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Humanitarian Demining Research: The Future Role of the European Union

This article aims to give an introduction to the information about the European Union's (EU) Research and Technological Development (RTD) programme, available on several of the EU websites, which are listed below.

by Russell Gasser, Project Officer, Humanitarian Demining RD&T

Legislative policy on landmines is determined by the Parliament and by the European Commission (EC). In 1998, the EC published a now strongly supported the Ottawa Process determined by the European Council and by the European Research and Technological Development (RTD) programme for Humanitarian Demining (HD) administered by the European Commission (EC). In 2000, the European Union (EU) contributed €125 million to the fight against landmines through both member state's donations and funding administered through the EC. The result of EU action can be found at: http://europa.eu.int/comm/external_relations/mine/publication/index.html.

In July 2001 the Council and the European Parliament adopted two Regulations on the Reinforcement of the EU response to the landmine crisis. This means that:

• one is covering developing countries and the second one covering other countries;

• the regulations form the basis for a European integrated and focused policy.

The majority of the RTD spending was delivered in support of the Information Society Technologies (IST) programme administered through the Directorate General Information Society (DG-INFOSO) http://www.cordis.lu/ist/ke_environment/projects/jtc1/cluster/thematic_clusters.html#curator. Other Directorates General also played important roles in humanitarian mine action RD&T, notably the Joint Research Centre.

The EU contribution to research and development, through the IST programme, is generally in the form of a maximum of 50% matching funds for developing demining technologies. The remit of the funding comes from participating industrial partners. The programme is therefore oriented towards the developments of prototypes, which can be turned into commercially successful outcomes so that the participating businesses can recover their RD&T costs from future sales of demining equipment or other equipment in the case of dual-use technologies. This is a very different RD&T environment from many military programmes which are 100% publicly funded and thus do not have the same commercial drive and commercial constraints. The EC is also seeking results in the short to medium term in order to aid compliance with the goal of APL clearance by 2010. Academic partners and Support Measures aimed at providing a service to demining RD&T can be funded at up to 100% of additional costs.

Detailed information about past and present EU-funded RD&T can be found on the Eudes2 website (http://www.eudes.vub.ac.be). Follow the route Technologies - Research & Development - Projects - EU-Funded Projects. Eudes2 is itself a project funded by the EU and Swiss government to provide an information service and technology watch programme to the humanitarıan demining research community, and Eudes2 builds on the success of its predecessor, Eudes1. The current RTD projects focus on new sensors and multisensor data fusion and range from artificial dog noses based on biotechnology to improved Area Reduction using advanced airborne sensors and data fusion.

The Joint Research Centre of the European Commission also supports HD research through a number of actions, principally through its Institute for the Protection and Security of the Citizen (ISPSC) http://humanitarian-security.jrc.eu.int/index.html. The JRC runs the ARIS network for demining research http://demining.jrc.it/aris/, and the main website about EU humanitarian demining http://eu-mine-actions.jrc.ece.eu.int/demining.asp. The ISPSC Institute also hosts the secretariat of the International Test and Evaluation Programme for Humanitarian Demining (ITEP) http://www.itep.ws.

European Union RD&T in the Coming Years: Framework Programme 6 (2002 - 2006)

The EU organises its RD&T activities in multi-annual "Framework Programmes" which typically last five years. Framework Programme 5 (FP5) is now finishing and Framework Programme 6 (FP6) will last from 2002 to 2006, inclusive. The Framework Programme defines the purpose and overall goals for all RTD activities under the EC and describes the working practices and methods, which are known officially as "instruments". The instruments cannot be specifically related to the needs of any one area, humanitarian demining's needs are not necessarily identical to those of the much larger RD&T programmes in such areas as telecommunications and transport, which also use the same instrument within the same framework programme. There is going to be considerable overlap and achieving "critical mass" influence between FP6 and previous framework programmes. The gap is so large that it has been described as a "gaping shift." Participating in RTD in FP6, introducing the "new instruments" will be very different from any previous EU research. Within Framework Programme 6 (FP6), Humanitarian Demining RD&T will be carried out in particular through the Priority 2 "Information Society Technologies" activities, under the first building block "Focusing and Integrating Community Research." Test and evaluation activities will continue to be supported by DG JRC. It might be anticipated that the proposed budget for HD RD&T will be about the same as in recent years.

