

# Colonel Vosburgh, OASD (SO/LIC): The Successes of Technology

Colonel Allen Vosburgh discusses the success of the Department of Defense (DoD) Research and Development (R&D) program, the challenges of meeting user needs and the role of the military in humanitarian demining operations.

by Margaret Busé, Editor

**Margaret Busé (MB):** What do you feel is the biggest challenge facing the humanitarian demining program?

**COL. Vosburgh (COL V):** In terms of technology, I find that determining technology requirements is the hardest part. Until somebody clearly states their requirements, no one can begin to tackle the problem. Many times it is hard to get good requirements out of the people doing demining work.

**MB:** Why is that a challenge for users?

**COL V:** If you ask a real deminer how many requirements he or she has written up and submitted, stating a need for technology, the answer would be "not many." Most users are not very good at doing that because they are too busy carrying out their jobs and do not have the time or the expertise to sit down to document their needs. Also, the system can be ponderous with long and involved paperwork documenting operational needs. That is why we conduct our annual Demining Requirements Workshops, to make the effort to say, "Come talk to us about your demining program and tell us what you are doing." We can then draw out technical

shortfalls and determine how DoD might help find a technical solution to some of the problems. This process seems to work very well.

**MB:** What is the mechanism where users can state their technical requirements or needs to your office?

**COL V:** We welcome unsolicited inputs to our Ft. Belvoir Night Vision Electronic Sensors Directorate [NVESD] Program Office, but it is the annual Demining Requirements Workshop that provides opportunities to state problems and provide information we need to develop technical solutions.

We have done some very quick turn-arounds once we have been approached for a solution to an humanitarian demining (HD) problem. For example, in August 2002, the Organization of American States sponsored Honduras to come see us to talk about their HD problem. In September, Mr. Bert Garcia, one of our Fort Belvoir engineers, and I, went to Honduras to look at the HD situation first hand. We came back and presented the problem to our engineers saying, "What can technology do to fix this and help them solve the problem?"

Essentially, their problem was an area flooded by Hurricane Mitch along the border with Nicaragua where mines had been buried under 50 centimeters of silt. Their mine dogs could not locate mines at that depth and it was beyond the capabilities of their detection equipment. The Hondurans were frustrated because they had only this one piece of territory left to do to declare the country mine safe.

Our Fort Belvoir engineers developed a novel technique to mechanically excavate deeply buried mines that we hope will provide Honduras a rapid solution to their problem. The equipment is expected to be there to begin field trials in November 2003. That is not a bad turn-around considering we were first approached with their problem in August 2002. We developed a new piece of equipment, a set of procedures and safety certification in just

over a year. Hopefully, this equipment will solve their problem while adding to our knowledge base.

**MB:** The result is twofold: the country will have another area cleared and you will have a new piece of equipment that aids demining efforts and can be deployed elsewhere.

**COL V:** Exactly! Other areas of the world have deeply buried mine problems. Jordan, for example, has an area along the Jordan River Valley that flooded, followed by drying and cracking of the soil. First the mines surfaced, then fell down into these cracks as the earth dried. We really have not addressed the deeply buried mine problem so we are hoping for an effective new technology that will be successful and that we can use in other places.

**MB:** Do U.S. policy changes affect where and how equipment can be deployed? Have the goals of the Special Operations and Low Intensity Conflict (SO/LIC) HD Technology Program changed or evolved because of U.S. policy adjustments abroad?

**COL V:** I do not think our policy has changed. Our goal for the humanitarian demining technology program is to try to reduce suffering and help people in mine-affected places by leveraging technology. One of the things I have seen is a much closer relationship with the military Countermine Program. For a long time, the countermine organization focused on military breaching, rapidly forcing a passage through minefields and other barriers to support a military operation. In the last couple of years, particularly in Afghanistan and Iraq, they have discovered technology shortfalls in area clearance. Of course area clearance is one of our strengths. Area clearance, particularly clearing to UN standards using technology to enhance human operators, is what we do best. The Countermine Program has benefited from our work and our program has benefited from countermine research. The relationship has improved the overall demining effort from countermine to humanitarian demining.

