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The Mine Action Technology Newsletter lets you know where to find more information and who to contact, where to go and what is going on in support of your work.

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This is the third issue of the Mine Action Technology Newsletter, produced by UNMAS and GICHD, dedicated to the promotion and development of related mine action technology.

Our first issue was distributed in November 2004 and received a number of constructive comments from readers. In our second issue we focused on the Rake Excavation and Detection System (REDS), Metal Detector Performance in "Problem Soils" and recent testing undertaken by ITEP on demining equipment. It is still our intention to produce a Newsletter on a quarterly basis. We will try to provide information as to where further details can be found. The Newsletter will not deliberately duplicate work being done by other organizations, or media, but will attempt to assist by advertising these facilities and sites.

Readers are once again invited to provide their own comment and to make constructive suggestions to the Editors, Noel Mulliner, Technology Coordinator at UNMAS, or Al Carruthers, Technology Officer in GICHD, (contact details provided on the left side of the page). We welcome new ideas, and suggested articles, and would happily share them with others if sent for inclusion in the Newsletter. Feedback from the field, NGOs, manufacturers, donors or headquarter organizations helps to make the Newsletter more effective.

HSTAMIDS, the US military dual sensor detector continues its world tour and some readers will hopefully have seen it being demonstrated in their area. Field evaluation trials have been completed in Thailand and Namibia and HSTAMIDS has moved on to Afghanistan. The UK/German dual sensor detector, now known as MineHound, has begun its field trial programme and the Japanese models continue to be developed and tested within the Japanese R&D Programme. The time when dual sensor detectors can be used on a day-to-day basis for operations is not that far away and Programme managers should be thinking through the implications now.

This issue includes three feature articles, one on the Database of Demining Accidents (DDAS), one on Mine Neutralisation and one on ITEP activities. Also included is a new page with snippets of general information and news gathered here and there in the course of the day.

The newsletter is also available on the UN Mine Action Service website, **E-Mine** (www.mineaction.org) and at the Technology, Research and Development page on the GICHD site at www.gichd.ch/15.0.html

Breaking news: It has now been confirmed that there will be a Technology Requirements Workshop held in the early part of 2006. This will be a truly working meeting with, regrettably, a limited attendance. Further details to follow.

Mine Action
TECHNOLOGY
NEWSLETTER

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WHAT'S GOING ON IN TECHNOLOGY?

Conferences, Training and other Events

Editor's Note: If readers have details of any forthcoming conferences, symposiums or training events please submit the information to one of the editors. Mine Action Programmers should note that UNMAS has some limited funds to sponsor attendance at relevant technology conferences. Anyone from the field mine action programmes interested in attending relevant technology meetings should contact Noel Mulliner of UNMAS (contact information on Page 1).

28 November – 2 December 2005. **Inventory and analysis of operationally validated results related to mine action space - and airborne surveys – Lessons learned, recommendations and suggestions for standardisation**

Zagreb, Croatia, (A Workshop -one day, between November 28 and December 2, 2005).

For the last ten years several scientific and technology demonstration projects have studied the use of high resolution airborne and space borne remote sensing to support humanitarian mine action. Several countries, the European Commission, national and international institutions and private companies have funded these projects. Over the years experience has been accumulated, lessons have been learned and projects have been more and more driven by the needs and demands of mine action actors. Each project has contributed to a better understanding of the needs and possible solutions.

The projects have already been analysed by the funding organisations in accordance with relevant project documents (e.g. Description of Work for EC funded projects) in the different review procedures. While many of these projects have ended, it is time to make a critical inventory of the current state of the art and analyse the projects from the point of view of the mine action community as the end user of the results. This is goal of the proposed workshop.

The Workshop will present the achieved level of the operationalization of the airborne and space borne remote sensing for mine action and provide an open-minded forum for assessment of the impact on mine action practice. The selection criteria will be the operational value approved by conventional humanitarian technology, implemented results or results that are mature for fast implementation. The workshop will be an opportunity for the researchers and projects to share experience, results and solutions without competition, and make future projects benefit from the lessons learned.

