

BG Genaro Dellarocco Discusses RDECOM Systems of Systems Integration (SOSI)

Michael I. Roddin and Cynthia D. Hermes

On Feb. 7, 2007, BG Genaro Dellarocco, Deputy Commanding General (DCG) for the Research, Development and Engineering Command (RDECOM) SOSI, met with *Army AL&T* Magazine staff to discuss his organization's mission, initiatives and capabilities.

RDECOM SOSI takes its mission seriously: "To provide the right technology at the right place at the right time!" Here, SGT Nicholas Fate, 1st Brigade Combat Team, 4th Infantry Division, relies on that technology to help him safely locate a weapons cache in a field near Mushahda, Iraq, last year. (U.S. Navy (USN) photo by MC1 Michael Larson.)

Army AL&T: How does RDECOM's mission, to provide "the right technology at the right place at the right time," translate directly or indirectly into support for combatant commanders [COCOMs] and their Soldiers on the battlefield?

Dellarocco: We've got a lot of initiatives in the pipeline in different stages of development and if we can make that piece of equipment or device better, and it works for the warfighter, it's on the battlefield as soon as possible. We have a fairly significant battlefield presence. We have the Science and Technology Acquisition Corps Advisor [STACA] who is part of the Multi-National Forces Iraq staff. We are now on our sixth one. These

are past O-6 level commanders or program managers [PMs] who go downrange and have earned quite a positive reputation for providing information and support to the warfighter. They ensure the right technology is delivered at the right time in terms of being a gatekeeper for Iraq.

Sometimes the right time is a couple of years, particularly with

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basic technology research and new prototypes, which, for safety reasons, must be matured to the right level before we deploy it for Soldier use. The right place may be Afghanistan or some other location. We've discovered some new technology through JIEDDO [Joint Improvised Explosive Device Defeat Organization] to take there for potential fielding. Not all technology works in the manner we hoped it would given variations in environmental conditions. Every technology has the right time and must go to the right place. When the technology is ready, we'll take it to the Soldier.

RDECOM has a global presence in 13 countries. This includes science advisors and International Technology Centers [ITCs]. We have three O-6 commands for international technology integration. They are globally located in Tokyo, Japan; London, England; and Santiago, Chile. We have scientists and engineers who go out

to industry, academia and defense military organizations to talk to them and see what kind of technology they've developed that we can integrate into our own R&D [research and development] initiatives. Also, we have science advisors at each of the COCOMs. We put RDECOM FAST [Field Assistance in Science and Technology (S&T)] STATs [S&T Assistance Teams] in Iraq, and we're up to about 15 teams in country now. That's been a very successful program for us. These men and women have been around R&D institutions for years, they belong to our command and they support our mission. That's another piece of how we're actively supporting our warfighters and bringing technology to the field.

We're also working with the Rapid Equipping Force [REF]. I serve as the Milestone Decision Authority for them. We work to directly support them, and we provide a lot of different types and levels of support. For instance, CBS Television just gave us permission to use the word "MacGyver." We're putting volunteers — civilian engineers and scientists — in direct support of units operating downrange in Iraq and calling them "MacGyver teams." So what are they going to do? Well, what did MacGyver do? They're going to help provide battlefield-expedient solutions.



BG Dellarocco, DCG, RDECOM SOSI, discusses his organization's Joint collaborations with the U.S. Navy, U.S. Marine Corps and the DOE, among others, during his interview with *Army AL&T Magazine*. (U.S. Army photo by Richard Mattox, Program Executive Office Enterprise Information Systems.)



RDECOM SOSI takes initiatives that are in their development pipeline and makes that piece of equipment or device better. If it meets Soldier requirements, it's on the battlefield as soon as possible. Here, SPC Joshua Milstead, 506th Regimental Combat Team, 101st Airborne Division, performs a battle-site zero on his rifle at the small arms range at Forward Operating Base Rustimiyah, Iraq, last year. (USN photo by PH1 Bart A. Bauer.)

The REF has some shops over there and we're bending metal to see what works. We envision using these teams as much as a recruiting tool for civilians, engineers and scientists as for expedient resolution of emerging requirements on the ground in the desert.

