# ARMY
## RD&A

# Speaking With
# The Army Chief of Staff

## GEN Dennis J. Reimer

*Also in this issue:*
- AMC's Logistics Reform Efforts
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- Contractors On The Battlefield

# FROM THE ARMY ACQUISITION EXECUTIVE

## Insights From A Visit To The National Training Center

In October, I spent a very intense 1½ days at the National Training Center (NTC) in Fort Irwin, CA, in the Mojave Desert. From a high hill between two valleys, I watched the Blue Force, the brigade being trained, battle against the OPFOR, our professional "bad guys." From my hill, I could see about 10 miles. At times, there was a structure and pattern to the battle, as if it had been diagrammed on a blackboard like a football play. But most of the time, it looked chaotic.

I vividly remember watching a platoon of tanks from the Blue Force moving at top speed toward a hill to the east. Suddenly, six OPFOR tanks came around that same hill going west. I thought the shooting would start instantly, but it didn't. I cannot be a dispassionate observer in these situations, and I was rooting hard for the Blue Force. As the opposing tanks rushed closer and closer together, I felt a rising tension. "Surely, surely," I thought, "the Blues can see them now." But they didn't. They couldn't. Nor could the OPFOR tanks see the Blues. Terrain features that I could not see, the dust of battle, and the fog of war hid each side from the other. They passed each other without firing a shot.

The NTC is a fully instrumented range. We record movement of every vehicle and every airplane, along with artillery vectors and weapons fire, using a set of red and blue icons. We do this so that scenes can be played back later as part of the after-action review for battle leaders. But if you want to, you can go into the "Star Wars" building and watch the battle in real time.

If you do this, you will see icons defining all the systems moving across a map that also roughly displays the terrain of the battlespace. You can see advantages and vulnerabilities of each position. If the leaders on one side had this situational awareness, they would have an enormous advantage in the fight. This is exactly what we will do by digitizing the force. By using information technologies to acquire, exchange, and employ timely information throughout the battlespace, we will give one side—our side—the ability to pierce the fog of war that so befuddled the Blue Force I watched at Fort Irwin.

We are building digitization into some platforms and adding digital capability to others. In both cases, the fundamental platforms we are digitizing today will sustain us for, perhaps, 25 to 30 years. During that time, we will add platforms to the system of systems that will be the digitized force of the future, and be part of the Army After Next. We want the systems we add in the future to be compatible with the systems we plan to field by 2000. And we want the ability to upgrade the systems we are building today to the performance level that we know technology advances will make possible for future systems.

The fact that we are going to have many of our platforms in place for so many years means that we are going to have to modernize them significantly over time. We may give the wrong impression when we say that 70 percent of our current systems will be in place for the Army After

Next. That is true enough, in terms of the outside appearance. Some of the Abrams and Bradleys in the field today will be part of the Army After Next. They will probably look the same. We do not plan to give them a cosmetic facelift, but they will get a brain transplant. A mortar will still look like a mortar, but it will be a mortar with digitized fire control. The digitized mortar will give our soldiers greater accuracy, lethality, and survivability.

Digitization depends on information and communication technologies. We have all seen the rapid advances of the past 15 years, since IBM introduced its first personal computer. The computer chips these technologies depend on are doubling in power every 18 months. Our time to field for a fairly large system is about 12 years. How can we keep the systems we field in the next few years compatible with the systems we will be fielding 10 or 20 years from now? Both will be part of the digitized Army of 2020.

We will have to change the way we do business. We used to design point solutions for specific platforms using military-unique components and architectures. To succeed in the future, we will need to use open architectures that allow horizontal technology integration across systems of systems. It is not simply that commercial information technologies are cheaper, although they can be. Nor is it always the case that commercial solutions are more capable than the point solutions we incorporated in the past. It will often be possible to design a military-unique solution that is more capable than anything presently available from the commercial market. The problem is that we take an average of 12 years to field a major system, while the power of the computer chips on which the commercial digital technology depends doubles every 18 months. The most important reason for us to gain access to commercial technology is not to save money, but to get on the commercial innovation cycle using an open architecture. If we do this, we will be able to continually modernize our weaponry through the timely insertion of communications and information technology—brain transplants.

What can the future be like for our soldiers? Let's return to the Blue Force. They were wiped out later in the battle. The OPFOR almost always wins at Fort Irwin. But, what if the Blue Force were digitized? What if they could see the battlespace and the locations of enemy units? What if Javelins were denying territory to OPFOR armor, as we know they can? What if we had a Comanche quarterbacking the battlespace, Apaches controlling the flanks? A four-tank platoon could be remarkably powerful. They could designate targets and call for remote fire from Crusaders. I think the result would be decisive victory.

*Paul J. Hoeper*

## Research Development Acquisition ARMY RD&A

### Professional Publication of the RD&A Community

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## FEATURES

## DEPARTMENTS

## COVER

GEN Dennis J. Reimer, Chief of Staff of the Army, responded candidly to interview ques-
tions from the Editor-in-Chief of *Army RD&A*. The subject matter included Army business
practices, information dominance, logistics reform, and AWEs.

# INTERVIEW WITH
# GEN DENNIS J. REIMER
# CHIEF OF STAFF OF THE ARMY (CSA)

**Army RD&A: There is currently a great deal of attention being given to the "Revolution in Military Affairs." What is your perspective on this, and can you give us an update on the Army's preparations for the 21st century?**

CSA: I've not yet been able to define for myself just what a Revolution in Military Affairs is, but I am convinced that we are doing some really significant things in managing how we change. Fundamentally, what we're trying to do is change the Army in a disciplined and effective way. We're changing from a Cold War Army to a post-Cold War Army, from an Industrial Age Army to an Information Age Army, and from a threat-based force to a capabilities-based force. The process of taking today's Army to what we refer to as the Army After Next is known as Force XXI. Our Force XXI process is a forward-looking, disciplined and deliberate process. It has worked very well for us and I believe it will continue to work well for us. We intend to leverage it and use it as we prepare for the 21st century.

In basic terms, our modernization strategy focuses on achieving information dominance across the full spectrum of possible operations by exploiting rapid technological advances. A prime example of this process in action is the Army Technology Seminar Game. The Office of the Assistant Secretary of the Army for Research, Development and Acquisition, and the Army Materiel Command sponsored the seminar game to help identify emerging technologies for the Army After Next, and to gain valuable insight into which systems could mature early and help form a bridge between our current Army and the Army After Next. The seminar game results will help the Army develop a roadmap for technology investments in the Army After Next and leverage technological advances in the commercial sector. Unlike other war games, experts from industry and academia participated in the seminar game as full partners with the Army, concentrating on new and emerging technologies using operational vignettes. Results from this seminar game will be incorporated into the [U.S. Army] Training and Doctrine Command's next Army After Next war game to strengthen the war game's output and the Army After Next vision.

Another good example is the Rapid Force Projection Initiative [RFPI] Advanced Concept Technology Demonstration. RFPI provides us a tool to explore new technologies combined with new operational concepts to enable us to respond quickly to unanticipated challenges to U.S. interests around the globe. Our early entry forces need increased survivability and increased lethality, especially when faced with heavy armor threats. We just completed the RFPI Large Scale Field Experiment using four sensor systems, three standoff weapon systems, three digital C4I [command, control, communications, computers, and intelligence] systems, and two data networks that were new capabilities for a Division Ready Brigade fighting an early entry scenario. Our initial insights indicate that we had an extremely successful experiment and the emerging results will prove invaluable in shaping the future structure of our light forces.

I want to make sure our force modernization goals are clear; they are:

• Field a digitized division by 2000 and a digitized corps by 2004;

- Maintain our present combat overmatch capabilities;
- Sustain essential research and devlopment;
- Focus science and technology on leap-ahead technologies for the Army After Next;
- Recapitalize the Army; and
- Further integrate the Active Army, Army National Guard and U.S. Army Reserve to support our "One Team, One Fight, One Future" philosophy.

Going back to the first part of your question, I truly believe we'll need a Revolution in Military Logistics before we have a Revolution in Military Affairs. In that vein, we are changing from a supply-based logistics system to a transportation-based system, and are now employing practices such as Total Asset Visibility and Velocity Management. These offer us great potential, which we must exploit to our full advantage.

Lastly, war will always be a nasty business and will always be a people-intensive profession. We must never lose track of the fact that the Army is not made up of people—the Army is people. One factor that underpins why our people accomplish extraordinary feats of courage is the values we hold dear. That is why during this period of enormous change we are spending so much time emphasizing the fact that values are the enduring foundation of America's Army—always have been, and always will be. We can never put technology ahead of people, but we can and must leverage technology to help our people. Soldiers truly are our nation's credentials.

*Army RD&A:* **You frequently refer to the importance of improving the way the Army "conducts business." Any additional thoughts at this time?**

**CSA:** Everybody knows we're in a constrained fiscal environment today. One of the challenges we face—and I certainly believe this is one of my most important responsibilities—is to balance near-term readiness, quality of life initiatives and future readiness, that is, force modernization. That is always a complex equation to balance, but especially so when we have constrained resources. The Army is committed to finding some of its funds for modernization by becoming the most efficient organization possible. We can only achieve that if everyone on the Total Army Team continues to look for ways to be more efficient. This efficiency campaign is not just for the Army Materiel Command [AMC], although I'll point out AMC has done a great job in this area.

Whether you're a senior noncommissioned officer in the motor pool managing your Prescribed Load List, a battalion commander trying to determine how to allocate your fourth quarter funds to achieve training objectives, or a program manager for a new system in the Engineering and Manufacturing Development phase, I'm convinced we can all be more efficient stewards of the scarce resources we've been given. By attaining efficiencies through better business practices, the Army can reinvest savings in other areas. To this end, the Army is undergoing a Revolution in Business Affairs. We expect to save more than $10 billion during the period FY98-03 by:

- Aggressively pursuing acquisition reform;
- Adopting more profitable commercial practices;
- Outsourcing and privatizing where it makes sense;
- Reducing unnecessary leases and unneeded space at our installations; and
- Taking advantage of the efficiencies we realize from our Force XXI process.

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In systems acquisition, Total Life Cycle Management is the management process we use to aggressively reduce the cost of our systems. For example, the Abrams Program Office is examining a Modernization Through Spares initiative to increase track life from 2,000 to 5,000 miles. Additionally, the Apache helicopter and M109 Family of Vehicles fleets are pursuing Prime Vendor Support [PVS] Pilot Program initiatives that hold the potential for significant savings to reinvest in modernization. PVS is an innovative way to reduce overall costs, improve the availability of spare parts, and maintain weapon systems readiness.

The Army must continue to pursue and fully implement existing acquisition reform initiatives and add new ones. Although it might not be visible to a lot of people, the Army has an impressive list of successes in the acquisition reform arena: leading the Services in the use of the Government Purchase Card, Single Process Initiative participation enabling cost savings and avoidance, and participation in Electronic Commerce and Electronic Data Interchange to revolutionize the way we conduct business and increase efficiencies. Our success in these areas is just a beginning. Further work is underway to take acquisition reform into the 21st century. Plans include extensive use of paperless acquisition, reducing the costs of fielded systems through total ownership cost reduction, and tackling funding and

program instability. These are real challenges, but our acquisition community is committed to continuous improvement. Certainly, the research, development and acquisition community has great potential to help the Army be more efficient. Overall, I believe we're doing a good job balancing the resources we've been given. The latest figures I saw indicate we're getting about 90 percent of what we projected from efficiencies. So, we're making tremendous progress, but we still have more to do.

*Army RD&A:* **The Army is investing a great deal of effort and funding in Advanced Warfighting Experiments [AWEs]. How important are these?**

**CSA:** They are absolutely critical to our change process. Internally, we must identify what changes are required and convince ourselves we have it about right before making major adjustments. Our soldiers and our missions are too important to take unnecessary risk. The Advanced Warfighting Experiment concept helps us reduce this risk. We've had a series of these AWEs at our combat training centers, including the Joint Readiness Training Center [JRTC], the National Training Center [NTC], and at Fort Hood, TX. These AWEs have been enormously successful because they have allowed us to try some new ideas and concepts with soldiers in the field, using current and upgraded equipment, in realistic training scenarios. The AWE we conducted at the NTC in March 1997 provides a great example of how these experiments are helping us to "see the future." Our Experimental Force [EXFOR] demonstrated the power of computers, space assets, advanced unmanned aerial reconnaissance vehicles, and digital information technologies on the battlefield. By applying these Information Age technologies to Industrial Age equipment, the EXFOR attained a quantum leap in situational awareness. The data collected and experience gained clearly validated that real-time situational awareness and information dominance can provide commanders with far greater mobility, firepower, and survivability—all prerequisites for our future force.

One facet that has helped our AWE process is our partnership with industry. I truly believe this has helped us immensely. Because of that great working relationship with industry, we were able to save weeks and months preparing for the AWEs, and that is critical because time is money in the acquisition business. One of the most visible byproducts of the AWE process has been the redesign of what has always been called the heavy division. We just announced what our new division will look like. We intend to transition the 4th Infantry Division (mechanized) to the new digitized organization by 2000. We also plan to field the First Digitized Corps by 2004. There's not enough time here to explain all of the changes encompassing those new organizations, but suffice it to say the new divisions and corps will be more lethal, more strategically mobile, more logistically sustainable, and more integrated with our Reserve components.

**"By attaining efficiencies through better business practices, the Army can reinvest savings in other areas."**

Our next AWE will focus on light forces and is currently projected to occur in FY00. We are also working with the other Services and should conduct joint AWEs fairly soon. The greatest challenge of staying on the crest of a Revolution in Military Affairs is knowing when to change and when not to change. That is a terribly difficult challenge, but I'm comfortable with the pace at which we're moving and the reason for that is our Advanced Warfighting Experiments. They really give us a window into "ground truth" on how well some of these future concepts and technologies will actually work, and by partnering industry and soldiers together, we have a pretty good feel for how much we can reduce "cycle time" in the development of systems and transfer commercial technology to military use. The bottom line is that the AWEs have been—and will continue to be—an important component of our Force XXI process.

