

C-IED

Operational tools



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Remotely Controlled Metal Detector Array for Quality Assurance (RMA, Belgium-Vallon, Germany)(Close-in-Derection)	Operational	Markus.sautter@vallon.de Geert.de.cubber@rma.ac.be
TR-LAUNCHER (RMA, Belgium – HOTZONESOLUTIONS N.V., The Netherlands) Protective Equipment (ICI, Belgium)(Personal Protection Equipment)	Operational	geokecha@gmail.com Marc.pirlot@rma.ac.be Olivier.mattmann@hotzonesolutions.com
T-IMS (SITE, Sweden)	Operational	torsten@sitescandinavia.se
APT (UNIGE, Italy) (C-IED)	Operational, prototype	zoppi@dimec.unige.it
MINERVA (IDS, Italy) (C-IED)	Operational, prototype	l.nuzzo@idscorporation.it
BILLY GOAT RADIO (Snail Aid, Italy) (risk education)	Operational	patfordemining@gmail.com
Hyperspectral Techniques for IED detection	Operational	Nikola.pavkovic@ctro.hr
Neutralisation Set	Operational	Januszko@witi.wroc.pl
Mobile UXO/IED CONTAINER	Operational	Januszko@witi.wroc.pl
C-IED Risk Education for Adults	Operational (free)	patfordemining@gmail.com A.maslowski@imm.org.pl
HOTZONESOLUTIONS Toolbox	Operational	Olivier.mattmann@hotzonesolutions.com

Area Preparation Tractor APT



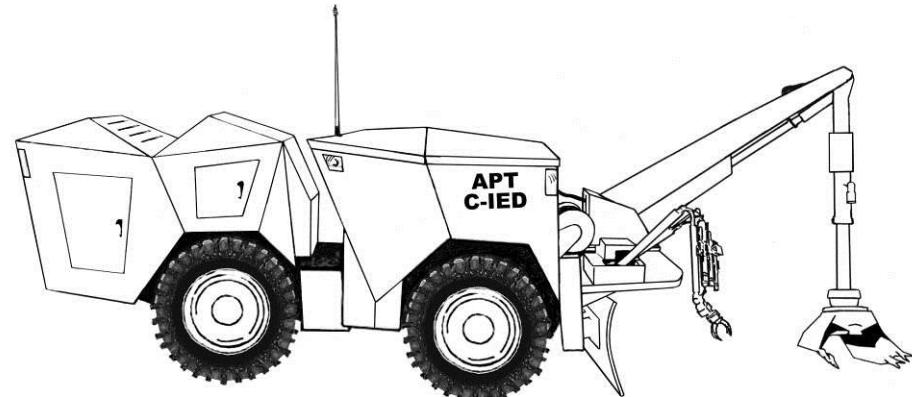
The lead partner in the development of the CIED-APT is DIME at the University of Genova.



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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.



C-IED utility

- The C-IED APT is able to:
 1. move rubble and obstructions aside (delicately when appropriate);
 2. **conduct a rapid camera survey of an area, producing accurate map records;**
 3. investigate suspicious objects either robustly or delicately;
 4. collect ordnance that may not be safe to move by hand;
 5. **disrupt potential IEDs with a water charge, an EFP, or a solid projectile;**



C-IED utility

6. place explosive charges to disrupt or destroy targets;
7. attach hooks and a winch cable to drag heavy items to another place;
8. deploy cutting equipment able to cut an entry into a vehicle/container;
9. deploy a freeze neutralising kit;
10. gain safe entry to a vehicle for internal camera inspection;
11. carry a multi-channel (selective) wireless signal jammer.





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



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MINERVA C-IED GPR: Specifications



MINERVA C-IED GPR installed on Humvee vehicle

Dimensions (1 antenna module)	~ 80x80x40 cm
Weight (1 antenna module)	< 15 kg
Nominal Antenna stand off	40 cm
Targets	IED laid on surface or buried down to 30-50 cm
Detection width transversal to track	80 cm each module (max. 4 modules = 320 cm)
Typical Speed	> 15 kph

MINERVA C-IED GPR: Key features

- **High quality data** for improved clutter rejection
- **Low weight antenna array** reduces the overhang payload for the mechanical support, simplifying installation and mobility issues

Closely packed antenna array



- **Flexible architecture** to configure the system depending on the specific platform (manned or unmanned) and mission profile

Modular architecture



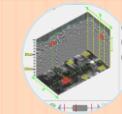
- Radar performances is guaranteed with **variable antenna stand off** from ground;
- This allows **greater mobility** without the need to mechanically adjust the antenna height to track the ground surface

