

EUDEM2 Research Survey

EUDEM2 Questionnaire-2 (Research Centers/University Labs/Governments (R&D))

Interviewer: Claudio Bruschini

PART I: Relationship with military/humanitarian demining. Problem knowledge.		DATE: 3/3/2003
Organisation (name + web address) INFN Padova (Istituto Nazionale di Fisica Nucleare) Contact Person (name + e-mail): Giuseppe Viesti , Giuseppe.Viesti@pd.infn.it		
Level of knowledge/understanding in military demining:	(1:none, 5: in depth) 3	
Level of knowledge/understanding in humanitarian demining:	(1:none, 5: in depth) 3	
No. of years involved in HD:	5	
Details (type of involvement): R&D in bulk explosive detection sensor using neutron based sensors		
Main sources of information on humanitarian demining: <input checked="" type="checkbox"/> direct contacts with deminers, (1:little, 5: mostly used) 2 <input checked="" type="checkbox"/> field visits, (1:little, 5: mostly used) 1 <input checked="" type="checkbox"/> literature, (1:little, 5: mostly used), which literature source is used on a frequent basis Journal: JMU <input checked="" type="checkbox"/> Internet, (1:little, 5: mostly used), which site is used on a frequent basis Web address: EUDEM2, GICHD, UN		
Frequency of field visits: 1: none; 2: sporadically (once a year) 3: regularly (several times a year) Where: indicate geographical zones: Croatia		
Frequency of contacts with deminers: 1: none; 2: sporadically (once a year) 3: regularly (several times a year) Who (names + contact details): InterSOS, CROMAC, Croatia [in particular the Scientific Council]		
Knowledge of demining operations: (ex. SOPs (Standard Operating Procedures))	(1:none, 5: in depth) 3	
Details:		
Knowledge of deminers' requirements: (ex. SORs (Statements Of Requests), "wish lists")	(1:none, 5: in depth) 3	
Details:		
Financial Sources of your research activities (who is financing the research carried out): INFN funds, EC project (DIAMINE), MURST (Italian Ministry of University and Research), University of Padova, NATO		
Would you like to know more on humanitarian demining (yes/no/yes and already planned): YES What and at which frequency: <input checked="" type="checkbox"/> ad hoc courses, <input checked="" type="checkbox"/> field visits; <input type="checkbox"/> weekly <input checked="" type="checkbox"/> monthly updates		

<p>Knowledge of the UXO problem (UneXploded Ordnance): (1:none, 5: in depth) 3</p> <p>UXO problem taken into account in your research: (1:no, 5: fully) 5 How has it been taken into account? (describe) Possibility of detecting larger UXO with TNA (Thermal Neutron Analysis) and FNA (Fast Neutron Analysis) methods has been simulated and taken into account experimentally.</p> <p>Technologies studied (list which ones) :</p> <p><input type="radio"/> GPR</p> <p><input type="radio"/> MD</p> <p><input type="radio"/> Combined multi sensor detection systems (details, which sensors)</p> <p><input type="radio"/> mechanical equipment</p> <p><input type="radio"/> remotely operated detection systems</p> <p><input type="radio"/> remotely operated area reduction systems</p> <p><input type="radio"/> chemical systems (e.g. Biosensor)</p> <p><input checked="" type="radio"/> nuclear sensors</p> <p>Kind of research (applied or fundamental):</p> <p><input checked="" type="radio"/> Short Term</p> <p><input checked="" type="radio"/> Long Term</p> <p>In which application areas:</p> <p><input checked="" type="radio"/> hand held</p> <p><input checked="" type="radio"/> vehicle based</p> <p><input type="radio"/> air borne</p> <p><input type="radio"/></p> <p>Aimed at</p> <p><input checked="" type="radio"/> AP</p> <p><input checked="" type="radio"/> AT</p> <p><input checked="" type="radio"/> UXO</p> <p><input checked="" type="radio"/> Counterterrorism applications (detection of explosives hidden in pipelines or in luggage).</p> <p>Overlaps between technologies from other application domains (e.g. medical/geoscience): which ones and how?</p> <p>Application of detectors and techniques developed for fundamental nuclear physics research.</p>	
<p>Research activities related to a specific country or area: Croatia (DIAMINE) (ex. Cambodia)</p>	
<p>PART II: Knowledge of other (R&D) activities, esp. EC.</p>	
<p>Knowledge of ongoing EC R&D projects related to humanitarian demining: (1:none, 5: in depth) 5</p> <p>Knowledge of other R&D projects related to humanitarian demining: (1:none, 5: in depth) 5</p> <p>Details: Involvement in the EC DIAMINE project.</p>	
<p>Would you like to know more on current research activities</p> <p><input checked="" type="radio"/> yes</p> <p><input type="radio"/> no</p> <p><input type="radio"/> yes and already planned:</p> <p>What and at which frequency:</p> <p><input checked="" type="radio"/> newsletter, Already receiving the IAEA (International Atomic Energy Agency) newsletter.</p> <p><input checked="" type="radio"/> workshop,</p> <p><input checked="" type="radio"/> conference,</p> <p><input checked="" type="radio"/> e-mail;</p> <p><input type="radio"/> weekly updates</p> <p><input checked="" type="radio"/> monthly updates</p> <p>Preference for “push” or “pull” technique: (ex. receiving possibly unsorted e-mail, or looking up oneself and selecting the information)</p>	
<p>PART III: Involvement in Product/System testing.</p>	

