established transnational trading networks to assist in the movement of drugs, arms and other contraband. These criminal networks are often linked informally or formally to state actors and non-state armed groups. This interrelationship between transnational organized crime, terrorism and conflict is a core enabler in the supply and demand of illicit weapons and ammunition throughout the region.

Libya’s 2011 conflict increased instability in the region, especially in Mali. Significant numbers of trained fighters armed with Libyan weaponry crossed the border following the overthrow of Moammar Gadhafi’s regime. In parallel, the inability of transitional authorities in Libya to establish...
control over weapons stores and munition depots led to significant diversion and a rapid increase in the availability and quantity of illicit arms. Specific arms identified include BM-21 multiple-launch rocket systems, recoilless rifles and OG-82 rockets with anti-personnel warheads.  

The consequences of Mali’s increased level of conflict include population displacement and escalating levels of political tension throughout the region. The situation remains volatile, despite the intervention of French military forces and subsequent deployment of the U.N. Multidimensional Integrated Stabilization Mission in Mali under Security Council resolution 2100 in April 2013.  

The links between the conflicts in Libya and fragility in Mali are clear, but the flow of weapons across porous borders within the Sahel and Maghreb regions also has wide-ranging implications for broader regional stability. Human Rights Watch Emergency Director Peter Bouckaert noted in 2011 that “weapon(s) proliferation out of Libya is potentially one of the largest we have ever documented—2003 Iraq pales by comparison—and so the risks are equally much more significant.” The In Amenas terrorist attack in Algeria was launched in part from Libya using Libyan weapons. Similarly, the ready availability of arms has exacerbated border clashes related to smuggling in recent years across the borders of Chad, Libya and Niger. Increased terrorist activity in southern Tunisia and Egypt relies in part on the availability of significant amounts of weapons flowing out of Libya.  

Arms Management and Destruction  

Increased awareness of the regional implications of poorly managed national stockpiles and of the role illicit weapons play in sustaining and fueling armed violence has led to a growing focus on reducing illicit availability of arms. Many states request assistance from the international donor community and specialist agencies, such as MAG (Mines Advisory Group), to identify and implement projects aimed at improving weapons and ammunition management practices. MAG has extensive experience implementing arms management and destruction programs in a range of countries including Burundi, Democratic Republic of the Congo, Libya, Somalia and South Sudan. This includes the destruction of surplus weapons and munitions; rehabilitation, relocation and construction of armories and munitions stores; training of armorers and ammunition storage personnel; and capacity building of managers and leaders. Initial assistance projects often focus on low-cost, high-impact improvements that act as a basis for more sustained, long-term efforts to build national capacity and infrastructure.  

Weakened national infrastructure in some locations where MAG provides assistance means that society and community institutions take primary responsibility for daily security. In these cases, with approval of relevant authorities, MAG also works with communities to address the effects of unguarded weapons and munitions by delivering risk education, which reduces small arms and light weapons (SA/LW) associated risks and promotes safe storage. This form of support, pioneered in Somalia, normally includes initiatives that aim to reduce the risk of small arms accidents within communities. Both activities raise awareness of potential consequences and help reduce intentional and unintentional risk-taking behavior. While SA/LW risk education is relatively easy to adapt across regions and borders, other aspects of arms management and destruction programs are politically sensitive and need to be tailored according to local circumstances.  

Context analysis and continued stakeholder engagement are central elements of successful assistance projects. Programs not rooted in these principles have little chance of delivering long-term successes. Prospects for sustainability are greatest when national authorities engage at multiple levels. Even when training is delivered at the local or small-unit level, senior leadership and political engagement and support are critical. Furthermore, regions benefit from partnerships between actors involved in arms management and destruction,
particularly when their activities cover a broad range of expertise, ranging from technical assessment and advice to institutional capacity building.

MAG recently strengthened its partnership with the Bonn International Centre for Conversion (BICC), an organization specializing in long-term capacity building within states to adopt and implement regional and international treaties and declarations on arms management and destruction. In cooperation with BICC and Handicap International, MAG is conducting a series of technical assessments in the Sahel and Maghreb regions to design contextually appropriate technical assistance activities. This union forms a central part of a project funded by the Office of Weapons Removal and Abatement in the U.S. Department of State’s Bureau of Political-Military Affairs (PM/WRA), under which MAG established a regional office in Dakar, Senegal.

Conclusion

The Sahel and Maghreb regions present complex challenges and a dynamic operating environment for organizations involved in arms management and destruction. The extensive, remote and porous borders of these regions increase the scale of need that should be addressed. Governments providing assistance and organizations implementing programs must take a coordinated approach in a complex region while also time-tailoring activities to the local circumstances. These are not, however, insurmountable. Principles of national ownership and context-relevant programming have proven to be key elements for success and sustainability at the national level.

MAG’s work in the Sahel and Maghreb regions aims to develop projects founded on these principles, combining this approach with regional contextual analysis while exploring options for community level engagement, new strategic partnerships and increased links to international policy frameworks. This innovation solely aims to maximize the support that arms management and destruction activities can have on efforts to build stability and resilience at local, national and regional levels.

See endnotes page 51
Balkan Flooding Exacerbates Landmine Crisis

Record flooding in spring 2014 in Bosnia–Herzegovina and Serbia killed an estimated 57 people and displaced more than 50,000 at the height of the natural disaster. As of 2014 June 13, 7,500 people were displaced and living in temporary shelters. The Red Cross reports that, in addition to destroying agricultural land, flooding caused thousands of landslides, displacing landmines buried during the 1992–1995 conflict associated with the break-up of the Federal Republic of Yugoslavia as well as the warning signs marking contaminated land. Authorities estimate that more than 120,000 mines contaminate Bosnia–Herzegovina. According to the U.N., 70 percent of the flood-affected areas may contain landmines and unexploded ordnance (UXO), and 800 sq km (309 sq mi) of suspected contaminated areas are flooded.

Residents in flood-affected areas in Bosnia–Herzegovina and Serbia reported mine and UXO sightings. A landmine in Brčko, Bosnia–Herzegovina, exploded underwater with no casualties reported. In addition, mines were documented in the following areas: Bosanska Krupa, Olovo, Semizovac and Visoko. As floodwaters carry mines downstream, currents could send mines as far as the Black Sea. Furthermore, there is growing concern that floating mines may become trapped in the turbines of a hydroelectric dam. Bosnia–Herzegovina Mine Action Centre (BHMAC) official Sasa Obradovic warns that residents must take precautions as they clean up their homes and lands from receding floodwaters.

Moreover, mines threaten the relief effort and landslides worsen the situation. While Serbian and Bosnian demining units are trained in clearing landmines and UXO under normal working conditions, the flooding complicates circumstances, requiring different approaches for shifting land and underwater mine clearance.

The EU allocated EU€65 million (approximately US$88 million as of 20 June 2014) to Bosnia–Herzegovina, and Serbia, and the International Monetary Fund is prepared to double its funds to €190 million (approximately $258 million as of 20 June 2014). The Office of Weapons Removal and Abatement in the U.S. Department of State’s Bureau of Political-Military Affairs (PM/WRA) deployed two separate Quick Reaction Force (QRF) teams, each consisting of three civilian explosive ordnance disposal experts, on 25 May 2014. The QRF teams assisted the BHMAC and Serbian Mine Action Centre in assessing the landmine situation following the floods, identified gaps in assistance, and provided recommendations to U.S. and local authorities on demining program needs. Bosnia–Herzegovina also received outside support from countries including Germany, France, Italy and the U.K.

by Christina Carr, CISR staff
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Promoting Firearms Marking in Latin America and the Caribbean

Marking firearms is an important step in combating illicit weapons trafficking. To promote marking and tracing among countries in Latin America and the Caribbean, the Organization of American States has strengthened national capacities to mark firearms by providing equipment and related training since 2009.

by Lourdes Rincón [Organization of American States]

In the last decade, more than one million people died in Latin America and the Caribbean as a result of criminal violence.\(^1\) Moreover, according to statistical information on citizen security provided by members of the Organization of American States (OAS), 75 percent of intentional homicides in the Americas were committed with a firearm. The proportion of intentional homicides by firearms was even higher for South America and Central America, at 83 percent and 78 percent, respectively.\(^2\)

Despite significant progress made in consolidating democracy in Latin America and the Caribbean during the last decades, the countries of the region still face considerable challenges in tackling armed violence. Public security constitutes a high priority for citizens and regional government authorities.

Numerous factors contribute to armed violence such as weak governance, poverty, rapid urbanization and a lack of employment opportunities. However, easy access to illicit firearms is undoubtedly one of the main factors.

Adopted in 1997, the Inter-American Convention against the Illicit Manufacturing of and Trafficking in Firearms, Ammunition, Explosives, and Other Related Materials (CIFTA) provides a regional framework for addressing the control and management of firearms as a necessary step for ensuring greater citizen security and reducing armed violence. As the technical secretariat for CIFTA, the OAS Department of Public Security (OAS-DPS) implemented corresponding efforts to support OAS member states in fulfilling their obligations to adopt legislative measures criminalizing the illicit manufacturing and trafficking of firearms under domestic law. CIFTA requires firearms to be marked upon manufacture and importation to ensure the security of national firearms stockpiles, as well as the exchange of information with other CIFTA signatories with respect to national control mechanisms and illicit-trafficking patterns.

Permanently marking a firearm with identifiable information, such as a serial number, name, place of manufacturer or importer, model, and caliber, is considered an important step in combating illicit firearms trafficking. Marked items are easier to trace and link to crimes in which they were used, thus increasing law enforcement and prosecutorial capabilities. By increasing tracing abilities, states are able to identify trafficking routes and arms traffickers more effectively, and can prosecute them accordingly.

OAS and Firearms Marking

Beginning in September 2009, OAS-DPS implemented the project Promoting Firearms Marking in Latin America and the Caribbean. With initial and subsequent contributions totaling US$1,182,493 from the Office of Weapons Removal and Abatement in the U.S. Department of State’s Bureau of Political-Military Affairs (PM/WRA), OAS-DPS sought to strengthen national capacities to mark imported, exported or confiscated firearms in accordance with CIFTA legal requirements.