*Army RD&A:* **An increasing share of Army modernization funds are going into achieving "information dominance" on the future battlefield. How do you respond to those who say that far too much emphasis is being placed on such a volatile and fast-changing technology?**

**CSA:** I believe that one of the critical areas in combat operations is battle command, and I also think this is an area we must improve by leveraging information technology. If we are able to achieve information dominance, it could be as significant to conducting future operations as the introduction of smokeless gunpowder to Western civilization in the 19th century. Let me expand on how we are approaching the issue of information dominance. We set up simple criteria to measure effectiveness. We know that in information-based operations, a soldier needs to be able to answer three questions: "Where am I?," "Where is my buddy?," and "Where is the enemy?" And we said, if you can answer those three questions with a high degree of accuracy, day or night, on offense or defense, then you have an extraordinary unprecedented advantage because in answering those three questions you remove uncertainty and allow commanders to better employ the weapon system they possess. This is a significant advantage and the real payoff of information dominance. The AWEs demonstrated that we can answer those questions and get reliable answers under tough, tactical conditions. They proved the potential of information dominance in a very real sense.

In my opinion, we still have some work to do in a couple of areas, most notably in how we train our leaders. That's important for a couple of reasons. First of all, when we start to leverage the advantages of technology, we must train our leaders relative to what they can get from that technology because we want to get everything possible out of it. Second, if we don't train leaders and their staffs on how to use this technology, we could literally be inundated with information—the key is to train leaders on

what constitutes critical information and then have the staffs and subordinates provide that information. Third, information operations give us a vital edge—they increase lethality, focus logistics and improve battle command and, with those kinds of advantages, we can move on to make other important changes like rethinking sustainment, redesigning command posts and revamping organizational designs—all leader tasks. You see, information dominance is really kind of a lynch pin for all kinds of things.

With information operations, we are capable of pressing the operation 24-hours-a-day up to the limit of human endurance and we are now working on ways to extend that too. So, I would say we have to move out—we have no choice if we want to move the Army into the future. But I would also add that the AWEs give us a fair degree of confidence that we are moving at about the right pace and in the right direction.

*Army RD&A:* **Another topic that is receiving some attention is the Army's logistics reform efforts. Could you explain what the Army is doing relative to this?**

CSA: As I said earlier, I remain convinced there will never be a Revolution in Military Affairs unless we first have a Revolution in Military Logistics [RML], and the reason for that is simple. It goes back to the old adage that the team can move only as fast as the slowest horse. In the past, that has always been logistics. Logistics sets the tempo and helps define the art of the possible. It determines when a force culminates. "Iron Mountain" logistics, where we stockpiled supplies and then brought them forward as we needed them, worked fine for Cold War operations because we pretty much knew where and how we would fight.

Today we have to be far more agile, so we need a sustainment system that expands the parameters of the art of the possible. This requires going from a stockpile system to a throughput system. What we emphasize here are two important characteristics, "knowledge and speed." We have to know what support is needed where, and get it there as fast as possible—that is the key to an RML. So here are some of the things I have been emphasizing to commanders and our logisticians that we have to do:

• Exploit technology. Don't just automate the current process. Insist on solutions that best leverage technological advantages.

• Establish long-term partnerships and partner with companies that are the best in their class.

• Eliminate activities that don't add value. Use the Velocity Management process. Challenge the old way of doing things and don't be reluctant to test new procedures.

• Develop decision support systems that can analyze lots of data quickly, and optimize rapid sound decisionmaking both on the battlefield and at home station. Exploit Total Asset Visibility.

• Create open architecture systems with the potential to grow and mature.

• Improve processes by striving for a "six sigma" operation in peacetime.

In basic terminology, six sigma is a management tool developed in the private sector. It is designed to improve the level and quality of performance by establishing relevant measures of performance to pinpoint errors, and helps us identify ways to eliminate impediments to quality. Six sigma also capitalizes on common sense and relies heavily on customer feedback.

**"If we are able to achieve information dominance, it could be as significant to conducting future operations as the introduction of smokeless gunpowder to Western civilization in the 19th century."**

*Army RD&A:* **You are a strong proponent of improved partnering between the Army and industry. What suggestions do you have for improving this partnership?**

CSA: Well, I think the most important thing is that we would like industry to participate in our Army After Next [AAN] war game and study the results. AAN is where we make our mark on the wall, defining the kinds of capabilities we think we will need in the year 2020 and beyond. We use the AAN to set our agenda for our investments in science and technology. So if we can get industry to focus on AAN, I think they'll find that is the right first step to building a strategic partnership. That is where we can start sharing ideas and see where we can pool our resources to develop the future capabilities the Army will need. I'd also say our Force XXI process and our spiral development is additional evidence of a close Army-industry team. Together, we are making the iterative, spiral process faster, more efficient, and cheaper.

*Army RD&A:* **Some people contend that a reported rift between the Active and Reserve components may undermine your staunch support for the "Total Army" concept. What are your thoughts on this?**

CSA: My fundamental thinking on this issue has been constant throughout my more than 36 years of active duty.

I have always been a big supporter of the Total Army concept and that is still the case today. We just have to look at how the Army is constructed to see how dependent we are on all three components: the Active Army, Army National Guard, and the Army Reserve. We simply cannot do any major operation anymore without the unique and complimentary capabilities of each. Take Bosnia, for example. There is no way we could have done that mission without the significant contributions of the Army National Guard and Army Reserve. That will be even more true in the future. The Army After Next must be a totally seamless force to truly leverage the exciting future I think is in store for the Army. A lot of people in and out of the Army don't realize that 54 percent of the Total Army is in our Reserve components—that's over 20 percent more than any of the other Services. So, we are dependent on each other for so many things and, therefore, must leverage the capabilities of all three components and work as a seamless team.

In the aftermath of the Quadrennial Defense Review, communication between components was not where it should have been and there were some hard feelings. During the past year, we all worked hard to keep the lines of communication open and work together more closely. I believe we've made a lot of progress in that area. We just released a white paper called *One Team, One Fight, One Future*. I believe that title is most appropriate because we are one team—have to be; we basically have one fight; and we share one future. I believe the new concepts outlined in the white paper—such as divisional teaming and integrated battalions—will bear fruit for the Total Army in the not-too-distant future. Now we must collectively help turn those concepts into reality. We must do that if we are to let the AAN be all it can be. I believe we can do that.

*Army RD&A:* **In earlier interviews, you stated that the new Officer Personnel Management System [OPMS] XXI deals with a cultural change in the Army. What type of cultural change is involved and what impact will this change have on the Army's acquisition community?**

CSA: I firmly believe OPMS XXI will have an enormous impact on the officer corps and the Army. When we began that process, we set out to identify what type of leaders we were going to need in the 21st century. We had spent a lot of time on the physical dimension of change with our Force XXI process and it was time to get into the human dimension of change. OPMS XXI is one component of our human dimension of change and it's an important one. As we began developing OPMS XXI, we remained focused on warfighting—that will always be our number one priority. However, we also acknowledged that there is a lot to warfighting and we need certain types of specialists—such as civil affairs officers, public affairs officers, Acquisition Corps officers, foreign area officers, to name a few—to remain dominant in the 21st

> **"Quality people are at the heart of everything we do, so we will always work hard to recruit and retain quality people."**

century. Throughout this process, we kept the emphasis on warfighting, but we knew to accomplish this mission we needed a certain number of officers with unique skills.

From the outset, the intent behind OPMS XXI was to develop an officer-personnel management system that allows us to do that. Eventually, we came up with the four career fields of operations, information operations, operational support, and installation support. OPMS XXI will help our leadership development programs produce the types of officers we'll need in the 21st century. One of the reasons I believe OPMS XXI is such a great program is because it offers more than one path to the top. I'm not exactly sure what the specific impact OPMS XXI will have on the Acquisition Corps or any other specialty. I can tell you in designing OPMS XXI, however, we factored in how important officers in the Acquisition Corps are to the Army. We wanted to ensure we afforded acquisition officers—because of their special talents, schooling and experience—an opportunity to have a successful and professionally rewarding military career because we understand how critical they are to our future.

*Army RD&A:* **The Army's modernization efforts are not limited to new equipment but also include training and education programs, leadership development, and attracting and retaining quality people. What plans are underway to keep all of this in sync?**

CSA: Well, one of the most important ways we keep all those synchronized is by acknowledging we have to keep them all in sync over time or else we'll have significant problems. That is what Force XXI is all about—we continue to assess how well synchronized we are at any given point in time and what, if any, corrections we need to make. In most cases, the technology is moving out rapidly and is capable of getting slightly ahead of our human capabilities. That's one of the reasons we have leader development programs and other educational efforts—to ensure our people have the requisite training and knowledge to leverage the full capabilities of the available and emerging technology. The Army does a good job at keeping these synchronized because we put them in the right order and make sure we get the leader development and training piece right first.

Quality people are at the heart of everything we do, so we will always work hard to recruit and retain quality people. We have done very well retaining quality officers, noncommissioned officers and junior enlisted soldiers. But that is something all leaders must pay close attention to because it is such a competitive job market in the private sector. I am confident the Army will always be a great place for soldiers of all ranks to serve our country.

# U.S. ARMY MATERIEL COMMAND'S LOGISTICS REFORM EFFORTS

GEN Johnnie E. Wilson
Commanding General
U.S. Army Materiel Command

*All is flux, nothing stays still ...*
*Nothing endures but change.*
**—Heraclitus**

## The Only Constant Is Change

These observations, made around 500 B.C. by the Greek philosopher Heraclitus, have been validated by the fires of time. Today, nearly 2,500 years later, we can still say that the only constant is change, and the U.S. Army Materiel Command (AMC) is certainly no stranger to it.

In this era of downsizing, limited resources, and preparation for the Army After Next and beyond, change is an ever-present necessity. In fact, the past decade heralded many changes that impacted and will continue to impact the Department of Defense technology, acquisition, and logistics communities. These changes in logistics, or logistics reforms, have occurred primarily in the two key subareas of strategic logistics and operational logistics. What follows are brief descriptions of the major reforms that affect or will affect the logistics community and the support AMC provides our soldiers.

## Strategic Logistics

In the strategic logistics arena, the following two key strategic logistics programs render timely, effective support that enables our post-Cold War power projection Army.

• *Logistics Civil Augmentation Program (LOGCAP)*. The LOGCAP provides peacetime planning for the use of civilian contractors to augment current and programmed force support capabilities, worldwide, during war and other contingencies. Global commercial resources are used on a planned and crisis action basis to quickly and effectively support our power projection Army.

Recognizing the need for logistics reform, the Army Deputy Chief of Staff for Logistics (DCSLOG) established a centralized contingency contractor support program in December 1985. The first worldwide, comprehensive, LOGCAP umbrella support contract was awarded in August 1992 to a single U.S.

prime contractor. The contract was first executed in December 1992 to support U.N forces in Somalia and has since been used extensively to support U.S. military missions in Rwanda, Haiti, Saudi Arabia, Kuwait, Italy, and southeastern Europe.

AMC assumed LOGCAP contract management responsibilities in October 1996 and awarded the second LOGCAP umbrella support contract in January 1997. The LOGCAP contract is designed to simultaneously support up to three contingency operations in different locations throughout the world. These operations may run the gamut from nonhostile humanitarian assistance to full mobilization. During an operation, the LOGCAP contractor is required to receive, move and fully sustain up to 25,000 troops in 8 base camps for up to 180 days.

The LOGCAP vision is to provide a full range of innovative, flexible and responsive logistics and engineering

# ARMY PREPOSITIONED STOCKS
## GEOGRAPHICAL LOCATIONS

**APS-2 EUROPE**
Central: Brigade (2)
Region: Operational Project Stocks
Sustainment Stocks
Italy: Brigade
Operational Project Stocks
Sustainment Stocks
Norway: 155 SP FA Battalion
Sustainment Stocks

**APS-1 CONUS**
CONUS: Operational Project Stocks
Sustainment Stocks

**APS-4 PACIFIC**
Korea: Brigade
Operational Project Stocks
Sustainment Stocks
Japan: Operational Project Stocks
Sustainment Stocks

NORWAY

APS-1 CONUS
APS-3 HQ CHARLESTON
APS-2 HQ EUROPE
BENELUX
ITALY
KUWAIT
KOREA
JAPAN
APS-5 SW ASIA
QATAR
APS-4 PACIFIC

APS-3 AFLOAT

**APS-5 SW ASIA**
Kuwait: Brigade
Sustainment Stocks
Operational Project Stocks
Qatar: Brigade
Sustainment Stocks

**APS-3 AFLOAT (HQ Charleston)**
Afloat: Brigade
Operational Project Stocks
Sustainment Stocks

and construction services for the current and programmed force, well into Army XXI and the Army After Next. LOGCAP continues to be the leading edge for the training, use and force integration of civilians on the battlefield.

• *Army Prepositioned Stocks (APS)*. The purpose of APS is to reduce the initial amount of strategic lift required to support a power projection Army and to sustain the warfight until sea lines of communications with the continental United States (CONUS) are established and industrial base surge capacity is achieved.

Although HQDA owns the APS, they are managed and accounted for in the wholesale supply systems by AMC, the Office of the Surgeon General, and the Defense Logistics Agency (DLA) for particular classes of supply. Within AMC, the U.S. Army War Reserve Support Command centrally manages the program. Centralized management allows

stocks to be moved from one location to another to support multiple commanders-in-chief in two near-simultaneous major theater wars.