Because RDECOM is at a crossroads of so many Army communities, and due to the complexity of the acquisition process when viewed across a broad range of commodities and technology maturity, we are forced to develop advanced processes and tools to help us get our job done. To address this, we have established an Enterprise Integrated Product Team [IPT] that focuses on system-of-system enabling processes and tools in the areas of

Systems Engineering, Technology Demonstration, Modeling and Simulation [M&S] and Knowledge Management. This activity, coupled with our technology integration efforts, is enabling us to balance between Current and Future Force activities while achieving advancements in the way we operate. A great example is the STEM [Science and Technology Enterprise Management] knowledge management system. STEM is a collaborative effort across all the S&T Army commands and ASAALT [Assistant Secretary of the Army for Acquisition, Logistics and Technology] that enables us to view all of our S&T programs across multiple views, supports coordination for operations in theater, enables collaboration across multiple

commodities and links us to the requirements activities in the U.S. Army Training and Doctrine Command [TRADOC] and in the program executive offices/program management offices (PEOs/PMOs).

Army AL&T: You mentioned the pipeline before. Historically, how do the requirements from the battlefield come into the pipeline?

Dellarocco: Requirements from the battlefield come to us in various forms, such as Joint Operational Needs Statements, Immediate Warfighter Needs, 10-liner requirements documents or something similar. They come in through our people, including the REF — who we send downrange —

our STACAs, the STATs and feedback from just about any source, frankly, including various Army Materiel Command [AMC] sources. RDECOM Command Sergeant Major [CSM] Al-civar brought back many lessons learned. He was very active with the noncommissioned officers and other CSMs and put a structure in place to leverage their expertise that had been overlooked before. A lot of kudos go to him because he's been able to collect a lot of valuable data and feedback. He's got quite a network established and has done a really terrific job. We have an IPT that is focused on current operations support, and the FAST and the IPT work together along with the Agile Development Center. I just re-organized the staff and put a colonel over all the current operations/force activities, and we're spinning up to support more JIEDDO activities as well. We're going to become one of the major sources of support for JIEDDO through our R&D and S&T initiatives and breakthrough technology.

Army AL&T: Current indicators estimate that 80 percent of the Army's S&T enterprise is being managed by RDECOM. What are some of the key S&T initiatives that RDECOM is working on for the Army, especially the new SOSI initiative? What comprises SOSI and how is it benefiting the Army's technology integration across Future Combat Systems [FCS]?

Dellarocco: We're a staff element technically focused on resource information and a catalyst to bring technology in, get it evaluated — a clearinghouse if you will. Our command is 13,000 strong with another 5,000 contractors within the lab structure and we're located all over the United States. What isn't widely known is that we have an agreement and reach-back capability with the Department

of Energy [DOE]. We're associated with nine of their labs directly and we do a lot of collaboration work with them. We've been fostering that relationship for the last 4 years. We're working a lot in terms of interagency collaboration as well, and we've teamed with the Navy on some critical projects. Last summer, we formally engaged with the Office of Naval Research. RADM William E. Landay III, Chief of Naval Research, and MG Roger A. Nadeau, CG RDECOM, reviewed potential programs for collaboration. When we performed the data call, it resulted in 17 pages of collaboration programs. Previously, no one knew that because it was a lot of engineers talking to engineers. We're reaching out to the U.S. Marine Corps and the U.S. Air Force as well, to see where potential exists for collaborative efforts and where we can share test results, research and technology transference. We already do a lot of collaboration with the Marines, and we're seeking to expand that relationship by establishing formal ties with my Marine counterpart.

We do everything from tactical evaluations to strategic road maps and support the ASAALT staff in that regard. We support Chief Scientist Dr. Thomas H. Killion and his staff in executing his goals and functions. We are organizing an initiative to support the Army Experimentation Task Force [AETF] at Fort Bliss, TX. This office was originally established to support FCS — and then the war occurred. Our focus then shifted to the current fight. What we're now doing — although we still

have a lot of dual-use type developments with FCS in supporting spinout technology and rapid fielding — is we're supporting other critical projects as well. We're now getting organized to support FCS and TRADOC AETF efforts at Fort Bliss. It's an 8-year project. We're spinning up to do that and provide on-site support to various organizations developing technology for Soldiers. We provide a lot of other support such as M&S, training aids and technology development in integrating many of their systems.