Through this project, beneficiary countries were eligible to receive at least one dot-peen marking machine, which uses small dots to mark products for identification, related equipment and training.\(^3\) To do so, interested countries needed to agree to the terms outlining the equipment’s maintenance and use by signing a
cooperation agreement with the general secretariat of OAS. From 2009 to 2014, 25 countries in Latin America and the Caribbean signed the cooperation agreement with OAS and joined the project.4

In December 2010, OAS-DPS and the government of Costa Rica organized and held a regional workshop on firearms marking in San Jose, Costa Rica, with the objective of raising awareness on the importance of marking firearms to combat illicit trafficking. In addition, the workshop sought to strengthen cooperation and promote information exchange among government authorities responsible for firearms marking at international, national and regional levels. Twenty-six participants, representatives of governments, international, regional, subregional and other organizations, had the opportunity to share their experiences and summarize actions undertaken to promote firearms marking and combat illicit trafficking.

During 2011, 15 marking machines and laptop computers were provided to participating governments along with training. For the majority of cases, the training consisted of a two-day course for six to 10 participants. The preparation included instruction on using the marking machine, setup and calibration, data configuration, storage and technical procedures related to marking and record keeping.

During the first quarter of 2012, OAS-DPS conducted a study on national firearms-marking laws and practices. The study’s objective was to identify laws, regulations and procedures in OAS member states regarding firearms marking and to measure the level of compliance with CIFTA. Specifically, the study analyzed countries’ marking procedures at the time of manufacture, import, and confiscation or forfeiture. This study was presented at the Third Conference of the States Party to CIFTA in May 2012.

Also during the Third Conference, OAS-DPS conducted a roundtable on firearms marking. In this activity the participating countries had an opportunity to share their experiences, successes and challenges faced as part of the Promoting Firearms Marking in Latin America and the Caribbean project. The information provided by national authorities was essential for OAS to continue assessing the program’s progress made and impact in the region, as well as to identify each country’s specific needs.

In 2012, 17 marking machines and laptop computers were provided with training on how to use the
equipment. After receiving reports from some national authorities on the difficulty involved in marking certain types of firearms due to lack of proper equipment, 30 vises for holding the firearms while they are marked were donated to requesting countries between 2012 and 2013. In addition, between January 2013 and May 2014, seven marking machines were turned over to national authorities, and OAS carried out refresher training in Dominica and El Salvador.

As of 2014, 39 marking machines and 30 vises were donated to 25 countries along with 39 laptop computers to facilitate the record-keeping process. OAS trained some 280 national authorities to use the equipment. As a result, more than 287,000 firearms were marked in the region.

**Lessons Learned**

Through this initiative OAS-DPS found that marking and tracing initiatives require long-term national commitment. While providing equipment and related training to each of the member states is a necessary step for the project’s initiation, it also requires that each of the national governments include the marking of firearms and record keeping as part of their long-term control strategy. The state is responsible for conducting effective firearms marking and record keeping in continued support of a system that will make tracking illicit firearms possible in the future.

National legislation allowing the marking of firearms is also key to a successful firearms control strategy. OAS-DPS found that most countries in the region have few or no legal provisions for marking firearms at the point of manufacture, import or confiscation, and require assistance to update their legal regimes to continue marking government stockpiles and civilian-owned firearms.

Common parameters to be recorded during marking activities were also needed. At the request of the member states that acceded to CIFTA, OAS-DPS drafted a regional standard for marking and record keeping, covering aspects such as size, font and depth of marking, as well as the types of information to be recorded in order to facilitate illicit firearms identification and tracking. The draft, regional standard was presented at the CIFTA Consultative Committee meeting in April 2013 for consideration and approval at the May 2014 meeting of the states parties. The final document will be presented for approval at the 2015 CIFTA meeting.
Continued Necessity

Despite important advances made through the OAS-DPS project, a considerable number of firearms still require marking. Many governments in Latin America and the Caribbean maintain large national stockpiles, often remnants of long-resolved internal and external conflicts. Even with the provision of a limited number of marking machines, most governments in the region still lack adequate technical capacity to mark and keep record of all weapons manufactured, imported and confiscated in an effective way. The majority of participating OAS member states require additional equipment; OAS has already received requests for additional marking machines from various governments. Moreover, nearly all participating states require additional technical assistance, training and follow-up to ensure that efforts continue to mark and maintain records of firearms.

Through these and related initiatives, OAS seeks to support the efforts of its member states for marking and tracing in order to strengthen member states’ capacities to respond to the increasing levels of crime and violence caused by illicit firearms trafficking. 

See endnotes page 51
Disability Rights in Laos

Relatively poor immunization and health standards, inadequate transportation infrastructure, and explosive remnants of war from previous conflicts are prevalent causes of disability in Laos. The exact number of disabled people living in Laos today is unknown due to inadequate surveys, poor reporting and little incentive for individuals to register as disabled. 1 Despite the large number of disabled persons in Laos, they are a highly underrepresented minority. However, disability issues have become increasingly mainstream in Lao society in recent years, and a renewed effort to secure disability rights has ensued.

With over two million tons of ordnance dropped between 1964 and 1973, Laos is considered the most heavily bombed country per capita in history. It is estimated that up to 30 percent of the 270 million cluster bomblets dropped on the country failed to detonate and remained after the conflict ended. 2 According to the country’s mine action center, the National Regulatory Authority for UXO/Mine Action Sector in Laos (UXO-NRA), unexploded ordnance (UXO) contamination exists to some degree in every province; about one in every four villages is contaminated. 3 The widespread and severe UXO contamination is a major cause of disability in Laos, where an estimated 12,500 to 15,000 mine/UXO survivors currently live. 4 New UXO casualties can be prevented by clearance operations and risk education initiatives.

International and National Legislation

Laos signed the Convention on Cluster Munitions (CCM) on 3 December 2008 and ratified the legislation on 8 March 2009. 5 The CCM is especially significant because Article 5 outlines the principles of victim assistance for UXO survivors. These principles are in agreement with the rights guaranteed to disabled people by the Convention on the Rights of Persons with Disabilities (CRPD), which Laos signed on 15 January 2008 and ratified 15 September 2009. 6 For example, that UXO survivors should receive support through medical and rehabilitative care corresponds with their right to the highest obtainable level of health and rehabilitation set forth by the CRPD. The CCM and the CRPD both emphasize social and economic inclusion for survivors. Like the CRPD, which highlights the rights of disabled women and children, the CCM stipulates that victim assistance for UXO survivors should be gender- and age-sensitive. 7,8

Shortly after the CCM’s entry into force on 1 August 2010, the First Meeting of States Parties was held in Vientiane, Laos. 9 The Vientiane Action Plan, which was adopted at this meeting, outlines what the State Parties should prioritize. Although not legally binding, the Vientiane Action Plan serves as an aid for the States Parties as they attempt to implement the measures set forth by the CCM. 10

As the national mine action center in Laos, UXO-NRA is responsible for the regulation and coordination of all clearance operations in the country. In addition to coordinating clearance activities, UXO-NRA also works toward the inclusion of UXO survivors into society. 3 UXO-NRA has
a victim assistance unit as specified in their strategic plan, titled Safe Path Forward. The plan calls for the creation and management of a national database for landmine/UXO incidents. Such a database will not only depict which areas to prioritize for clearance and mine risk education (MRE) tasks but also the number of survivors and their specific needs. This information will then be factored into future public health initiatives. UXO-NRA has conducted the Lao National UXO Victim and Accident Phase 1 Survey, which identified particular areas with high concentrations of UXO incidents and recurring characteristics of survivors such as activities, occupations, age and gender.

Disability Rights in Laos

While ratifying the CRPD is undoubtedly a step toward the fulfillment of disability rights, the focus on disability rights is not a new trend in Laos. Laos passed several national laws addressing issues disabled people face. As a result of its revision in 2003, the Laotian Constitution now guarantees that disabled persons will receive social security benefits and receive time off work in the event of incapacitation or disability.

Additional national laws, such as the amended Labour Law of Lao People’s Democratic Republic of 2006, further address issues disabled people encounter. This legislation encourages employers to give disabled persons positions with pay comparable to other workers and calls for employers to provide assistance to those disabled during work or while commuting. Those who fail to comply with this law may receive a warning or fine, have their business suspended or license revoked, and legal action may be taken against them. While the law does address issues such as providing suitable jobs and aid in the case of work-related disability, it fails to protect disabled people in areas such as workplace discrimination. The law states that the employer and the employee should mutually benefit without “discrimination as to race, nationality, gender, age, religion, beliefs and socio-economic status.” Missing from this clause, as well as other national legislation, is any explicit prohibition of discrimination on the basis of disability. Because disability-based discrimination is not explicitly prohibited, legal action cannot remedy such situations.

In 1995, the Prime Minister’s Office issued a decree establishing the National Committee for Disabled People (NCDP). However, the roles and responsibilities of NCDP are not clearly outlined in the decree. A second decree was passed in 2009, shortly after Laos signed the CRPD, aligning the responsibilities of NCDP with the convention’s requirement for structure to “promote, protect, and monitor the implementation” of the CRPD. The decree further clarified that NCDP is to coordinate disability-related policies and programs in Laos, conduct nationwide needs surveys and produce statistics depicting the distribution of various types of disabilities and disabled people’s needs. NCDP has the advantage of access to government-controlled information channels such as newspapers, radio broadcasts and television.

Challenges for Disabled People

To fully participate within society, often disabled people must overcome physical and attitudinal barriers. In Laos, many live in rural settings where rough roads and topography limit mobility. Weather indirectly, yet significantly, impacts disabled people in Laos. During the rainy seasons, numerous rural roads become nearly impassable by foot. Many public and commercial buildings feature a set of front
steps in case of flooding. Similarly, stilts support houses in rural areas and homes generally have steps leading to the front entrance. The country’s political history has also affected the architecture of its buildings. Shops in Laos are often very narrow with several floors, because businesses were traditionally taxed on the amount of street frontage their business occupied. Some disabled people with mobility issues cannot access the buildings due to their tight, narrow construction, which prohibits wheelchair ramps and makes other accommodations equally difficult.