APS are comprised of seven prepositioned brigade and unit equipment sets, operational projects, war reserve sustainment supplies, and war reserve stock for allies. Supplies and equipment are stored ashore in 4 regions and afloat on 15 ships (see accompanying figure). Future APS reforms include allowing site managers to requisition authorized major items for each of the APS brigade sets (i.e., push to pull requisitioning); transitioning to container ships to facilitate rapid distribution of ammunition forward to the battle area; and establishing, by FY01, an eighth brigade to support Central Command.

As demonstrated by deployments to southwest Asia, prepositioning is a highly visible, critical component of the Army's power projection capability to meet the national military strategy.

## Operational Logistics

In the operational logistics arena, initiatives are underway that will dramatically impact sustainment maintenance operations, logistics information systems, inventory management functions, and business processes. As seen from the following descriptions, the way the logistics community is conducting day-to-day business is changing—revolutionizing military logistics.

• *Integrated Sustainment Maintenance (ISM)*. AMC is HQDA's executive agent for implementing ISM, an initiative that focuses on maintenance above the direct support level by centralizing management of sustainment maintenance at the local, regional/theater, and national levels. It significantly changes the way the Army manages sustainment maintenance operations.

At the installation/local level, the Local Sustainment Maintenance Management Offices manage work performed by Active and Reserve maintenance units,

logistics directorates, forward repair activities, and contractors.

At the regional and/or theater level, Regional and Theater Sustainment Maintenance Management Offices designate Centers of Excellence (COEs) for items selected for repair. Items are repaired at a COE designated for that entire region or theater instead of repairing the same item at several different installations.

At the national level, the National Sustainment Maintenance Management (NSMM) Office manages maintenance performance across regions. In addition, the NSMM Office interfaces with AMC major subordinate commands in performing general support maintenance to meet national requirements. The NSMM Office also supports contingency planning, and NSMM personnel may deploy in support of AMC's Logistics Support Element.

ISM implementation is well underway, both in and beyond CONUS, with all sites scheduled to be operational by Jan. 1, 1999. Through ISM implementation, the Army will optimize the total Army's sustainment maintenance capability, while supporting the full spectrum of Army missions, and will contribute to the Army's ongoing revolution in military logistics.

• *Wholesale Logistics Modernization Program (WLMP)*. Under this program, AMC will maintain responsibility for all wholesale logistics business processes, but will transfer control of the software supporting these processes to the private sector. AMC will rely on a competitively selected contractor to modernize its wholesale logistics business processes and provide information management services in support of those processes. Contractor support will also be provided after the new processes are implemented. The purpose of this effort is to reengineer the antiquated wholesale logistics business processes and ultimately provide the Army with an integrated, seamless process based on industry's proven management principles.

This approach will provide the necessary revolution required in AMC's logistics business processes. Ultimately, this will complement the Army's efforts to balance readiness and modernization. Leveraging industry's best business processes and technology will provide Army XXI and the Army After Next with the logistics tools required on the modern battlefield.

• *Virtual/Single Integrated Materiel Management Center (V/S IMMC)*. The July 1997 Defense Planning Guidance (DPG) directed leveraging of technology and consolidation of common functions to reengineer Inventory Control Points (ICPs) into one virtual ICP for DLA and one per military department. DLA and each military department must provide virtual ICP plans by September 1999 with complete program implementation by September 2001.

Since the Army's logistics organizational structure has advanced beyond the ICP structure, AMC determined that its DPG implementation strategy should consider all wholesale logistics functions and defined its DPG implementation as a migration to a V/S IMMC. Thus, by September 2001, AMC's virtual IMMC will be in place, providing electronic connectivity and performance of common business functions for the AMC community. AMC's goal is to have its V/S IMMC operational by December 2003.

AMC's V/S IMMC effort is in the analysis phase and, as of submission of this article, is predecisional in nature.

• *Single Stock Fund (SSF)*. The SSF is an Army logistics business process improvement initiative that will dramatically impact the AMC. It is one element of an overall Army plan to ensure cash solvency of the Army Working Capital Fund-Supply Management Army (AWCF-SMA), and represents a major change in the way the Army manages the AWCF-SMA. AMC will be designated as the AWCF-SMA home office and SSF national manager, and will assume increased responsibilities for all facets of AWCF-SMA. Responsibilities will include distributing and executing AWCF-SMA obligation authority and credit; maintaining AWCF-SMA fund solvency; developing policies and budget guidance; and managing unit cost goals, sales, financial reporting, requirements determination, retail inventory management, budget stratification review and analysis, and budget justification.

The SSF Campaign Plan provides the concept, strategy, approach, and an event-driven milestone schedule for implementing the SSF throughout the Army by 2001. AMC and the Army DCSLOG are key participants in designing the enabling logistics and financial business rules, processes, policies and procedures essential to achieving the SSF.

From the warfighter's perspective, SSF will improve supply availability and relieve commanders of logistical and financial management burdens, thus allowing them to focus on operational issues. As the SSF national manager, AMC will help the Army realize a leaner, more responsive and cost-effective logistics system that meets the needs of the 21st century Army.

## Conclusion

Here at AMC, soldiers are our business. Therefore, we will continue to change and adapt our processes, policies, and practices to provide timely and effective support to our soldiers in this austere environment. With change as our constant companion, we in AMC will continue to meet the challenges associated with supporting the current and programmed force well into Army XXI, the Army After Next, and beyond.

> *From the warfighter's perspective, the Single Stock Fund will improve supply availability and relieve commanders of logistical and financial management burdens, thus allowing them to focus on operational issues.*

*Risks On The Road Ahead . . .*

# CONTRACTORS ON THE BATTLEFIELD

## Eric A. Orsini and LTC Gary T. Bublitz

## Introduction

Contractor support for the Army is not a new concept. It has been used many times in the past. For example, in Desert Storm, 76 U.S. contracting firms deployed with 969 employees to provide maintenance, technical assistance, and equipment support. Contractor personnel deployed almost at the same time that the first U.S. troops deployed, and provided support mainly at echelons above corps. Some contractor field service representatives and contact teams were used in the corps and division area, and a few went into Iraq and Kuwait with combat elements.

The Army is now considering institutionalizing contracts and using contractors on the battlefield to support routine military operations. In fact, two test programs are currently in development—Apache Prime Vendor Support (PVS) and Paladin Fleet Management. If successful, these programs may lead to many more, and force a change in our culture while presenting new and unique challenges.

Although many believe that contractor support in routine logistics functions can save the dollars necessary to fund future modernization, there is still no data to prove this. Contractors argue that when all costs are compared equally, contractor support can be significantly cheaper than using the existing force structure. Relative to this article, the authors assume that a degree of savings can be achieved by using contractor support within the scope of industry's best business practices.

This article explores some inherent risks associated with expanded use and presence of contractors on the battlefield. The goal is to fuel continued dialog across the Army and Department of Defense (DOD) to ensure a full and thorough airing of the issues and to identify risks.

## Risk Defined

Our definition of risk includes one or all of the following: a degradation to mission accomplishment, an increase in the time needed to complete the mission, or an increased potential for loss of life. The latter is the most severe and the one for which the American people have little tolerance.

## How Are We Fixed For War?

Today, U.S. military forces enjoy the rep-

utation of being the best trained, best resourced, and most capable in the world. They earned this distinction by withstanding the tests in a multitude of operations on the battlefield, in the peacekeeping arena, and in providing humanitarian assistance. One reason this distinction is possible is because unit readiness is constantly monitored by commanders, senior leaders, and Congress. This monitoring includes assessments of personnel, training, and equipment as well as subjective evaluations by unit commanders of their unit's ability to accomplish the mission. Additionally, relevant and vigorous training at facilities such as the National Training Center and Joint Readiness Training Center ensure combat effectiveness.

In contrast, there is no system currently in place to monitor contractor readiness. If there were such a system, who would monitor it? Would it be monitored by the Army Chief of Staff in his unit readiness review, or by the Chairman of the Joint Chiefs in his operational readiness review? Would Congress scrutinize industry readiness reports as they do the military's, or would industry's financial bottom line drive contractor readiness?

To reduce risk, the Army must ensure that contractor support is tested and evaluated in ongoing operations and training events on a continuous basis. Contractors must undergo the same rigorous scrutiny of Congress and senior military leaders that our military faces daily. To have anything less will severely limit our leadership's ability to answer the question: How are we fixed for war?

## Will Contractor Support Be There When Needed?

Anytime a discussion of contractors on the battlefield comes up, so does the question of whether contractors will be there when needed. Many cite the famous tree-cutting incident in Korea in August 1976 as an analogy to civilian support on the battlefield. This incident caused an increase in the alert status to Defense Condition (DEFCON) 3 (an increase in the force above that required

for normal readiness) and resulted in hundreds of requests for immediate transportation out of Korea from Department of Army (DA) civilians who had replaced military depot maintenance and supply workers.

The issue of concern is not whether large Defense contractors will continue to service the contract, but whether they will be able to keep their employees on the battlefield when and where they are needed. Moreover, if subcontractors are performing for a parent contractor, will the subcontractor be as reliable?

Unfortunately, there is no easy answer. The particular situation will ultimately determine the outcome. Therefore, a clear understanding must exist between the contractor and the government to ensure that the contractor will be held accountable to provide service regardless of the threat, and that they have adequately trained personnel to meet all contingencies.

## Battlefield Commander Combat Flexibility

Flexibility is one of the principles defined in Joint Publication 4-0 as essential for effective logistics performance. It is defined as adapting logistics structures and procedures to changing situations, missions, and concepts. Contract support will be guided by a contract—a legal document outlining a statement of work (SOW) and expectations. If mission requirements change, the SOW may require changes that may also necessitate contract modification—many times with associated changes in cost.

The contract can also limit command and control flexibility as the contract becomes the controlling factor. Consequently, the contracting officer's representative (COR) is assigned the task of working with field commanders and contractors to interpret, implement, and modify contracts as required by the mission. This process reduces flexibility and may jeopardize mission execution.

Commanders have enough to worry about while fighting a war; they do not need to be concerned about contracting. They need the flexibility to do what is needed, when it is needed, and to the degree it is needed. Reducing flexibility increases risk significantly.

Consequently, the art and science of writing contracts will become extremely

critical to ensure flexibility, sustainability, and survivability on the battlefield. Every commander and logistician from the field commander down must be familiar and knowledgeable about the contract process, and the COR must be able to adapt to constantly changing situations.

## Protecting Contract Employees

Most military personnel are classified as combatants and can be relied on to assist and augment the fighting force as well as to provide self-protection and defend equipment and terrain. This was demonstrated repeatedly in World War II, Korea, and Vietnam. In World War II, clerks and technicians replaced infantrymen who were killed, and combat service support personnel were reclassified to combat arms to make up for casualties. Logisticians have always been the "infantry in reserve," and in many cases provided force protection for rear-area headquarters and lines of communication.

Contractor personnel, on the other hand, are currently classified as noncombatants and can carry a weapon for self-protection only with the expressed approval of the theater commander. This means that additional force structure will be required to protect contractor personnel even if they are former military personnel. This additional force structure will become especially critical in a scenario with asymmetrical (chemical, biological, or nuclear) threats, or where contract personnel are directly supporting the warfighter and traveling with lead combat elements. The cost of this force protection must also be calculated in the cost equation when comparing contractor support to force structure.

The bottom line is that force structure will be required to provide protection for all civilians working in the theater of operations—whether in rear areas, on forward lines, or in forward-deployed task forces.

## Impact On Military Career Progression

The Apache PVS and other fleet management concepts currently suggest that contractor support will be available from the factory to the foxhole. This means that contractor support will be the primary and sole source of receiving support. There will be no force structure backup or military stockpiles of repair parts. The contractor will control and own all supplies until requisitioned by the military unit. This supports the velocity management concept and, together with total asset visibility, gives the logistician the ability to deliver the right quantity at the correct time and place.

Until now, the Army has had force structure to maintain, requisition, supply, and transport equipment and repair parts on the battlefield and enough reserves to support anticipated needs. However, the cost to maintain this stockpile is no longer affordable and contractor support is regarded as a solution. Although we find no fault in this logic, it does present a void in the career progression path of logistics officers and noncommissioned officers (NCOs).

With contractors responsible for providing supplies on the battlefield, there will be no trained or capable force structure to perform this function. The problem-solving opportunities so critical in preparing senior logistics officers and NCOs will be gone, as will the hands-on training and real-world opportunities that give most logisticians the sound foundation to handle senior-level logistics decisions. If contractor support is implemented for most or all of the Army's current weapon systems, future senior logisticians will have significant shortfalls in their professional development.

## Strategic Vision Or Cost Savings Goal?

Every soldier understands what is meant by "Commander's Intent." It is a part of every operations order and serves as a guide for the desired end state of the mission. Unfortunately, doctrine and policy regarding contractors on the battlefield in relation to the desired end state is unclear. No one can clearly articulate if the intent is for all of the Army's current weapon systems to be supported by contractors, or if only future weapon systems will be contractor supported. Nor can anyone answer where on the battlefield contractors will operate or what they will be doing. This is because no one has clearly articulated the "Commanders Intent." Instead, the driving factor is cost savings to fund future modernization. Although a very worthy goal, it does not provide a vision of the desired end state.

This lack of vision is not because the commander forgot to give one, but rather that it is nearly impossible to conceptualize given the fact that doctrine must cover how the current Army of Excellence fights, how the digitized divisions of Force XXI will fight, and how the Army After Next will fight. It is nonetheless essential, if we are to forge ahead, to ensure the world-class fighting force of the 21st century is supported by an equally outstanding logistics force.

## Conclusion

As noted previously, contractor support has been a part of military operations in the past and will continue to be so in the future. The key is to find the right mix of contractor support and force structure (Active, Reserve and DA civilian), the right jobs for each, and to do so with an acceptable amount of risk. The old adage, *more is better*, may not apply to contractor support, especially when the factory-to-foxhole concept may create hundreds of stovepipe contractor support systems.

