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The R&D Requirements Workshop

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standard bucket parallel to the minefield. It then makes a second pass where the sifting “forklike” bucket is inserted into the bottom of the minefield trench wall and operated in such a way that it collapses a small section of the wall back into the existing trench. Finally, a third pass is made with the COTS Rotor sifting bucket attachment. The Rotor sifting bucket is used to scoop up and sift the collapsed soil to remove mines and large debris at a separate location. Although it is a time-consuming process, testing has shown this system to be very promising. Deployment to Honduras is scheduled for November 2003.

Tempest

The Tempest is another great example of an HD R&D Program success story. The Tempest was specifically designed to be an affordable remote-controlled mechanical system for clearing medium vegetation, neutralizing craters and removing metallic debris on the surface of AP minefields. It utilizes interchangeable vegetation-clearing components (rail, mulching mower), and it integrates mowing to prepare the land for follow-up detection technologies, into its design. The system places interchangeable heads at the end of a 360-degree rotating articular arm, providing a “reach” capacity to clear vegetation ahead of the machine. This mode of operation allows the system to operate from cleared areas, reducing the risk of damage if a mine is detonated. MAXX was recently deployed and is operating in Rwanda on an Operational Field Evaluation. Early results are very promising.

Conclusion

The U.S. HD R&D Program is making steady progress toward achieving its goal of making demining safer, faster and more efficient than current methods. Mechanical clearance equipment currently undergoing Operational Field Evaluations has helped clear over 500,000 sq m in just the first six months of 2003. The HD R&D Program is conducting new site assessments and is planning for new Operational Field Evaluations in FY04. The results of the 2003 Annual Humanitarian Demining Requirements Workshop have been analyzed and the program execution plan has been developed for FY04. The project engineers, logistics and technicians working on the program have

The R&D Requirements Workshop

It doesn’t take more than a day with deminers in a minefield to realize the challenges they face. You quickly discover they are dedicated to what they do, they are passionate about it, and they are extremely vocal about what they think they need to do a better job. A group of dedicated engineers and developers have been carefully listening to what they have to say.

by Joe Lokey, RDECOM CERDEC NVESD

For the past seven years, the U.S. Department of Defense Humanitarian Demining (HD) Research & Development (R&D) Program at Fort Belvoir, Virginia, has reached out to global experts in demining to find out what they need to better their tools, techniques and technologies. The positive results can be found in Thailand, Cambodia, Central America, Africa, and the Middle East. These improvements and innovations in tools, technologies and machines all start with an annual requirements workshop, which deminers from the field are invited to bring their ideas and problems to a group of specialists to solve these very problems.

The concept is simple: gather useful and effective suggestions and ideas from the experts in the field on their most critical needs. Then use the resources made available by the U.S. government to adapt solutions to those ideas to off-the-shelf technologies or local solutions to improve mine detection, mine clearance or personal protection. The results are then tested and evaluated in a live minefield where more data is collected and mines are cleared.

The NVESD Process

What the Night Vision and Electronic Sensors Directorate (NVESD) does is simple. They find out what needs completing and determine what will make the largest difference by prioritizing their funding, they develop and field test prototype equipment and technologies. Not all output is from pure research. For example, RDECOM CERDEC NVESD takes an existing piece of equipment and modifies it, tests and conducts field trials in a variety of “live” conditions. The cost to the host nation that requests these operational tests is minimal since all they fund are essentially the daily operations costs. Thus, the host country does not have to absorb the huge expense of development and engineering.

During the test and evaluation, performance data is collected on the technology. This information is used to change the configuration, make modifications or even change the certifications procedures to get the optimal benefit to the deminer from the innovations being fielded. It is this continuous path of process improvements that results in a less, expensive, more efficient, safer path to a mine-free world.

Of course, there is always some paperwork involved, but a visit to the U.S. Embassy, a letter of request and a phone call to the right office is all it takes to start the process of testing these technologies. Once approved, a team of specialists is dispatched to assess the demining situation and lay the foundation for future action. The tests and in-country evaluations are normally set up for six months to a year. The host country then decides whether or not that particular technology or equipment should be acquired on a permanent basis.

At the end of the evaluation, everyone benefits. The NVESD receives feedback on performance and suggestions to improve the product or technology. The host nation’s minefields are cleared or mines are detected with the technology or equipment on loan. The operators on the ground get hands-on experience and training with new and updated technologies. The company or manufacturer of the technology collects invaluable marketing and performance data for future sales of more appropriate and affordable tools targeted to address the landmine problem.

Inside the Workshop

The workshop has evolved over the years and has grown in participation. The number of countries supported by the United States is well over 40 and representatives from most of these countries have, at one time, attended one or more of these workshops. The past few years have averaged attendance from 16 to 18 various country demining programs. Others have also attended as guests from countries, such as the People’s Republic of China.

The mix of attendees is also critical to the success of the workshop. In addition to all the major non-governmental organizations (NGOs) involved in demining, there are many military experts in the field on their most critical needs. Then use the resources made available by the U.S. government to adapt solutions to those ideas to off-the-shelf technologies or local solutions to improve mine detection, mine clearance or personal protection. The results are then tested and evaluated in a live minefield where more data is collected and mines are cleared.

