

Annex A to
UNMASS/GICHD Technical Workshop
Geneva
15-17 February 2006

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TECHNOLOGY WORKSHOP 15-17 February 2006

PRE-WORKSHOP INFORMATION

Please provide as much information as possible in response to the questions.

1. Organisation Title :

2. Detectors (hand held or vehicle mounted)
 - How many hand held detectors do you use in your programme / organisation?
 - What types (makes and models) of detectors do you use?
 - How many of each type?
 - What is the average age of your detector fleet?
 - When / how do you plan to change the detector fleet?
 - Are you content with the performance of each type of detector?
 - Do you require improved detector performance? If so, what improvements do you want?
 - Have you conducted detector trials?
 - Are you planning to conduct any detector trials?
 - Have you heard of the CWA 14747? Do you use it?

Answers to these questions will influence discussion on detector performance, the influence of soil on detection and the effort required for improvements.

Please provide other comments or expanded answers if you think it necessary.

3. Mine Action Machines

- What types of demining / mine action machines do you use?
- How many of each type do you use?
- How old are the machines?
- When do you plan to replace them?
- Why do you plan to replace them?
- What improvements would you like?
- Do you have any plans to conduct machine trials?
- Have you heard of the CWA 15044? Do you use it?
- Additional comments.

4. PPE

- What PPE do you use (manufacturer and type, e.g. Rofi aprons, or Med Eng helmets and visors),
- Do you have different PPE for different activities i.e. deminer or supervisor or dog handler etc?, please list the types.
- How did you select which PPE to provide?
- When do you plan to replace the PPE?
- Have you conducted any trials?
- Do you intend to conduct PPE trials?
- Additional comments.

5. EOD/ disposal tools

- What are the main types of explosive that you use?
- Approximately what quantity of demolition explosives do you use in a year?
- Do you have a problem providing or obtaining this quantity of explosives?
- What specialist EOD tools do you use?
- What specialist EOD tools would you like?
- Do you use pyrotechnic torches? If 'No', would you like to?
- Have you considered a local facility to recover explosives from 'safe' munitions for re-use as demolition explosives? If 'yes' would you be interested in obtaining such a facility?

6. Hand Tools

- Do you locally manufacture hand tools?
- Are there requirements or procedures for which you do not currently have the right tools?
- Comment on any gaps, requirements.

7. Communications

- Do you have problems communicating with your field units?
- Do you have problems with vehicle communications?
- Do you know of adequate software or communications equipment that would solve your problems?
- Comment on any gaps, requirements.

8. Medical equipment

- Do you have adequate trauma packs or equipment in your medical first aid packages?
- Comment on any gaps, requirements.

9. Accidents

- How many demining accidents have there been in the last year?
- How many demining accidents have there been since the beginning of the programme/operation?
- How many accidents have been attributed to a demining tool or demining tool failure?
- Which tools or techniques have been contributory factors to accidents?

10. Miscellaneous

- Do you have any other known requirements for technology improvements to your operations or procedures?

Consolidated Summary – Technical Workshop Questionnaire

GENERAL

Total Number of Respondents: 18
Number of MACs/NMAAs: 10
Number of NGOs: 4
Number of Companies: 4

DETECTORS

Total Number of Metal Detectors: 7836

Types and Quantities of Metal Detectors: Some respondents did not give detector manufacturer; therefore the total number of detectors given below will not match the total number of detectors given above.

CEIA: Total 2235

MIL-D1 2235

MineLab: Total 2086

F1A4 1669

F3 417

F1A4 (UXO) 24

Schiebel: Total 847

AN 19 (All Mods) 779

ATMID 68

Vallon: Total 808

Unknown Model 14

ML1614C 34

ML1620B 30

ML1620C 137

VMH1&1.3 201

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|---------------|-----|
| VMH 2&2.1&2.3 | 150 |
| VMH 3 | 168 |
| VMH 3 CS | 74 |

Ebinger: Total 604

| | |
|--------------------|-----|
| 420 PI | 8 |
| 420 SI | 16 |
| 420 PB | 35 |
| 420 GC | 47 |
| EBEX 420 | 139 |
| EBEX 421 | 300 |
| 740 m (Large Loop) | 59 |