Recent efforts in the Army, such as multifunctional integrated process teams studying various competitive sourcing alternatives, policy memorandums, doctrine, and functionally oriented regulations, appear to be the answer to getting a firm grip on the issue—but are they? The issue is clearly bigger than any functional area, it is bigger than any Service, and perhaps even bigger than DOD itself. The functional proponents that have driven these efforts thus far should be commended. Now it's time to establish a single DA proponent who will solicit input not only from Army functionals but also from the Army Service component commands of the geographic warfighting commanders-in-chief (CINCs). This would give the needed emphasis to solidify a strategic vision and the desired end state. After all, it is the CINC who will be responsible for prosecuting any warfight and the CINC who will make the ultimate decision on the battlefield.

Further discussion, evaluation, and exploration of these issues is necessary to attain alternative solutions. The time to act is now, not after we have established contacts and reclassified the force structure.

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# SUPPORTING TRAINING SYSTEMS THROUGH FIXED PRICE CONTRACTS

David W. Manning and
Dianne L. Parrish

## Introduction

In 1988, the Program Manager for Training Devices formed the Technical Support and Readiness Division to consolidate and manage all U.S. Army Materiel Command fielded training systems. Today, that mission belongs to the Logistics Directorate of the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM). The directorate provides total logistics life-cycle management for "virtual," "live," and "constructive" simulations, simulators, training devices, and instrumentation systems. This includes providing logistics support to STRICOM acquisition programs; maintaining readiness of fielded systems; providing for upgrades, post-deployment software support (PDSS) and relocations of fielded systems; operation support; and supply and facilities support for command operations (see accompanying figure).

STRICOM currently outsources 95 percent of its field support. Eighty-one Table of Distribution and Allowances (TDA) employees manage more than 1,700 contractor and government workers. Basically, STRICOM has opted to "buy" readiness—not inventory. Unlike other commodity commands,

STRICOM has no Integrated Materiel Management Center (IMMC) or depot. This means the following:

• Ongoing efforts to reduce Army inventory do not impact STRICOM because it essentially has no inventory;

• Efforts to reduce repair and turn-around time have no impact because STRICOM has no organic repair and return program; and

• Efforts to outsource more within the Department of Defense have a dramatic

impact on STRICOM because its logistics operations are approximately 95-percent outsourced.

STRICOM is in concert with the Defense Science Board's Sub Task Force on the Acquisition Workforce, which calls for outsourcing entire commodities via fleet management, expanding price-based contracting, and retaining a government workforce that makes decisions based on good business practices vs. rule-based processes.

> By awarding
> fixed price contracts
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> fielded systems, STRICOM
> has avoided spending
> millions of dollars
> in life-cycle system
> costs.

## Consolidated Life Cycle Contractor Support Contracts

By awarding fixed price contracts to support fielded systems, STRICOM has avoided spending millions of dollars in life-cycle system costs. The dramatic savings have come from awarding fewer contracts. STRICOM supports hundreds of thousands of systems worldwide using eight Life Cycle Contractor Support (LCCS) contracts. By the year 2000, STRICOM will reduce that number to four LCCS contracts, which is considered an optimum number of contracts to manage while maintaining competition.

STRICOM supports fielded systems such as low-dollar maintenance "panel trainers," state-of-the-art instrumentation systems (considered the backbone of the Army's Combat Training Centers), hundreds of thousands of sets of Multiple Integrated Laser Engagement System (MILES) gear, and numerous flight simulators and tank driver trainers. Support often includes PDSS and operations. This places the responsibility on STRICOM contractors to schedule training, operate systems, and provide after-action reviews to students. These services are performed within an "umbrella" contract.

These umbrella or LCCS contracts, originally structured as firm, fixed price contracts, are now structured as fixed price, award fee contracts. All contracts have time and material lines to accommodate "known unknowns" such as deployments or moves caused by force structure changes, and to be responsive to customer needs. However, the key to cost avoidance is the fixed price nature of the contracts. The better the requirement is defined in the Request for Proposal (RFP), the greater the likelihood of cost savings. Thus, it is in the defined portion of the contract where the competition results in lower costs.

## New LCCS Consolidated Contracts

By the year 2000, STRICOM plans to merge LCCS services into four new consolidated contracts: Command, Control, Communications, Computers and Intelligence (C4I); Battlefield Mobility/Target Acquisition (BM/TA); Live Training; and Gunnery Maintenance Trainers (GMT). A brief description of each of these follows.

*C4I.* The C4I contract is STRICOM's first effort at consolidating hardware and software maintenance for constructive simulations (i.e., Janus, Brigade/Battalion Battle Simulation (BBS), Corps Battle Simulation, and Intel Systems); PDSS; Simulation Networking system operations; and technical support to U.S. Army Training and Doctrine Command schools for JANUS and BBS into one large contract vehicle. To ensure quality service at the best price, the following initiatives



STRICOM LOGISTICS

LIFE CYCLE CONTRACTOR SUPPORT

DEPOT

IMMC

INVENTORY

CCSS

SUPPORT THE SOLDIER

ALLOWS STRICOM TO...

**BLANKET THE CUSTOMER**
• ONSITE SUPPORT
• DIRECT COMMUNICATIONS (STRICOM/CUSTOMER)

**FOCUS ON:**
• CUSTOMER SATISFACTION
  – ANTICIPATE NEEDS
  – WRITE A FLEXIBLE CONTRACT
• READINESS
• UTILIZATION
• COST REDUCTION
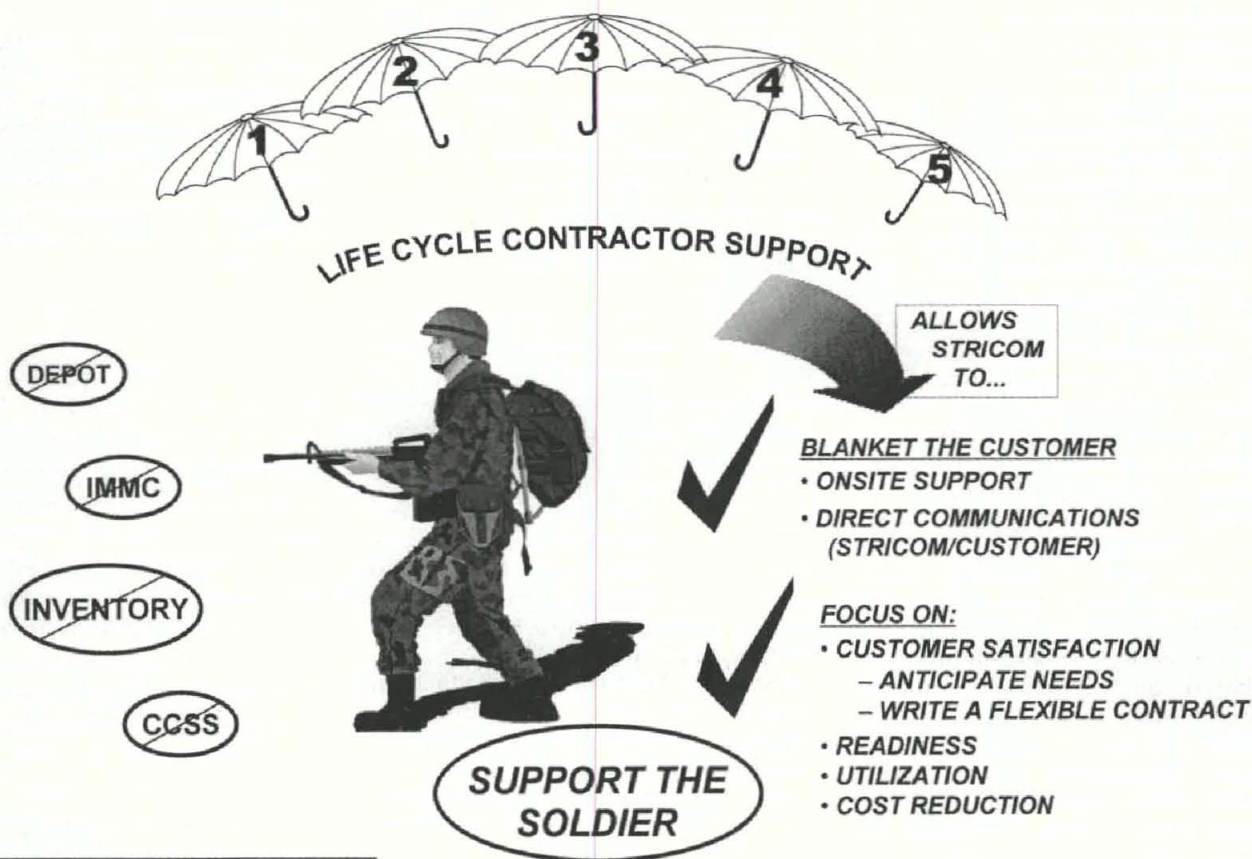
CCSS Commodity Command Standard System
IMMC Integrated Materiel Management Center

were pursued:

- Performance-based specifications;
- Fixed price, award fee contracts to motivate contractors to reduce costs, provide customer satisfaction, and maintain readiness;
- Modernization through spares to encourage contractors to extend the shelf life of legacy systems and track and monitor these issues;
- Evaluation of technical proposals by the user's representatives;
- Requiring the prime vendor to subcontract 15 percent of effort to small businesses;
- Fixed priced labor rates for the full term of the contract (time and materials), which allow quick turnaround on contract modifications and more accurate Program Objective Memorandum projections;
- Allowing contractors to make a fixed price PDSS bid for the entire term of the contract;
- Full paperless reporting tools, where baselines for the system's software and hardware configurations are developed and changes to these baselines are reported electronically;
- An automated proposal evaluation tool developed by the Air Force, leveraged and tailored for STRICOM, permits a paperless evaluation and roll-up of evaluations and generates the proposal evaluation report; and
- Oral presentations provide offerors the opportunity to explain their written proposals. Sessions are videotaped for review by the government.

*BM/TA.* The BM/TA contract will provide operation and maintenance services for the Army's flight simulators; air defense, field artillery, and chemical training devices; and for the maintenance and part task trainers, such as the Stinger Troop Proficiency Trainer and Firefinder Maintenance Trainer. This contract includes many of the initiatives in the C4I contract with some tailoring. It focuses contractor performance on providing a fully mission-capable training system during required mission time (that is, the time the training devices are actually used) vs. the entire performance period. For example, the contractor receives 50 percent of award fee based on performance during required mission time. Partial mission capability will also be included in the contract. If a training system is only partially mission-capable during the required mission time, a portion of that time will count as downtime in the calculation of the contractor performance factor.

*Live Training.* The live training contract, STRICOM's largest contract in terms of people and dollar value, will provide operational support to instrumentation systems and devices at the Army's Combat Training Centers, and will combine worldwide maintenance support for all MILES force-on-force training equipment. It will also provide certified MILES instructors to train the user on the equipment.

The unique aspects of this effort include early contractor involvement in government preparation of the RFP with one-on-one discussions to assist in streamlining the proposal writing and source selection processes. The government will encourage extensive use of oral presentations and demonstrations to speed up the source selection process.

*GMT.* The GMT contract was the first fully consolidated life cycle contractor support contract awarded by STRICOM. This contract supports all tank and Bradley simulators, including Conduct of Fire Trainers, tank driver trainers, Thru Sight Video, Precision Gunnery Training System, M1A1 Advanced Gunnery Training Systems, maintenance trainers, various systems in support of operations in Bosnia, and foreign military sales trainers in Egypt, Oman and Tunisia. Services include maintenance, supply, system modifications and upgrades, engineering support, PDSS, and system integration. This contract provides a rapid response to the user's needs and provides "one-stop shopping" for the systems supported.

## Life-Cycle Acquisition Manager

In the Logistics Directorate of STRICOM, Level II or III certified logisticians (GS-0346 series) serve as Integrated Product Team (IPT) members on acquisition projects, and project directors (PDs) manage umbrella LCCS contracts. All PDs are Defense Acquisition Workforce Improvement Act-certified Level II and/or III, serve as leaders of multifunctional IPTs, develop RFPs, lead source selection panels, and manage/oversee contractors as contracting officer representatives.

Because of the team effort within each of STRICOM's three logistics divisions, cradle-to-grave life-cycle acquisition management resides within each division. This eliminates the risky transition of responsibilities for field support. Logisticians supporting a project may be responsible for that project through the entire life cycle, from con-

cept exploration through production, fielding and deployment, and operational support.

Because STRICOM logisticians manage a wide range of functions and are "acquiring" logistics, they are being referred to as life-cycle acquisition managers. However, the greater challenge, and the next step, is to formalize this dual-tracked (logistics and acquisition) discipline within the personnel system. This is particularly important because during the next few years there will be:

- Increasing requirements to support fielded systems;
- More funding available to support fielded systems, although, the gap between "funded" and "required" is expanding exponentially;
- Fewer government employees to develop and manage the contracts within the STRICOM Logistics Directorate; and
- A threat of even more personnel cuts.

New position descriptions will be needed to more accurately describe the expanded and multifunctional nature of the positions, and attention will be required to ensure that qualified personnel are continuously placed in these positions.

## Conclusion

Consolidated and competed fixed price award fee contracts for LCCS is a major initiative to improve service to STRICOM customers and reduce support costs. Managing these large contracts requires life-cycle acquisition managers who possess the technical and business skills to operate in the 21st century.