**MB:** What about the U.S. military role in HD—has that changed or been affected by policy changes?

*"A key challenge is not allowing our existing technology to drive the program. Requirements and continuous new thinking must pull the technology forward. I am interested in going beyond even the best technologies we have now. You can always build a better vegetation cutter or mine probe and continue to do incremental product improvements. I believe we need to take some risk and leverage new ideas and new technologies to deal with these problems."*

**COL V:** I do not think interest has shifted from supporting humanitarian efforts. An obvious problem is that Army Special Forces provided many of the people conducting demining training. Because of the global war on terrorism and post-9/11 conflicts, there has been an impact on these operations overall. Because of the stress on the Special Operations community, we are seeing a shift to use of general-purpose forces to do the training. In the past, we have looked to the Special Forces because of their cultural awareness and language skills, sending them to the Humanitarian Demining Training Center [HDTTC] at Fort Leonard Wood, Missouri, for a technical course in teaching demining to others. HDTTC is one of the world's premier training facilities and is run through the Defense Security Cooperation Agency and ASD (SO/LIC).

Now we are looking for general-purpose forces that can teach demining. What really counts is having people with the ability and knowledge to train others to do effective demining. Special Operations Forces will continue to participate consistent with their availability. It is beneficial for Special Operations to meet and work with their counterparts in other countries, but at the same time, I feel this can also benefit general-purpose forces. The important thing is that we continue to support these kinds of missions.

**MB:** What do you feel are some of the challenges facing your program and emerging technologies today?

**COL V:** The main challenge is maintaining continued funding and adequate resources. We can always build machines to deal with a variety of mine-related problems, but few developing nations could afford to buy them or the infrastructures would not support them. For example, there has been criticism regarding big machines like Rhino because they are not useful in every country and few developing countries can afford to buy them. I disagree

with that. The last issue of the *Journal of Mine Action* talked about a successful program using a Rhino machine in Croatia. There are many different considerations of size, resource requirements and needs.

We recently deployed a Uni-Disk, a large machine with a rotary grinding device attached to an articulated arm to Mozambique. Uni-Disk was specifically requested by Menschen gegen Minen [MgM People Against Landmines] to solve a mine problem along the Limpopo Railway. This railway has a narrow but long band of mines running parallel to the tracks. MgM wanted a machine that could operate from a safe area, reaching into the minefield to clear vegetation, mines and trip wires. Data obtained from MgM indicates Uni-Disk has been a huge success. Our friends at MgM are the primary users and are very happy with the result. We are in the process of putting more equipment into the hands of non-governmental organizations [NGOs] in Mozambique and Angola. They will benefit from the mechanical systems we will be supplying them, and the Department of Defense will benefit from the field reports and data they provide us.

For instance, biological technologies may have huge potential for expanding our demining capabilities. We have been using dogs to locate explosives and mines for years, but other organisms may equal the dog's ability. Work is being done using rats, bees, plants and even bacteria to locate mines.

The U.S. Defense Advanced Research Projects Agency is sponsoring research at the University of Montana using trained honey bees to locate mines or other explosives. Independent work is being aggressively pursued by the Croatia Mine Action Center [CROMAC] in Croatia. Dr. Jerry Bromenshenk at the University of Montana and Professors Milan Bajic and Nikola Kezic in Croatia are doing fascinating work. I am very interested in following the progress of these novel approaches.



Mine Clearing Cultivator.



NVESD recently completed comparative testing of South African and U.S. systems using different mechanisms to capture air samples. These samples are then analyzed both by machines and by dogs for trace amounts of explosives. As with all good research, these efforts have identified additional interesting questions that will require answers.