Optimal performance with variable stand off



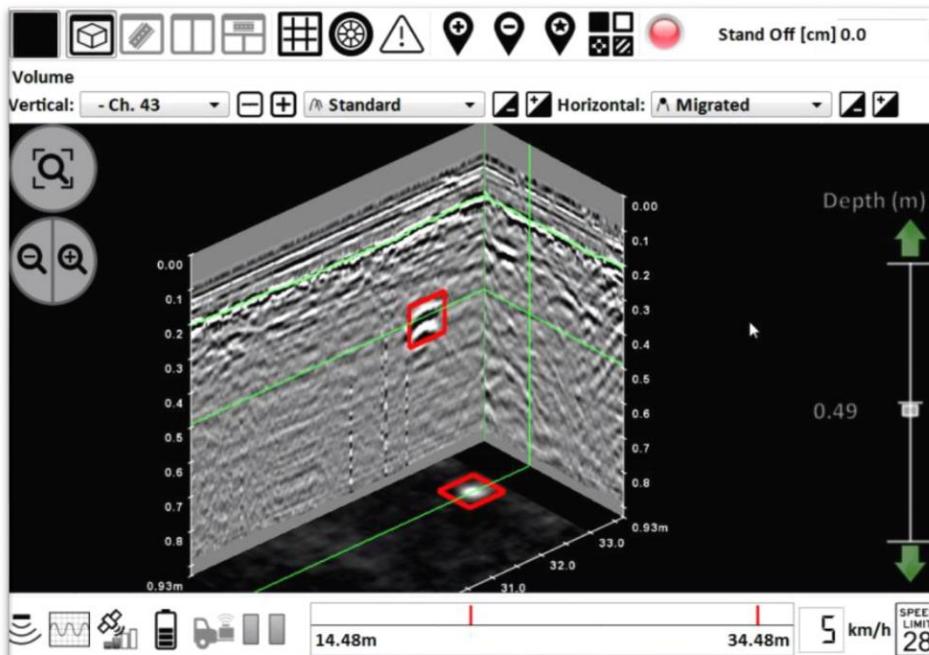
- Based on **automatic** extraction of the object geometry and electromagnetic signature
- Target **database for training** can be improved by the operator

Automatic target classification



MINERVA C-IED GPR: User Interface

- ▶ The user interface provides intuitive and reliable information during real time acquisition (“RUN” mode)
- ▶ “PAUSE” mode allows deeper analysis of data to confirm automatically generated alarms



RUN mode

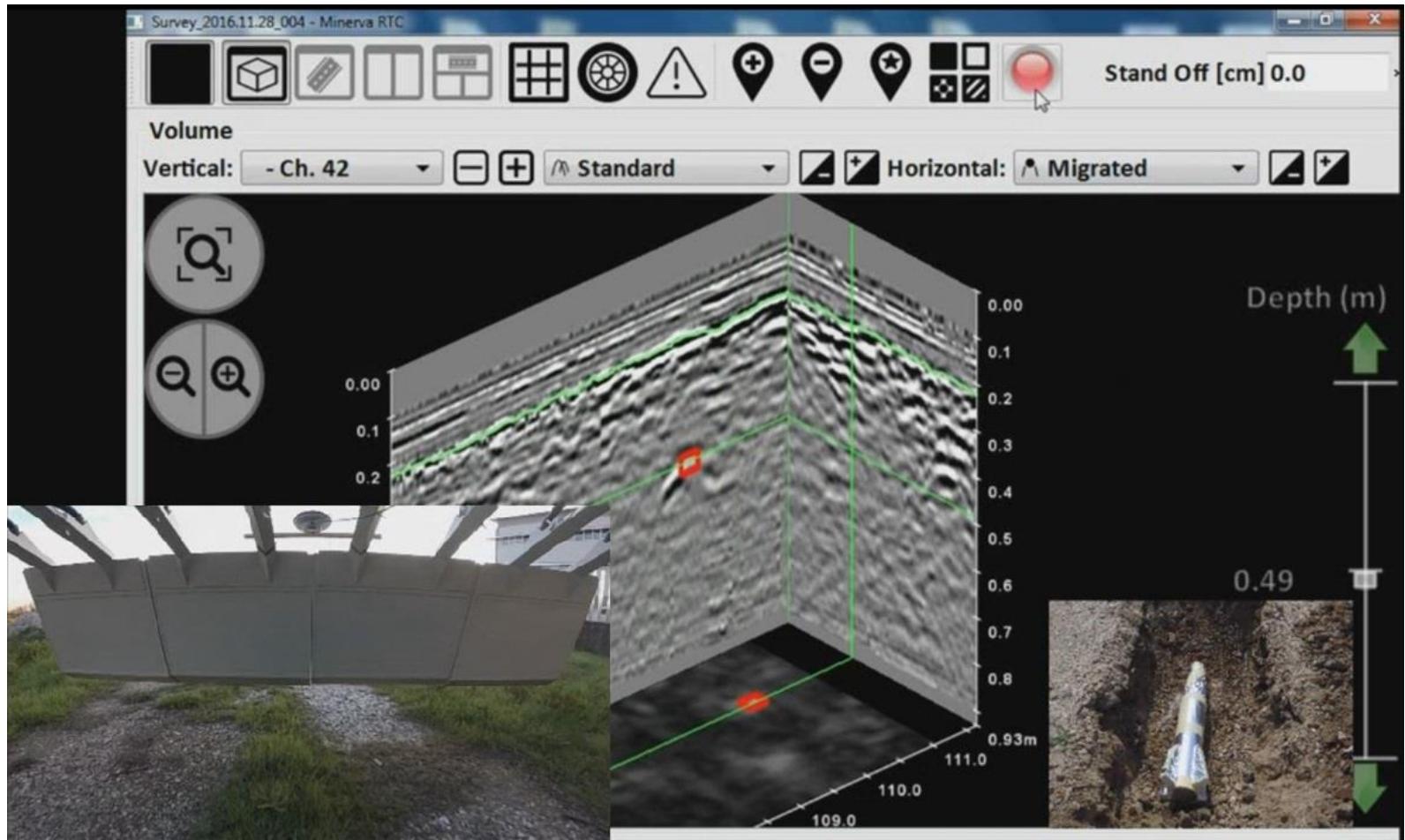
- Data acquisition mode on the run
- Automatic detection and alarm generation

