

MINE ACTION TECHNOLOGY

NEWSLETTER

November 2004 Issue No 1

**Produced by:
United Nations Mine Action Service and
Geneva International Centre for Humanitarian Demining**

Mine action technology - Where is it? What is it? How do you find out more?

This 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. Read it and send your comments to the Editors.

Introduction –

At the National Directors and Technical Advisors meeting this year the question was posed “How would you like your Technology served Sir (or Madam)?” It was decided that, although there were a number of useful websites available and there were two specific posts, one within GICHD and one in UNMAS, dedicated to making progress in the development of technology, a Newsletter collecting the sources of information and alerting operators to some new ideas and thoughts would be beneficial. This Newsletter, produced by UNMAS and GICHD, is dedicated to the promotion and development of technology.

The Newsletter will be produced on a quarterly basis, if possible, but will depend on the reaction and needs of the readers. It will aim to provide information as to where further information can be obtained. It will rely on feedback and contributions from

anyone who reads it and it will remain as flexible as possible.

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, hopefully, with some useful comment.

Readers are invited to provide their own comment on the Newsletter and to make constructive suggestions to the Editors, Noel Mulliner, Technology Coordinator at UNMAS, or Al Carruthers, Technology Officer in GICHD, (contact details are provided below). Feedback from the field, NGOs, manufacturers, donors or headquarter organizations will help make the Newsletter even more useful. It will be available on the UN Mine Action Service website, E-Mine at www.mineaction.org and in hard copy available from the Editors. Finally, if you find the Newsletter of interest please tell a friend or associate about it so that we can increase the distribution and widen the range of information referred to within it.

Useful websites:

There are many websites containing information regarding technical mine action activities and organizations, as well as calendars showing forthcoming technology conferences. Below is a list of some sites. As this Newsletter grows it may be possible to provide additional websites and further comment on the particular relevance of websites in order to provide advice as to where to go for what.

Some useful websites include:

- E-Mine – the web site of the UN Mine Action Service (UNMAS), www.mineaction.org. Good for general information, who's who and links to other sites.
- Geneva International Centre for Humanitarian Demining (GICHD) www.gichd.ch. Good for GICHD activities, studies and projects including the Equipment Catalogues
- International Campaign to ban Landmines (ICBL) www.icbl.org. Good for Ottawa Treaty information, general information and a calendar of mine action activities.
- International Test and Evaluation Programme (ITEP), www.itep.ws. Good for current test and evaluation reports of machines and technologies. (see below)
- James Madison University (JMU), www.maic.jmu.edu. Good for a global mine action registry, The Journal of Mine Action, a Lesson Learned database and a Spatial Information Clearing House.
- European Demining, (EUEDEM), www.eudem.vub.ac.be. Good for current technologies, publications, general information, links and events. This web site will be taken over by GICHD in the near future.
- Demining Technology Information Forum, (DTIF) www.maic.jmu.edu/dtif/ (This Forum is currently being reviewed)
- Society for Countermine Technologies (SCOT), www.demine.org. Good for Technical publications and news of SCOT/MINWARA conferences.
- www.UXOinfo.com Good for latest UXO news and information, photo gallery and documentation sharing.

Let us know if you have found other useful websites or ways to obtain information other than the fallback of a hopeful "Google" search.

More on the ITEP

Website: www.itep.ws.

This section gives you a better idea of the type of information you can find on the ITEP website by listing the most recent items that have been published on the site.

ITEP news that has appeared since July 2004:

- The ITEP is preparing to test handheld dual-sensor mine detectors.
- Publication of the CWA Test and Evaluation on Demining Machines
- ITEP collaboration during the Mine Clearing Survivable Vehicle Proof of Performance Test in the US.
- ITEP assists in CMAC internal metal detector trials.
- ITEP continues the test and evaluation of two flail devices.
- An ITEP project testing the Tempest Mk V has been initiated.

For a full description of the above news items, go to

http://www.itep.ws/news/view_all.php

Reports that have been published on the ITEP website since July 2004:

- Summary Report MINEBREAKER 2
- Development Tests for Measuring the Detection Capabilities of Metal-Detectors
- A Preliminary Investigation of the Effects of Soil Electromagnetic Properties on Metal Detectors.
- Preliminary Evaluation of the EVD-3000
- Reliability Model for Test and Evaluation of Metal Detectors (ITEP project 2.1.1.2)
- CEN Workshop Agreement, Test and Evaluation of Demining Machines (CWA 15044)
- Identifying and Obtaining Soil for Metal-Detector Testing
- Armtrac 75 Assessment Phase
- MineWolf - Clearing of Live Mines. Final Report.
- Mine-Clearing Vehicle MineWolf. Biomechanical Assessment of Mine-Clearing Tests with Live Mines.