For more information, contact Milan Bajic, e-mail Milan.bajic@zg.htnet.hr, tel +385 98 460 917. Or visit the website at <http://www.ctro.hr>

2 - 5 May 2006 **Seventh International Symposium on Technology and the Mine Problem** Monterey, CA

The scope of this symposium includes emerging technology of mines, fuses, and explosives; naval mine countermeasures; land countermine including minefield breaching, neutralization of Improvised Explosive Devices (IED), humanitarian demining, and site remediation of areas contaminated with unexploded ordnance (UXO) also known as the explosive remnants of war (ERW).

For more information, email Al Bottoms at amb@demine.org.

A study of manual mine clearance.

The Geneva International Centre for Humanitarian Demining (GICHD) has recently published a study into manual mine clearance.

Whilst there has been considerable research into various areas of mine clearance such as the use of dogs or machines, thus far there has been no thorough analysis of the basic tenet of mine action – that of manual mine clearance .

Working in close coordination with the broader mine action community, the study analysed the management of mine action programmes, recorded and commented on a number of operational techniques and processes, ran trials to make recommendations for the improvement of efficiency of clearance, discussed risk assessment and risk management and the issues of costings related to

mine action programmes. These issues were overlaid against a discussion that explained the development of manual mine clearance as an activity since the post Second World War clearance of mines and UXO in Europe and, more recently, the development of humanitarian mine clearance.

The study found that much has improved since the early days of manual mine clearance and that the safety of both the deminer and of the product (cleared land) has improved significantly. It identifies areas where there is still significant scope for improvement in the manual mine clearance process which would increase productivity and would provide not only better value for money for donors but, ultimately, a better quality of life for the populations of mine affected countries. The study also developed a risk based cost benefit model which showed that the delivery of a "100% clearance solution" was not necessarily the most practical or optimal solution for mine affected countries.

The study is available free of charge to the general public and to the mine action community and can be ordered online at <http://www.gichd.ch/482.0.html>. A pdf version of the study is available online at <http://www.gichd.ch/7.0.html#1086>.

For further information, please contact:

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Technology Requirements Workshop :

Plans are underway to hold a Technology Workshop in Geneva in February 2006. This will be jointly hosted by UNMAS and GICHD and will fulfil one of the recommendations of the GICHD Study of Manual Mine Clearance, requested by UNMAS. This will be an opportunity to catalogue the basic field requirements for technology assistance from a wide selection of mine action programmes and operators, with which to inform industry of real and practical needs. Further details will be sent separately.

Comments on Past events:

CROMAC once again hosted an **International Symposium** in April this year, directed very much towards the employment of mechanical technology in demining. Thirty two different countries were represented and a large number of machine manufacturers demonstrated and displayed their hardware. The large number of demonstrators is testimony to the huge investment by manufacturers and, presumably, proof that they are being sold and used around the world. CROMAC ensures all machines are tested at the Centre for Testing, Development and Training Ltd, and these tests are conducted in accordance with the new CEN Workshop Agreement CWA 15044, 'Test and Evaluation of Demining Machines'. The results are available on the CROMAC website or can be obtained by contacting CROMAC directly. There were many interesting presentations and there is no doubt that CROMAC is a very good source of information for programmes wishing to introduce machines into their toolbox. If the Symposium is repeated next year attendance is certainly recommended.

Another annual event is the **US DoD Humanitarian Demining R&D Requirements Workshop**, but this is by invitation only. Supported Programmes are invited to attend and to put forward their specific needs. The Humanitarian Demining Programme then seeks to assist technology development to meet those needs and supports trials of suitable equipment in country. This is also an excellent forum for technology interchange and, if invited, programmes should make every effort to attend.

Other Course Information

Editor's Note: This section highlights details of some courses that have been brought to the attention of the editors and are therefore shared with readers. If anyone has details of other courses suitable for technology/operational staff from mine action field programs, NGOs, or commercial companies, please submit details to the Editors. Program Managers may consider Quality Assurance / Control Monitors attending "Lead Auditor's Courses", which are run by many civilian Quality Management / Auditing Companies and have some good general guidance.