We evaluate technology integration and provide mission information for the warfighter and decision makers. The future of land warfare depends on the Army's ability to incorporate S&T into the Future Force.

We have numerous Cooperative Research and Development Agreements — more than 300 — with universities and colleges throughout the country and a few overseas. We're in just about every aspect of industry as well. One notable out of the Army Research Lab [ARL] is the Army Research Office [ARO] in Triangle Park, NC. ARL and ARO have been in existence since World War II, so they have a rich heritage of supporting Army R&D and S&T initiatives.

We've contributed to about 17 Nobel laureates. [See related story on Page 76 of this issue.] We've funded, in part and at some point in their careers, some of the research that went into their award-winning studies. Of course, we fund a lot of research at universities and in the private sector as well. We also contribute to a lot of patents and venture capital-type resourcing where appropriate. The Small Business Innovation Research [SBIR] program is also part of our organization. SBIR was just realigned

from ARL to SOSI within RDECOM this past fall and we are formally embracing the process. There is a lot of room for growing a better return on investment [ROI] and we're taking some positive steps to do that for the Army. I think we can probably increase our ROI fairly well in the next few years by applying Lean Six Sigma principles and techniques. We've looked at all of our processes to see what we could improve. We found areas where we could improve and refine our business processes so that we can spend our money more efficiently. This will benefit everything from patents to platform interjections to battlefield solutions, near term. It's an interesting program with unlimited room for development, and we're just now scratching the surface.

As far as S&T initiatives go, RDECOM takes science fiction and brings it to reality. That's the essence of a lot of our research in our labs and our Research, Development and Engineering Centers [RDECs]. Some of the scientific discoveries are literally stuff that you might have read about in comic books or science fiction magazines, or saw on television or in movies over the years. Additionally, the Army's Greatest Inventions program is managed here at RDECOM. We do basic research (6.1) — that's where a lot of this stuff comes from. During 6.2 research, we get the application going and then get the platform integration in 6.3 and 6.4. We bring science fiction to reality using the right technology and finding the right place for it at the right time, all to fulfill battlefield requirements that benefit our Soldiers.

Army AL&T: You mentioned ITCs. How is the ITC presence actually manifested in technology integration and the research support that you're doing for specific organizations?

Dellarocco: Our robust ITC presence accomplishes several things. The fact that we have a uniformed O-6 representing RDECOM, AMC and the Army to become the technology ambassador, the intent from a strategic standpoint is that it provides us a presence and a line of communication for many different international companies, government agencies, universities and ministries of defense. So it's another avenue where the ITCs contribute to the warfight by offering up their techniques or technologies to us for us to evaluate and see if we can adopt that technology to existing field requirements or future projects. We have a process to integrate, evaluate and then send those techniques or technologies to one of our RDECs or laboratories for further understanding of what the technology actually does. Occasionally, we buy things directly from overseas and field them for a particular mission, solving technology challenges that way. We also work with academia within a particular country. Our guys are out there talking about technology development from the standpoint of meeting immediate Soldier requirements. What the host country gains are:

- Political benefits with interaction between the U.S. and the host country on a scientific level.
- Respect and intellect ability of scientists in the international world.
- Joining of the brightest science-minded people on a truly inspirational collaboration effort in one location.
- Economic impacts if we adopt something and go into a joint venture or buy something from them based on their technology development.

So there are a lot of win-win situations out there that we foster in the R&D and S&T communities.

Army AL&T: In your experience, have other countries or companies been pretty forthcoming with their technology?