Foerster: Total 106

| | |
|---------------------|----|
| Model not specified | 58 |
| Minex 2 FD | 48 |

Quartel: Total 25

| | |
|-----|----|
| MD8 | 25 |
|-----|----|

Schonstedt: Total 176

| | |
|---------------------|-----|
| Model not specified | 102 |
| GA 72 | 74 |

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|--------------------------|-----------|
| Age of Detectors: Oldest | 10 years |
| Youngest | New |
| Typical Age | 2-5 years |

Plans for replacing detectors:

- 3 respondents planned a systematic replacement. E.g., replaced after 5 years use.
- 5 respondents said as necessary through damage or wearing out.
- Many stated that they were replaced through donors or when new contracts were awarded.

Performance improvements required:

- Most were satisfied with performance of their detectors.
- 3 respondents wanted improved ground compensation.
- Several recognized poorer performance from older detectors.

Detector Trials Completed:

- 9 respondents reported conducting trials.
- Several reported using trial results from other programs/agencies E.g. ITEP

Detector Trials Planned:

- 6 respondents said that they planned trials.

Number of Organizations aware of CWA on Metal Detectors

3 Respondents know about the CWA 14747 and use it or portions of it.

6 Respondents know of it but hadn't used it.

10 Respondents hadn't heard of it.

General Comments

3 respondents wanted Ground Penetrating Radar (GPR)

Some wanted ability to discriminate between clutter and mines

CMAC Comment – In a given context a use of a detector should be standardized among all demining operators to obtain the same standard and quality. For instance, if one organization uses a detector which can detect up to 10 cm and another organization uses a detector which detects up to 15 or 20 cm, the cost and quality of operations will be different. This is even more important in the current competitive mine action environment.

CMAC Comment – Another factor to seriously consider is the improvement of the GPR system. High fragmentation and non-mine metal pieces are the persistent problem in Cambodia, where in CMAC alone over 300 million fragments have been unearthed in the past 13 years. This was done when clearing over 140 million square metres and finding and destroying over 300,316 mines.

MINE ACTION MACHINES

Total number of demining machines in use: (Does not Include Mine Protected Vehicles)

202

Total number of each type of demining machine in use.

Heavy Flails

| | |
|-----------------------|---|
| Scanjack 3500 | 3 |
| Dokking MV 20 | 1 |
| Hydrema 910 MCV | 3 |
| Aardvark (All Models) | 9 |

Medium Flails

| | |
|-----------------------|---|
| Unknown Make | 1 |
| Mine Cat (All Models) | 5 |
| Sampson | 1 |
| RM KA | 1 |
| M-FV-2500 | 1 |
| Armtrac 100 | 2 |
| NOMA | 2 |

| | | |
|---|------------------|----|
| Light Flails | | |
| Unknown Make | | 1 |
| Dokking | MV4 | 22 |
| | MV3 | 2 |
| Bozema | 4 | 23 |
| | 3 | 9 |
| | 2 | 1 |
| | 1 | 1 |
| Armtrac | 75 | 1 |
| Tempest | | 6 |
| Heavy Tillers | | |
| Rhino | | 3 |
| Zeus | | 1 |
| Oracle | | 1 |
| Mine Guzzler | | 1 |
| Heavy Flail/Tiller | | |
| Mine Wolf | | 3 |
| Medium Flail/Tiller | | |
| Dokking | MV10 | 1 |
| Heavy Vegetation Cutters/Excavators | | |
| Unknown Make | | 3 |
| Komatsu | | 2 |
| Hitachi (All Models) | | 25 |
| MT 01 | | 1 |
| Light Vegetation Cutters | | |
| Strimmer | | 1 |
| Rotary Cutters | | 3 |
| JCB/Case | Backhoe | 4 |
| HIAB | | 2 |
| HEC Max Plus | | 1 |
| Other Vegetation Cutters (Unknown Weight Class) | | |
| MVB | | 6 |
| BGH-600-1 | | 1 |
| ZNB 01 | | 1 |
| Miscellaneous Earthmoving/Processing Machines | | |
| Rotary Sifters | | 5 |
| Gallion/CAT | Armoured Graders | 6 |
| Dozers and Tracked Loaders | | 7 |
| Wheeled Loaders with Backhoe | | 25 |

Age of Machines:

Oldest 20 Years

Youngest New

Typical Age: Highly variable 4-10 years

When do you plan to replace them: Most replaced as required, some are related to high operating and maintenance costs. One respondent tried to replace when machines were and average of 6 years operating time.