United Nations Institute for Training and Research Programme of Correspondence Instruction

UNITAR POCI offers a self-paced correspondence course entitled "*Mine Action: Humanitarian Impact, Technical Aspects, and Global Initiatives.*" All course materials are mailed directly to the student and usually arrive within two weeks. The course has 12 lessons students complete on their own through self-study. Each lesson has a quiz with answers available. When students finish all 12 lessons they complete an End-of-Course Examination and submit it by mail, fax, or e-mail. If they pass with 75% they are awarded a Certificate-of-Completion from UNITAR POCI. The enrollment fee is US\$95 and covers all costs except the postage to submit the Exam.

For more information: <http://www.unitarpoci.org>
United Nations Institute for Training and Research
Programme of Correspondence Instruction
Box 20475 , Dag Hammarskjöld Centre
New York, NY 10017-20475

Geneva International Centre for Humanitarian Demining

The Centre has developed high-quality, thematic training modules for mine action professionals at all levels of management, for both national and expatriate staff. The packages allow for a realistic insight into the challenges and opportunities that they face on their work. Thematic modules include:

- Introduction to mine action
- Mine risk education
- Socio-economic approaches to mine action planning and management
- Evaluating mine action programmes
- Developing national mine action legislation
- Development of national mine action standards based on International Mine Action Standards (IMAS) and,

-Training and technical support for the Information Management System for Mine Action (IMSMA)

Further details can be found at the GICHD website <http://www.gichd.ch/14.0.html>

Swedish EOD and Demining Center

The Swedish EOD School offers quality certified training. Each year approximately 35 courses are delivered, which represents a total of 10 000 student hours. All the school instructors possess a wide spectrum of knowledge and experience in EOD and mine clearance subjects. Several of them have participated in various international missions.

For more information
<http://www.swedec.mil.se/article.php?dontaddcount=1&id=5639>

International School for Search and Explosives Engineers

The International School for Search and Explosive Engineers (ISSEE) has released their 2005 curriculum for Search, Security, Explosives and Counter-Terrorism Training. David Hitchins, Sales and Marketing Director of ISSEE, explains that all training can be delivered from a single, purposed-built site and has the added benefit of enabling the internationally recognized City and Guilds of London academic qualification.

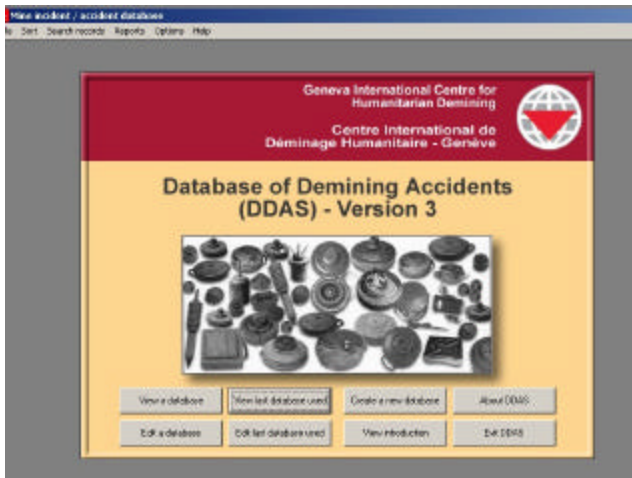
The Standard UK courses are suitable for all ranks of military and police students. In addition, ISSEE offers quick development and delivery of bespoke courses in order to meet more specific technical requirements.

Courses can be delivered through an interpreter for students who do not have English as their first language.

For more information: <http://www.issee.co.uk>
+44 (0) 1980 847484.

Feature Article 1

Maintaining the Database of Demining Accidents (DDAS)



Now as a joint project between Geneva International Centre for Humanitarian Demining (GICHD) and UNMAS, the Database of Demining Accidents (DDAS), aims to collect and analyze all accidents and incidents which have occurred in the demining workplace. The main objective of the project is to learn from past experiences in order to make demining programs safer. DDAS also offers the potential to examine the development of procedures, standards, equipment capabilities and protection measures in the field. Furthermore, it provides empirical evidence of risk activities, threat items and resulting injuries, and provides evidence of how injuries can be reduced (for instance by use of appropriate tools and PPE).