Dellarocco: They come forward with it generally. It's proprietary in many cases, and we understand the rules that are associated with that. That's what they hope for; they want us to buy their technology because it works. A lot of the innovative technological development is evolving and is no longer based solely in the United States or a few other technologically advanced countries. It's a global market economy. Just look at the tremendous technological innovations and products coming out of China, Korea, Taiwan, Japan, India, Europe and Australia, among others. All those countries have great technology bases. We monitor and look at them, establish relationships to understand the technology and try to leverage their technology to benefit our Soldiers on the battlefield. It's the same way in Europe where there are dozens of countries that have special niches — everything from software writing to lens grinding. This is also true of Canada, South America and Mexico. We had not really looked at Latin America as being a source of technology, but Mexico, Brazil, Argentina and Chile have a fairly robust technology development capability. Having a presence there shows that we're interested in their economy and the way they do business. There are some geopolitical positive spinoffs as well to establishing these working relationships.

Army AL&T: We are hearing a lot of buzz about AMC's Rapid Support Network [RSN] and we know that RDECOM is a major catalyst behind that. How is AMC leveraging RDECOM's procedures and capabilities into a focused, integrated and responsive

network concentrating the AL&T community's robust S&T capabilities to meet immediate warfighting needs through the RSN?

Dellarocco: We have a gap within the support structure of AMC and within the Army. PEOs and PMs have a pretty robust process and support network. In AMC, they are called Life Cycle Management Commands [LCMCs]. There we put several organizations together to support the PEOs/PMOs who are developing equipment, communications systems and weapons platforms for our Soldiers and the logistics systems that will sustain them. We feed the technology into the PMs via the RDECs and

industry and that's how they get supported. We have a group of customers such as the REF, the Asymmetric Warfare Group, JIEDDO and Technology Support Working Group that have requirements for support and materiel solutions and have funding. When they come in with a funded requirement, where do they get their support from? Well, each LCMC is assigned particular customers to support. To complicate this process even further, many of these customers cross several LCMC competencies. For instance, the REF and JIEDDO touch just about every lab we have on the R&D side and they touch a lot of PEOs and PMs as well.

So what was the AMC structure to support this very small, but high-profile, group of customers with direct impact on the battlefield? Previously, we weren't organized to do that. But now, the RSN does two things. First of all, it establishes a process for life-cycle management of rapid acquisition that didn't exist before. AMC is a great command. It has a tremendous logistics reputation and capability. It also has a tremendous R&D and S&T capability — both are well known and respected worldwide. What is not widely known, but is germane to the very foundation of the command, is their contracting capability. The acquisition centers support every PEO and PM in the Army. So we needed



RDECOM's MacGyver teams are going to provide battlefield-expedient solutions to meet Soldier requirements on the ground in Iraq and Afghanistan. Here, Soldiers from 2nd Battalion, 377th Parachute Field Artillery Regiment, 25th Infantry Division, fire their M119A1 105mm Towed Howitzer during a fire mission outside Forward Operating Base Kalsu, Iraq, last November. (U.S. Army photo by SSG Sean A. Foley.)

to harness all three of those major command capabilities into a process to support these special customers and to do it rapidly, given the vital nature of their business. That was the intent behind the RSN. It's embryonic, and we're still writing the processes for it. So the RSN will fill the void for life-cycle management of those types of customer requirements. We'll manage it here out of SOSI, in coordination with the AMC G-3. It's pretty interesting stuff.

Army AL&T: I don't think our readers have a firm grasp of what SOSI is and what it does. In just a few sentences, could you summarize basically

what SOSI is and the support that you're providing?

Dellarocco: We're a staff element of RDECOM Headquarters. SOSI was created for integration of all technologies that are being worked on within RDECOM labs. The hope is we will be able to eliminate duplicated efforts between the separate RDECOM organizations as well as save time and money. We evaluate technology integration and provide mission information for the warfighter and decision makers. As you can imagine, there's a lot of information to process, evaluate and then translate into potential capabilities. We evaluate it, disseminate it

and package it. The future of land warfare depends on the Army's ability to incorporate S&T into the Future Force. Lots of coordination is involved — that's the integration aspect. From a SOSI aspect, we touch just about every platform the Army has in one way or another. We are consolidating S&T efforts that accelerate FCS technology transition.