This is the only forum in the world where deminers are regularly brought in to provide developers and researchers the ideas and challenges to improving mine clearance. They come from a variety of climates, terrains and environments around the globe, thus adding a wide range of perspectives on the same issues. The office responsible for running this annual requirements workshop is the NVESD at Ft. Belvoir in Virginia.
This hands-on field visit is the ultimate opportunity to see, touch, bear and feel the possible solutions to any demining challenge. It is no longer just a picture on a briefing slide, the attendees are able to see the equipment up close and, in some cases, operate it themselves to get a full and complete understanding of the improvements being made and the results that may come with these improvements.

demining units and civilian demining agency heads that attend and brief their programs and development priorities. Commercial demining organizations are not invited. Workshop proceedings are usually made available to the attendees and any other government that requests them. The workshop normally covers several days. Most of the time is spent in a workshop setting with presentations and frequent discussions. Each country program is briefed and is encouraged to contain a list of the technologies in use and their greatest challenges that may need a technology solution. Far from being a purely academic exercise, an entire day of the workshop is set aside for a field visit to view and handle the various equipment, the technologies and tools under development or available for field trials by the NVESD at their field development and testing facility. Attendees view 15 to 20 various machines or tools in operation, as well as detonations of various pyrotechnic neutralization tools under development. A wide variety of discussions are continually taking place during the workshop, and many attendees have the opportunity to learn from others in a similar situation and discover common approaches to their problems. This leads to a variety of suggestions and ideas that may, in some form, provide the basis for new and improved mine action processes in the future. A detailed overview of the technologies presented at the workshop are in the accompanying article “U.S. Humanitarian Demining R&D Program: Emerging Technologies (page 47). Other topics discussed include:

- Minenach gegen Minen (MgM; People Against Landmines) in Angola discussed an ongoing effort to get plants to detect the explosives in the soil.
- The Accelerated Demining Program (ADP) in Mozambique provided some observations on equipment in use in southern Africa.
- Improving the use of mechanical systems in area reduction was discussed as well as reducing the skills needed to operate the new machinery.
- Norwegian Peoples Aid (NPA) discussed increased speed with alterations in the cabin of some equipment.
- The use of robotics has both benefits and drawbacks. Automated performance reporting was one big benefit.
- Korean discussions focused on the vegetation along the Demilitarized Zone (DMZ) that might be addressed with the Mine Clearing Cultivator or Floating Mine Blade.
- Scrap metal problems could be enhanced with better anchor attachments.
- Thailand emphasized increased mobility in wet jungle terrain. They also sought better protection against the AT-18s as well as innovations in hydraulics and even protection from the sun.

Getting Good Ideas

The workshop is the biggest and best opportunity for country demining programs to focus their needs on technology as a solution to their biggest challenges. The staff of NVESD also harvests new and innovative ideas by a variety of other venues and forums.

Site Assessments

During visits to minefields around the world, NVESD engineers and scientists get a firsthand look at the conditions and environment within which deminers operate. This experience enhances the technology solution and ensures a full understanding of the operational field conditions that will challenge their technology improvements.

Conferences and Workshops

Nearly all of the staff at the NVESD HD R&D team travels to where the solutions may be found. Whether it is a technical workshop, field demonstration, commercial demonstration or scientific presentation, they are busy building the foundation for the next good idea or that next breakthrough innovation. As the attendees of the workshop found out, the staff at NVESD is eager to listen and also ask all the right questions. The response to their demining challenges seem to demonstrate that clearly.

- Minex Advisory Group (MAG) emphasized criteria they considered in acquisition, such as being robust, being easy to use and repair, having access to parts, and being transportable across bridges in austere environments.

Website

The attendees at the workshop were also reminded that all the equipment and technologies they saw were also described in great detail on the NVESD website at http://www.humanitarian-demining.org, along with many other items of interest. The website has recently been updated and now offers the following:

- Catalogue of available technologies
- R&D publications and reports
- Development process description
- Global landmines background
- Online demining pull

In addition to the above sections, the site also has one of the most comprehensive, and frequently updated, links pages to key global demining-related sites in the mine action community. All visitors are encouraged to leave feedback on how the site addresses their issues. Finally, the current video of R&D efforts available and underway may also be ordered online through this site.

Direct Mail

After viewing all the equipment available and in development, workshop attendees are encouraged to take the concepts and ideas back to their home operations and consider how the NVESD may assist their specific needs in the field. Anyone with an idea or concept is encouraged to submit a "white paper" or detailed proposal to the staff at the NVESD for review and consideration. The address for such submissions or any other questions is:

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No Silver Bullets

Anyone engaged in creating workable, pragmatic and cost-effective solutions for mine detection and clearance knows there is no "silver bullet," or any one solution that solves every problem. There are, however, a considerable number of areas in our current methodologies where the application of science can make demining safer, faster and less expensive. These solutions do not come from a laboratory but have their foundations in the daily routines of deminers looking for a better way to do their job. Getting these ideas and challenges to the people at NVESD, who have the skills and experience to address them, is the first step toward achieving advances that can quickly lead to a mine-safe world.

The value of these workshops is clear. At the close of this year's event, Hendrik Ehlers, CEO of MgM, closed the session by saying, "I am fairly certain I speak for most here in expressing gratitude for this very special event. It is different from anything else in the world and unique in many aspects. What you are doing here has a direct beneficial outcome into what we are doing in the field."

*All photos courtesy of the author.

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