Have you already been involved in equipment testing: **YES**
(yes, ongoing, no)

Details: **see below**

Do you have own test facilities? (Yes/no) **YES**

Which ones?

- sand box indoor
- sand box with environmental control facilities indoor
- sand box outdoors
- sand box with environmental control facilities outdoors
- dummy minefields in controlled conditions
- dummy minefields in less controlled conditions (e.g. Croatia, Angola etc)

What kind of tests are performed? **Performance tests of Thermal and Fast Neutron sensors (TNA, FNA using the associated particle technique) and neutron backscattering sensors using mine simulants (e.g. melamine and dummy landmine) and Chemical Warfare Agents (CWA) simulants.**

and how?

- own test methods
- ITEP proposed methods
- nationally indicated methods?
-
-

Is any further equipment testing planned: **YES**

(none; in the lab, under internal controlled conditions, under external controlled conditions, in the field)

Details: **Associated particle technique tests. Similar tests at the Rudjer Boskovic Institute, Zagreb, on real mines.**

Type of product/system at which you are aiming + indication of how (with which funding/partners):

1) DIAMINE: hand-held metal detector + NBT (neutron backscattering sensor). Project finished beginning 2003. Funding: EC, Partners: DIAMINE consortium members. 2) EXPLODET (TNA sensor). Funding: INFN. Research program finished. 3) API (Associated Particle Technique) sensor. Funding: INFN, MURST, NATO. Partner: Rudjer Boskovic Institute, Zagreb; EADS-SODERN, France.

What is the state of maturity of your programme?

- Research,
- Breadboard (preliminary assembly of hardware to prove feasibility of proposed system, without regard to packaging, reliability or, often, safety). **EXPLODET (TNA) and API system.**
- Prototype. **DIAMINE (MD+NBT).**
- Pre-Production,
- Production (if so what volume has been produced to date and what is the planned production rate per annum).

What further budget will you require to reach each stage? **API system : ~50 k€ to move from Breadboard to Prototype.**

Have you used your: equipment / prototypes / research breadboards on test sites? **Only in the lab/under internal controlled conditions.**

What test sites? **INFN sandbox. RBI sandbox**

How many mines?

What type? **Mine simulants (e.g. melamine and dummy landmine) and CWA simulants at INFN. Real ATM and APM at RBI.**

What performance statistics did you obtain?

1) DIAMINE: simulation results: small AP mines detectable on a timescale of below 1 minute down to 15 cm depth in a soil with at maximum of 10% moisture by weight. Confirmed experimentally in dry soil. Shallow AT mines detectable in near real time (simulation and tests on melamine sample). 2) EXPLODET: large mines (>1 kg) detectable on a timescale of about 1 minute. Possible niche applications such as demining of infrastructures (e.g. pipeline). 3) API system passed feasibility tests.

What sample set size did you use?

What soil weather conditions did you use?

How did the operators perform?

What was their response / performance

Assuming budget availability, how soon could you personally carry out demining operations with your equipment? in days, weeks months years?

Are you taking into account social studies:

socio-economic surveys/

environmental factors/ **Effect of working with radioactive sources has been evaluated, taking into account the actual legislation. Soil moisture campaign.**

physical limitations of the technologies/ **DIAMINE: end user requirements explicitly taken into account. The effects related to the soil moisture have been extensively studied.**

operational scenarios: **DIAMINE: end user requirements explicitly taken into account.**

How:

Do you disseminate the results? **YES**

How?

Participation to conference

Scientific Journals

other specialised publications

JMU/MAIC?

PART IV: General Comments:

Comments on the EUDEM2 initiative in general:

Questionnaire:

Comments on the concept of an Open, Detailed Web based Database/Information Center (ex. EUDEM2):

For EC projects only: what exploitation plans exist?

When will the first pre-production models be available for evaluation?

Comments on the way EC projects are financed, suggestions:

**Please send us a copy of your reference material together with the fully approved complete questionnaire by separate mail to the following address:*

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