In addition to these environmental challenges, disabled people in Laos must overcome societal stigma. Similar to several other countries, disability and disabled persons in Laos are often associated with negative stereotypes, widely misunderstood and misrepresented. Because Laos has an agrarian-based economy, in which most jobs require physical labor and mobility, many Laotians believe that disabled people cannot contribute and are a burden to their families and society.

Because of the negative stigma associated with disability, society is more likely to abandon, ostracize or even hide children with disabilities. Furthermore, families receive little or no benefits from registering a child as disabled. When a family hides a disabled member from authorities, it affects the government’s ability to improve legislation and living conditions and reduce overall prejudice because the total number and distribution of disabled people remains unclear.

**Advocacy**

Creating awareness about disabled persons’ abilities and contributions is one way to change societal beliefs and dispel associated stereotypes. In accordance with the CRPD, States Parties must take measures to spread awareness about the rights of disabled people at all societal levels, including the nuclear family, to prevent potential discrimination or concealment.

At the forefront of awareness efforts are disabled people’s organizations (DPO). As the majority of their members are disabled, DPOs work directly with and serve as a representative for persons with disabilities. In order to counteract the stigma associated with being disabled, DPOs aim to educate the public about disability rights. One of the largest DPOs in Laos is the Laos Disabled Persons Association (LDPA) with branches in 11 of the 18 provinces. Because of its physical and ideological breadth, LDPA has become the prominent DPO in Laos. One of its most important responsibilities is to monitor.
What Help Does Laos Receive?

In 2013, the Office of Weapons Removal and Abatement in the U.S. Department of State's Bureau of Political-Military Affairs (PM/WRA) funded several clearance, mine risk education (MRE) and survivor assistance projects in Laos. The clearance projects were as follows:

- The HALO Trust conducted clearance in the Savannakhet province.
- MAG (Mines Advisory Group) coordinated survey and clearance operations in the province of Xiangkhouang.
- Norwegian People's Aid conducted survey and clearance activities in the Xekong province.
- Sterling Global provided capacity development to UXO-NRA as well as monitored and coordinated UXO Lao clearance units, ultimately extending their technological capacity.14

PM/WRA survivor assistance initiatives for disabled persons in Laos were implemented by the following organizations:

- Health Leadership International developed and strengthened the diagnostic capabilities of medical personnel at the district level and provided portable ultrasounds.
- World Education Inc. enhanced victim assistance services in Xiangkhouang province, improved trauma care training capacity for Laos medical personnel and developed first-aid curriculum to be used nationwide.14

Additionally, PM/WRA supported MRE programs in Laos:

- Catholic Relief Services distributed MRE materials in two provinces.
- Spirit of Soccer used sports-oriented curriculum to teach MRE to children living in high-impact areas.14

Organizations such as Handicap International (HI) and the Cooperative Orthotic and Prosthetic Enterprise (COPE) are devoted to the physical rehabilitation of UXO survivors and other disabled people in Laos. HI strives to strengthen the operational capacity of Lao institutions and increase their collaboration to address factors that cause disability and to promote and protect the rights of disabled people. With a budget of about EU€1,768,000 (US$2,417,794 as of 12 January 2014), HI supports capacity building of disabled people’s organizations (DPO) through partnership and collaboration and advocates for the prevention of disability through UXO clearance, MRE, maternal and childhood healthcare, and improved road safety measures.14 HI works closely with the Laos Disabled Persons Association (LDPA), supporting the DPO in its efforts to construct a nationwide network of local committees dedicated to promoting disability rights. Additionally, HI and LDPA have collaborated to make work more accessible for disabled people by creating a job center that provides jobs and a support center that helps those currently employed.14

COPE is a nonprofit organization created in 1997 by the Lao Ministry of Health and several nongovernmental organizations including POWER, World Vision, and the Cambodian School of Prosthetics and Orthotics to address the need for rehabilitative and orthotic care for UXO survivors.14 COPE now collaborates with the Center of Medical Rehabilitation, the Lao Ministry of Health and four provincial rehabilitation centers to ensure that UXO survivors and other disabled people receive comprehensive rehabilitative care. In 2012, COPE supplied more than 1,000 orthotic and prosthetic devices to survivors free of charge for those unable to afford them.14 In addition to subsidization of the costs to equip disabled persons with prosthetics and mobility devices, COPE strives to develop the capacity of rehabilitative services by conducting nationwide trainings on physiotherapy, occupational therapy and pediatric healthcare.14 Although many of the individuals that COPE equips with prosthetics and mobility devices are survivors of UXO incidents, the organization also provides assistive devices to children born with disabilities, victims of trauma and individuals affected by diseases such as polio and leprosy.14

The International Committee of the Red Cross Special Fund for the Disabled has given financial support to COPE since 2007. This funding provides for the costs of prosthetic rehabilitation of about 250 disabled persons annually, many of whom are UXO survivors. Costs of food, accommodation and transportation to one of the partner rehabilitation centers located in Vientiane, Pakse, and Xiangkhouang to receive treatment is also covered for the duration of the patient’s rehabilitation.14

The U.S. Agency for International Development (USAID) has supported survivor assistance programs in Laos since 1990. Over US$10.3 million has been provided to support programs aimed at improving the quality of emergency, orthopedic, rehabilitation and referral services for survivors of UXO incidents and other physical trauma. USAID-funded programs also focus on the expansion of educational opportunities for children with disabilities, vocational training and employment opportunities for people with disabilities and building capacity of DPOs. Since December 2010, USAID has provided financial support to COPE to strengthen physical rehabilitation services with a specific focus on improving the prescription and manufacture of orthotic devices.14

See endnotes page 51
the implementation of the measures set forth by the CRPD. Additionally, LDPA broadcasts a 30-minute radio show weekly that discusses disability rights and other disability-related issues. The content of the radio show is written and presented by disabled people. Because radio is the main mode of news and information exchange in Laos, the show serves as an effective way to educate the public about disability rights. LDPA also broadcasts a 30-minute television program monthly, in which disabled people present information related to disability issues. Both the radio show and the television program serve as invaluable media for disabled people to voice their opinions, educate the public and dispel stereotypes. Ultimately, LDPA serves as a liaison between disabled people and government, nongovernmental organizations (NGO) and society as a whole.

**Future Action**

Despite ratification of the CRPD and the CCM and related national legislation, many issues related to disability, including disabilities caused by UXO, remain unclear or have yet to be addressed for full CRPD implementation. The government of Laos and LDPA recently collaborated to create a draft of the *Decree on the Rights of Persons with Disabilities*. More detailed and expansive than previous legislation, this decree, which was still pending approval from the government as of January 2014, is crucial to the improvement of conditions for disabled people in Laos.

Laws that feature vague language are much easier to exploit and circumvent than those with clear, precise language. Unlike previous legislation, this decree explicitly defines what qualifies as discrimination on the basis of disability, reasonable accommodation, universal design, assistive devices and public infrastructure. Furthermore, the decree not only calls for reasonable accommodations, but also addresses measures that prevent disabling conditions such as improved maternal healthcare, increased immunization, childhood nutrition, prompt treatment and rehabilitation, and prevention of accidents, including UXO-related incidents.

The authors would like to thank Channapha Khamvongsa, executive director of Legacies of War, for providing helpful information for this article.

See endnotes page 51
Achieving Local Ownership in Mine Action

Sustainable development is key to maintaining a self-sufficient national mine action program. To achieve self-sufficiency, programs must build capacity and transition away from the international community’s financial and technical support.

by Blake Williamson [CISR]

Until recently, the concept of a state’s government owning a mine action program was a more speculative than achievable goal. Sustainable development is an important aspect of maintaining a national mine action program. To achieve a financially and technically self-sufficient program, national authorities must be willing to commit to mine action goals and claim responsibility for mine action issues within their countries. In A Guide to Transitioning Mine Action Programmes to National Ownership, the Geneva International Centre for Humanitarian Demining (GICHD) asserts that sovereign states are responsible for confronting issues that exist within their jurisdiction. In a mine action context, these issues include landmine and explosive remnants of war clearance, mine risk education (MRE) and victim assistance.

To help facilitate the transition process for mine action authorities and mine action centers, GICHD has provided a guide to assist in identifying goals according to national circumstances. Instead of using procedures that correspond to specific situations, GICHD recognizes that circumstances vary by country and provides “a structured series of processes, questions, suggestions and tools” to achieve a transition by

A deminer works in Cambodia. Photo courtesy of Suzanne Fiederlein/CISR.
assessing country-specific conditions, designing a transition plan, developing an implementation plan and monitoring progress throughout the process.¹

Although the degree of control transferred from a mine action program to national authorities can vary, GICHD defines transition as “the process through which the international community reduces its financial and technical support, as the affected state develops the required national programme management capabilities that lead to national ownership.”¹ Notably, the transition process is not an end goal, nor does it mark the end of international cooperation. From the U.N.’s point of view, transition simply characterizes sustainable development, which is often a prerequisite for meeting mandate objectives.

H. Murphey (Murf) McCloy, an expert on post-conflict and conventional weapons destruction with the Office of Weapons Removal and Abatement in the U.S. Department of State’s Bureau of Political-Military Affairs (PM/WRA), explains that the overall goal of centralizing control of mine action within the state is threatened by the issue of multiple mine action programs. This can be remedied through the presence of an organization acting as a coordinating authority.² According to McCloy, this means that “the arrangements/compromises necessary to centralize control of mine action within the state and keep separate programs from operating independently are easier to achieve.”² In the event that local authorities or non-state actors exercise control in a loosely defined area independent of national authorities, non-state actors may maintain more influence in their local domains than authorities acting on behalf of the national government and will often see the financial benefits of independent programs, therein rendering the centralization of control impossible.² While otherwise counterintuitive, a program truly seeking self-sufficiency must be integrated into the government structure. GICHD explicitly states that “transition requires a commitment of more national resources with a parallel reduction of external assistance.”¹ In other words, states must consciously decide to support transition while compensating for reduced international funding to become successfully self-sufficient.

