C-IED
Operational tools

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<table>
<thead>
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<th></th>
<th>Email/URL</th>
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<tbody>
<tr>
<td>T-IMS (SITE, Sweden)</td>
<td><a href="mailto:torsten@sitescandinavia.se">torsten@sitescandinavia.se</a></td>
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<td>TR-LAUNCHER (RMA, Belgium) Protective Equipment (ICI, Belgium)</td>
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</tr>
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<td>Hyperspectral detection tools</td>
<td><a href="mailto:Nikola.pavkovic@ctro.hr">Nikola.pavkovic@ctro.hr</a> <a href="http://www.fp7-tiramisu.eu">www.fp7-tiramisu.eu</a></td>
</tr>
<tr>
<td>Neutralisation Set</td>
<td><a href="mailto:Januszko@witi.wroc.pl">Januszko@witi.wroc.pl</a> <a href="http://www.fp7-tiramisu.eu">www.fp7-tiramisu.eu</a></td>
</tr>
<tr>
<td>Mobile UXO CONTAINER</td>
<td><a href="mailto:Januszko@witi.wroc.pl">Januszko@witi.wroc.pl</a> <a href="http://www.fp7-tiramisu.eu">www.fp7-tiramisu.eu</a></td>
</tr>
<tr>
<td>Mine (IED) Risk Education for Adults</td>
<td><a href="mailto:patfordemining@gmail.com">patfordemining@gmail.com</a></td>
</tr>
<tr>
<td>Computer game for school children education on mine /IED risk</td>
<td><a href="mailto:m.kacprzak@imm.org.pl">m.kacprzak@imm.org.pl</a></td>
</tr>
<tr>
<td>CHEMICAL/Laser Sensor</td>
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</table>
The lead partner in the development of the CIED-APT is DIME at the University of Genova.

Contact: Dr Matteo Zoppi; Email: zoppi@dimec.unige.it; Telephone: +39 320 or his 438 2160, Research Associate who is also a demining specialist, Andy Smith; email: avs@nolandmines.com; Telephone: +44 1600 719993
APT C-IED

- The C-IED APT is designed for use when responding to IED threats in an urban environment.
- The C-IED platform can simply replace the area preparation tool on a demining APT or it can be fitted to a dedicated C-IED APT with upgraded (rifle resistant) armour and refined CBRN decontamination features.
- The C-IED platform includes a dozer blade, large manipulator arm, small manipulator arm with disrupters, winch and extra cameras.
The background of the approach is a use of the hyperspectral (HS), the forward looking longwave infrared (FLIR), the forward looking ground penetrating radar (FLGPR), the harmonic radar for detection of non-linear components in non-explosive parts of IED (NLJD), the command line-wire detection (CLWD), the situational awareness decision support system for convoy. All considered follows: "forward detection is a must, and not when vehicle is on top of the IED".

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MINERVA: a vehicle mounted ground penetrating radar system for IED and mine detection

Contact: Ms Luigia NUZZO (l.nuzzo@ids corporation.com)
## MINERVA C-IED GPR: Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tbody>
<tr>
<td>Dimensions (1 antenna module)</td>
<td>~ 80x80x40 cm</td>
</tr>
<tr>
<td>Weight (1 antenna module)</td>
<td>&lt; 15 kg</td>
</tr>
<tr>
<td>Nominal Antenna stand off</td>
<td>40 cm</td>
</tr>
<tr>
<td>Targets</td>
<td>IED laid on surface or buried down to 30-50 cm</td>
</tr>
<tr>
<td>Detection width transversal to track</td>
<td>80 cm each module (max. 4 modules = 320 cm)</td>
</tr>
<tr>
<td>Typical Speed</td>
<td>&gt; 15 kph</td>
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MINERVA C-IED GPR: Examples
Laboratory based validation
• Vapour tests with DNT, TNT, RDX
• Systematic materials design and film processing to optimise sensor response speed and sensitivity

Validation tests in relevant environment
• Simulated landmines prepared with TNT, RDX, DNT buried in array of soil types, depths and casings
• Vapours detected from buried sources; tests ongoing
• Air sampling stage being improved
• Testing with ‘Honeybees’ cooperation
C-IED Protection

- EASY TO USE - Field ruggedized
- COMPREHENSIVE MATERIAL EVALUATION AND IDENTIFICATION
- PROVIDES THE CRITICAL SAFETY INFORMATION

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Billy Goat Radio
an innovative tool for risk education

Contact: Dr. Emanuela Elisa Cepolina
patfordin@gmail.com
Tested successfully together with local NMAAs in two very different contexts: the Sahrawi refugee camps in south-west Algeria and in Pailin region, Cambodia.