SOSI's organizational mission is to deliver the right technology information at the right time — for the decision maker and the warfighter. To accomplish this wide-ranging mission, some key SOSI initiatives focus on technology integration and capability



Soldiers depend on the Army's corporate laboratory to deliver the scientific discoveries, technological advances and analyses that provide warfighters the capabilities with which to execute full-spectrum operations. ARL's investment portfolio is focused on maturing technologies for transition to the RDECs, PEOs/PMOs and Army Test and Evaluation Command (ATEC). Here (inset), an ARL scientist experiments with emerging laser technology. (U.S. Army photo courtesy of ARL.) A Soldier from 1st Brigade Combat Team, 125th Field Artillery Regiment, Minnesota Army National Guard, practices firing a non-lethal laser in preparation for a convoy support mission, Scania, Iraq, last November. Technology he is using in the field today is a result of ARL research conducted at an RDEC or ATEC facility. (U.S. Army photo by 1LT John Mastbergen.)



assessment by leveraging the global technology base; enterprisewide tools, processes and capabilities; and integrating M&S and technology demonstration activities.

Now, do we touch missiles? Yes, but we don't do a lot of R&D with the missile defense guys per se. We do have a missile capability that does transcend that. Do we do medical? Well, yes, we support the medical community as well. We collaborate with the RDECs and the Medical Research and Materiel Command, but they have their own R&D-focused activities. That's part of SOSI's coordination efforts.

Army AL&T: You mentioned before that RDECOM serves as a clearing-house for information, especially technology information. How is that information integrated among the PEO and LCMC communities?

Dellarocco: My predecessor, BG Mark Brown, gets all the credit for establishing that process. We've got a lot of commodities, including survivability, and stood up 11 IPTs, stretching from hardware to software to information technology integration. The IPTs have membership from the TRADOC and LCMC community and the other services as appropriate. Working together, the IPTs perform technology assessments and develop road maps to work things around. The DOE is also part of our IPT. Some of the IPTs are small, about 40-50 people, while others are more than 150. All told, the 11 IPTs tap about 800 people on any given day. We put the information together from every source, from the international guys to the guys buying the

newspapers. We look at this information, determine what's useful and then pass it to the people who actually have the authority to make decisions, whether it's the lab, the ASAALT staff or other decision makers.

Army AL&T: What total dollar amount is expended annually by RDECOM for basic S&T research? How much is spent on applied research? How much is spent on advanced technology development?

Dellarocco: While our annual operating budget exceeds \$5 billion, about half of our S&T budget is Congressional Adds and it's well over a billion dollars. The President's Budget, coupled with the Congressional Adds, is really the core of our S&T and R&D funding. Another

very large mission and part of our budget is engineering matrix support, which surpasses the budget levels of our S&T. So we have two very large mission areas. We provide the engineering support for most of the PEOs and PMOs in the Army, as well as for other defense agencies that may come in with reimbursables to hire our talents. We provide a good source of engineering support. So when you think about the 13,000-plus employees, a lot of them provide PEO/PMO support and that's in the neighborhood of about \$1.7 billion annually. It's a pretty hefty budget, but then again, we touch every aspect of AL&T one way or another, directly or in support, to get the right technology at the right place at the right time. And we have fun bringing science fiction to reality. This is the best job for a new one star that the Army Acquisition Corps has

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MICHAEL I. RODDIN is the U.S. Army Acquisition Support Center Strategic Communications Director and *Army AL&T* Magazine Editor-in-Chief. He has B.S. degrees in English and journalism from the University of Maine and an M.A. in marketing from the University of Southern California. Roddin is a former Army Advertising Program Manager and three-time Army Keith L. Ware Journalism Award recipient. In 2005, he was selected by the Secretary of the Army for Editor-of-the-Year Honors.

CYNTHIA D. HERMES is Executive Editor of *Army AL&T* Magazine. In her 27 years of government service, she has worked as an editor for both the Army and Navy. Hermes previously worked at the Navy Tactical Support Activity (NTSA) editing U.S. Navy and Marine Corps aircraft procedural and tactical manuals. She was also a program analyst at NTSA managing the government contract for file conversion of these manuals from print to CD-ROM and overseeing mass CD-ROM production and distribution.