PAUSE mode

- Activated automatically when the vehicle stops (returns to RUN mode when the vehicle moves off)
- The acquisition systems are active but when the vehicle stops, no data are acquired
- Useful to analyze data in potentially hazardous situations

Deep, longitudinal dummy IED

MINERVA C-IED GPR: Examples





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



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Billy Goat Radio: the system



Billy Goat radio is a Risk Education (RE) tool allowing operators living in mine and other explosive affected areas to produce short educational serial dramas which will be broadcast by **radio** and performed live by a team of local actors travelling through the interested region.



Billy Goat Radio: key points



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



Information Management in mine action

“It all starts in the field”



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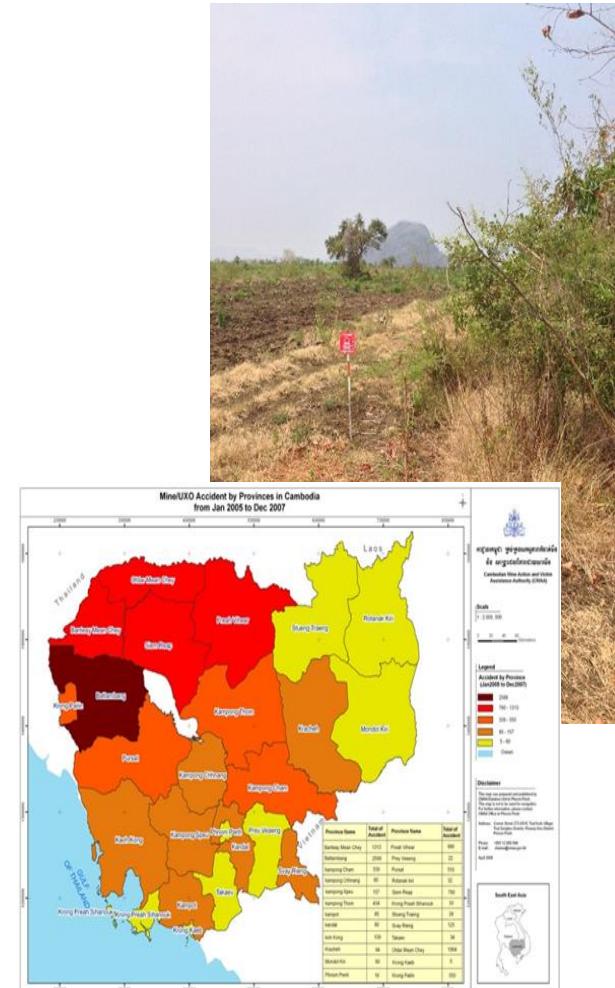
T-IMS – SITE Information Management System

- 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



More: Article of the Cambodian case study in the Journal of Conventional Weapons Destruction, issue 20.2.