In order to gather this information, all mine-action programs and operators have been requested by the Director of UNMAS to forward demining accident reports to the Database of Demining Accidents, held and maintained by the GICHD (reports should be sent to Mr Phil Bean, or emailed to P.Bean@gichd.ch). In the past it has proven difficult to obtain full details of accidents and there may be several reasons for this. First, organisations may fear that blame will be unfairly apportioned to those involved in incidents. However, no personal details or names of programs or organisations are made known to others, thereby ensuring anonymity.

Secondly, it may be argued that the effort involved in sending these reports is too great. While the effort may indeed be significant, it is hoped that

the benefits for others can be balanced against this. Thirdly, some agencies may not see the benefit in providing such information. We already have a pool of accident data now - so why do we need more? The answer lies in the fact that advice cannot be provided, nor standards updated if evidence does not exist to support the need for such changes. The information that agencies provide will benefit everyone. More specifically, the provision of data can (and already has) assisted the demining community in the following areas:

1. Identification of high risk activity

Before the DDAS, it was believed that the most common deminer injury was stepping on a missed mine. This has been demonstrated not to be the case as most accidental detonations occur in front of a deminer who is kneeling or squatting. Work on blast-boots for deminers did have a very high priority but this has now changed. Conversely, some would not accept that the use of chainsaws and pangas to remove undergrowth was dangerous - statistical evidence has now shown otherwise.

2. Demonstration of needs for basic field disciplines

Well maintained site and lane marking systems, effective internal QA and regular supervision, all may seem obvious, but when people do not put them into practice there is an increasing need to show WHY they should. Simply telling them does not always work unless the "teller" has sufficient authority. As National agencies increase, and the number of advisors are reduced, there is an increasing need to explain, with evidence, why things should be a certain way. Remarkably, corporate memory of the cause of an accident is very limited - (perhaps because the organisation often does not recognize the real cause and blames the victim instead) - so, sharing "anonymous" but real data in training materials has a great advantage.

3. Identification of appropriate PPE - for both protection and comfort

- Before the DDAS many committees and

conferences accepted that deminers worked lying down - and PPE was being designed for that use. Now, even groups who were most committed to the process of lying down allow deminers to choose their working position in almost all contexts, and PPE is designed accordingly.

- Before the DDAS - it was not universally recognized that AP blast mines presented by far the most common threat, or that most accidents occurred while "uncovering" them. Both are demonstrably true from existing data – yet, given the dynamic nature of our environment, both may change in the future – hence the importance of maintaining data to detect and monitor these changes.
- It was originally believed that back protection was necessary, and yet evidence in the DDAS makes the provision of back protection no more than possibly desirable.
- It was believed that the chest and throat were high risk areas. Most accidents in the DDAS have occurred to deminers not wearing chest and throat protection and yet severe injury is rare.
- Fingers, hands and arms appear to be at the highest risk of sustaining severely disabling injury, and longer tools, that do not break apart in a blast, can be shown to be effective at limiting injury.
- The need for eye protection is demonstrated by the DDAS data, as is the fact that current visors often do not meet that need because they are not worn or maintained appropriately. There is a proven need for the provision of eye protection to be reviewed.



However, the most compelling argument for maintaining the DDAS is that if we do not collect current (and future) data, we cannot react to changes. Both threat devices and demining methods are changing, and we need current data to stay on top of the safety consequences of those changes. Opinion about risk and what constitutes a "safe" activity is evident in every demining group and in almost every individual. Arguing from personal experience is understandable, but needs to be put into a quantitative and global context by sharing the industry's experiences over threats, risk, safety and effective/ineffective current demining activities.



To get the most out of DDAS, we must first get the data up to date. Ultimately this will allow an update on the changing face of demining accidents - covering new threats and injuries, and the production of some "lessons-learned" for publication to be shared with all deminers.

It is important that everyone in the industry of mine action understands their responsibility and the need to share information relating to safety so that others can avoid repeating mistakes or oversights. A conclusion or lesson may become immediately apparent after a single accident or incident in the demining work place. More frequently, analysis of collected accident records over a longer period can help identify clear messages or trends concerning safety. Without further data (past and future) we will be out of date on the new threats and practices. The future benefits that will flow from the study of a well-populated DDAS are impossible to guarantee, but, looking at its past value, we can have a reasonable degree of confidence that it will benefit us all.