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# Introduction

*For years, the U.S. Army has been deploying contracting officers to support contingency contracting operations around the world. Most recently, officers and civilians from the Army Acquisition Corps provided support to U.S. Forces in Haiti, Somalia, and Saudi Arabia. During each of these operations, acquisition personnel made a real impact on the quality of life of each deployed soldier, sailor, airman, and marine, as well as the local population.*

*Today, in Bosnia, our contingency contracting officers procure an enormous variety of supplies and services and are working with local businesses to show them how to operate more competitively in a capitalistic marketplace. By procuring what U.S. forces need and helping local businesses, our contracting officers are saving the Army time and money, enhancing our soldiers' ability to perform their mission, and expediting the host nation's ability to stand on its own economically. In my opinion, this translates into three very important outcomes: saved lives, shorter deployments, and a reduced probability of redeployment because of an unstable economic environment in the host nation. We all want to make a difference in this world, and from my point of view, this is where it's at, at the pointed end of the spear, probably in some distant foreign land. During a recent trip to Bosnia with LTG Paul J. Kern, Director of the Army Acquisition Corps, we witnessed our Acquisition Corps officers making a difference. I echo the comments made by LTG Kern during our trip. He said, "This is where we, the Army Acquisition Corps, are really making a difference. They should all be very proud of their part in bringing peace to this region." This is one of the last places acquisition officers can really get "hands-on" contracting experience. I encourage everyone in the Acquisition Corps to seek this type of assignment and will do my best to make this great opportunity available to more Acquisition Corps officers.*

**BG William L. Bond**
**Director, Army**
**Digitization Office**

Since late 1995, U.S. forces have been deployed to the former Yugoslavia on Operation Joint Endeavor (OJE) and Operation Joint Guard (OJG) to enforce the Dayton Peace Accords. From the very beginning of the operation, U.S. forces have had continuous contracting support from elements of the U.S. Army Contracting Command, Europe (USACCE). USACCE was designated in the early phases of the operation as the executive agent for contracting support for OJE/OJG. In addition to deploying its personnel to support the mission,

# CONTINGENCY CONTRACTING IN SUPPORT OF OPERATION JOINT GUARD

## MAJ Paul McDermott

USACCE staffs its offices with additional military and civilian contracting officers from various Army, Air Force and Marine Corps commands. This article explains what can be expected upon notification of deployment and actual movement into the theater. It covers daily contracting operations in theater and addresses USACCE initiatives and aspects of contingency contracting in Sarajevo, Bosnia. Working for USACCE and participating in this deployment is very rewarding, both professionally and personally.

## Deployment

The U.S. Army Materiel Command (AMC) provides contingency contracting officers to support USACCE's mission in OJG. USACCE sends the tasking requirements through channels to Headquarters, Department of the Army (HQDA). HQDA then tasks AMC, which tasks its major subordinate commands to fill the slots. It is possible, and even likely, that as the mission continues, other major commands in addition to AMC will be tasked by HQDA to support OJG with contracting officers.

Upon notification for deployment, the selected individual receives Temporary Change of Station orders for assignment to USACCE to support OJG. The orders specify a number of predeployment activities to complete prior to departing home station. Based on my experience, do what the orders state and complete as much as you can before you go. Of primary importance is ensuring your personal and medical records are current.

Movement to the theater of operations starts when you report to Fort Benning,

GA, where up to 8 days are spent conducting Preparation for Overseas Movement. These activities include medical and dental screening, records update, drawing TA-50, and attending a series of briefings intended to provide an orientation to Bosnia, including a short history of the recent conflict.

A representative of USACCE will meet you at Rhine-Main Air Force Base in Germany and take you to Hammonds Barracks near Mannheim, Germany. USACCE will provide further orientation for your mission in Bosnia and make arrangements for the Situational Training Exercise (STX) in Hohenfels, Germany, a requirement for entering the theater. Hohenfels provides the STX that teaches mine awareness and emergency reaction drills. When you complete training, you return to Hammonds Barracks for any additional inprocessing. USACCE then schedules your flight to Bosnia.

## Operating In Theater

The countries of Bosnia and Croatia make up the OJG area of operations. Additionally, an intermediate support base has been established in Hungary. USACCE operates three joint contracting centers (JCCs), one each in Bosnia (Tuzla), Croatia (Slavonski Brod) and Hungary (Taszar). There are also two joint contracting offices (JCOs) that are under the control of the Taszar JCC. The JCOs are in Bosnia (Sarajevo) and Hungary (Budapest). Army personnel can expect to go to one of four locations: Taszar, Slavonski Brod, Tuzla, or Sarajevo. Living conditions differ at each site, but

all offices are equipped with personal computers, printers, and photocopiers, and have full telephone and fax capability.

The offices are all referred to as "joint" because each office has contracting officers and noncommissioned officers (NCOs) from either the Air Force or Marine Corps deployed in support of the mission. USACCE has coordinated with the other Services for these officers. This is a unique opportunity to work with members from other Services and learn how they operate.

Conducting contingency contracting operations is an exciting and vital part of logistical operations in theater. Daily activities include all phases of the acquisition cycle. Contingency contracting officers do complete life-cycle (cradle-to-grave) contracting for supplies and services. A typical contracting office will procure a wide variety of supplies and services to support the force in theater. This includes office supplies and equipment; building materials; small construction projects; leased vehicles; snow, trash and sewage removal services; and force protection—the possibilities are almost endless.

## Contracting Initiatives

USACCE has implemented a number of new initiatives that make the JCCs and JCOs more effective. These include:

*Designation as the executive agent.* The designation of USACCE as the contracting proponent for U.S. forces in theater has reduced inter-Service competition for scarce commodities, enabled the consolidation of requirements, and helped eliminate confusion for our customers. With one U.S. contracting office in each area, U.S. forces have one consolidated office to go to for contracting support.

*"Stovepiping" the chain of command.* The chief of each contracting activity in theater provides direct contracting support to the local commander, but remains under the command and control of the USACCE Commander.

*The Joint Acquisition Review Board (JARB).* The JARB was established as a mechanism for higher headquarter's review of unit requests for logistical support. The JARB ensures that the correct method of supply is used to provide what the unit needs, through the supply system, sustainment contract, or commercial purchase.

## Contingency Contracting In Sarajevo

The mission of all JCOs in theater is to provide rapid, responsive and flexible support to the supported commander. Additionally, JCOs ensure that contracting operations directly support the commander's tactical, operational and geopolitical objectives. The JCO-Sarajevo supports the National Support Team-Sarajevo (NST-S). Units that receive support from NST-S include everything from Table of Organization and Equipment units to U.S. forces who work for Stabilization Force Headquarters, to Special Operations elements operating throughout Bosnia.

Some of the unique aspects of working in Sarajevo include:

*Educating vendors.* Some businesses in Sarajevo existed while Bosnia was a part of the socialist state of Yugoslavia, and many of the business practices developed then are still in use. We believe we are assisting them in increasing competition, working with leases (for vehicles and copiers), and improving customer service.

*Competition.* In the early phases of a contingency contract, we can expect to pay a premium for many local purchases. As the operation enters the sustainment phase, increased availability should begin to drive prices down as competition increases. We call for quotes on an item we previously procured. Some vendors still quote the same price they quoted a year ago, although competition has driven the price down by as much as 50 percent! Then they wonder why they are no longer getting purchase orders.

*Leases.* Many vendors have a hard time dealing with the concept of a lease. To them, you rent your house or other real property. Selling local businesses on the idea of leasing an item such as a photocopier is new to them.

*Customer service.* We have helped many vendors improve performance by assisting them in areas of customer service. To continue my photocopier example, we taught vendors how to increase business volume by providing a regular service for the machines.

*Making payments with electronic funds transfer (EFT).* The finance units deployed in theater do not have the ability to process payments via EFT. Many of our vendors want to be paid by EFT. Some want it because they do not feel safe leaving our base with a large sum of cash, and some want it because the banks in Bosnia charge customers a fee for making cash deposits. We initiated payment via EFT with the Defense Finance and Accounting Service in Kaiserslautern, Germany, in late January 1998, and the first vendor was paid electronically 1 month later.

*Geographic separation.* Contracting operations in Sarajevo are affected geographically two ways. First, our Resource Management Office (RMO) is in Taszar. A lack of personal contact with the RMO is a challenge. We have to rely on a somewhat unreliable phone and fax system, and mailing documents can take days. Second, the Zone of Separation (ZOS) between the Bosnian-Croat Federation and the Republic of Srbska is on the outskirts of Sarajevo. Many vendors are hesitant to cross the ZOS to do business on either side; so in some cases, we have had to write two contracts to get one type of service completed.

*Supply network.* NST-S is not an organic unit. It is a multi-Service entity, and the traditional Army staff sections do not exist. Many procurement actions have to be approved by NST-S' higher headquarters, the National Support Element, which is also at Taszar. This affects the supply system because the NST-S supply section is at the end of a long logistics tail. The distances involved can cause any regular supply action to take a very long time to complete. This adds to the local contracting workload because we buy many "emergency" type items.

## Benefits Of Deployment

The main benefit of deploying on OJG is the knowledge that you are supporting a successful and worthwhile mission. You will receive a North Atlantic Treaty Organization medal, Armed Forces Service Medal, and a service/achievement medal for your participation. Financially, your military basic pay (if you are in Bosnia or Croatia) is tax free, and you will draw hostile fire pay, family separation pay, plus a rate of per diem. Deployed civilians receive overtime, danger pay and premium pay, though their pay has not yet been declared tax free. Army contracting officers also learn first hand how valuable Air Force and Marine contracting NCOs can be during a deployment. Most of them have years of contracting experience and many have previous deployment experience. They are highly skilled and contribute greatly to the success of the mission.

## Conclusion

Completing a contingency contracting assignment in the Balkans is fun and rewarding. USACCE provides the right level of support and oversight for the deployed contingency contracting officer to do his or her job. Being in the position to directly affect the success of a unit's mission is one of the more satisfying aspects of contracting during a deployment. Contracting in support of OJG also provides a great training opportunity that all contracting officers and civilians should experience.

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*A Picture Is Worth
A Thousand Words . . .*

# THE
# POWER
# OF
# VIDEOCONFERENCING

Mary Craul and
Veril Scott

## Introduction

What is one avenue to increase productivity in your organization while saving time and money? Videoconferencing is now a practical alternative for almost any organization. State-of-the-art advances in performance, economical pricing, local area networks, and the benefits of digital telephone networks have enabled the research, development and acquisition community to discover the competitive advantages and power of videoconferencing.

## Understanding The Real Meaning

Everyone has heard the phrase "a picture is worth a thousand words."

Videoconferencing provides that picture, bringing decisionmakers together for face-to-face meetings regardless of their location. Merely hearing words spoken in a phone conversation limits total communication. Adding a visual link to see the face and the body language enhances communication. Seeing the "picture" allows the participants to comprehend the *intended* meaning, not just the *perceived* meaning of conversations.

"Researchers have suggested that when there is an incongruity between the verbal and the nonverbal message, we tend to believe the nonverbal one," according to Patton and Giffin, authors of *Decision-Making Group Interaction*.

In videoconferencing, hand and arm movement as well as other gestures can illustrate an idea or express an emotional state. More important, facial expression and eye movement can communicate valuable information that is lost in a mere telephone conversation. According to Goss and O-Hair, authors of *Communicating in Interpersonal Relationships*, "Several research projects in nonverbal communication have indicated that the face may be the most important body area through which nonverbal cues are conveyed." More accurate communication is achieved by facial expressions and nonverbal cues.

> *In videoconferencing,
> hand and arm movement
> as well as other gestures
> can illustrate an idea
> or express an emotional state.*

> *"Videoconferencing is a wonderful application of technology that provides real savings and convenience for the organization."*
>
> **—COL Leonard Gliatta**
> **Executive Secretary**
> **Army Science Board**

## Increasing Productivity

"Today's business professionals spend more than 50 percent of their time in meetings, and nearly half of that time they feel is unproductive. Can you imagine as a resource manager spending money on travel for meetings that business professionals feel are unproductive," said Francine Savage, New Business Development Manager of 3M Visual Systems Division. Savage suggests that money invested in videoconferencing equipment will eventually be recouped via the savings from not sending employees to meetings.

Busy Army managers can address organization-wide issues using videoconferencing. Although they may never have time to speak to individual employees in offices scattered around the country, spending one-half hour addressing employees in a multipoint videoconference can personalize an otherwise large, impersonal organization. This results in savings of both time and money. "There are few business media that can have greater positive impact on productivity than successful multipoint videoconferencing," says John Rhodes, Director of Marketing and Sales for Pinacl Communications.

One of the Army's senior leaders, LTG Paul J. Kern, Military Deputy to the Assistant Secretary of the Army for Research, Development and Acquisition (ASARDA), and Director of the Army Acquisition Corps, is capitalizing on the positive impact provided by videoconferencing. Kern conducts bimonthly meetings with Army program executive officers and deputies for systems acquisition (DSAs). These individuals are sometimes located at remote sites hundreds of miles apart. Kern said he is pleased with the way videoconferencing has helped reduce the amount of travel and increase the ability to exchange information with the program executive officers and DSAs. He adds, "[I] see the need to use it more effectively not only over long distances but also locally. There will be a lot of growth for videoconferencing especially once users learn how to use the data-sharing capabilities."

COL Leonard Gliatta, Executive Secretary of the Army Science Board, says, "Videoconferencing is a wonderful application of technology that provides real savings and convenience for the organization."

## Resources To Do The Job

Some organizations will have to invest significant capital to take advantage of this powerful technology. Such is not the case in the Office of the ASARDA (OASARDA). Its Information Management Office has been building a dynamic videoconferencing program for the past 4 years. There are now more than 60 desktop videoconferencing units installed on individual workstations and 12 conference room systems. At the heart of the program is a multipoint control unit (MCU) equipped with the latest software and options. This allows us full control and flexibility to support OASARDA's multipoint conferencing needs.

The impressive capabilities of OASARDA's MCU were recently demonstrated at the International Definity User's Group Conference in Washington, DC. Representatives from hospitals, universities, law firms, and companies from around the world participated in and enjoyed the demonstration presented by the Information Management Office. All of this videoconferencing equipment and the latest audiovisual rear-projection equipment are ready for use in OASARDA's new conference room at Presidential Tower in Crystal City, VA.