“From the field: Mobile technologies for Mine Action”

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



Activity GBG1709

Hazard reduction activity report details Activity type: Non-technical Survey Created time: 2017-09-07 12:29:39 Ongoing	Devices Number of devices: 1	Geographical objects Points: 6 Lines: 3 Areas: 1
Area information Area name: Assumption prior to visit: Not specified Area type: Not specified	Interviewees Number of interviewees: 0	Forms 0 forms added

Ordnance search

Land
Name
Ordnance type
Country of origin
Countries used in
Measurements
Width/Diameter (mm)
200
Height/Length (mm)
0
Deviation (%)
20

ITALIAN LANDMINE, ANTITANK, MATS/1.4 Ordnance type: Landmine Country of origin: Italy The MATS/1.4 is a pressure-activated, blast antitank mine. The mine can be deployed by hand or scattered from a helicopter-mounted delivery system. If employed by hand, several mines can be stacked to increase the effect of the mine.	ITALIAN LANDMINE, ANTITANK, TMP-1 Ordnance type: Landmine Country of origin: Italy The TMP-1 is a contact, blast antitank mine produced in Cuba. This antitank mine appears to be a variant of the SAQ 54/57/3 mine manufactured in Italy. The SAQ series of mines are plastic-bonded mine with AC5 fuses. The TMP-1 mine has a similar secondary fuze well which can be equipped with the ACS 52 antistrike fuze which...	JAPANESE LANDMINE, AT, LUNGE Ordnance type: Landmine Country of origin: Japan Used in World War II, penetrating 6 inches
ROMANIA LANDMINE, ANTITANK, MAT-87 Ordnance type: Landmine Country of origin: Romania The MAT-87 is the Romania modernized version of the MAT-62 and MAT-70 mines. The mine is a relatively simple mine, scattered, blast antitank mine. It has a relatively large fuze well which will accommodate a variety of mine fuses, including the fuses the Soviets designed for the TM-82 series and the TM-72. However, the updated fuse designed...	U.S. LANDMINE, AT, HE, HE, M1, M1A1 & M4 Ordnance type: Landmine Country of origin: United States The figure shows the appearance and dimensions of the landmines. The M1, M1A1, and M4 are anti-personnel (AP) landmines. The M1 and M1A1 are practice landmines. All these mines have manually armed, pressure-activated fuses. The practice mines have smoke charges incorporated into the fuze.	U.K. LANDMINE, AT, EP, MK (6V) Ordnance type: Landmine Country of origin: United Kingdom This mine is used as a mine to break the tracks of light vehicles and disable other vehicles
SOUTH AFRICAN LANDMINE, APERS, CLAYMORE, MK3A1/4/5	FRENCH LANDMINE, AT/PUR/CHARGE, MINE/AR/5	JAPANESE LANDMINE, ANTI-VEHICLE, A

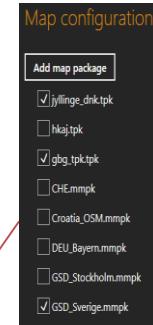
87 found
Search



T-IMS, GIS based The map module in focus



Map data & layers
[Esri ArcGIS Pro]
.TPK, .MMPK



Ordnance database
[CORD (~5 000 objects)]
.XML



UAV/UAS
Geotiff



SMART Dog vest
maXML

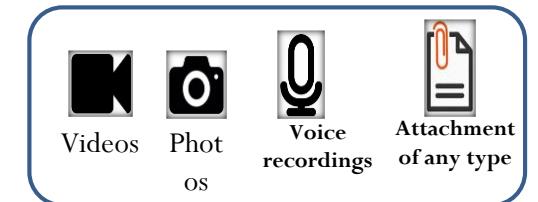
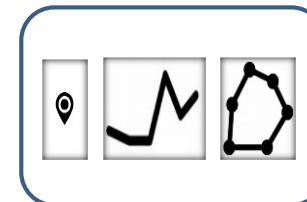


GPS Tracker
[Qstarz]

GPS (unless built-in)



Laser Rangefinder
[Truepulse 360(R),
Vector]



