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Serving Mine Action With Technology

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SRSA and Mine Action

The Swedish Rescue Services Agency (SRSA) is a Swedish governmental organization. It maintains a high level of emergency preparedness so that, with short notice, it can assist during international relief operations with specialist personnel and equipment. SRSA involvement in international mine action mainly supports Mine Action Coordination Centers (MACCs) through the United Nations Office of Project Services (UNOPS), where SRSA personnel hold positions within the MACC. SRSA has been contributing to research and development of new mine detection and clearance technology by concentrating on two specific projects: BIOSENS and DEMAND.

SRSA R&D

SRSA involvement in research and development (R&D) of mine detection and clearance equipment includes assistance in the development and testing of mechanical mine clearance equipment, metal detectors and multi-sensors including ground penetrating radar and biosensors or "artificial dog's nose." SRSA partly financed and conducted initial tests of the Mine Guzzler, Oracle and Scan Jack machines in Croatia during 1999 and 2000. In cooperation with the Swedish Armed Forces and the Finnish Defense Material Administration, SRSA has tested and evaluated seven different metal detectors. SRSA seconded a member of staff to the Geneva International Center for Humanitarian Demining (GICHD), a mine detection dog (MDD) specialist who is concentrating on the study, development and evaluation of humanitarian demining with MDDs. SRSA also participates in the International Test and Evaluation Program for Humanitarian Demining (ITEP).

SRSA is the co-coordinator of the "BIOSENS—Vapor Detection for Demining" project and a partner in the "DEMAND—Enhancement of Three Existing Technologies and Data Fusion Algorithms for the Test and Demonstration of Multi-sensor Landmine Detection Techniques." Both projects are sponsored by the European Union through the fifth framework program for research and technological development. In the following paragraphs, we introduce the objectives of these projects and SRSA's role.

DEMAND

The partners initializing the DEMAND project saw the potential of combining three advanced sensor technologies with data fusion to provide a tool for humanitarian demining that could show that advanced technology is able to carry out demining in a

safer and more effective way than present demining techniques. The basic idea is that knowledge from three sensors enhanced with data fusion can reduce false alarms. The project has been able to increase the state of the art for the three sensor technologies in the project (metal detector array, ground penetrating radar and biosensor explosive detector for TNT) as well as implement a novel generic data fusion approach. The system performance from measurements and tests in near-real field scenarios is being evaluated and will be available at the beginning of 2004.

In this project, SRSA has a leading role in assessing the biosensor system for its suitability for humanitarian demining. The system has two main components: the sample collection system and the analysis unit, the latter of which has been developed in this project. SRSA has also organized the field tests and is helping to analyze the results and performance of the multi-sensor system. Together with SRSA, partners in the project are the Technical University Ilmenau, Germany; MEODAT GmbH, Germany; IDS Ingegneria dei Sistemi S.p.A., Italy; Biosensor Applications Sweden AB, Sweden; Schiebel Elektronische Geräte GmbH, Austria; and GTD Ingeniería de Sistemas y Software Industrial S.A., Spain.

BIOSENS

The BIOSENS project aims at an increase in the performance of the biosensor analysis unit developed in DEMAND through, for example, an increase in the number of simultaneously detectable explosives from one to three, an increase in system sensitivity and a reduction in size. The BIOSENS project is also developing a sample collection system and methodologies and procedures for the use of explosive vapor and particle detection equipment for area reduction.

Extensive tests have been undertaken and are continuing in test fields that have been purposely built by SRSA in Croatia with the help of the Croatian Mine Action Center (CROMAC) and in other areas, e.g., Bosnia. Parts of these tests include comparison with MDDs. This work is helping researchers to better understand the environmental conditions affecting mine detection through vapor or particle detection.

The present biosensor detection technology is able to detect and distinguish between TNT, PETN and RDX. Present work in the project is focused on increasing sensitivity, gathering further test results and developing procedures. Performance evaluation will be available towards the end of 2004. Together with SRSA, the present partners in the project are Biosensor Applications Sweden AB, Sweden; Norwegian People's Aid, Norway; and Weizmann Institute of Science, Israel.

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