The above reports can be found at

<http://www.itep.ws/reports/search1.php>

Technology

Conference dates and venues:

Technology related meetings are held around the world each year. The ability to attend them all is impossible but some may be of interest to different audiences and many deminers may wish to be aware of what is being researched on their behalf. To this end, the UN Portfolio of Mine Action Projects has included a project, which has kindly been funded by the Government of Canada, to assist people from the field to attend relevant meetings and activities. Details of this support can be obtained from Noel Mulliner at UNMAS. If you know of a conference that you would like to attend, and are working in an affected country, contact Noel Mulliner to see if it is possible. Details of some conferences and meetings can be found on a number of websites and the following is an initial selection for your information.

- GICHD, www.gichd.ch click: Calendar
- JMU, www.hdic.jmu.edu click: Conferences
- ICBL, www.icbl.org click: Calendar
- EUDEM, www.eudem.vub.ac.be click: Events
- ISN, www.isn.ethz.ch click: Events Calendar
- ITEP www.itep.ws click: Other News, and then click: See all Events

Details or comments of additional websites, or where further information can be found, should be sent to one of the Newsletter Editors for future inclusion.

Recommended attendance:

The EUDEM2/SCOT series of conferences on technologies and research for mine action were excellent but very technical. The last was held in Brussels in 2003 but we await news of the next.

The UXO/Countermine Forum held in St Louis USA is an excellent gathering of manufacturers and presenters on a wide range of EOD and mine clearance activities and technologies – over 190 presentations at the last Forum!

The US sponsored Humanitarian Demining Programme Requirements Workshop, held in Crystal City, Washington DC, is an excellent gathering of field based personnel stating their requirements, but this is by invitation only.

Several manufacturers also hold conferences of their own and a metal detector

manufacturer, VALLON, now has an annual International Workshop in Germany. This would be good for those wanting to understand the technology of metal detection.

You may know of others. If so please let the Editors know.

The Journal of Mine Action - Call for Papers:

<http://www.maic.jmu.edu/journal/index/index.htm>, is soliciting articles for its Research, Technology and Development in Mine Action section for both print and online issues. All articles on current trends and developments in R&D will be considered for this new section. Topics will include but not be limited to:

- Detection and Neutralization
- Mechanical Equipment
- Manual Equipment
- Data Fusion
- Biosensors (to include dogs, rats, bees)
- GIS, Mapping and Terrain Analysis
- Personal Protective Equipment
- Demining Tools
- Metal Detectors
- Needs of Users

- Lessons Learned in the Field
- Test and Evaluation
- Information Technology
- Mine Detection Test Facilities
- Landmines, ERW and Ordnance

Articles and inquiries can be made to the Journal of Mine Action Editor: Margaret Busé, James Madison University, MSC 8504, 1 Court Square, Harrisonburg, VA 22807. Phone: 540-568-2503 Fax: 540-568-8176 E-mail: busems@jmu.edu

Contact details: -

Do you have time to continually surf the web for information that might help you? Do you have the facilities? If the answer to either of these questions is “NO”, why not contact someone who maybe able to help? UNMAS, GICHD and UNOPS have dedicated officers concerned with technology development and promotion in mine action. Call or e-mail them and tell them what you need. If they do not know the answer immediately they can find out for you or point you in a better direction.

Contact details are:

UNMAS: Noel Mulliner Mulliner@un.org
Tel: +1 212 963 2627

GICHD: Al Carruthers

**A.carruthers@gichd.ch Tel + 41 22 906
1679**

UNOPS: JJ van der Merwe

Johanm@unops.org Tel + 1 212 457 1283

Special feature: –

MULTI-SENSOR DETECTORS

Considerable work has been done in several countries, including the US, UK, Australia, Germany, and Japan, on the development of a multi-sensor detector which combines Ground Penetrating Radar (GPR) and Metal Detection (MD) technologies. GPR or MD technologies cannot provide, individually, the reliability and detection performance required for military mine clearance and mine action. When combined, however, they can complement each other and overcome some of the disadvantages of each of the technologies.

Handheld Standoff Mine Detection System (HSTAMIDS)

HSTAMIDS is a US-developed military multi-sensor device that combines GPR and MD sensors into a single integrated detector. It employs Aided Target Recognition

(AiTR) to assist the operator in the detection of mine-like objects. It is operable in highly mineralized/metallic soils and reduces the false alarm rate by up to 50% when compared with existing handheld detectors in the US military. At the UXO Countermine Forum (March 2004) some trial statistics were made public on the HSTAMIDS performance based on operational and developmental test data. (Tables 1 and 2 – see below).