After making the decision in April 2001 to transition, Azerbaijan successfully transferred its mine action capacity to national ownership by 2004. Through its experience, the Azerbaijan National Agency for Mine Action (ANAMA) suggested that transition processes require three basic elements: “a decision as to what should be developed as the capacity of the programme, ... a government decision to nationalize the programme, with a reasonable timeframe in which to gain experience under supervision and then assume responsibility,”¹ and “a strong national manager who understood the process.”³ According to PM/WRA, ANAMA’s ability to fund program needs internally and on a long-term basis is perhaps the strongest indicator of the organization’s success.

In most countries, transition may take longer than in Azerbaijan. In very impoverished countries, national authorities may not consider national ownership of a mine action program to be a priority. For countries suffering from devastated infrastructures and crippled economies, compensating for the withdrawal of external support from mine action programs is never easy. However, when international community partners recognize and respect the host nation’s sovereignty, authorities will often feel empowered and remain more disposed to develop their own capabilities in a constructive partnership with the international community.² Alternatively, in situations where the relationship between the host nation and international partner was formed under highly autocratic conditions, local ownership becomes significantly more difficult to achieve.²

On behalf of the state, leadership must be interested in and capable of fulfilling clearance obligations.¹ Hence, to achieve a local buy-in, international donors should first select implementing partners that can empower local national leadership.² Authorities must also possess a clear understanding of implementation challenges as well as the financial, technical and human resources necessary to fulfill Article 5 of the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-personnel Mines and on Their Destruction.¹ Therefore, donors benefit from communicating with implementing partners and enforcing
compliance through regular reporting. A practical, purposeful plan to complete implementation of Article 5 and a significant financial commitment to the national mine action program are also necessary. Moreover, the implementing partner must hire local nationals capable of growing with and providing leadership to the program. Notably, while the skills local staff learn from the international community will create desirable employees in and outside of the humanitarian mine action (HMA) sector, donors recognize that, when dedicated to local self-sufficiency, local authorities retain the ability to minimize the negative impact this causes within the local context. While these components will not ensure the success of the transition process, they will certainly improve the chances that those in need will receive support from those who can provide it.

Once national circumstances are identified, a transition plan and implementation strategy can help mitigate a country’s shortcomings. GICHD divides the transition process into multiple phases: assessment and analysis, development, and implementation. While international donors may not prioritize the same objectives as their respective host nations, emphasis is placed first on core values and the mission of their respective organizations followed by the affected host nation’s needs. Particular political environments may also affect the priorities of the host nation as well as the maturity of the local HMA infrastructure, amount of available funding and conditions the providing authority places on the expenditure of funds.

To ensure a successful transition, appropriate measures must be taken to monitor the success of the process. By assessing the program’s internal conditions, authorities can identify potential issues or constraints in the transition process. Similarly, when analyzing the program, national authorities are able to evaluate the current state of the transition process. Notably, key components of a successful assessment and analysis will include a “consensus on the nature and size of the residual contamination and requirements for MRE and victim assistance that the post-transition structures will have to address, government commitment (which is absolutely essential) and an effective advocate who will drive and protect the transition process.”

See endnotes page 51
New Mine/ERW Risk Education Initiatives in Afghanistan

Many steps, including training midwives, police officers and teachers in mine and explosive remnants of war risk education (mine/ERW RE), have been taken in Afghanistan to ensure that mine/ERW RE is integrated into local networks. This article outlines the move toward integrating mine/ERW RE within local networks in Afghanistan to assure that high-quality and sustainable material is delivered in the areas that need it most.

by Samim Hashimi [MACCA]

Torn apart by decades of conflict, Afghanistan is one of the world’s most mine-contaminated countries.1 Addressing the problem of mines and explosive remnants of war (ERW) in Afghanistan will remain a major challenge over the next decade. In order to foster government ownership and ensure that affected communities across the country have access to relevant information, mine/ERW risk education (RE) must be integrated across government networks.

The Mine Action Coordination Centre of Afghanistan (MACCA) successfully mainstreamed mine/ERW RE across several government networks, providing training to various groups including

- Ministry of Education (MoE) (schoolteachers)
- Norwegian Afghanistan Committee (NAC) (midwives)
- UNICEF (vaccinators)
- Child Fund Afghanistan (community health workers)
- Ministry of Interior (police-e-mardumi [community-based police officers])
- Ministry of Religious Affairs (MoRA) training of Mullah Imams (pastors)

MACCA is examining innovative ways to institutionalize mine/ERW RE activities and succeeded in expanding the program to reach more impacted communities thanks to these networks.

As one of the countries most affected by landmines and ERW, Afghanistan has a responsibility to ensure mine/ERW RE is carried out in an effective and sustainable way throughout the country. According to the latest figures, mines and ERW injured or killed 8,986 Afghans from 2002 to 2013.2 The reported figures have significantly decreased since 2002 (see figure 1, page 33).

For more than 10 years, U.N. Mine Action Service (UNMAS) has supported MACCA’s mine action activities in Afghanistan. MACCA coordinates the Mine Action Programme of Afghanistan (MAPA), which has more than 20 years’ experience in successfully working mine action in the country. UNMAS and MACCA work toward the gradual transition of mine action responsibilities to the government of Afghanistan. MRE and victim assistance lead this transition, and exciting steps were taken in ensuring a sustainable, national authority delivers quality mine/ERW RE.

Mine/ERW RE in Afghanistan’s Midwifery Networks

Accessing women in mine/ERW-impacted communities is often challenging. MACCA recently collaborated with NAC
to train all NAC midwives in different provinces of Afghanistan. This initiative aimed to provide landmine and ERW awareness to women and girls in communities impacted by mines/ERW to ensure informed decisions can be made regarding the threats posed when conducting everyday tasks. While responding to medical treatment referrals, the trained midwives will provide awareness to housewives as well as girls in their houses and health facilities.

NAC trained 135 midwives in Wardak province to provide awareness workshops to other women and girls in their areas of responsibility. The workshops provide information for women and girls about the location of safe water and firewood collecting areas as well as where to graze livestock. This process will continue to train remaining midwifery networks in other provinces of Afghanistan.

Mine/ERW RE Training for Police-e-Mardumi

MACCA has trained around 130 male and female community-based police officers, or police-e-mardumi, in seven Afghan provinces. The officers provide training to mine/ERW-affected communities and to other police officers, community members and schoolchildren. Results show that this successfully raised awareness among community members and built relationships between police and communities.

Mine/ERW RE in the MoE

In Afghanistan, as in many other countries, a high proportion of mine-accident victims are children. Therefore, MACCA identified the need to incorporate mine/ERW RE into the national education system. The three main initiatives were to:

- Train teachers in mine/ERW RE
- Incorporate mine/ERW RE into the new national curriculum
- Distribute mine/ERW RE materials to schools

The mine/ERW RE messages are now integrated into the curricula for grades seven through 12. The curriculum for grades one through six was nearly finalized by the end of 2013, and it is expected that funding to complete the curriculum will soon be available in a grant from the U.S. Embassy in Kabul.

MoE child-protection officers (CPO) trained a total of 23,237 male and female teachers in more than 11,000 schools in 34 Afghan provinces to teach mine/ERW RE to children. This curriculum ensures children know to avoid dangerous areas, understand warning signs and recognize clues that an area may be unsafe. Moreover, parent-teacher committees were established to discuss child safety outside of school and during times of outdoor activity.

CPOs and schoolteachers received more than 11,000 mine/ERW RE kits to support their sessions with students and community groups. These kits include three posters of life-size mines and ERW, 10 mine/ERW RE/victim-assistance activity cards (seven mine/ERW RE and three disability-advocacy cards) and a guideline for those helping to conduct the trainings for schoolteachers. This effort helped to mainstream mine/ERW RE within the government sectors, in particular MoE. More than 60 percent of Afghan children attend school and learn about mine/ERW risks and unsafe behaviors. In addition, children receiving mine/ERW RE pass on lessons learned and related textbooks to family members and others who are not attending school. The mine action and livelihood survey shows that the majority of women and girls unable to attend mine/ERW RE classes were provided with RE sessions through their elders and family members whom MAPA teams and schoolteachers had visited. MoE has recruited more than 70 people to serve as mine/ERW RE focal points in all 34 Afghan provinces to support the integration and expansion of future mine/ERW RE activities.
Integration of Mine/ERW RE within MoRA

MACCA has also trained over 1,000 Mullah Imams in early 2014 and plans to train a total of about 15,000 Mullah Imams throughout the country to provide awareness to their communities.

Community Mine/ERW RE

In order to expand the outreach of MRE activities, MACCA trained around 41 out of 49 survey teams from various organizations, including the Mine Clearance and Planning Agency, Afghan Technical Consultants, Danish Demining Group (DDG), The HALO Trust and Sterling International (now Sterling Global). These survey teams conduct mine/ERW RE sessions with affected communities across Afghanistan. Recent reports indicate this resulted in greater mine/ERW awareness among communities.

To reach the roughly 35 percent of Afghan children who do not attend school, MACCA and MAPA work together through Afghanistan’s Community Based Mine Risk Education (CBMRE) program, which reached around 20 million Afghans from 1992 to 2013.

CBMRE is implemented by MAPA mine/ERW RE partners including the Afghan Red Crescent Society, Organization for Mine Clearance and Afghan Rehabilitation, DDG, Association for Aid and Relief Japan, Handicap International and Mobile Mini Circus for Children. CBMRE programs target impacted communities by directly implementing MRE and training community volunteers in collecting data on mine/ERW casualties. Around 45 CBMRE teams are currently providing awareness sessions for mine/ERW-affected community members.

MACCA’s New Hotline Number

MACCA recently created a hotline number to promote information gathering and to ensure a rapid response to mine/ERW problems. Beginning in September 2012, a pilot program introducing the hotline began in two provinces—Kabul and Parwan—before gradually expanding to other Afghan areas. The new hotline has also supported the MRE program as a means for communities to report mines/ERW. The analysis shows that MAPA demining organizations removed several mines/ERW, which helped to avoid mine/ERW accidents and casualties. The hotline also improved the emergency response in affected communities.

During the pilot phase, different community members received 25 calls reporting the existence of mines/ERW. Locals found six mines, 121 ERW, one bomb and 1,000 pieces of small-arms ammunition; and these items were subsequently
destroyed as a result of reports received from community members.