Some types of businesses will always require in-person, face-to-face meetings. Videoconferencing, however, does compress time and distance and is changing the way the Army conducts business. Further information can be found on our web site: **http://www.sarda.army.mil/vtc/vtc.htm.**

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# SIMULATION AND MODELING FOR ACQUISITION, REQUIREMENTS AND TRAINING, AND COST AS AN INDEPENDENT VARIABLE

Angela D. Winter

## Introduction

Simulation and modeling for acquisition, requirements and training (SMART) is a new initiative to totally integrate the use of simulation throughout all aspects of the acquisition process for major weapon systems. Similar to the Cost as an Independent Variable (CAIV) initiative, SMART requires cultural and procedural changes. This article looks at the key aspects of SMART and CAIV and compares the impacts, benefits, and interdependencies of the two initiatives.

SMART and CAIV are strategies of acquisition reform. Both strategies are designed to save money while ensuring that acquisition programs are timely and efficient, and meet customer needs. Ideally, both begin with the initial concept development goals and are continuously reviewed throughout the life cycle of a program. SMART focuses on the integration of simulation across acquisition phases and functional areas of a program as well as between different programs. CAIV focuses on requirements, performance, and cost tradeoffs.

CAIV was a major cultural and procedural shift from traditional acquisition. Once CAIV was introduced as a concept, it didn't just *happen*. CAIV had to be explained, and required major senior leadership involvement to make it part of everyday business practices. CAIV was presented at conferences, workgroup sessions, and educational workshops. The intent was to provide not just the overall CAIV concept, but to present ideas on implementation at the program management level.

SMART also requires a major cultural shift to become an accepted practice. By looking at the past successes and the evolution of CAIV, we can recognize similarities with SMART that will make this next change easier. Senior leadership supports SMART. The Acquisition Council of the Department of Defense (DOD) Executive Council for Models and Simulations and focused subgroups are currently looking at the vision, definitions, implementation, and education process for SMART. The Army recently sponsored a SMART conference for program executive officers and program managers (PMs). The Office of the Secretary of Defense is also planning additional workshops and "Industry Days." These investments in time and resources are necessary to effect a change of this magnitude for everyday program management.

## Key Concepts

CAIV and SMART similarities and interdependencies are reflected in some of the key concepts of each initiative. By exploring commonalties between the two initiatives, we can see the potential synergism that could lead to even greater system optimization with increased cost savings (Table 1).

When comparing the key concepts of CAIV and SMART, we see that both initiatives have similar goals. Both encompass flexibility and exploration of system design and implementation. CAIV and SMART are pervasive throughout the acquisition process, but for maximum benefit, both should begin with requirements definition,

**Table 1.**
*Comparison of key concepts of CAIV and SMART.*

### GOAL: 50% Cost Savings and Reduced Development Time

| CAIV | SMART |
|---|---|
| • Long-range planning | • Long-range planning |
| • Begin with requirements definition | • Begin with requirements definition |
| • Estimate cost objectives | • Estimate simulation objectives |
| • Concurrent engineering (IPT) | • Concurrent planning (IPT) |
| • Customer participation throughout life cycle | • Customer participation throughout life cycle |
| • Metrics to track performance | • V&V to track performance |
| • Training program included in delivery | • Training considered upfront |
| • Use existing military or commercial hardware if possible | • Use existing simulations where possible |
| • More analysis in program definition and risk reduction for future tradeoffs | • Push the envelope for program definition while reducing risk |
| • Minimize key performance parameters in operational requirements document for flexibility | • Explore interdependencies of performance parameters |

long-range planning, and preparation for key decision points. Both need strong customer involvement and integrated product and process development (IPPD). Another important aspect of CAIV is the use of existing military or commercial hardware. This is also inherent in SMART as evidenced by the term "reuse" and the push to use commercial off-the-shelf software wherever possible.

## Cost As An Independent Variable

If the success of CAIV had to be condensed into two key concepts, it would be customer involvement and IPPD. Prior to CAIV, the customer usually defined requirements independent of cost considerations and independent of the PM. Likewise, the PM usually did not involve the customer in the management decisions necessary to implement the program. With the advent of CAIV, the customer became a major participant throughout the entire life cycle of the program. Integrated concept teams and integrated product teams facilitated the right mix of knowledge necessary to begin looking at the cost/requirements/performance tradeoffs in a dynamic environment (Figure 1).

Customer involvement brings a greater understanding of the cost impact of each unique requirement. With that understanding comes a greater flexibility in system design and performance based on true threshold mission effectiveness. In the simplest terms, the customer is the advocate for the key performance parameters, the

PM balances the budget, and the contractor works design issues. These three areas, requirements, cost, and performance, directly influence each other. Inflexible requirements don't allow for maximizing across the three subobjectives. Flexible requirements open the trade space and allow exciting design and implementation possibilities. Simulation can be used to define requirements, potential tradeoff areas, enhance cost goals, and predict and benchmark performance. Simulation, therefore, is an integral part of achieving CAIV goals.

## SMART

Simulation is not new to acquisition. It has routinely been used as a tool to assist in analysis, research and development (R&D), test and evaluation (T&E), training, and logistics. So what *is* new? Similar to the expansion of cost into all life-cycle phases with CAIV, simulation is expanding into all life-cycle phases, but not only as a tool. SMART is much broader than the use of a single simulation. SMART is about interoperability and reuse of multiple simulations for multiple purposes. SMART is about the customer, cost, and efficiencies.

Figure 2 shows some examples of simulation use in five different functional areas. A decision point exists in each of these areas. The decision is how to incorporate simulation to cut costs and reduce timelines. The least desirable option, but sometimes an unavoidable one, is to develop a new simulation from scratch. The best option is to modify an existing simulation, thereby saving some resources

and development time. CAIV has reportedly had its greatest cost savings impact in the areas of R&D, T&E, and logistics. SMART can explicitly assist with the cost/requirements/performance tradeoffs in those areas.

Reuse occurs when the use of a simulation crosses from one functional area into another. For example, a simulation originally designed for analysis can be expanded and used in T&E and be further expanded for training. This type of reuse, however, is not inherently available in most simulations. Reuse of a simulation requires programming languages, software architecture, flexibility in code design, and numerous other factors. Reuse is not difficult if it has been planned in the original development of the simulation.

## CAIV Risks

CAIV implementation has risks, but the use of SMART can help reduce these risks. In the spring 1997 issue of *Acquisition Review Quarterly*, "CAIV: Concepts and Risks," Dr. Benjamin Rush listed several risks associated with CAIV. Three that he cited are as follows:

• "The risk that the threshold performance requirements will provide the necessary mission effectiveness and ... that the difference between threshold and objective requirements will provide sufficient trade space to allow tradeoffs between cost, schedule and performance."

Simulation can assist here by allowing for analysis that pushes the envelope of the requirements, both above the threshold and below it. By doing multiple iterations of the system modeled with different capabilities, the customer can see the potential outcomes taken to the extreme and make a more informed decision.

• "Risks that the shape of the function between performance, requirements, mission effectiveness, and cost can be determined and utilized in tradeoff analysis."

Simulation and modeling can reduce this risk by providing the mission effectiveness information to assist with determination of the function and assist with determining the "knee of the curve," as defined by Rush.

• Third and last, Rush stated "Risks that the interrelationships of the system performance requirements are sufficiently understood to select the most cost-effective system performance objectives."

Simulation allows for the interrelationships of system performance to be explored in a cost-effective, controlled environment. By holding certain system
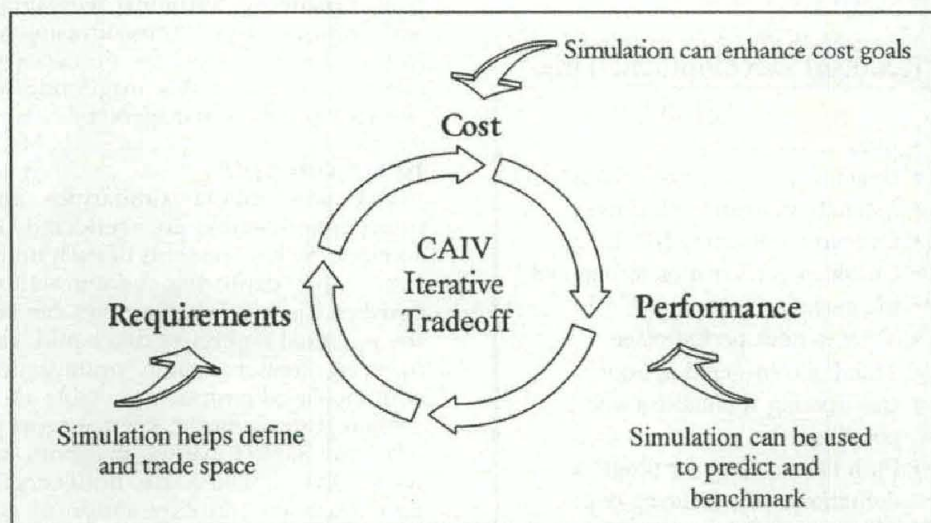


Simulation can enhance cost goals

Cost

**Requirements**

CAIV Iterative Tradeoff

**Performance**

Simulation helps define and trade space

Simulation can be used to predict and benchmark
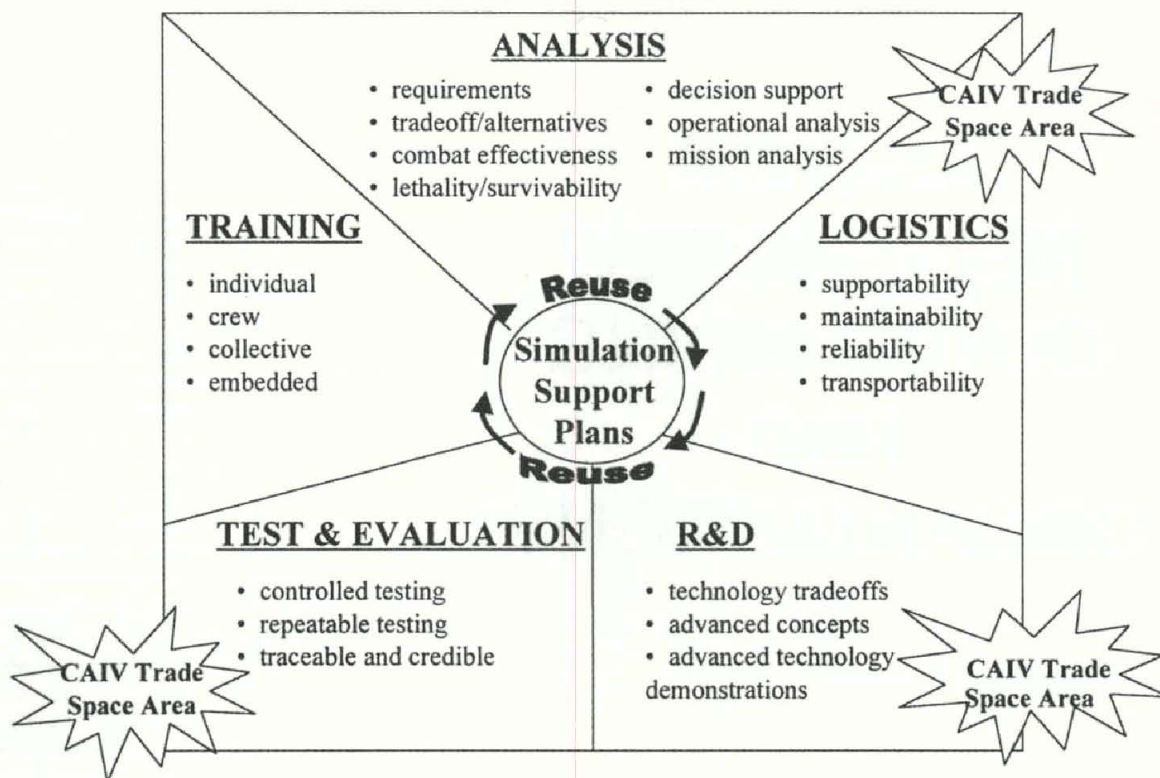
**Figure 1.**
*CAIV tradeoffs.*

**Figure 2.**
*SMART decision points across all phases and functional areas.*

performance characteristics steady while varying others in the simulation, interrelationships can be determined and optimized.

## SMART Risks

SMART also has risks associated with its implementation. Below are just a few to consider when implementing SMART.

• There are risks that capabilities of software and hardware will outpace the program development. The capabilities of computers and hence simulations are increasing by an order of magnitude about every 6 months to 1 year. Given that acquisition programs are multiyear programs, there is a risk that a simulation developed during concept exploration for future T&E or training may be outpaced by technology. This risk can be reduced by continuous review of the use of simulation and keeping up to date with current simulation technology.

• There are risks that the data used in the simulation are incorrect or biased. Proper simulation verification and validation (V&V) can help reduce this risk. While V&V requires a dollar investment, it is one of the most important areas that a PM should personally oversee in any simulation development. Simulation is only useful if it is credible.

• There are risks that the simulation will not be ready to support a required program event. Development of a simulation requires program management just as the overall system requires program management. Periodic management reviews, V&V, and proper configuration management can help reduce this risk.

## Conclusion

SMART and CAIV are two major acquisition reform initiatives with the potential for significant cost savings. With the introduction of cost as a variable, customer involvement, and the IPPD process, CAIV has laid the groundwork for achieving DOD's 50-percent cost savings acquisition goal on its own merits. The same cost savings potential has been proposed for SMART, along with reduced development time and increased product effectiveness. By applying the lessons learned from the evolution of CAIV and SMART, and by exploiting the similarities between CAIV and SMART concepts, we can optimize the acquisition process. SMART and CAIV are a natural fit. An understanding of the overlapping goals and interrelationships between CAIV and SMART can only increase our potential for achieving these goals. In the final analysis, we must make giant strides to ensure that acquisition is kept in the forefront of technology. By combining the attributes of CAIV and SMART, we can meet that challenge.