The European Research Area

The new European Research policy emphasises the fundamental position of the concept of the European Research Area (ERA) by stating that "The framework for approaching RD&T ought to focus on main blocks of activities: focusing and integrating community research, structuring the European Research Area and strengthening the foundations of the European Research Area," the first and the third of which, as regards indirect actions, "should be implemented through specific programmes" (http://europa.eu.int/eur lex/en/com/pdf/2002/3020200305_01.pdf).

The thinking that lies behind FP6 is that the need for the member countries of the EU to be more competitive with their advanced countries, notably the U.S. and Japan. In proportion to the size of their national economies, both of these countries currently spend substantially more on RD&T than the European Union, and the European work is more fragmented due to the number of different countries involved. FP6 aims to address this, and has proposed new "instruments" to make collaborative EU-wide RD&T more cohesive. The "new instruments" aim to provide a more efficient use of resources. In the ERA, the added value gained by different programmes working together and achieving "critical mass" influence will be, if it is possible, significantly advance research goals.

"In its communication "Towards a European Research Area of January 2000, the Commission outlined the objectives and the scope of a new strategy. The vision of having a fully developed, functioning and interconnected research space, in which barriers would disappear, collaboration would flourish, and where a functional integration process would take place, was thus clearly expressed." http://europa.eu.int/comm/research/pdf/ con-2001-549-en.pdf

In recent humanitarian demining meetings and conferences (e.g. IST Programme HD cluster meetings held in Brussels in November 2001 and June 2002, a conference organised by the Royal Military Academy of Belgium in April 2002, and an IST meeting to introduce FP6 to potential partners in May 2002) there has been a clear expression of a desire to improve Europe-wide co-ordination and move towards a more collaborative approach to solving the technical problems of landmine action. The concept of the ERA appears to have been well received by the EU humanitarian research community.

Existing and New Instruments

Not all the existing "instruments" which have been used in previous framework programmes, will be abandoned immediately. Targeted Research Projects, similar to the current FP5 style research projects with very specific technical goals, will still be used where appropriate, in a range of supporting Accompanying Measures, which provide services to researchers, will also continue. However, there will be no minimum threshold and the consortia will be able to define the size of a project, for example, from tens of millions of Euros. However, there will be no maximum, so a longer duration could be accepted if it is necessary to achieve the objectives of a project. (http://europa.eu.int/comm/research/infopages/jti/pip_provisions_075052.pdf)

The Future Role of the European Union
Networks of Excellence

Networks of Excellence (NoE) in FP6 will be substantially different from the Thematic Networks in earlier framework programmes—the use of a similar name does not imply the same primary goals or structures. The document at http://europe.eu.int/comm/research/fp6/pdf/noe_070021.pdf clearly sets out the purpose of this new instrument: "Networks of excellence are designed to strengthen scientific and technological excellence on a particular research topic by networking together at European level the critical mass of resources and expertise needed to provide European leadership and to be a world force in that topic."

"Networks of excellence are therefore an instrument designed primarily to address the fragmentation of European research. Their main deliverable consists of a durable structuring and shaping of the way that research in Europe is carried out on particular research topics. Though it is not their primary purpose, networks of excellence will generate knowledge on the topic through the support they provide to enable excellent teams to work together. It is important that these networks do not act as "closed clubs," concentrating only on strengthening the excellence of the partners inside the network. Each network will therefore also be given a mission to spread excellence beyond the boundaries of its partnerships. Training will be an essential component of this mission."

It is expected that larger networks may involve several hundreds of researchers. Others are expected to be a much more limited size, provided that they pursue ambitious goals and mobilise the critical mass needed to achieve them."

The proposed method of funding NoE will be in the form of a one-off grant towards the cost of integration, paid per person joining the network. The key term of a NoE is the Joint Programme of Activities, which goes far beyond current activities like Internet Forums and can even include proposals for exchange of personnel between institutions for extended periods.