The second phase began in January 2013, and the hotline expanded to other Afghan provinces. Calls were received from Badakhshan, Badghis, Balkh, Bamyan, Faryab, Kabul, Kapisa, Khost, Kunduz, Laghman, Logar, Nangarhar, Paktya, Panjsher, Parwan and Takhar provinces. Data shows that 122 calls were received from January to November 2013 including

- Six calls related to minefields
- Four calls for new minefield surveys
- 47 calls for mine-related problems
- 34 calls for ERW-related problems
- Five calls related to aircraft bombs

The calls led to the discovery of 37 mines, 931 ERW, five aircraft bombs and 1,990 pieces of small-arms ammunition.

Assessment showed that the expanded hotline received more calls, resulting in a rapid emergency response for affected communities and those living or working near contaminated areas in Afghanistan. Response times ranged from one day for emergency ERW spot check to two or three days for other tasks.

Conclusion

In its capacity as a coordinating-body, MACCA arranged for its implementing partners to train relevant personnel across the government networks in health, education and security in Afghanistan in order to expand mine/ERW RE’s reach, which ensured that a greater number of men and women were aware of the threats posed by landmines and ERW. In the context of transition, the success of this mainstreaming initiative has been to strengthen the capacity of Afghanistan’s national authorities to directly implement future mine and ERW RE.

See endnotes page 51
Kurdistan’s Erbil Mine Action Center

The Erbil Mine Action Center (EMAC) of the Iraqi Kurdistan Mine Action Agency increases mine risk education efforts in the spring to reduce high casualty rates during this season. EMAC also conducts landmine clearance in Iraqi Kurdistan.

by Jamal J. Hussein [Erbil Mine Action Center]

The spring season is a busy time in the Iraqi Kurdistan region. Several national holidays, such as Newroz (Kurdish New Year), fall between March and April, and many Kurds celebrate by enjoying picnics in mountain locations, green areas and along riverbanks. Similarly, many residents begin planting crops and gathering herbs in the spring, an act that often occurs near or within contaminated areas. These outdoor activities result in an increased number of injuries from landmines and explosive remnants of war (ERW) during the spring.

Erbil Mine Action Center’s Role

To reduce the number of casualties, the Erbil Mine Action Center (EMAC) at the Iraqi Kurdistan Mine Action Agency (IKMAA) increased mine risk education (MRE) activities in the spring. Funded by the Kurdistan Regional Government (KRG), EMAC issues safety instructions and MRE teams perform special awareness training in mine and ERW affected areas.

KRG provides all sustainable funding for mine action in the Kurdistan region. At IKMAA’s request, some short-duration projects, such as MRE and trainings, received limited funding from outside parties (e.g., UNICEF, Handicap International and the Geneva International Centre for Humanitarian Demining). Funding from outside agencies is not a reliable and ongoing source; funds received vary from year to year.

Delivering MRE

MRE teams are composed of locally trained staff that follow MRE awareness guidelines provided by EMAC. Beginning the first week of March and continuing until the end of April, teams conduct one special MRE session per affected district, making an effort to reach residents and nomadic families.

Each district in Kurdistan has its own security checkpoint. The MRE team provides posters and other MRE instruction to all persons passing through checkpoints. Through television, radio, security checkpoints and community presentations, MRE teams can effectively communicate MRE to villagers and communities prior to the spring season.

In spring 2012, EMAC visited 72 villages to deliver MRE and distributed more than 4,600 leaflets, booklets, posters, landmine photos and instructions, which benefited more than 2,000 men, women and children. In March 2013, these numbers were halved due to snow, rain and other inclement weather; therefore, MRE teams could not reach all planned targets. However, villagers responded positively and the casualty rate dropped during the spring seasons of 2011–2013 in targeted areas, suggesting that MRE awareness trainings may have made a difference.

EMAC also conducts MRE sessions for schoolteachers and students as needed, depending on available funding. In 2012,
197 teachers and 1,054 students were trained, and in 2013, 103 teachers and 723 students were trained. In 2014, EMAC concentrated on training educational supervisors to monitor MRE teaching, which is a part of the primary-school curriculum. Prior to 2014, EMAC had not trained supervisors. During the months of March and April 2014, 106 supervisors, 34 teachers and 128 students were trained.

As part of the Community Based MRE (CBMRE) project, 34 villagers were trained in 2012 to work as MRE volunteers that disseminate information on safe behaviors in their communities and report anything that is ERW related to IKMAA MRE teams. In 2013, 32 villagers were trained. Additionally in 2013, EMAC distributed MRE materials including 730 leaflets, 250 posters and 73 guidance booklets as part of CBMRE activities. Moreover, the number of villages to join the CBMRE project increased from 17 to 20 from 2012 through May 2014. Likewise, the number of child beneficiaries also increased from 441 to 799 over this same time period.

According to IKMAA, a preliminary technical survey conducted from 2009 to 2010 found that since 2003, no additional landmines had been laid. The Information Management System for Mine Action department in IKMAA headquarters maintains all mine action center records. Weekly and monthly progress reports track mine/ERW victims. Data from 2013 indicates that a total of 56 victims were recorded in the Kurdistan region during that year and, of these, the Erbil governorate had 11 victims.

**Combating Challenges**

In the future, EMAC plans to increase its capacity and resources to raise clearance production by EMAC demining teams and demining companies. Likewise, EMAC plans to utilize the newest generation of demining assets such as

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**EMAC Spring 2014 MRE Guidelines**

1. Do not approach unfamiliar areas that you have not visited previously. Ask others who know the area if it is safe. Mined areas do not always have signs and most mines lie just beneath the surface.
2. Do not approach areas marked by mine signs (red triangle), rocks painted red and marked with the letters BM (Benchmark), previous military posts, battle areas, areas surrounded with barbed wire or locations with pictures of bone and ERW.
3. When gathering edible herbs, picnicking or pasturing animals, only enter areas known by the public to have no mine risk.
4. Do not approach, touch or throw objects at mines or unknown items because explosions can be fatal or cause severe injury.
5. Call the EMAC emergency number to report landmines, ERW and other threats, or to seek emergency help.
detectors or mechanical clearance machines; deliver more targeted MRE sessions to at-risk individuals; distribute safety messages through the Internet and mobile phones; and engage media to reduce the mine/ERW impact. According to IKMAA, 20 to 27 percent of Erbil governorate’s minefields were cleared and handed over to the owners.

EMAC’s mine action program still faces several key challenges. Kurdistan has little information available about the location of mines, such as original minefield maps. Although EMAC survey teams gather information about contaminated lands from villagers, this is a slow process. Kurdistan’s weather, specifically in winter due to snow and rain, inhibits demining in the mountains where many minefields are located. In addition, valleys, dense bush, vegetation and hard ground complicate Kurdistan’s demining terrain. Metal fragments still contaminate battle areas from the Iran-Iraq War (1980–1988), making metal detector use less efficient. Additionally, most minefields were disrupted. In some cases, local villagers attempted land clearance by disarming visible mines or removing mines from the minefield and stockpiling them in another location. Finally, staff turnover is a problem at EMAC; due to limited resources, skilled and qualified personnel leave the program for better salaries and less rigorous work.

Although faced with a multitude of challenges, EMAC’s efforts to rid Iraqi Kurdistan of landmines continue. See endnotes page 51

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Number of Beneficiaries</th>
<th>Number of Villages Visited for MRE</th>
<th>Number of MRE Aids Distributed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Children</td>
</tr>
<tr>
<td>2012</td>
<td>March + April</td>
<td>389</td>
<td>601</td>
<td>1,017</td>
</tr>
<tr>
<td>2013</td>
<td>March + April</td>
<td>179</td>
<td>321</td>
<td>415</td>
</tr>
</tbody>
</table>

Table 1. MRE beneficiaries 2012–2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Teachers Trained</th>
<th>Number of Students Trained</th>
<th>Number of Educational Supervisors Trained</th>
<th>Number of Volunteers from Villagers Trained</th>
<th>Number of Villages Joined CBMRE Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>197</td>
<td>1,054</td>
<td>0</td>
<td>34</td>
<td>17</td>
</tr>
<tr>
<td>2013</td>
<td>103</td>
<td>723</td>
<td>0</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>2014 to date</td>
<td>34</td>
<td>128</td>
<td>106</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2. CBMRE training summary, January 2012–May 2014.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Villages of CBMRE Project</th>
<th>Number of Beneficiaries</th>
<th>Number of MRE Aids Distributed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>2012</td>
<td>17</td>
<td>670</td>
<td>450</td>
</tr>
<tr>
<td>2013</td>
<td>20</td>
<td>517</td>
<td>702</td>
</tr>
</tbody>
</table>

Table 3. CBMRE Project 2012–2013.

Jamal J. Hussein is a director general of the Erbil Mine Action Center with the Iraqi Kurdistan Mine Action Agency and director of the Fria Society of Mine Action Professionals in Erbil, Iraq. In 1986, he earned a Bachelor of Science in chemistry at Salahadin University in Erbil. He began work in the field as a deminer in 1998 with Greenfield Consultants. He became a demining team leader in 1999 and a demining training instructor in 2000. He has worked with the U.N. Office for Project Services as a technical and safety guideline and training monitor.

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Advanced Ordnance Teaching Materials

The Advanced Ordnance Teaching Materials (AOTM) program leverages recent advances in the accessibility of 3-D printing to raise the quality of humanitarian explosive ordnance disposal education worldwide.

by Allen Tan [Golden West Humanitarian Foundation]

Regardless of geographical location or native language, explosive ordnance disposal (EOD) technicians must understand common key concepts. The Advanced Ordnance Teaching Materials (AOTM) program addresses a fundamental aspect of EOD education: ordnance fuze functioning. To assess the risks associated with handling ordnance effectively, it is essential to understand how ordnance fuze mechanisms function. Successfully teaching these principles remains challenging, even in more advanced EOD programs.