For more information contact Noel Mulliner, UNMAS, at mulliner@un.org or Phil Bean, GIHCD, at P.Bean@gichd.ch.

Feature Article 2

Mine Neutralisation Devices

Noel Mulliner

Technology Coordinator

UN Mine Action Service



Burning a landmine (MineBurner)

Once found, the most common method of disposing of landmines or UXO is to place an amount of explosive close to the device and destroy it through detonation. This method was originally taught in the early days of humanitarian demining and is referred to in International Mine Action Standards. It does, however, require the provision of explosives and this brings with it the problems associated with importing explosives and moving them around the mine action programme operational locations. Both cost and safety factors have to be taken into consideration.

Over time, however, some programmes have sought to reduce the associated problems by allowing neutralisation of some devices for central destruction but no programme has adopted the use of more easily handled destruction devices such as pyrotechnic torches, flares, binary explosives and small shaped charges etc. Explosive destruction inevitably spreads metal contamination whereas burning using flares or torches can concentrate the metallic debris, providing the device does not go "high order". The question, therefore is inevitably raised, why don't more programmes use neutralisation devices rather than explosive slabs?

Some years ago, Switzerland made available some 10,000 SM-EOD (shaped charges) devices which were given freely for use by programmes that

requested them. For those who used them it was, presumably acceptable, but it is believed that there are not huge orders for more. Last year, The US Humanitarian Demining Research and Development Programme, in response to requests from many programmes, conducted an Operational Evaluation Test of Mine Neutralisation Systems. They looked at 6 deflagration systems, including 7 different devices and 7 high order systems including 11 different devices. The report of the tests can be obtained from RDECOM-CERDEC-Night Vision & Electronics Sensors Directorate, attention of AMSRD-CER-NV-CM-HD (Dr Divyakant Patel), Fort Belvoir, VA 22060-5806, USA. The report concludes that all devices can be effective against some devices, providing they are correctly matched, but, perhaps the most telling conclusion is the estimated cost per device when purchased in quantity. The cheapest device, using a purchase quantity of 1000, is quoted as \$2.19 (Note: this refers to a charge size of 250gm, which is considered more than necessary to destroy many small devices and so the price per unit can be further reduced.)

Since that test, some devices have been developed further and new devices have been produced. A price of \$0.42 per "shot is now quoted by one manufacturer using a reusable device, but that is based on the expectation of 15,000 devices destroyed.

The aim of this article, apart from drawing attention to the US tests, is to start a debate about the use of neutralisation devices rather than the use of a slab of explosive and to try to understand the real requirement for these types of devices. Many questions can be raised, such as, is there really a problem in obtaining explosives and transporting them around the programme area? Are explosives a significant cost of the operations? Is metallic fragment scattering as a result of explosive detonation of mines and UXO a real problem? What is the actual cost of destruction using conventional explosives, detonators and firing devices? If made available at no cost, would programmes welcome devices that could destroy mines and UXO hopefully not through high order detonation? And, is \$3.00 per destruction too much to pay? There are probably many more.

National Programmes and demining organisations are encouraged to submit comments on these questions and any other considerations they may have. They are also encouraged to review the US report and to visit the web sites of two other devices developed since the US Tests – www.mineburner.com (MineBurner) and www.disarmco.com (Dragon). If there are others that are not included in any of the above references, the Editors would be pleased to hear of them.

As a final comment, the use of destruction devices is probably never going to be one thing or another but very likely a combination of several methods in the same way as is used for demining tools – the tool box approach. Demining Programmes and organisations will probably need some of many different devices to suit different situations (e.g. built up areas, specific problem targets, etc). It would, however, be useful to be able to inform industry which devices are most useful, what is a reasonable cost and how big might the market be. Your comments are most welcome .