Impact of FP6 on Demining Research

The new instruments pose some challenges, as well as to offer some real opportunities for HD research and development. Many participants in HD research in Europe are already welcoming the potential structuring effect and increased co-ordination that could arise from one or more NoEs. For example, improved co-ordination of the many test facilities located throughout Europe could bring immediate benefits both in terms of comparing results and also in promoting a complementarity which allows individual sites to focus on their specific key areas of competence. Similarly, developing areas of common interest in research could not only reduce duplication of scarce resources but also allow faster progress towards the goal of eliminating mines. Managing the requirements of common-interest collaboration between competing commercial companies remains a major challenge, which has to be addressed in a realistic manner in FP6.

Integrated Projects also offer some challenges, as well as opportunities, to develop key technologies in areas such as drone area reduction as well as tools and equipment used during individual mine detection and elimination. It is now clear that attempts by individual organisations to work alone and develop new equipment in isolation are no longer an option. European wide collaboration on a large scale is required, the necessity to form groupings or "consortia" is now urgent and this is especially true for SMEs who wish to participate in FP6. Given

the proposed scale of activities in IPs, it seems likely that the market for humanitarian demining equipment may, by itself, not offer a viable return on investment for companies investing 50 percent of research costs to match the 50 percent paid by the EC. Increasing attention is being given to dual-use and multiple-use technologies to help resolve this issue; for example explosive vapour detection has potential applications in humanitarian demining, civil security (e.g. airports), range remediation and military purposes. Within a single IP it is envisaged that there will be integration from developing the concept with "principal stakeholders, including users" through to transfer of the finished technology, demonstration and training, and also integration across the applications of dual and multiple-use technologies, see http://europe.eu.int/com/r/1esearch/fp6/pdf/ip_provisions_070502.pdf.

Overall, the goal of the EU remains to deliver the new tools and equipment that humanitarian deminers urgently need and want."

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by Andy Smith, AVS Mine Action Consultants

R&D in Southern Africa

If you measure research and development (R&D) success by the presence of the equipment somewhere in the field, then a lot of useless equipment can be called a "success." This is because those who supported the R&D want us to be able to claim "success" so they "give" equipment to field users. Sometimes this is a direct gift, sometimes it is formally a "loan" or tied to further funding. This equipment would often be wholly uneconomic for the users to buy—because its utility is far too limited to justify the expense. Sometimes it is not even wanted, but "political" concern lead to it being accepted. If you measure R&D success in terms of the equipment being purchased and used around the world, then the number of R&D successes falls dramatically. Moreover, most of the R&D that has achieved this success was "home-grown." It did not originate in the ivory towers and defence research centers of the developed world. Most of it was also very limited. Often it was the result of inspired lateral thinking that led to improving existing technology and methods.

The most famous—and successful—mechanised mine-detection system ever was the Pookie, developed in Zimbabwe (then Rhodesia). Unfortunately it was only good at locating large steel-cased mines recently buried on roads, but that was what it was designed to do and it saved many lives. With its low weight, "V"-shaped sacrificial wheels and high frequency VHF detector pans it was truly revolutionary in the 1970s.

Mechanical Assistance

When looking for more sophisticated mines laid a long time before they are cleared, the use of machines had to change. Old minefields in many parts of the world tend to be overgrown, and the vegetation must be cut to allow

"The Pookie is a single-seat mine-resistant mine-detection vehicle."

therefore mine clearance, which is where most "mechanical assistance" comes to the fore these days.

Steel Wheels and Rollers

Using machines to "deal with" the vegetation began with MECHUM's steel-wheel and rollers in the early 1990s. The wheels and rollers were attached to AVS mine-resistant vehicles developed during South Africa's involvement in the Angola and Mozambique wars. The wheels and rollers "crushed" the undergrowth, which tended to spring back up unless the machines were followed up by deminers immediately. Deminers had to follow up because the wheels and rollers left mines and ordinance behind. The system pushed a cushion of vegetation over the mines making it less likely that the wheels would initiate them. In the first half of the 1990s, several deminers were severely injured or killed while following this kind of vegetation suppression."

(These examples are recorded in the DDIV/DDAS introduced in another paper in this journal.) Civilians were also injured in areas supposedly cleared by these machines. As a result, the steel-wheel and roller methods..."