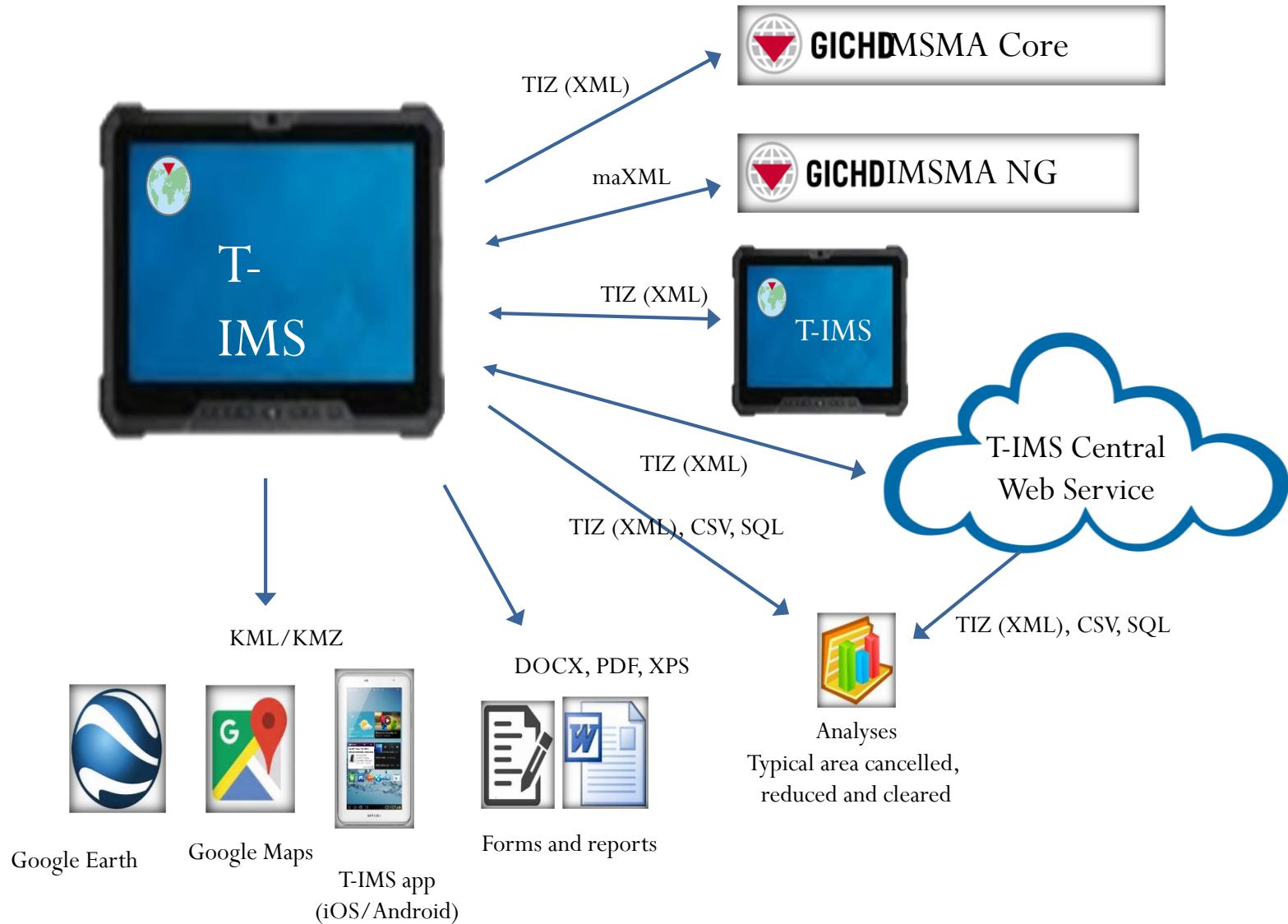
Videos
Phot
os



Voice
recordings
Attachment
of any type



T-IMS, share your data!



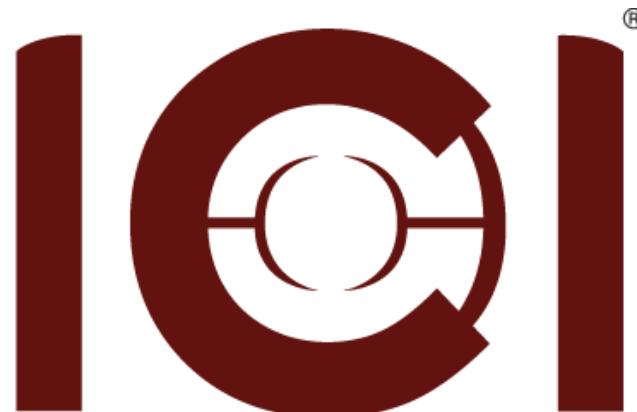


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