The ITEP website contains two Test and Evaluation reports of pyrotechnical mine neutralisation means and these can be found at [ITEP Project No. 6.2.7](#) and [Nr. 6.2.4](#). The first involved Disarmco Ltd. thermite charges (Hurricane, Storm, LTT and TSID 2000), FOI and other products and the results recorded concluded that the DISARMCO Ltd. Charges were good and have demonstrated that the use of thermite charges in many cases constitutes an efficient manner to render AT-mines and unexploded ordnance harmless. The DISARMCO Ltd. Hurricane, Storm and LTT charges have proven to be very efficient against anti-tank mines. The trials have shown that the mines were destroyed in an efficient manner by using two or more thermite charges. The TSID 2000 charges have proven to be very efficient against thin-walled shells. The performance against ammunition with thicker shell bodies is more uncertain. However, it is also recorded that further test and evaluation has shown that there is no relevant use for thermite charges in humanitarian demining. Therefore, the project will be closed down.

The second trial/test involved DM29 Ignition Charge -Fire-EOD-PT, FireAnt A210, Hyper Heat Mine Flare and the [final report](#) is available in the

ITEP reports database. It is recorded that the report concludes that no safe method for non-explosive (low order) clearance of AT mines using ignition charges and (thermite) demining flares could be found. It further details the results for the tested charges/flares related to:

- Chemical-Technical testing,
- Thermal signature measurements,
- Penetration performance in a laminar target,
- Parameter optimisation using an AT mine TM-46 as target, and
- Initiation tests of experimental demolition charges using a thermite flare.

These two reports perhaps illustrate the confusion that exists in the recommendations for use of pyrotechnical devices and that there is more room for discussion and development.

ITEP update: April – August 2005

ITEP Secretariat

Email: secretariat@itep.ws

Introduction

This update is intended to provide some additional information on ongoing and newly started ITEP collaborative testing. It further includes a list of test reports, issued from previous ITEP collaborative activities and published since April 2005.

Since the publication of the last UNMAS/GICHD Technology Newsletter in April 2005, ITEP's collaborative activities have primarily focused on test and evaluation of mine detectors. A large field trial, testing a range of COTS metal detectors took place in Mozambique during April 2005 as a follow-up to the November 2004 trials in Laos (STEMD, [ITEP Project Nr. 2.1.2.3](#)). Furthermore, long term field trials of the ERA/Vallon MINEHOUND dual-sensor (VMR1) have started in Cambodia and Bosnia during summer 2005. The campaign is planned to continue until the end of November 2005, with the last field trials to start in Angola during September 2005 ([ITEP Project Nr. 2.4.2.4](#)).

Systematic Test and Evaluation of Metal Detectors (STEMD)

(contacts: [Dieter Guelle](#), [Adam Lewis](#))

The main objectives of the STEMD project are to provide the demining community with reliable performance data for currently off the shelf available metal detectors, and to train people to conduct metal detector tests using the [CEN Workshop Agreement on Test and Evaluation of Metal Detectors](#) (CWA14747:2003). It further allows for an experimental verification of the latter test protocol and the formulation of possible improvements.

The first field trial took place in Laos and focused on the specific problems over there, i.e. determining the detection probabilities/detection capabilities for BLU 26B cluster bomb submunitions and 20 mm cannon projectiles. Eight commercial off-the-shelf detector types from six manufacturers were tested - four large head types designed for UXO items and four small-head types for mines. Full details of the trials in Laos, together with the performance results for each detector tested are available in the [test report](#) published on the ITEP website.

The STEMD field trial in Mozambique was different from the one in Laos as it did not include detection

reliability tests but focused on in-air and in-soil detector sensitivities for a wide range of soil types. Furthermore, typical local mine targets were used and twelve commercial off-the-shelf detector types, all small-head types, from eight manufacturers were included. The trials were all conducted using the [ADP test facility](#), which allowed for the testing of the detectors against seven different soil types with widely varying electro-magnetic characteristics. Preliminary results of the comprehensive in-soil measurements confirm the well-known fact that detectors are losing sensitivity when moving from neutral to non-cooperative soil; even to the extent that some detectors cannot be used in certain types of soils. However, the preliminary findings also highlight interesting phenomena which are currently still being analyzed. Full details on the field trials and performance results for all tested detectors separately, together with a comparison amongst detectors will be available in the interim report, which is due for publication in October 2005.