The potential for biological systems to aid us in demining may be great. Remember, we started demining technology with dogs and some very rudimentary mechanical systems, which were improved. A number of geneticist-botanist researchers are developing a fast-growing, self-limiting plant that can detect explosives leaking from mines or UXO. You sow the plants in suspect areas and they turn color in the presence of mines or explosives. If it doesn't work, it doesn't work, but at least you have tried. If we don't figure out a way to explore new technologies, all we will do is continued product improvement.

**MB:** How does your office determine what technologies are worthy of future funding?

**COL V:** It always goes back to the requirements process. We look at the needs and try to determine if one can match an off-the-shelf technology to the specific requirement. If not, we have to look for a new approach.

One clear trend I heard during the last requirements workshop was the need for better area reduction. "If we only had something that could reduce the areas that we have to demine." If you have 1,000 acres you believe are mined, then people will consider them mined until you prove otherwise. If you can reduce that area down to 10 acres, that is more manageable.

If we could use a biological approach to enhance area reduction, this would be a great benefit. For example, if it can be validated as a reliable tool, genetically modified plants may be very useful in a place like the Limpopo Railway. You could broadcast the seeds from a safe area, let them grow and reduce the area using color change or lack of change as an indicator.

The people working these biological technologies are very enthusiastic about trying different approaches and working on

these problems in new ways. While I am not able to help fund these emerging technologies right now, I am interested in seeing where they go. Our program is limited to rapid prototyping and demonstration. We are not funded to participate in basic or applied research areas. Many of the emerging technologies are still in these research categories, but we will continue monitoring them closely.

**MB:** How can the community foster the information sharing of these technologies?

**COL V:** The key is continuous communication. Publications like this are great for information sharing and discussion. We can't be afraid to disagree as long as we recognize that we are all focused on getting mines out of the ground. This effort is not always easy. For example, our International Pilot Project for Technology Co-operation [IPPTC] effort to technically evaluate off-the-shelf metal detectors for humanitarian demining was a project where we worked with international partners testing a selection of available detection equipment against established standards. The goal was to provide a consumer report-type publication providing specific performance information for use by the international demining community. The United States funded the purchase of detectors and other countries conducted some of the testing. The project was difficult because you have to work with all the different stakeholders. This does not

mean it cannot be done, it is just harder and takes longer. I believe we have to continue pushing for that type of effort.

The U.S. cannot, nor should we, fund everything because that is not our role. However, we have to make an effort to be an active participant. Other countries have a lot of good ideas to offer and a lot of great experience in these areas. For example, if you look at the International Trust Fund [ITF] in Slovenia, and all of the things they are doing in underwater demining, mine dog training and other technologies, they have a lot to share with the worldwide community.

Should there be a formal effort? I guess so, but I wouldn't presume to suggest what it might be. Should it be under the auspices of an international organization like the UN? ITEP [the International Test and Evaluation Program]? Some other, yet-to-be-identified international group? I don't know. As long as the effort supports our program goals and is not counter to United States interests, we will continue to provide support. We are currently working on or planning projects in Azerbaijan, Rwanda, Honduras, Thailand, Mozambique and Angola the program is definitely expanding and I am very pleased to see that expansion.

**MB:** Who has been contacting you—countries or NGOs?

**COL V:** NGOs and national demining agencies have been the leaders in contacting us and trying to develop



Rotary Mine Comb at test site in England.

solutions. Occasionally, countries approach us through the embassies. We just deployed a new piece of equipment called MAXX to Rwanda supporting the Mine Action Center [MAC] there with a field trial. Rwanda has done a good job of demining, but manual demining has gone as far as it could go and now there is an opportunity to consider a mechanical solution.

**MB:** Is there any particular equipment that you feel has been more successful than others?

**COL V:** The TEMPEST remotely operated vegetation clearance system has been extremely successful. TEMPEST is manufactured by DTW in Cambodia and successfully used in Cambodia, Thailand and most recently by the Accelerated Demining Program [ADP] in Mozambique. Like many systems, there have been incremental improvements. We had problems with the TEMPEST's wheels getting stuck in the mud during the wet season. We are now adding tracks as a modification to solve that mobility problem.

