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TIRAMISU Final Technology Demonstration at SEDEE-DOVO

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Field Notes

TIRAMISU Final Technology Demonstration at SEDEE-DOVO

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A few of the products demonstrated include the TIRAMISU drone, which provides 3D mapping capabilities, and the TIRAMISAR (in the background on the right), a side-looking imaging sensor with ground penetrating radar.

On 24 September 2015, and in the presence of Her Royal Highness Princess Astrid of Belgium, the Royal Military Academy of Belgium (RMA) organized a demonstration for mine action tools in Meerdael, Belgium. At the Belgian EOD battalion premises of SEDEE-DOVO, RMA presented technology developed under the TIRAMISU project, which was co-funded by the European Union and coordinated by RMA.[1] Designed by twenty-six different organizations, the tools covered multiple elements of mine action, including survey, operation and validation, information management, mine risk education (MRE), close-in-detection, and personnel protective equipment (PPE). Organizers held inside and outside demonstrations as well as discussions of the tools developed throughout the four-year project.

Outdoor demonstrations involved several pieces of mechanical equipment with mounted detectors, including a remotely-controlled vehicle with a multi-channel metal detector; an agriculture tractor-based vehicle with a ground penetrating radar and blast resistant wheels; a small autonomous robot with a rotating metal detector; and a vehicle-mounted, side-looking radar.[2,3]

Organizers also presented geospatial tools based on open-source information and earth-observational data. Visibility and trafficability analyses demonstrated utility for the areas of battle reconstruction, vulnerability estimation and mine action campaign planning. A prioritization tool was demonstrated using a case study from Cambodia, while a case study from Croatia demonstrated how satellite data, airborne surveys and drones can assist in determining the presence or absence of mine indicators.

The arm of the remotely operated Semi-autonomous Demining Robot Husky-ISR/UC carries a triple coil metal detector, and the robot carries a sensor payload composed of video cameras, a 3D laser range finder, an inertial measuring unit and a GPS receiver.

After floods struck Bosnia and Herzegovina in 2014, a drone capable of building a three-dimensional representation of terrain assisted with search and rescue operations, and was used to identify locations where floods could have displaced landmines.[4] This technology was demonstrated at SEDEE-DOVO. The combination of the three-dimensionally generated relief and aerial data was recognized as a valuable tool for surveyors, and a guide on "Geoinformation for demining" is available on the TIRAMISU website, listing products' availability and capabilities.[2]

Relating to data collection during surveys, SPINATOR developed a tablet application called TIRAMISU Information Management System (T-IMS), which ensures data are collected correctly with GPS coordinates and are easily compatible with other systems. Alternatively, proTime and DIALOGIS designed a set of communication boxes to create a Wi-Fi mesh where GPS coordinates and data can be transferred in the absence of an Internet connection. These boxes can be mounted on mobile equipment, together with a metal detector, in order to gather data and record its position.

The event demonstrated two methods for mine risk education (MRE). Snail Aid exhibited a modular and highly-adaptable theater play that is broadcast via radio and was evaluated in Algeria and Cambodia.[5] Additionally, the Institute of Mathematical Machines presented an electronic board game that teaches children MRE safety messages to mitigate the everyday dangers of landmines.

The Spanish National Research Council (CSIC) demonstrated new methods for training that involved the implementation of detectors and prodders for deminers as well as virtual reality applications for operators of remotely-controlled vehicles. The University of St. Andrews (U.K.) introduced an explosives detector vapor that can be used together with the Remote Explosive Scent Tracing (REST) survey method.

The Military Institute of Technical Engineering (WITI) showcased a blast-resistant container designed to transport hazardous items to disposal areas. The container was tested extensively to evaluate its resistance in case of an unwanted explosion. WITI also demonstrated new techniques to dispose of explosives that involved the physical destruction of the fuse using hexogen charges.

While most PPE is currently tested against several consecutive impacts, equipment can sustain far worse damage when multiple impacts occur simultaneously. To test equipment against this kind of threat, RMA designed a piece of equipment with three adjacent barrels that can shoot three projectiles almost simultaneously at a test object. Attendees had the opportunity to view a film depicting the triple-launcher at work in the RMA ballistic lab.

Haris Balta of the Belgian RMA prepares the Teodor V-Metal Detector D Array for a field demonstration.

Other fundamental research included the use of honey bees to detect explosives developed by the University of Zagreb (Croatia) and the Croatian Mine Action Centre (CROMAC) Centre for Testing, Development and Training (CTDT), and a smart prodder developed by the University of Catania (Italy) that can identify the type of material detected. Other developments include innovations in ground penetrating radar technology, metal detection and GIS mapping capabilities.

Conclusion

The objective of the TIRAMISU project is to provide the mine action community with a multi-functional toolbox that can assist in addressing the many issues related to humanitarian demining. Twenty-six partners collaborated over four years (starting in 2012) to build the best tools Europe can offer to make mine and unexploded ordnance clearance safer and more efficient.

For more detailed information on the technology featured at SEDEE-DOVO, please view the online version of this article at http://www.jmu.edu/cisr, or visit the TIRAMISU website at http://www.fp7-tiramisu.eu.

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