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# ASARDA RECOGNIZES OUTSTANDING R&D ORGANIZATIONS

## Dr. John F. Ayala

## Background

Since 1975, the Assistant Secretary of the Army for Research, Development and Acquisition (ASARDA) has presented annual Army Research and Development Organization (RDO) of the Year Awards to Army organizations in recognition of outstanding programs executed during the previous fiscal year. This year, the Army expanded the RDO Awards Program to two categories: large and small laboratories. The intent is to recognize the best research and development (R&D) efforts that enhance the Army's capabilities and readiness, and improve the national defense and welfare of the United States.

## Selection Criteria

RDO Award recipients are selected by an evaluation committee chaired by the Army Director for Research and Laboratory Management, and composed of highly qualified members of the Army science and technology community. The committee evaluates written nominations and verbal presentations from each organization's commander or director. Primary areas of consideration are accomplishments and impact; organizational vision, strategy, and plan; resource utilization; and continuous improvement.

## Award Recipients

Based on the evaluations of accom-

plishments during FY97, the evaluation committee selected the U.S. Army Corps of Engineers (COE) Waterways Experiment Station (WES) and COE Cold Regions Research and Engineering Laboratory (CRREL) as the Army's 1998 RDOs of the Year in the large and small laboratory categories, respectively. Additionally, the U.S. Army Tank-automotive and Armaments Command's Armament Research, Development and Engineering Center (TACOM-ARDEC) and the U.S. Army Research Institute (ARI) for the Behavioral and Social Sciences were selected as recipients of 1998 Army Excellence Awards for large and small laboratories, respectively. Paul J. Hoeper, ASARDA, presented the awards during a ceremony Aug. 21, 1998, in his office. The recipients and their accomplishments are described below.

### Waterways Experiment Station

WES is the largest civil engineering and environmental quality R&D complex in the nation. In FY97, it managed an R&D program exceeding $340 million, performed approximately $50 million in research, development, test and evaluation to support the Navy, Air Force, and other DOD agencies, and completed four Army science and technology objectives (STOs). These STOs were rapid obstacle creation, reduction, and planning; field fortifications; vehicle terrain interaction; and lines of

communication-construction materials and methods.

The major WES FY97 technical achievement was continued maturation and development of the Groundwater Modeling System (GMS). The GMS (developed in partnership with other DOD R&D agencies, Department of Energy laboratories, Environmental Protection Agency laboratories, academia, and industry) is being used by more than 600 federal government and more than 1,300 commercial users for environmental assessments, evaluation of environmental cleanup alternatives, and optimization of cleanup operations. Technological breakthroughs included an innovative probe to detect subsurface radioactive contaminants, and development of an innovative analytical procedure to resolve concerns about the structural stability of six intake towers at water resource facilities. In addition, WES is credited with developing antiterrorist planning software for use in making structural damage assessments.

The major FY97 management initiative was diversity. For the seventh consecutive year, WES exceeded the DOD goal in contract awards to historically black colleges and universities/minority institutions. When the National Science Foundation Young Scholars Program and the local Community College Minority Science Improvement Programs were not funded, WES initiated its own outreach program for 100 minority students to interest them in a science or engineering career.

### Cold Regions Research and Engineering Laboratory

CRREL's mission is to gain knowledge of the cold regions through scientific and engineering research, and to put that knowledge to work for the Corps of Engineers, the Army, DOD, and the nation. Headquartered in Hanover, NH, CRREL has a field office in Fairbanks, AK, and is the only DOD laboratory addressing problems and challenges unique to the world's cold regions. Transitioning the Army from a forward-deployed force to a force projection force demands the capability to meet environmental challenges throughout the world, especially during winter and in cold regions. The U.S. involvement in Bosnia is indicative of these current and future operations and challenges, where CRREL is instrumental in providing technology, information, and guidance to overcome hostile winter environments.

Highlights of CRREL's major work accomplishments in FY97 span the

research areas of battlespace environments, civil engineering, and environmental assessment and cleanup.

CRREL was specifically recognized for developing the capability to remotely sense the location of vehicles during adverse weather conditions using seismic sensors. Acoustic sensors are a key component in a number of developmental systems, but can be highly susceptible to adverse weather conditions such as wind and snow cover. Evaluated in a side-by-side field trial with an acoustic detection method, the seismic sensor array was able to detect vehicles at distances in excess of a mile under harsh winter conditions, and in certain conditions demonstrating a tenfold improvement over acoustic sensors. This accomplishment is critical to the Raptor Program, where its acoustic detection and ranging capability can be significantly hampered in winter conditions.

### U.S. Army Tank-automotive and Armaments Command's Armament Research, Development and Engineering Center

TACOM-ARDEC provides the U.S. military with the overwhelming firepower necessary to achieve decisive victory on the battlefield. The mission of TACOM-ARDEC is to conduct and/or manage research, development, acquisition and life-cycle engineering for armament materiel, munitions, and fire control systems, as well as be the Army's executive agent for pollution prevention R&D technology. TACOM-ARDEC provides acquisition and management of initial production quantities and technical support to the soldier in the field.

In FY97, TACOM-ARDEC's development programs culminated in 19 type classifications and 18 materiel items released to the field for the first time. These items will provide greater survivability for our soldiers while substantially improving battlefield firepower. Recent TACOM-ARDEC innovations and breakthroughs include cannon tube with integral midwall cooling; explosively formed penetrator warheads; cryofracture demilitarization; laser ignition of propellant; cryogenic pyrotechnic composition processing; and supercritical water oxidation.

TACOM-ARDEC was specifically recognized for developing technologies that advance "smart" munitions and weapon system concepts. These technologies cross numerous mission areas including infantry, artillery, tank armament, fire control, maneuverability, and logistics. Examples include the Sense and Destroy Armor Block-II; Objective

Individual Combat Weapon; 120 mm Precision-guided Mortar Munition; and battlefield acoustic sensors. Advanced technologies in the smart systems area will dramatically increase hit and kill probability of weapon systems, provide precision strike capability of maneuver commanders, enhance the operational use of minefields, and provide the technologies to launch and guide smart precision-guided anti-tank munitions to extended range high-value targets.

### U.S. Army Research Institute for the Behavioral and Social Sciences

ARI is the Army's lead laboratory and developing agency for personnel performance and training technology. ARI's mission is to maximize individual and unit performance and readiness to meet the full range of worldwide Army missions through advances in the behavioral and social sciences.

In FY97, ARI was involved in more than 50 efforts that influenced policy or product development for the Army. Examples include work with U.S. Army Europe commanders and family support centers to assess post-deployment effects of peacekeeping on family issues, and development and validation of a computer-based instructional package for thermal combat vehicle identification for use at the U.S. Army Infantry School.

ARI was specifically recognized for its research efforts on Special Forces selection, assessment, training, and on-the-job performance. One example was the systematic identification of individual skills and characteristics most critical to performance in the Special Forces Assessment and Selection Course and to Special Forces mission performance. The importance of this research has been recognized internationally by foreign military services.



Left to right, Victor Lindner, Associate Director for Systems, Development and Engineering at TACOM-ARDEC; Dr. Edgar Johnson, Director of ARI; Paul J. Hoeper, ASARDA; Dr. Barbara J. Sotirin, Director of CRREL; and Dr. Robert W. Whalin, Director of WES.

### 1999 Awards

To continue having the greatest Army in the world, we must continue having exceptional R&D organizations like the ones recognized. In FY99 (for FY98 achievements), the ASARDA will again present RDO Awards for Organization of the Year and Excellence in two categories: large R&D organization and small R&D organization. A call for nominations will go out in January 1999.

*DR. JOHN F. AYALA, P.E., was a senior-level Industrial Engineer managing the MANTECH Program at Corpus Christi Army Depot, TX, when he wrote this article. He recently completed a developmental assignment in the Office of the ASARDA and is now a Logistics Management Specialist serving as the Combat Developer's Representative at the U.S. Army Medical Command, Fort Sam Houston, TX. He has both a D.E. in engineering and an M.S.I.E. from Texas A&M University, and a B.S.E.E. from St. Mary's University in San Antonio, TX. He is the 1998 recipient of the Army Materiel Command Engineer of the Year Award and the 1997 Hispanic Engineer National Achievement Award Conference winner for Military Technical Achievement.*

# 21ST ARMY SCIENCE CONFERENCE FEATURES BEST TECHNICAL PAPERS, R&D ACHIEVEMENT AWARDS
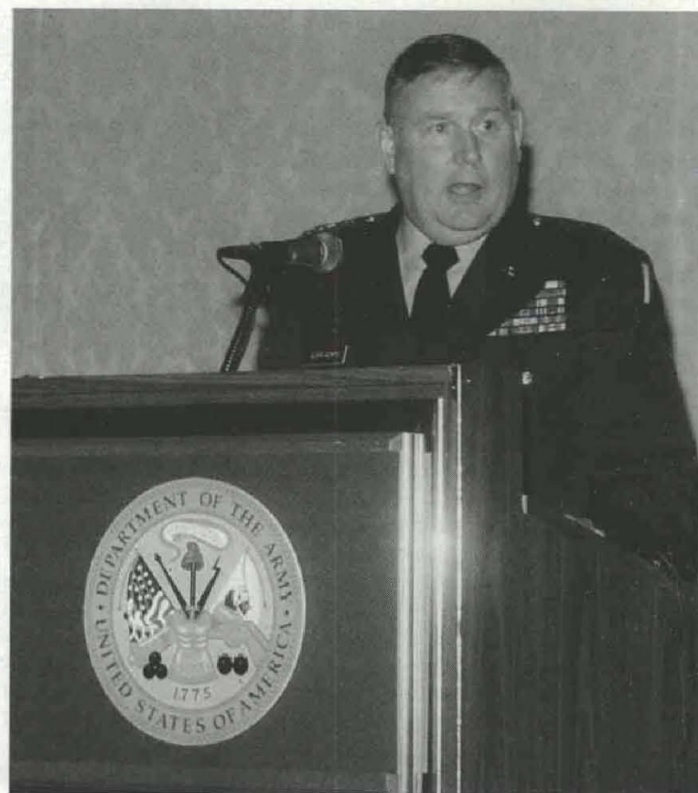


*GEN John N. Abrams, DCG, TRADOC.*

## Introduction

Two ceremonies recognizing top research efforts of Department of the Army scientists and engineers were among the highlights of the 21st Army Science Conference held June 15-17, 1998, in Norfolk, VA. Initiated in 1957, the biennial Army Science Conference provides a forum for the discussion and recognition of significant accomplishments that are considered highly beneficial to the Army's mission. This year's conference theme was "Science and Technology for Army After Next."

Traditionally, the conference attracts overwhelming interest and support from the science and technology community, and this gathering was no exception. Attendees included numerous government employees and representatives from industry and academia. In addition to special ceremonies recognizing the "best" Army research papers and research and development achievements, the conference featured prominent guest speakers, displays, and panel discussions.

## Catherine Kominos

### Best Papers Awards

One of the highlights of the 21st Army Science Conference was the Best Papers Awards luncheon, which was held to honor those technical papers representing the overall "best" in Army research. The luncheon was hosted by LTG Paul J. Kern, Military Deputy to the Assistant Secretary of the Army for Research, Development and Acquisition, and Director, Army Acquisition Corps, and featured a keynote address by GEN John N. Abrams, Deputy Commanding General of the U.S. Army Training and Doctrine Command (TRADOC). The following 13 papers, listed under general subject areas, were selected for honorable mention, while the authors received certificates of achievement and a $500 cash award:

*Microelectronics and Sensors.* B-02, "Correlated Input-Port, Matter-Wave Interferometry: Quantum-Noise Limits to the Atom-Laser Gyroscope," Dr. Jonathan P. Dowling, U.S. Army Aviation and Missile Command (AMCOM); and B-03, "Acousto-Optic Tunable Filters for Chemical and Biological Agent Sensing and Target Detection," Dr. Neelam Gupta, U.S. Army Research Laboratory (ARL), and co-authored by Dr. Rachid Dahmani.

*Defense Against Weapons of Mass Destruction.* E-02, "A Midcourse Multiple Kill Vehicle Defense Against Sub-munitions," Dr. Brian R. Strickland, U.S. Army Space and Missile Defense Command, and co-authored by Dimitrios P. Lianos; and E-03, "Bacterial Differentiation by Matrix-Assisted Laser Desorption Ionization Time-of-Flight Mass Spectrometry," Dr. S. Randolph Long, Edgewood Research, Development and Engineering Center, and co-authored by Dennis C. Roser, Liang Li, Zhengping Wang, and Larry Russon.

*Engineering Sciences.* H-03, "Vehicle System Modeling in SOVAS," Dr. David Lamb, U.S. Army Tank-automotive and Armaments Command's Tank Auto-motive Research, Development and Engineering Center (TACOM-TARDEC), and co-authored by Jim Overholt, Patrick Nunez, Greg Hudas, and Mark Brudnak.

*Advanced Propulsion and Power Technologies.* D-01, "Global Modeling of Combustion in Direct Injection Diesel Engines," Peter Schihl, TACOM-TARDEC, and co-authored by Dr. Walter Bryzik and Ernest Schwarz; and D-03, "Theoretical Chemistry: An Emerging Practical Tool in Army Research," Dr. Betsy Rice, ARL.