Why are they replaced: When operating and maintenance costs are too high.

Trials:

3 respondents said they were aware of CWA 15044 and used it.

6 respondents said they were aware of CWA 15044.

6 respondents said they were going to conduct trials.

What improvements would you like to see:

-There is an urgent need for demining machines that can work in forested areas.

-A practical integrated magnet system on machines

-Vehicle Mounted Detections system with real time marking

-3 respondents wanted AT mine resistant machines.

-Many expressed the opinion that lighter machines are required for ease of transport and weak infrastructure such as roads and bridges.

-Better wet ground mobility.

-An excavating machine to help in detecting and clearing land with shifting sand and dunes.

-One respondent wanted an integral water sprayer and air compressor to ease maintenance in the field.

-3 organizations indicated that they wanted to start using demining machines and 1 organization was going to expand its demining machine program.

PPE

What PPE is being used? By far the majority of respondents use body apron or vest with visor and headband/helmet. Manufacturers for each are listed below.

Apron/Vest Manufacturers/Providers

ROFI

Med Eng

Borovo

Rabintex

Tetranike
UXB International
Force Ware
Security Devices
LBA International
Scavenger
Envostar/Envotech
South Africa Body Armour(?)
Harsha
TRZ Hadzici

Visors and Headbands/Helmets

BACTEC
Global Armour
LBA International
Med Eng
Veplas
Sestan and Busch
ROFI
Harsha

Do you have different PPE for different activities?

- One respondent said the dog handlers use goggles to enable better hearing
- Several respondents said that EOD personnel sometimes used EOD suits and improved leg and groin protection.
- One respondent reported that they used a hybrid between a vest and an apron for deminers.
- One respondent reported using a lightweight PPE and visors for BAC.

How do you select PPE?

The selection is based upon the threat, previous experience, and what was donated to the program.

Several respondents referred to STANAG 2920 and IMAS as standards.

Several reported referring to manufacturers claims. One respondent stated that all manufacturers claim to provide adequate protection.

When do you replace PPE?

Mostly they are replaced as required, i.e., when they become damaged or worn.

Several respondents referred to a life expectancy of visors and vest material. A respondent mentioned getting local repairs done with new Kevlar material.

Trials Conducted

Nine respondents reported conducting trials.

Several referred to manufacturer certification.
Two respondents noted the results of military trials.

Trials Planned

5 respondents said they intend to conduct trials.

Other comments

One respondent wanted better protection and less weight.
One respondent said better hand protection was needed.
Several respondents expressed satisfaction with the current PPE.

EOD/Disposal Tools

What are the types of explosive used?

PE 4/C4/Semtex/808

TNT

HMX

Commercial quarrying, mining, or civil engineering explosives.

What quantity is used per year?

The quantities used were highly variable from 50 kg to 13000 kgs. Most were less than 500 kgs.

Do you have any difficulties obtaining explosives?

- Programs who received explosives from the Army reported few problems.
- Those that had to import explosives reported numerous problems and several said that the UN system was slow and cumbersome.
- Several programs have switched over to commercial suppliers.

Specialist EOD tools used.

- Most programs use basic demolition charges and accessories.
- Some programmes reported having available Swiss SM devices and expressed satisfaction in their performance.
- Several programs reported use of de-armers, rocket wrenches, specialized shaped charges, fuze extractors.
- One respondent was particularly well-equipped even down to a fuze X-ray.

What Specialized EOD equipment would you like to have.

- The most common request was for a lightweight exploder.
- One respondent wanted to get a full suite of EOD equipment including robots, vehicles, EOD suits, etc.
- One respondent expressed a need for an ultrasound UXO casing thickness measurement device.