This issue extends worldwide to a multitude of ordnance-remediation programs. Many of these programs, such as those in Southeast Asia, continue seeking assistance in developing long-term EOD-response capabilities. Using the example of how Europe addresses unexploded ordnance (UXO) challenges by maintaining national capacities for UXO response validates this approach; countries benefit from developing sustainable indigenous assets capable of dealing with these issues as they are discovered. Instead of pursuing the idea of “total clearance,” this focus confronts UXO as it arises.

Five SOTS items:
1. Top left—point-detonating projectile fuze with setback-armed slider
2. Top center—point-detonating projectile fuze with setback and centrifugal arming using locking balls and slider-detent
3. Top right—vane-armed aircraft bomb fuze with impellor and rotor
4. Middle—point-initiating, base-detonating high explosive anti-tank round with piezoelectric element
5. Bottom—pressure, pressure-release, tension, tension release booby-trap with cocked striker

All photos courtesy of Nick Street.
To meet these objectives, most nations operate one or more EOD schools. In the Asia-Pacific region, EOD schools continue to request donor assistance for facility and infrastructure improvement, curriculum development and third-party technical advisers and instructors. These assistance packages often lack affordable and effective hands-on training materials.

Inert ordnance training aids from Golden West Humanitarian Foundation’s (Golden West) extensive library are often requested by humanitarian operators. Unfortunately, due to factors detailed in this report, distribution of these materials is limited. Golden West has struggled to find a solution to this problem.

The Advanced Ordnance Teaching Materials (AOTM) program aims to close the gap between the availability and need for EOD education, and endeavors to bring a set of universally applicable training materials to the EOD community. Ultimately, by improving the quality of EOD instruction, AOTM will increase operator safety within the profession.

Training Aids

The highest quality training aids currently available are made from various materials, such as plastic or wood, that seek to replicate the original appearance of ordnance. In programs where neither of these resources are available, classrooms rely on paper or electronic representations. Even when physical training aids are available, the absence of professional teaching tools or materials may mean that these aids are not used to full potential.

Inert ordnance. Inert ordnance training aids are handmade craft products. Because quality, functionality and appearance vary significantly, the products have inconsistent instructional value. Other issues associated with inert training aids include:

1. Limited supply of donor ordnance
2. Requirement of highly specialized technicians for production
3. Inherent risk to technicians
4. Labor-intensive craftsmanship (2–20 or more hours for one item)
5. International shipping regulations that severely limit distribution

Due to significant demand for these products, as well as the issues listed above, inert ordnance training aids cannot be distributed in quantities meeting the global need. Additional factors limit usefulness of inert ordnance for basic-level EOD training:

1. The complexity and small size of internal mechanisms obscures tactile observation of the device’s function.
2. The fragility of inert ordnance prevents repeated disassembly, which is particularly acute in complex mechanisms (fuzes were never designed for disassembly).
3. Conventional machining and fuze composition limits the degree to which the device can be cut away to expose functional components.

Replicas. Ordnance replicas generally consist of one or more parts that amalgamate the fuzing mechanisms of the item they represent. Replicas are commonly nonfunctioning; the components representing any fuze mechanisms have very limited or no mechanical functionality relative to the item they represent.

Typical production of replica ordnance employs hobby techniques such as silicone mold production for resin casting, while wood turning and other labor-intensive methods have also been used. Historically, lack of cost-effective fabrication methods for small-batch production limits manufacture of mechanically complex replicas.

Replicas excel at representing mechanically simple items such as projectile bodies, improvised explosive devices and simple ordnance fuzing (such as mines utilizing Bellville
springs). There is a notable market absence for items such as mechanical time fuzes.

Due to the accuracy of their external appearance, replicas are primarily useful for teaching ordnance identification during basic-level EOD education. Ordnance identification is important but does not substitute for a comprehensive understanding of fuze functioning. Moreover, the current range of capabilities represented in most replicas cannot adequately illustrate fuze functionality.

Publications. Publications are a pillar of EOD education and one of the most valuable resources available to field operators. The humanitarian community primarily relies on publications such as ORDATA II and unclassified military documents. While a critical source of information about specific ordnance items for advanced EOD operators, publications have significant limitations for teaching basic fuze functionality to entry-level trainees.

The level of formal education among EOD students in post-conflict developing nations, in which the majority of the sector’s work takes place, is another factor limiting usefulness of publications for entry-level education. In countries with low exposure to formal education and literacy (such as Cambodia and its civil-war generation), Golden West EOD instructors found that traditional teaching methods relying on written materials are significantly more difficult than “hands-on” methods. Even in countries where students acclimate to using print sources, the value of physical training materials remains undisputed.

AOTM Approach

AOTM identifies two distinct categories for ordnance training materials

1. Aids that teach generic ordnance and fuze functionality (PIBD, MT, BD, etc.)
2. Aids that teach ordnance-specific functionality (i.e., how an MJ-1 rocket fuze functions, etc.)

AOTM addresses both categories. The first deals with generalized fuze functionality, which is a universal requirement for all basic EOD education and is addressed through creation of a Standard Ordnance Training Set (SOTS). This set includes 10 models representing the most common fuzing mechanisms found in ordnance. While these mechanisms are true to generic fuze functionality, they are not specific to any single fuze design.

SOTS includes a comprehensive set of instructional resources to ensure students receive the best possible education. These support materials include lesson plans, multimedia materials (i.e., PowerPoint presentation slides), quizzes and exercises. The set also includes open-source reference materials. The entire SOTS package is delivered in a single Pelican Case™ for easy transport and storage in field conditions worldwide.

The SOTS package is tailored to meet the learning objectives of the European Committee for Standardization Workshop Agreement (CWA) for EOD Competency Standards for Humanitarian Mine Action Levels 1 and 2. This training set addresses CWA EOD Knowledge Base Competency Standards for
- Explosive ordnance recognition
- Explosives theory and safe handling of explosives

Addressing specific fuzes, the second category of training models is more applicable to high-risk munitions where EOD operators need precise knowledge. Another application trains EOD teams on threats specific to their area of responsibility. To serve these purposes, AOTM is building a database of 3-D ordnance models true to the original items. Some of the models are ready, but the goal is for the database to continue growing and serving the community’s needs. These can
be enlarged to scale to facilitate ease of use but are otherwise replicas of the originals.

The AOTM production process overcomes the aforementioned limitations by providing the ability to

- Create complex, cut-away windows to represent internal workings of ordnance
- Design custom representations based on specific training objectives
- Meet economical, low-volume production demands, international shipping constraints and on-demand production quotas
- Produce models with mechanical functionality, more detailed models and models with simplified mechanical functionality to teach basic EOD concepts
- Enlarged-to-scale items and components

**Pedagogy**

Faculty partners from Singapore University of Technology and Design and Massachusetts Institute of Technology have focused their contributions on incorporating current methodologies for mechanical education into the SOTS package. SOTS training materials are based on active learning methodology, engaging students in problem-solving and other activities requiring active participation. This methodology proved effective in teaching mechanical concepts.4

An example SOTS classroom exercise consists of dividing students into small teams; each team receives a disassembled model to reassemble and is asked to explain how it works to the class. The students perform the exercise prior to any instructor explaining how the mechanisms function. The instructor then guides the class to answer any questions that arise through group analysis.

The Instructor Guide is a professional lecturer’s guide and provides step-by-step directions on how to run lessons. This includes guidance on how to set up the class, facilitation activities and suggested teaching methods. Included in the digital resource kit, the guide is provided as a bound book accompanying SOTS.

**Technical Specifications**

SOTS includes 10 ordnance-based training models, each addressing major learning objectives for completion by October 2014. The design of all 10 models is loosely based on existing fuzes but features adaptations optimizing their presentation in order to clearly demonstrate each applicable learning objective. Table 1 outlines each of the models SOTS includes and the fuze mechanisms they represent.

The physical models included in SOTS were designed with the following constraints:

1. Mechanisms must be easily resettable to the unarmed position.
2. Mechanisms must be true to ordnance.
3. Mechanisms must be clearly visible.
4. Models must be physically robust and able to withstand repeated disassembly, tabletop drops and general classroom rigors.

Recent advances in affordability and accessibility of additive manufacturing enabled design and production of these models within constraints of the nonprofit sector. The engineering required to design these models is substantial, and some items require more than 100 design hours. The nature of this process is iterative, requiring multiple rounds of fabrication and redesign. 3-D printing offers the only known solution responsive and cost effective enough for this purpose. The printers used to fabricate AOTM models use Acrylonitrile Butadiene Styrene or ABS plastic, which proved well suited for this purpose.

**Sustainability**

The Office of Weapons Removal and Abatement in the U.S. Department of State’s Bureau of Political-Military Affairs (PM/WRA) provided full funding for the first round of AOTM development, which includes completion of SOTS. While still operating within the nonprofit framework, the AOTM project can continue serving the mine action community by expanding the database of available ordnance models.

In order to ensure the program’s continued evolution and serviceability, sales of models to humanitarian demining organizations in good international standing directly support the AOTM funding structure. PM/WRA, in cooperation with Golden West, will determine an organization’s purchasing eligibility. All PM/WRA implementing partners are expected to be eligible and can place orders at a web store (http://eodtrainingaids.com/).