Cost-efficient system, based on educational entertainment theory

Adaptable to different contexts and risks, including IEDs, landmines and UXOs. Easily adaptable to other risks

Designed to promote sustained behavioural change

Embedding impact assessment
Mine Risk Education computer game for children

Great Rally on the Back of Electronic Turtles

Andrzej Masłowski, Marek Kacprza
Institute of Mathematical Machines
Warsaw, Poland
Implementation of the game

- Architecture client – server (local or remote).
- Mobile devices (iPads, smartphones) and laptops as players’ devices.
- Game may be played simultaneously by up to ten players.
• Game successfully tested in school conditions in Poland and Croatia
• Video on the game:  https://youtu.be/GRcpXNJB63Y
• Demo version at:  http://gamedemo.imm.org.pl/
• Paper on the game:  Computer Games Journal
Accessible in English, Polish and Croatian.
• Spanish language versions on request
Information Management in mine action
“It all starts in the field”

Focus: Using mobile technology in field data collection

Contact: Torsten Vikström, founder of SITE.
He was project manager for the T-IMS development within the European Union’s TIRAMISU-project.
Torsten@sitescandinavia.se
T-IMS – SITE Information Management System

- Operationally validated by HCR-CTRO (CROMAC-CTDT)
- User-friendly and intuitive field data collection tool built on touch technology, no need for a keyboard or a mouse
- Full compliance with international standards for land release (IMAS 7.11)
- Adaptable input forms for easy customization
- Runs with Esri map engine and supports all well established map formats and layering of data
- For use in the early stages of non-technical surveys through the phases of technical survey and mine clearance as well as quality assurance/quality control, reporting and analyses
- Any type of attachment – such as georeferenced photos, images, documents and voice recordings – can be attached to any activity
- Communicates with IMSMA NG and is a part of the new “IMSMA Core Eco-system”
- Optionally equipped with JMU's ordnance database – CORD, giving access to approximately 5,000 ordnance objects in T-IMS off-line
- Operates on Windows platform (tablet, laptop etc), with internal or external GPS connected
- Ability to use a rangefinder for positioning of objects in the map directly in the field situation
- Runs with 100% functionality off-line and does not require internet or WiFi connection
- Hosts a user and support program
Experiences from the field, Battambang Province in Cambodia

- Case study of T-IMS together with GICHD and the Cambodian Mine Action and Victim Assistance Authority (CMAA) at three (3) minefields where the Cambodian Mine Action Centre (CMAC) were conducting clearance operations.
- Non-technical survey (NTS), technical survey (TS), quality assurance (QA) and quality control (QC).
- SHA, CHA, turning points, safe routes, benchmark, area cleared, findings (landmines), videos captured, photos taken, GPS-tracking made etc.
- Reports created.
Experiences from the field, Battambang Province in Cambodia

The complete documentation was made directly in the field, without any additional office work afterwards. Average time spent on reporting was between 15 and 30 minutes.

T-IMS, fundamentals
T-IMS, GIS based
The map module in focus

- Map data & layers [Esri ArcGIS Pro] .TPK, .MMPK
- UAV/UAS Geotiff
- GPS Tracker [Qstarz]
- Laser Rangefinder [Truepulse 360(R), Vector]
- Ordnance database [CORD (~5 000 objects)] .XML
- Video, Photos, Voice recordings, Attachment of any type
T-IMS, using high resolution imaging from a UAV/UAS
T-IMS, share your data!

Google Earth

Google Maps

T-IMS app (iOS/Android)

Forms and reports

KML/KMZ

DOCX, XLSX, PDF, XPS

Analyses
Typical area cancelled, reduced and cleared

TIZ (XML), CSV, SQL

TIZ (XML), CSS, SQL
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