Do you use pyrotechnic torches, would you like to use them?

- 6 Respondents reported using flares. A further 5 said they would use them if they had them.
- 5 respondents said there was no requirement, and several said the need was very limited to special cases.

Considered explosive recycling facility? Would you like it?

- Several respondents stated that they already recycle explosives from certain mines.
- Numerous respondents showed interest in such a system.

Hand Tools

Manufacture of hand tool locally. (Comment: This question may have been understood as some respondents took it to mean “Did their program manufacture tools?”)

Most programs use locally manufactured tools and expressed general satisfaction with them.

Are there any requirements for which you do not have the right tools?

General satisfaction was expressed.

Other Comments

- One respondent requested a better pulling equipment than locally improvised items.
- One respondent recommended addition of rakes in tool kits.
- One respondent recommended that a standard tool kit with specifications for its contents be the subject for an IMAS.
-

Communications

Problems communicating with field units.

In general programs were satisfied with communications; one respondent each reported the following problems:

- totally reliant on mobile phones
- a shortage in the number of channels/frequencies authorized
- high costs of commercial systems
- problems in mountainous areas

Two respondents reported a lack of radios.

Problems with Vehicle Communications

-General satisfaction with vehicle communications but one respondent each reported problems with:

- interference with other non-demining NGOs “hogging” the net.
- lack of vehicle installations
- shadow zones in specific areas
- requirement to set up their own automatic repeater sites.

Are you aware of software or equipment available which would solve your problems?

Most did not specify any shortages or solutions but it was mentioned that cheaper forms of communication should be investigated and several wanted satellite communications.

Medical Equipment

Trauma packs adequate?

There was unanimous agreement that the trauma kits were adequate.

One respondent reported a shortage of kits.

One reported a shortage of handheld VHF radios for medical staff and ambulance vehicles.

Another reported difficulty with local authorities to carry painkilling drugs in the kits.

Comments

Suggestions for change included

- provision of stretchers which could be adapted to different lengths of vehicles.
- provision of emergency oxygen (EMOX kits)
- provide airway kits to accommodate different sizes of patients

Accidents

Accidents in the last year: Comment- There was some confusion with this question and some answered in terms of the number of casualties and others in terms of number of incidents. Some reported accidents to equipment while demining where no injuries occurred. As near as can be determined the number of personnel accidents resulting in injury or death was 34.

Accidents since the beginning of the programme operation. Similar comment as given above. According to the responses received, there were 290 personnel accidents in years prior to 2005 but several respondents did not reply to the question.

Accidents attributed to demining tool or demining tool failure. The responses to this question were sometimes difficult to interpret but in general, respondents did not attribute

accidents to the tools themselves. One notable exception was where the respondent believed that 37 of 39 accidents were attributable to a demining tool or tool failure. Another reported that the use of heavy rakes was a contributing factor. One respondent reported that a mine detection dog was a contributing factor. Most accidents were attributed to carelessness or failure to follow SOPs.

Tools or techniques that were contributing factors. As above.

Miscellaneous

Some suggestions that were placed in this portion of the questionnaire have been moved to other sections above where they are more applicable. The following comments were expressed by one respondent each:

1. Development in the tool design and the procedure, to increase the clearance progress.
2. A Drager type air sampler that confirms the presence of explosives that will be used as a confirmation test for the abilities of residual explosive bio-detectors.
3. It is important to utilize the one man one lane demining drill as it is safer and increases productivity.
4. Improved area survey tools are required.
5. There should be more information on R&D projects that are funded in the name of demining. It was believed that most of the money was wasted.

AGENDA NOTES

TECHNICAL WORKSHOP

15-17 FEBRUARY 2006

General Format

This workshop is designed to address technical issues. It is not intended to be a forum where one solicits funds, puts forth personal agendas, or to describe country programs. The workshop will focus on issues such as experiences with new equipment, defining capabilities and limitations of equipment, identifying capability gaps, lessons learned, how to improve the exchange of technical information/experiences, and constructive advice on how to introduce new technologies into demining programs. We need to get maximum participation from the workshop attendees. If you need a computer/projector, vufoil projector, or flip charts to illustrate a point these will be available in the Conference Room.