**In Summary**

The AOTM program is poised to provide access to effective ordnance-training aids worldwide. By leveraging recent advances in additive manufacturing (3D printing), AOTM brings innovation to the humanitarian EOD classroom. These items have the potential to positively impact the quality of EOD education across the sector. See endnotes page 51
<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
<th>Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOTS – VTM1A1</td>
<td>Explosive firing train</td>
<td>Instructor's video</td>
<td>Match, Paper, Wood</td>
</tr>
<tr>
<td>SOTS – VTM2A1</td>
<td>Shear pin</td>
<td>Animation</td>
<td></td>
</tr>
<tr>
<td>SOTS – VTM3A1</td>
<td>Shaped charge</td>
<td>Animation</td>
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</tr>
<tr>
<td>SOTS – VTM4A1</td>
<td>Platter charge</td>
<td>Animation</td>
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<tr>
<td>SOTS – VTM5A1</td>
<td>Spit-back</td>
<td>Animation</td>
<td></td>
</tr>
<tr>
<td>SOTS – VTM6A1</td>
<td>Battery firing device</td>
<td>Animation</td>
<td>Thermal battery</td>
</tr>
<tr>
<td>SOTS – VTM7A1</td>
<td>Powder train time fuze</td>
<td>Animation</td>
<td></td>
</tr>
<tr>
<td>SOTS – VTM8A1</td>
<td>Chemical delay</td>
<td>Animation</td>
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</tr>
<tr>
<td>SOTS – VTM9A1</td>
<td>Mechanical delay</td>
<td>Animation</td>
<td>Wire through lead</td>
</tr>
</tbody>
</table>

Table 2. Supplementary instructor materials included in SOTS to demonstrate concepts best taught using multimedia.
3-D Printers Create Low-cost Prostheses

The war in Sudan has led to around 50,000 amputees, including Daniel Omar, the subject of a Time magazine article that attracted the attention of Not Impossible Labs co-founder Mark Ebeling. Omar was 14 when he lost both hands to a bomb dropped by the Sudanese government. He was rushed to the Mother of Mercy Hospital in the Nuba mountains of South Sudan where Dr. Tom Catena, an American doctor, cared for Omar. After reading Omar’s story, Ebeling assembled a team of medical and engineering experts, including Robohand inventor Richard Van As, to build prosthetic limbs for Omar.

Not Impossible Labs works on delivering low-cost and simple solutions to healthcare problems. The lab’s work is not limited to prostheses but includes the BrainWriter—a device that reads basic brain waves to engage and disengage a computer mouse, giving users the ability to draw with their brain only. With the help of Intel Corporation, a semiconductor chip manufacturer, and Precipart, a company that designs and manufactures precision parts, Not Impossible Labs developed a functional 3-D-printed prosthetic limb for Omar with production costs of US$100. The lab also established the first 3-D-printed prosthetic lab and school to continue creating prostheses for children of war in South Sudan. On average, one prosthesis was printed each week after the design team left South Sudan.

This prosthetic device is particularly remarkable because of its low cost and printability with a 3-D-printing facility in under six hours. Most prostheses developed for patients in the U.S. can take weeks to fit and design, and can cost between $3,000 to $30,000. The lower cost and added convenience of the 3-D design have a significant impact in South Sudan’s Nuba mountain region, where prosthetic limbs are 3-D-printed every week despite escalating violence in the region. Patients are able to obtain new prostheses without the expense traveling to a city for multiple days; they can be fitted for and receive a new limb in less than one day.

Hoping the technology will improve the lives of many other amputees, Not Impossible Labs made the design open source (available for public use free of charge), which allows health professionals and amputees worldwide to modify, improve and print the design. This technology has potential to make a significant difference in other areas of the world, particularly Southeast Asia and South America, where developed sectors have the proper infrastructure and expertise, but the rural population most affected by explosive remnants of war and mines is unable to afford professionally made prostheses.

See endnotes page 51

~ Patrick Shea, CISR Staff
Using MINEHOUND in Cambodia and Afghanistan

The HALO Trust uses the MINEHOUND dual sensor detector in Cambodia and Afghanistan to reduce false-alarm rates. MINEHOUND combines a metal detector with ground-penetrating radar to improve efficiency of mine removal in areas highly contaminated with metallic false alarms.

by David Daniels | Cobham Technical Services |, Jürgen Braunstein | Vallon GmbH | and Michael Nevard | The HALO Trust |

The vast majority of humanitarian mine clearance is conducted by manual deminers primarily using metal detectors. Increasing clearance rates of manual deminers is one of the primary ways organizations can improve effectiveness and efficiency. For this purpose, The HALO Trust (HALO) has used MINEHOUND VMR2 and VMR3 dual sensor landmine detectors in Cambodia since 2010 and in Afghanistan since 2012. The detector proved to be an adaptable and reliable means of increasing manual clearance rates.

MINEHOUND is comprised of an integrated metal detector (MD) designed, developed and manufactured by Vallon GmbH, and ground-penetrating radar (GPR) designed and developed by ERA Technology (now Cobham Technical Services or CTS). The integrated MD was first produced in 2004 and has been continuously improved to meet the needs of demining operators. Vallon and CTS collaborated to conduct initial HALO field trials in Cambodia. Since 2012, the U.S. Army’s Humanitarian Demining Research and Development (HD R&D) Program, which extended the project to Afghanistan, have also supported them.

Development

ERA Technology started developing the dual sensor MINEHOUND detector in 2001 based on its expertise in the use of radar for landmine detection and by careful observation of humanitarian deminers in action. The aim was to fully utilize the deminer’s skill while avoiding the complexity involved in operating current hand-held GPR systems and reducing reliance on software-driven auto-calibration. Using a radically different approach from conventional GPR designs regarding user interface, the detector employs a novel, audio-interface technique.

The original prototype detector combined output from an off-the-shelf MD and an ERA Technology-developed GPR with the design aim of offering considerable improvements in detection performance and a significant reduction in false alarms. A key element in the design philosophy was the need to avoid an expensive, complex and potentially distracting image display and to implement GPR design that mimics operation of a conventional MD. This was achieved using an audio output in which the pitch of the output represents target depth and amplitude represents target size. The U.K. Department for International Development sponsored the initial trial element of the MINEHOUND project, and proving trials were carried out in Angola, Bosnia and Cambodia between 2005 and 2006.

As the initial trials were successful in live minefields, focus shifted from demonstrating the dual sensor technology (i.e., MD and GPR) to simplifying it for nonscientific operators. Prototypes from 2001 to 2005 were A, B, C and D models, indicating the technology’s advancement. The D model was MINEHOUND VMR1, first produced in November 2005. GPR setup required a laptop, which was linked to the detector via a cable. Since multiple setups were needed throughout the day, setup procedure was too cumbersome for routine detector usage.

In July 2006, MINEHOUND VMR2 was fielded; this was the first operable MINEHOUND without using external devices. Due to its capacity for finding not only objects containing metal but completely
metal-free objects too, VMR2 was useful during searches for improvised explosive devices or their components.

After VMR2 proved successful, Vallon developed a lighter version using plastic injection-molded casings for the main electronic compartment. At the same time, CTS developed a more powerful GPR subsystem, allowing for implementation of more sophisticated algorithms for signal processing. Vallon and CTS modernized the display and further facilitated the operation, which was integrated into MINEHOUND VMR3. Production of VMR3 started in May 2010.

Technology

MINEHOUND combines advanced technology—a dual sensor MD and GPR—into one system designed specifically for use in humanitarian demining operations. MD and GPR emit audio-signal output to the operator. The detector is designed to operate initially in MD mode, where all metal threats are noted. GPR mode then confirms presence of a threat. MD audio gives accurate positioning information and can indicate a mass of metal. GPR provides accurate positional and depth information, including information on the target’s radar cross section. GPR responds to the smallest mines buried flush with the soil but does not respond to small metal fragments. This results in the rejection of false alarms caused by metallic clutter such as cartridge casings, small pieces of shrapnel and metallic debris.

The operator can choose to work exclusively with MD, GPR or both simultaneously. Furthermore, a gated mode is available in which GPR is only activated when MD detects metal. This mode minimizes the number of undesired GPR alarms, as it is only active when required. VMR3 has a ready-to-use operational weight of just under 4 kg. With more than 8 hours of operation, a customized rechargeable battery powers the detector without requiring frequent recharging.

MD of VMR3 has a semiautomatic setup procedure for mineralized soils, which can adapt to current soil conditions in less than 30 seconds. The specific setup for soil is kept in VMR3’s nonvolatile memory, hence setup for mineralized soil is only necessary when soil changes, not after turning the system on or off.

GPR of VMR3 has optional, advanced setup parameters, allowing users to tailor the system to the requested detection needs and facilitating the increase of clutter-rejection efficiency. Not only can GPR sensitivity be adjusted but also the detection depth. Two parameters offer selections for detection depth: depth from where to start giving alarms (start point) and depth that will not be exceeded (stop point). Start point is used if detection is carried out under a safe layer, such as snow or gravel. Stop point is used to limit detection depth. If objects below the stop point cause GPR alarms, they are automatically ignored.

AP Minefields in Cambodia

HALO first began MINEHOUND trials in Cambodia in August 2010. Vallon and CTS personnel provided training and technical support in the field. Cambodia was chosen as the location for trials, as HALO has successfully used dual sensor detectors with GPR—the U.S. Army’s Handheld Standoff Mine Detection System (HSTAMIDS)—since 2006 in Cambodia. HALO started working with three VMR2 detectors on loan from Vallon and CTS, and from the beginning of 2012, the U.S. Army’s HD R&D program provided two additional VMR3 detectors and extra support for the MINEHOUND project in Cambodia.

MINEHOUND detectors were trialed across HALO’s area of operations in northwestern Cambodia (Banteay Meanchey, Battambang, Oddar Meanchey and Pailin provinces) on minefields containing primarily anti-personnel (AP) blast mines. The minefields were chosen to provide a range of soil and vegetation conditions as well as varying levels of metal contamination and different mine threats.

For each minefield, a GPR calibration area was created to determine appropriate GPR-sensitivity settings for the mine threat and soil conditions. Calibration test pieces provided with MINEHOUND were used together with nonexplosive mine targets. Smaller mine targets with a reduced radar cross section are more difficult to find with GPR, as are targets flush with the surface of soil. Therefore two calibration targets of each expected type were buried: one flush with the surface and one at the national clearance depth (13 cm in Cambodia). The GPR was then adjusted, so that all targets were audible with GPR while also minimizing the number of false alarms on surrounding soil. HALO’s procedures require regular checking of the GPR calibration throughout the work day, since variations in soil temperature and moisture can significantly change sensor performance.

HALO’s existing linear clearance methods, sometimes called lateral clearance, comprise marking a 70-cm deep strip of uncleared minefield up to 30-m long (a bound) adjoining cleared ground. Vegetation along the bound is removed with a strimmer (brush cutter), and then a deminer searches the area using a standard hand-held metal detector from HALO’s existing fleet of Ebinger and Minelab detectors. The deminer places a red wooden disc (chip) on the center of each metal signal, a process known as mapping the bound.