ERA/Vallon MINEHOUND dual-sensor (VMR1) (contact: [Ian Dibsall](#))

The hand-held dual sensor land mine detector MINEHOUND (VMR1) is being tested on real minefields in Cambodia, Bosnia and Angola with the help of ITEP. The tests in Cambodia (from early August to mid-September 2005) and Angola (from mid-September to early November 2005) are carried out by MAG (Mines Advisory Group) with support from ERA Technology and are sponsored by the United Kingdom. The tests in Bosnia-Herzegovina (from mid-August to late October 2005) are carried out by NPA (Norwegian People's Aid) with support from ERA Technology and are sponsored by Germany.

Support has been requested from ITEP to provide technical assistance to the Non Governmental Organizations. The support staff seconded under the auspices of ITEP is known as ITEP invigilators and come from Belgium, Canada, Germany, the European Commission, the Netherlands and the United States. They all attended a course in the use and maintenance of the MINEHOUND detector at ERA at the end of June 2005.

The primary aim of the ERA trials is to record data of the MINEHOUND's response to objects located using the existing in-country detector. In each country there is a target of a minimum of 1000 data records required over the period of the trial.

Itep invigilators are responsible for providing daily support to the deminers and supervisors on the operation of the MINEHOUND. They further have to verify the performance of the deminers/detectors on a weekly basis. The Itep invigilators also carry out additional in-country tests based on CWA14747:2003, using specially constructed test lanes for "blind" testing (the detector operator does not know the location of the test targets) on calibration and clutter targets. These additional tests are used to gather data on the performance of the MINEHOUND with respect to target depth and soil type and also to reinforce the training of the operators. Although these trials are not the main scope of the MINEHOUND field testing campaign, they will provide relevant experience to the Itep Working Group on Test and Evaluation of Dual (Multi) sensors which can then be applied to draft a standard test protocol for test and evaluation of dual-sensor mine detectors.

Other

During July 2005, a new Itep collaborative initiative has been initiated by the [Canadian Centre for Mine Action Technology \(CCMAT\)](#) with the aim to evaluate commercially available metal detector array systems. More detailed info on this project will be available for the next issue of the UNMAS/GICHD Technology Newsletter.

- [Itep Secretariat](#)
- Handheld Stand-Off Mine Detection System (HSTAMIDS) Operational Field Trails and Demonstrations, [Lee Offen](#)
- Assessment of the next generation of the ERA dual-sensor mine detector, [Ian Dibsall](#)
- Evaluation of the Tempest Ground Penetrating Flail in Cambodia, Pre-Trial Assessment of the Armtrac 75, [Chris Leach](#)
- T&E of the Bozena-4 mini flail, Evaluation of the bunching saw, [Geoff Coley](#)
Pre-Trial Assessment of the Mineworm, [Goran Danielsson](#)

Reports

[Itep Project Nr. 3.2.23](#)

Report: [Duro Dakovic RM-KA-02 Flail Test and Evaluation](#)

[Itep Project Nr. 3.2.24](#)

Report: [Tempest V system with Ground Engaging Flail. Cambodia trials report.](#)

[Itep Project Nr. 6.2.4](#)

Report: [Test and Evaluation of Pyrotechnical Mine Neutralisation Means](#)

Mine Action Technology Information Resources

The following websites contain information on the latest technical mine action activities and organizations, as well as calendars showing forthcoming technology conferences.

• E-Mine

The Official Website of the United Nations Mine Action Service (UNMAS) designed to support both the planning and coordination of global mine action efforts

<http://www.mineaction.org>

Geneva International Centre for Humanitarian Demining

The Official Website of GICHD that provides regular updates on GICHD activities, studies and projects, including the Equipment Catalogues.

<http://www.gichd.ch>

International Campaign to Ban Landmines

Provides information on the Ottawa Treaty, as well as general information on landmines, campaigns and calendar information on mine action activities.

<http://www.icbl.org>

The International Mine Action Training Centre (IMATC)

The International Mine Action Training Centre (IMATC) is a joint British and Kenyan venture aimed at alleviating the suffering caused by landmines and Explosive Remnants of War by providing high quality Mine Action Training.