The workshop is split generally into four sessions:

- ✓ **Morning, 15 Feb – Welcoming addresses, introduction to the workshop, and a review of the comments provided in the questionnaires received from workshop attendees. Start discussion on detector equipment.**
- ✓ **Afternoon, 15 Feb – Detection Equipment and Manual Demining /PPE Themes**
- ✓ **All Day - 16 Feb –Clearance Theme including Demining Machines, Road Clearance, Survey Tools, EOD Tools, and Medical Equipment.**
- ✓ **All Day - 17 Feb – Bring forward outstanding issues from the previous days plus Miscellaneous Technical Equipment Issues and Way Ahead.**

UNMAS/GICHD TECHNICAL WORKSHOP

15 – 17 FEBRUARY, 2006

GENEVA, SWITZERLAND

Wednesday, 15 February

| Time | Activity | Location | Facilitator | Remarks |
|-------------------|---|---------------------------|-------------------------------------|--|
| 0830-0900 | Coffee | Ground Floor Foyer | Al Carruthers | |
| 0900-0910 | Welcome Address by Ambassador Nellen/GICHD | C2 | | |
| 0910-0940 | Introduction, Aim and Objectives of the Workshop | C2 | Noel Mulliner | |
| 0940-1000 | Introduce Attendees | C2 | Noel Mulliner/ Al Carruthers | |
| 1000-1030 | Coffee | C2 | | |
| 1030-1100- | Confirmation of Agenda | C2 | Al Carruthers/ Noel Mulliner | Take into account comments received from questionnaires |
| 1100-1200 | Hand-held Metal Detectors | C2 | Al Carruthers | Topics: <ul style="list-style-type: none"> ➤ Information sources ➤ Performance ➤ Difficult Soils ➤ Logistics |
| 1200-1300 | Lunch | Cafeteria | | Meal Voucher required |

Wednesday, 15 February 2006

| Time | Activity | Location | Facilitator | Remarks |
|------------------|---|-----------------|----------------------------|---|
| 1300-1400 | Multi-Sensor Detectors | C2 | Ian Dibsall/QinetiQ | Topics: <ul style="list-style-type: none"> ➤ Performance ➤ Advantages ➤ Implications ➤ Display of hardware |
| 1410-1520 | Manual Demining & Alternative Procedures | C2 | Havard Bach | Topics <ul style="list-style-type: none"> ➤ Adequacy of Hand tools ➤ Rakes ➤ Drills and Procedures |
| 1530-1630 | Discussions on PPE, Technology lessons from accident investigations, | C2 | Phil Bean | Topics <ul style="list-style-type: none"> ➤ Recent changes in PPE ➤ Accident statistics and their usefulness |
| 1640-1740 | Open discussion on Detection/ Manual Demining subjects | C2 | | |
| 1740-1800 | Days Summary | C2 | Al Carruthers | |

UNMAS/GICHD TECHNICAL WORKSHOP

15 – 17 FEBRUARY, 2006

GENEVA, SWITZERLAND

Thursday, 16 February

| Time | Activity | Location | Facilitator | Remarks |
|------------------|--------------------------------|------------------|-----------------------|--|
| 0900-1000 | Mine Detection on Roads | C2 | Erik Tollefsen | Topics: <ul style="list-style-type: none">➤ Systems available➤ Operational experience |
| 1000-1030 | Coffee | C2 | | |
| 1030-1130 | REST | C2 | Havard Bach | Topics <ul style="list-style-type: none">➤ Capabilities➤ Limitations➤ Employment |
| 1130-1230 | Survey Tools | C2 | Rune Engeset | Topics <ul style="list-style-type: none">➤ PDA Devices➤ GPS➤ GIS |
| 1230-1330 | Lunch | Cafeteria | | Meal Vouchers |