Approximately two hundred HSTAMIDS (or the AN/PSS-14, using the U.S. military designation) have been deployed with US Forces in Afghanistan and Iraq. A further 130 are to be fielded this year (2004) as part of the limited production phase of the overall HSTAMIDS project.

Table 1
HSTAMIDS Operational Test Results (Arid Site)
Operators in Kneeling and Standing Position

	Standing – PD				Kneeling PD
	AP-LM	AP-M	AT-LM	AT-M	
	97%	99%	99%	100%	
%PD	98.7% (For all types of mines combined)				100%
FAR	0.008				0.009
Scan Rate	3.2				1.9

Notes:

- AP-LM = Anti-Personnel Mine – Low metal Content
AP-M = Anti-Personnel Mine – Metallic
AT-LM = Anti-Tank Mine – Low Metal Content
AT-M = Anti-Tank Mine – Metallic
- PD = Probability of Detection
FAR = Number of False Alarms per square metre
- Scan Rate = Square metres per minute

For security reasons the actual mine targets used and the detection depths could not be released. However, comparative data between the HSTAMIDS and two other detectors well known in mine clearance circles were released. These were the Schiebel 19/2 (or the AN/PSS-12 as it is designated by the US military) and the MineLab F1A4. These comparative performance data on probability of detection and false alarm rates are summarized in Table 2. All three detectors were tested

under identical conditions and against the same threat mines and targets. These developmental trials were conducted in three environments; laterite, arid and temperate soil types. The improved probability of detection is quite obvious for the HSTAMIDS when compared with the other two detectors.

Table 2
Developmental Testing
Combined Results from Three Sites

Detector	Probability of detection (Pd) as a percentage					FALSE ALARM RATE (NOTE 1)
	AP-LM	AP-M	AT-LM	AT-M	Combined PD for all mines	
HSTAMIDS AN/PSS 14	98	99	94	99	97	0.80
MineLab F1A4	95	96	79	91	89	1.1
Schiebel 19/2 AN/PSS-12 (NOTE 2)	80	99	64	99	81	0.43

Notes:

- False Alarm Rate (FAR) is the number of false alarms per square metre.
- Local conditions greatly effected sensitivity and resulted in reduced PD and FAR. The results for this system do not include performance in laterite soil. For this system under that soil condition, it was not possible to collect reliable data for either Probability of Detection or False Alarm Rate

The United States has also embarked upon development of a humanitarian demining version of HSTAMIDS known as the HD-HSTAMIDS. This development effort, while originally focused on providing an even greater probability of detection and discrimination capabilities for all models of the HSTAMIDS, will also significantly reduce the overall cost and simplify the operation of the system for deminers. This is an active multi-year program. It will likely be at least two years before a product will be available for testing.

At the Humanitarian Demining Program Directors Meeting at the Geneva International Centre for Humanitarian Demining in March 2004, the U.S. Representative announced plans to evaluate and demonstrate the HSTAMIDS to a number of mine action agencies and NGOs in mine-affected countries in South East Asia, Africa and South West Asia. This will provide an opportunity for a substantial portion of the mine action community to become familiar with the technology and to assess the potential of the HSTAMIDS in mine action scenarios.

What does all this mean to deminers?
Combined sensor technology is very

promising and appears to offer significant improvements to the probability of detection and reduction of false alarm rates when compared with existing metal detectors. There is considerable evidence that the overall clearance rate for the detector is much faster than existing metal detectors.

A potential issue with this new technology is the cost. The current price for the military version of the HSTAMIDS is \$20,000.00 US. With HSTAMIDS now entering full scale production, the cost will be reduced. In addition, as mentioned above, there are efforts currently well underway to provide deminers with a less costly version. Although the cost of the humanitarian demining version has not yet been established, the HD-HSTAMIDS is expected to exceed the already superior performance of the fielded military system.

The central issue then is the cost effectiveness of the system. What needs to be done is a cost-benefit analysis on the use of HSTAMIDS (and HD-HSTAMIDS in the future) in comparison with existing detectors currently in use by deminers. This must include system performance, life cycle costs, training costs, as well as a safety assessment of the HSTAMIDS in demining operations.

Other issues that need to be examined are sustainability and the training requirements for HSTAMIDS operators.

The upcoming evaluations/demonstrations should provide some of the answers, as the plans call for training and using local deminers with the HSTAMIDS in side by side comparisons with their best detectors. We look forward to these tests and Bob Doheny has offered to update us on the progress and report back at the Humanitarian Demining Programme Directors meeting in Spring of 2005.

Correspondence: -

We are happy to publish “short” articles in this Newsletter so send us something if you want to tell others. But remember, the JMU Journal of Mine Action has a dedicated technology section and welcomes articles for publication. This Newsletter is a better forum for an exchange of views of how to get information and to express your needs; it does not intend to become a magazine.