[The International Mine Action Training Centre \(IMATC\)](http://www.imatc.org)

International Test and Evaluation Programme

Provides information, updates, current test and evaluation reports of demining machines and technologies.

<http://www.itep.ws>

UXOInfo.com

Website devoted to information on Unexploded Ordnance (UXO). Latest news on UXO, photo galleries and technology information available.

<http://www.uxoinfo.com>

Mine Action Information Center at James Madison University

Contains a good global mine action registry, the Journal of Mine Action, Lessons Learned database, and a Spatial Information Clearing House.

<http://www.maic.jmu.edu>

Canadian Forces National Defence Mine/Countermine Information Center

The NDMIC provides mine and countermine information for Canadian Forces in international operations.

<http://ndmic-cidnm.forces.gc.ca>



Mine Information and Training Centre (MITC)

Sponsored by the Battlefield Engineering Wing at Minley in Surrey, UK, MITC provides a gateway that facilitates the flow of information between military and civilian organisations.

[United Kingdom Mine Information and Training Centre \(MITC\)](http://www.mitc.org)

ORDATA Online

ORDATA Online supports the U.S. Department of Defense by providing information to facilitate international UXO training, awareness and clearance operations.

<http://www.maic.jmu.edu/ordata>

Nordic Demining Research Forum (NDRF)

Aims to stimulate research and development activities to support improvement in demining efficiency and safety through promotion of co-operation between the operator, research and development, and industrial environments; stimulation of information exchange; and initiation of cross border and cross sector research and development activities between companies and institutions in the Nordic countries.

<http://www.ndrf.dk/>

Sound Bites

The following section contains snippets of information for general interest. They are collected from different communications in the course of the working day. They are offered for what they are worth but the accuracy of the information cannot be guaranteed. If you, too, have short interesting bits of information just send them to the Editors and we will pass them on, submit to the lessons learnt database or discard as appropriate!

Rakes: Those who have visited Sri Lanka and seen the rakes in action are normally convinced that they work in certain circumstances. It is for serious consideration that EVERY mine clearance unit should purchase a set of rakes (ca\$25.00) and carry out some trials with them. This is also inferred in the GICHD Study on Manual Mine Clearance but not expressed as directly.

Magnets: Read the GICHD Manual Mine Clearance Study Report and ask why more people don't use magnets to help reduce metallic clutter. Why don't all operators buy some and carry out some trials? Again this is a recommendation that should be considered by everyone today. They are cheap and can be very effective.

Missed mines: A natural concern is to avoid missing mines but some are inevitably found. When found during or before the final QC the danger is to our deminers. We need to record those that are found after QC and, of those, how many are found as mines/UXO or as explosions. Are you keeping these records?

Exploders: Many readers may have used the South African AEC exploders over the last few years. They are a lot cheaper than some of the better known makes. AEC have now built a new exploder with input from the field. They call it the Suprex621-F; it is hand cranked so never needs batteries and punches out 615v/3.0J, which rates it at 110 caps over good wire. The model is not on their website yet and so if anyone is interested they should contact AEC for a data sheet at sasles@aece.co.za. For other AEC stuff visit <http://www.aece.co.za/products.html#Exploders>

Non Metallic Mine Detectors: See page 73- 74 of Peter Stiff's book "Taming the Landmine" for more information on non-metallic mine detectors used in the war in Rhodesia. There are now 30 of these available (NMD 78 and 79) and the transfer of technology for manufacture is also available. For more details contact the Editors.

Plants that change colour when grown over explosives:

Aresa Biodetection and the Danish Army have achieved progress in engineering a plant that changes colour when grown over and explosive item. The technology seems to work but there are still many practical problems of how to use it realistically in humanitarian demining. For more details see the website at www.aresa.dk

Bees: There will be more to follow on this but the development of bees to assist in the location of explosive traces has progressed through the summer. Next year, hopefully, there will be controlled field trials. Just think what you could achieve with 80,000 willing workers, who cost next to nothing and may just be able to tell you if an area is suspect or not.

Mineguzzler: Mineguzzler is now owned by Rybro International Ltd. It is reported to be being used in the southern region of Iraq. See www.rybro.co.uk