The Dutch-produced ROTAR rubble-clearing tool has been developed as a very useful system via a partnership with MgM in Namibia and Angola. We are also field-testing a new mine clearing sifter and cultivator with MgM in Angola. We are working to improve detection systems and partnering with the Army Countermining Program to improve those technologies. We are working with HALO Trust to field trial special explosion-resistant tires for demining equipment. We have had some real success developing disposal and neutralization equipment. We continue to develop flares and torch systems to burn mines out instead of detonating them. Hopefully this will help eliminate problems with contamination and fragmentation common to explosive solutions.

**MB:** What about the remote-controlled systems?

**COL V:** We continue to believe in the superior safety of remotely operated systems. We work with experts in the field like Dr. Herman at Carnegie Mellon University, constantly improving our remote control capabilities. I would like to see us develop a common architecture for remote-controlled ground systems. Our needs are clearly different from military tactical

*"The U.S. Humanitarian Demining Technology Program has a great relationship with the NGOs, MACs and other deminers working in Angola. While U.S. presence in Angola is limited, Angola is an excellent place for us to test equipment. We benefit by increasing our knowledge and, at the same time, helping provide Angolans a safer environment by eliminating landmines. That is a win/win situation for everybody."*

requirements, but it would be useful if we all gravitated toward using a common system.

**MB:** How does your office determine what type of equipment and manufacturer you will be working with?

**COL V:** We use competitive solicitations to industry and academia, and conduct continuous market investigations to remain abreast of emerging technology. The technicians and engineers at our Fort Belvoir NVESD Project Office are experts in their field and bring a lot of experience to the table. Again, you start with the requirement and then begin to narrow the different systems down. Also, we try to leverage previous testing done by countermining programs or international agencies that may have done similar testing to help us determine the best prospects. Of course that does not mean it will work off the shelf, and in many cases we have to modify the system to make it fit our needs.

**MB:** What other criteria do you use besides user needs and site evaluation in making your decision?

**COL V:** I would be less than candid if I ignored political considerations, but a major strength of this program is that we are able to work almost worldwide in areas with mine problems.

My goal is to support Department of Defense and Department of State humanitarian demining programs through application of technology solutions to demining problems. We support regional Combatant Commanders and United States Embassy Country Teams by providing low-profile, humanitarian-oriented programs. We frequently work in places with limited U.S. presence, providing engagement and visible U.S. humanitarian assistance that might otherwise not be possible.

**MB:** Overall, what has been the feedback that you have received from the MACs, NGOs or host countries?

**COL V:** They have been largely complimentary on our efforts, whether we can help them or not. They understand we cannot solve all problems, but they also are beginning to know that we are ready to make an effort to come up with a solution to help them. In the last couple of years, more NGOs are contacting us. I think the word is getting around that we are straightforward in our approach and that we are out there trying to do good things. We are willing to work with them to make things happen. It supports their goals and fulfills our mission. We are now doing projects with Mines Advisory Group [MAG] in northern Angola and MgM, ADP and HALO Trust in a variety of other areas.

**MB:** How are you promoting this program to the mine action community?

**COL V:** Through our website at [www.humanitarianmining.org](http://www.humanitarianmining.org), the annual Requirements Workshops and by opportunities like this to tell our story. Our best advertising is probably word of mouth and that seems to be happening. I believe this is particularly true as a result of our efforts in Asia, Africa and rapid response in Honduras. Our friends at the Department of State have been quite helpful making suggestions and helping get the word out. Sadly, demining is a growth industry that seems only limited by our funding. The U.S. Department of Defense has spent over \$120 million [U.S.] developing technology solutions to humanitarian demining problems. I think we have been extremely successful so far and hope we can continue developing new solutions to this worldwide problem.

*\*All photos courtesy of the author.*

#### Contact Information

Margaret Busé  
MAIC  
Tel: 540-568-2503  
E-mail: [busems@jmu.edu](mailto:busems@jmu.edu)