Deminers in Cambodia are taught how to calibrate the GPR on the MINEHOUND VMR3 using buried test targets chosen for the expected threat in the minefield.
This was done without rapid excavation of blue chips, which was introduced in October 2010 after sufficient confidence had been gained in the system’s capabilities and reliability. Since then, all clearance has been in fully live conditions.

Teams with MINEHOUND support cleared 573,109 sq m from August 2010 to December 2013 and encountered 661,890 metal signals, of which 92% were marked as clutter with blue chips. In addition, 845 landmines and other explosive remnants of war (ERW) were correctly identified. There have been no incidents where the detector has incorrectly indicated a metal signal when it was actually a landmine. The vast majority of ERW found were AP blast mines (Type 72 AP, PMN, PMN-2; MD-82B, MN-79, PMD-6), but some were fragmentation mines (Type 69, POMZ), anti-tank (AT) mines (TM-46) and other ammunition, such as mortars.

The proportion of metal signals that were not mines, yet were correctly marked with blue chips and could be rapidly excavated, increased from a low of 78% in 2010 to 95% in 2013. Overall this clutter-rejection rate is not expected to increase significantly in the future, although some variation exists between minefields and conditions.

The area of ground cleared by a deminer each day depends on signal density: the number of metal signals in the soil at the site. Heavily contaminated areas require more time to excavate metal signals and thus less ground can be cleared per day. This is true even when a proportion of the metal signals can be rapidly excavated as is possible when using MINEHOUND. Figure 1 shows the results of MINEHOUND teams in 2012 and 2013. Each cross represents one day’s work for a MINEHOUND team. The overall trend in productivity as signal density increases can be clearly seen. Figure 1 also reveals that, most of the time, the teams worked in areas with signal densities within the range of 0.5–2.5 signals per sq m. The red crosses in the same figure show a sample of comparative results for standard metal detectors. These are clustered much more in the range of 0.0–0.5 signals per sq m; at higher signal densities the MINEHOUND clearance rates are generally higher.

Although like-for-like comparisons have somewhat limited value due to the number of variables affecting clearance rates, Figure 2 illustrates the relative productivity of different methods for different signal densities. When metal signals are relatively few, the advantage of using MINEHOUND is small and usually involves a 10–20% boost in clearance rates. However, productivity is doubled in areas with more metal. A standard clearance team consists of nine deminers, one of whom is usually cutting vegetation with a strimmer. While MINEHOUND teams also have nine deminers, one uses MINEHOUND and another conducts rapid excavation of blue chips. These productivity figures consider each deminer equally.

**Limitations**

In general, HALO found MINEHOUND to be effective for the majority of Cambodia’s terrain types and mine threats. However, it cannot be efficiently used in some conditions. In minefields with very rocky ground, it is not always possible to find space to swing the detector head over metal signals at the optimum height for GPR to function correctly. Such metal signals cannot be marked as clutter, negatively affecting the clutter-rejection rate and thus the overall clearance rates. Moreover, soil with a very uneven surface—for example, old plowed furrows hardened over time—can be very challenging for GPR. In these conditions, tuning out false alarms from the soil surface is sometimes impossible while correctly identifying small AP mines flush with the surface. Both of these minefield types are the exception rather than the rule in HALO’s area of operations in Cambodia; hence, moving teams to areas where they can be more effective is possible.

Good MINEHOUND performance almost entirely depends on correct GPR calibration. This procedure is somewhat subtle, re-
AT Minefields in Afghanistan

In Afghanistan, HALO is trialing MINEHOUND detectors to assist with clearance of minimum-metal AT mines. This work is concentrated in the western province of Herat, where the Mujahedeen sparsely laid minimum-metal AT mines, in particular the Italian TC series and other low-metal AT mines, over large areas in the 1980s to impede Soviet military action across the desert plains. Although the density of mines is very low, they continue to cause accidents, often with multiple fatalities, and block access to valuable agricultural land.

The mine threat and very different soil and conditions, which include dry sandy soils and gravel with rocks but little vegetation, provide a different challenge for MINEHOUND when compared to Cambodia. HALO has two VMR3 detectors in Afghanistan as part of an operational field evaluation in conjunction with HD R&D. They are currently used in minefields that do not contain AP mines. Method of use is similar to Cambodia in that MINEHOUND checks positive signals that were previously identified by Minelab F3S detectors, which are sensitive enough to find all AT mine types required.

However, calibration of MINEHOUND’s GPR in Afghanistan is different than in Cambodia. Two explosive-free TC 2.4 AT mines, with their main explosive charge replaced with lime mortar, were used as calibration targets. One was buried at a depth of 20 cm, while the other was flush with the surface of the soil. This calibration meant that only very large anomalies in the soil or large metal items would give GPR return. The TC 2.4 is used for calibration, as it has the smallest cross section of the expected mine types.

MINEHOUND detectors in Herat are deployed in support of manual deminers who are searching ground using Minelab F3S detectors. The deminers place red chips on metal signals, and MINEHOUND is then used to check for a GPR return. If GPR return is positive, the operator leaves the red chip in place; if negative, the operator leaves a blue chip. Red chips are investigated carefully using standard excavation techniques; blue chips are removed rapidly using a shovel. One MINEHOUND can support more than 20 deminers employing this methodology.

Trials have been conducted on MINEHOUND GPR ground-search methods that omit use of a metal detector. Although believed to be reliable, this method is not suited for most scenarios, as the detector can only sweep relatively slowly due to GPR’s limited detection area. This means that a single MINEHOUND can only cover about 250 sq m per day. While this may have an advantage in areas with very high levels of metal contamination, it is more efficient to have MINEHOUND support 20 other deminers marking positive signals using other detectors in areas with less metal. In this way MINEHOUND can assist with clearance of more than 700 sq m of ground per day.

Results in Afghanistan

From the beginning of the trial in September 2012 through the end of December 2013, two MINEHOUND detectors checked 197,044 metal signals and marked 99% as clutter. Six minimum-metal AT mines were found, and 432,082 sq m of minefield were cleared. On average, 32,841 metal signals were encountered for each mine found; all except 321 of these could be excavated by shovel.

The Afghanistan results show a generally higher clutter-rejection rate than in Cambodia. This is most likely due to larger radar cross section of AT mines, which effectively increases probability of detection while also reducing probability of a false alarm. Because the calibration targets are much larger, GPR can be set at a far less sensitive setting than if AP targets were used. The consistent minefield terrain, weather conditions and lack of vegetation and roots likely contributed to this. The large, flat areas forming the majority of the minefields in Herat make them ideal for MINEHOUND. The few false alarms giving a GPR return were most often large pieces of metal fragmentation, scrap or plastic containers with a foil layer.

Conclusion

Trial results reported from Cambodia and Afghanistan show that MINEHOUND is extremely effective in reducing the false alarm rate encountered by generic metal detectors. Average reduction in false alarm rate was better than 90% in Cambodia on AP minefields and 99% in Afghanistan on AT minefields. HALO’s method of operation is a major component of this outcome. Using MINEHOUND as a confirmatory detector to filter out false alarms enables a highly cost-effective deployment. Rapid excavation of false alarms is the main reason for increased productivity. HALO is actively looking at extending trials and deployment of MINEHOUND to other parts of its global operations to take advantage of customizable GPR.
Although the MINEHOUND is significantly more expensive to purchase than standard MD, the improved productivity and reduction in labor required for clearing highly contaminated minefields should cover the cost of the initial investment within one to two years. In the future, overall cost per square meter should be reduced in areas with high signal densities compared to using standard MD alone.

The authors would like to acknowledge the support of the following organizations for their contribution:

- U.K. Department for International Development for initial proving trials carried out in Angola, Bosnia and Cambodia in 2005 and 2006.
- U.S. Army’s HD Re&D Program for supporting trials in Afghanistan and Cambodia.
- The directors of Cobham Technical Services and Gerhard Vallon of Vallon GmbH for their support of the dual sensor technology.
- HALO deminers for gathering the data.

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Balkan Flooding Exacerbates Landmine Crisis by Carr [from page 19]


Promoting Firearms Marking in Latin America and the Caribbean
by Rincon [from page 20]


4. These include Antigua and Barbuda, Argentina, the Bahamas, Barbados, Belize, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Uruguay.

Disability Rights of Survivors in Laos by Hinton and Rutherford [from page 24]


ISSUE 19.1 (Submissions due 1 September 2014)

FOCUS: Environmental and Cultural Considerations in Demining
Mine and explosive-remnants-of-war (ERW) clearance can have detrimental effects in sensitive ecosystems or at sites of significant cultural heritage. What environmental and archeological considerations must be taken into account in clearance operations?

FEATURE: Vietnam
What is the current state of clearance efforts in Vietnam? How has Vietnam's 2010 Disability Law helped survivors? What is the current state of survivor assistance in Vietnam?

SPECIAL REPORT: Deminer Training
What experience and training are necessary for someone to enter the field as a deminer? What models of deminer training have been successful? What international standards do deminer-training practices employ?

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ISSUE 19.2 (Submissions due 1 February 2015)

FOCUS: Risk Education
What strategies are most effective at local, national and regional levels? What methods keep populations alert to the risks of mines, ERW and improvised explosive devices? What new strategies are used to measure the impact of RE?

FEATURE: Best Practices in CWD and Mine Action
How can successful strategies and programs be replicated? How can evaluations be compared across implementers in a national and regional program? Do mine action strategies apply to arms and munitions security and destruction efforts?

SPECIAL REPORT: Colombia
Colombia has recently allowed humanitarian demining nongovernmental organizations (NGO) to begin work in the country if they become accredited. What prompted this change in policy? What is the accreditation process for NGOs to work in Colombia? How has this development affected civilians?

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Peer-reviewed Research, Technology and Development Section
Each print issue contains a peer-reviewed Research, Technology and Development section. Articles on current trends and developments in R&D will be considered for this section. Topics include but are not limited to detection and neutralization, manual or mechanical equipment, data fusion, biosensors (including dogs, rats and bees), GIS, mapping and terrain analysis, personal protective equipment, demining tools, metal detectors, needs of users, lessons learned, test and evaluation, information technology, mine-detection test facilities, landmines, ERW and ordnance. Submissions are accepted on a rolling basis.