Thursday, 16 February

| Time | Activity | Location | Facilitator | Remarks |
|-------------|--|-----------------------------|-----------------------|--|
| 1330-1430 | <i>Demining Machines-Brush Cutters</i> | <i>C2</i> | <i>TBC</i> | Topics: <ul style="list-style-type: none"> ➤ <i>Capabilities</i> ➤ <i>Limitations</i> ➤ <i>Employment</i> |
| 1440-1540 | <i>Demining Machines-Flails, Tillers and Rollers</i> | <i>C2</i> | <i>Erik Tollefsen</i> | Topics <ul style="list-style-type: none"> ➤ <i>Capabilities</i> ➤ <i>Limitations</i> ➤ <i>Employment</i> |
| 1550-1650 | <i>Neutralization/EOD Tools, Medical Equipment, and Underwater Demining?</i> | <i>C2</i> | <i>Phil Bean</i> | Topics <ul style="list-style-type: none"> ➤ <i>Operational requirements for EOD Tools</i> ➤ <i>Storage and Transit</i> ➤ <i>Adequacy of Medical Eqpt</i> |
| 1700-1745 | <i>Open Discussion for additional Issues raised during the day</i> | <i>C2</i> | | |
| 1745-1800 | <i>Days Summary</i> | <i>C2</i> | <i>Noel Mulliner/</i> | |
| 1900-2100 | <i>Hosted Dinner</i> | <i>Edelweiss Restaurant</i> | | |

UNMAS/GICHD TECHNICAL WORKSHOP

15 – 17 FEBRUARY, 2006

GENEVA, SWITZERLAND

Friday, 17 February

| Time | Activity | Location | Facilitator | Remarks |
|------------------|--|------------------|---------------------|---|
| 0900-1000 | Vehicles and Communications | C2 | Phil Bean | Topics: <ul style="list-style-type: none">➤ Vehicle/Crew Protection➤ Adequacy of comms equipment |
| 1000-1030 | Coffee | C2 | | |
| 1030-1130 | Test & Evaluation and Trials in mine affected countries | C2 | Mark Buswell | Topics: <ul style="list-style-type: none">➤ Exchange of Information➤ Priorities➤ Field Trials➤ Assistance |
| 1130-1230 | Information Management | C2 | TBC | Topics <ul style="list-style-type: none">➤ Imagery, Maps➤ GPS➤ IMSMA Ver. 4 |
| 1230-1330 | Lunch | Cafeteria | | Meal Vouchers |

Friday, 17 February

| <i>Time</i> | <i>Activity</i> | <i>Location</i> | <i>Facilitator</i> | <i>Remarks</i> |
|------------------|--|-----------------|---|---|
| <i>1330-1430</i> | <i>Way Ahead/Final Exam</i> | <i>C2</i> | <i>Noel Mulliner/ Al Carruthers</i> | <i>Topics</i> <ul style="list-style-type: none"> ➤ <i>Technology issues that must be addressed</i> ➤ <i>Priorities</i> ➤ <i>Recommendations for Insertion of New technology into Demining Operations</i> |
| <i>1440-1540</i> | <i>Open Discussion on Issues raised during the day- Any Other Business</i> | <i>C2</i> | | |
| <i>1540-1600</i> | <i>Days Summary and Parting Comments</i> | <i>C2</i> | <i>Noel Mulliner/ Al Carruthers</i> | |

Sources of Information

Selected Websites

General Information

- Geneva International Centre for Humanitarian Demining www.gichd.ch
- United Nations Mine Action Service
<http://www.mineaction.org/sitemap.asp>
- James Madison University/Mine Action Information Center
<http://maic.jmu.edu>
- Land Mine Monitor <http://www.icbl.org/lm/>

Technical Subjects

- International Test and Evaluation Program <http://www.itep.ws/>
- European Union Demining <http://www.eudem.vub.ac.be/>
- US Humanitarian Demining <http://www.humanitarian-demining.org/demining/default.asp>
- Canadian Centre for Mine Action Technologies
http://www.ccmata.gc.ca/SiteMap/index_e.shtml
- Swedish EOD and Demining Centre <http://www.swedec.mil.se/?lang=E>
- Various Equipment Manufacturers

Miscellaneous Sites

- People Against Landmines <http://www.mgm.org/e/index.htm>
- Inter-Galactic EOD Foundation <http://www.igeod.org/>