*Environmental Sciences and Geosciences.* G-03, "Large-Scale Atmospheric Turbulence Effects on Target Finding Using Acoustical Sensor Arrays," Dr. D. Keith Wilson, ARL; and G-02, "An Integrated Study of Wave Phenomena Affecting Floating Breakwater Design for JLOTS," Michael J. Briggs, U.S. Army Corps of Engineers Waterways Experiment Station (WES), and co-authored by Zeki Demirbilek and Enrique E. Matheu.

*Medical and Behavioral Sciences.* F-04, "3-D Audio Displays in Army Helicopter Systems," Dr. Ellen C. Haas, ARL, and co-authored by D.C. Wightman; and F-02, "Exploiting Immobilized Enzymes: Detoxification of Nerve Agents," Richard K. Gordon, Walter Reed Army Institute of Research, and co-authored by Shawn Feaster, Bhupendra Doctor, Donald Maxwell, David Lenz, Michelle Ross, Keith LeJeune, and Alan Russell.

*High-Performance Computing and Simulation.* C-02, "Multistory Building Structural Response from Explosions," Dr. Raju Namburu, WES, and co-authored by Tommy Bevins, Photios Papados, and Byron Armstrong; and C-04, "Parachute Performance Simulations: A 3-D Fluid-Structure Interaction Model," Richard J. Benney, U.S. Army Soldier Systems Command, Natick Research, Development and Engineering Center, and co-authored by Keith Stein, Dr. Vinay Kalro, Dr. Tayfun Tezduyar, Dr. John Leonard, and Dr. Michael Accorsi.

Three papers were judged by scientific peers as representing the Army's highest quality research. Authors of two of these papers received a bronze medallion and a $1,000 cash award, while the author of the paper judged as representing the overall best in Army research received the Paul A. Siple Memorial Award and a cash award of $2,500.

Dr. A. Fenner Milton, then Deputy Assistant Secretary of the Army for Research and Technology, OASARDA, addresses attendees.

The first bronze medallion was awarded to Mark Bloemer, AMCOM, for "Optical and Microwave Properties of Metal/Dielectric Photonic Band Gaps." Using optical and microwave experiments, Bloemer demonstrated the essential features of transparent metals. Applications for transparent metals include laser safety glasses, heat-reflecting windows, and transparent conductors.

The second bronze medallion was awarded to Dr. Doran Smith, ARL, for "Force Detected Magnetic Resonance Imaging." This is a new approach to detecting magnetic resonance and, because of its greater sensitivity, it provides subsurface imaging for lesser known features ranging from ohmic contacts in integrated circuits to protein structure.

The winner of the 1998 Paul A. Siple Memorial Award was Dr. Bruce Fink, ARL, for "Co-Injection Resin Transfer Molding for Optimization of Integral Armor." Fink's paper describes the invention and development of two composite processing technologies that enable the manufacture of lightweight composite/ceramic integral armor offering significant cost reduction and performance enhancement over existing Defense industry practices.

## R&D Achievement Awards

Another highlight of the conference was the Research and Development Achievement Awards luncheon to honor 60 Department of the Army researchers who were recognized for their outstanding scientific and technical accomplishments. Dr. Richard E. Smalley, a Rice University Professor and a 1996 Nobel Laureate in chemistry, delivered the keynote address. Listed by the major command or activity where they are employed, the recipients of these awards are shown below.

**U.S. ARMY CORPS OF ENGINEERS**
**U.S. Army Cold Regions Research and Engineering Laboratory**
*Kathleen F. Jones*



Dr. Richard E. Smalley, a Rice University Professor and a 1996 Nobel Laureate in chemistry, delivers the keynote address.

**U.S. Army Construction Engineering Research Laboratories**
Vincent F. Hock
Dr. Charles P. Marsh
Susan A. Drozdz
Michael C. Worsham

**U.S. Army Waterways Experiment Station**
Dr. Jeffery P. Holland
Dr. Hsin-Chi Jerry Lin
David R. Richards
Dr. David W. Moore
Dr. Todd S. Bridges
Dr. John F. Peters
Dr. David A. Horner
Dr. Stacy E. Howington
Dr. Jane W. Adams
John H. Ballard
Dan Y. Eng

## U.S. ARMY MATERIEL COMMAND

**U.S. Army Research Laboratory**
Michael V. Scanlon
Brian P. Ketchel
Gary L. Wood

**U.S. Army Armaments Research, Development and Engineering Center**
Russell N. Broad
Patricia L. Farnell
Richard Fong
William Ng
Dr. Rao Surapaneni
Dr. Reddy Damavarapu
Christopher Rinaldi
Edward Hyland
Jeffrey W. Haas
James A. Neese
Dr. Frank Owens

**U.S. Army Aviation Research, Development and Engineering Center**
Dr. Robert L. Meakin
Matthew S. Whalley

**U.S. Army Communications-Electronics Command Research Development and Engineering Center**
Michael W. Grenn
Mark Coy
George Au
Edward J. Plichta

**U.S. Army Edgewood Research, Development and Engineering Center**
Bruce W. Jezek
Patrick L. Berry
Donald L. Curtis
Kenneth H. Kammerer

**U.S. Army Missile Research, Development and Engineering Center**
Dr. Mark J. Bloemer
C. Stephen Cornelius
Stephen M. Motz
David C. Tribble
Bryan L. Williams

**U.S. Army Natick Research, Development and Engineering Center**
Dr. Heidi L. Schreuder-Gibson



Left to right, Dr. John Parmentola, then Acting Director for RLM, OASARDA; best paper award recipient Dr. Betsy Rice, ARL; and LTG Paul J. Kern, Military Deputy to the ASARDA.

Henry J. Girolamo
Donald W. Pickard
James E. Sadeck
Cyrus E. Kendrick
Dr. Donald Rivin

**U.S. Army Tank-Automotive Research, Development and Engineering Center**
Dr. Arunachalam M. Rajendran
Krishan D. Bishnoi
David J. Grove

## U.S. ARMY MEDICAL RESEARCH AND MATERIEL COMMAND

**U.S. Army Research Institute of Environmental Medicine**
COL John P. Obusek

**Walter Reed Army Institute of Research**
Dr. Gregory Galbicka
CPT Maurice L. Sipos

## U.S. TOTAL ARMY PERSONNEL COMMAND

**U.S. Army Research Institute for Behavior and Social Sciences**
Dr. Judith E. Brooks
Dr. Robert N. Kilcullen
Dr. Michelle M. Zazanis

## Panel Discussions

The two panel sessions, Army After Next and Managing the Role of Research in the Army, provided conferees the opportunity to hear various viewpoints from a broad cross section of military and civilian managers. The Army After Next panel featured various perspectives on the evolving Army After Next concept. Dr. John Parmentola, then Acting Director for Research and Laboratory Management (RLM), Office of the Assistant Secretary of the Army for Research, Development and Acquisition (OASARDA), chaired the panel. Other panelists were Dr. A. Fenner Milton, then Deputy Assistant Secretary of the Army for Research and Technology, OASARDA; BG Edward T. Buckley, Deputy Chief of Staff for Doctrine, TRADOC; COL Steve Kirin, Director, TRAC Study and Analysis Center; Gene Baker, Associate Director, Systems and Technology Integration Business Group, U.S. Army TACOM-TARDEC; and Dr. Michael P. Scully, Chief Design Engineer, Aeroflight-dynamics Directorate, U.S. Army Aviation Research, Development and Engineering Center, AMCOM.

The panel on Managing the Role of Research in the Army presented viewpoints from a broad cross section of research managers. Panelists were Dr. John Parmentola, Panel Chairman; Catherine Kominos, Associate Director, Army Research, OASARDA; Dr. Chester C. Carroll, Senior Research Scientist, AMCOM; Dr. Gerald J. Iafrate, Professor of Electrical Engineering, University of Notre Dame; Dr. Alastair M. Glass, Director of Photonics Research, Bell Laboratories-Lucent Technologies; and Dr. Joseph Roccio, Deputy Director, ARL.

## Conclusion

Overall, the conference proved a tremendous success. The special efforts of the Army senior technologists who chaired the technical sessions and the support provided by the Army Research Laboratory are greatly appreciated.

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*CATHERINE KOMINOS is the Associate Director of Army Research in the Office of the Assistant Secretary of the Army (Research, Development and Acquisition). She holds a B.S. degree in civil engineering and an M.S. in engineering administration from The George Washington University. She is a doctoral candidate in public policy/public administration at the University of Southern California.*

# USING RESEARCH AND DEVELOPMENT TECHNOLOGY PROGRAMS FOR AFFORDABILITY

## Introduction

Declining Defense budgets have increased the Department of Defense (DOD) emphasis on producing higher quality products in less time and at a lower cost. Some of the factors that have significantly changed the way the Army does business are competition with industry, downsizing, base closures, privatization, new and changing environmental laws, and the extraordinary demands of using weapon systems beyond their intended service life. In response to this environment, the Army leadership has revitalized its research and development (R&D) process to identify and prioritize systems that may be candidates for significant cost avoidance. This effort is specifically targeted at Army weapon systems currently in engineering and development or production, or for sustainment of systems after they are fielded. The three-pillar approach to the Army's Program for Affordability is com-

Dr. John F. Ayala,
Carol Gardinier,
Juan L. Millan, and
Dr. Robert S. Rohde

prised of *Manufacturing Technology* (MANTECH), the *Commercial Operations* and *Support Savings Initiative* (COSSI), and *Reliability, Maintainability and Sustainability* (RM&S). This article provides an overview of each of these efforts.

## MANTECH

The Army MANTECH Program is designed to provide essential manufacturing technologies that will enable affordable production and sustainment of future weapon systems and is used during the last phases of the R&D process. The MANTECH Program recently completed its first year under a revised program strategy (see *Army RD&A*, May-June 1998, page 13). The revised MANTECH Program is modeled after the Science and Technology Objective (STO) process and showcases Manufacturing Technology Objectives (MTOs), which are at the core of the discretionary funding program. The balance of the revised MANTECH Program consists of MANTECH Demonstrations (MDs) (smaller, quicker reacting projects). Both the MTOs and MDs are proposed by the U.S. Army Materiel Command's (AMC) major subordinate commands (MSCs) in conjunction with Army program managers (PMs) and address pervasive manufacturing problems. In general, solutions to these problems are provided by the affordable production of Army weapon systems.
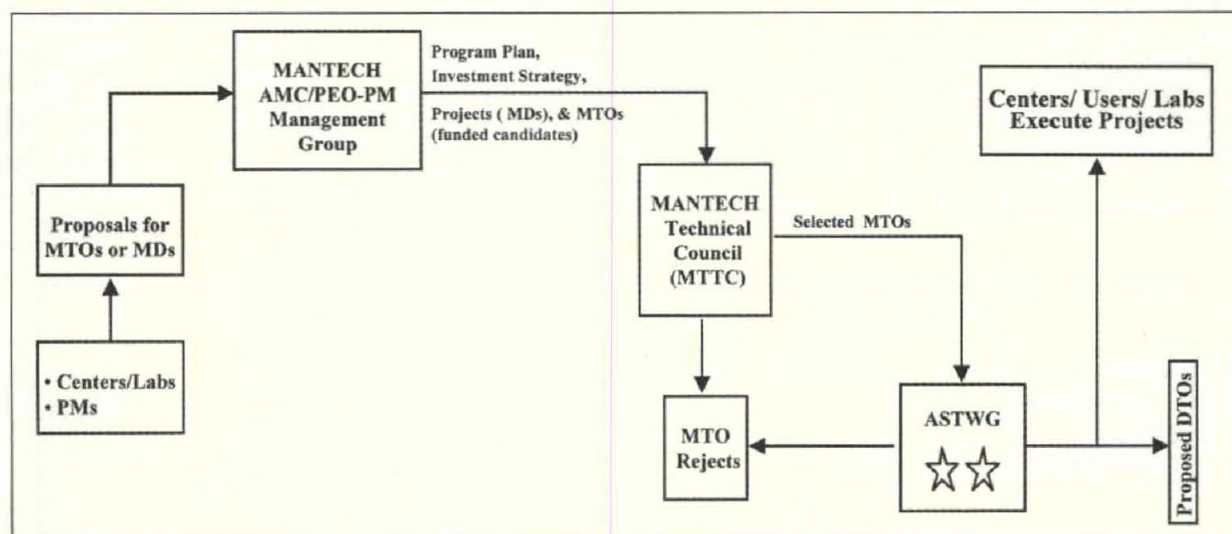


**Figure 1.**
*Army MANTECH MTO approval process.*

> *The use of commercial components allows DOD to reduce its inventories, obtain rapid delivery from commercial suppliers, and use the "modernization through spares" approach as new technology becomes available.*

MTOs are selected by the MANTECH Technical Council (MTTC) and approved by the Army Science and Technology Working Group (ASTWG) (Figure 1) in a process similar to that used for STOs and Advanced Technology Demonstrations (ATDs). MTOs are designed to provide broad-based manufacturing solutions that promise maximum return on investment. They are selected based on criteria such as technology feasibility, timely application to weapon system production schedules, the potential for application to multiple weapon systems, the pervasive nature of the problem addressed, PM support and cost sharing (25 percent of cost), and the total cost avoidance and benefit-to-investment ratio. The MANTECH Program has achieved savings-to-investment ratios as high as 13-to-1 (see MICOM Reports CR-RD-SE-88, -3). These efforts can produce tangible payoffs within 1 to 4 years of completion. The PMs' cost share is considered crucial to PM acceptance and support of the program.

Another issue important to the MANTECH Program is cost sharing with industry, which is used to supplement MANTECH funds. In addition, cost sharing approaches pioneered by the Defense Advanced Research Projects Agency (DARPA) using Other Transactions under 10 U.S.C. 2371 will be used to reduce program risk and encourage support by nontraditional industrial suppliers.

There are currently four approved Army MTOs: Manufacturing Technology for Infrared Cooled and Uncooled Staring Sensor Arrays (FY98 start); Knowledge and Process Tools for Manufacturing of Affordable Composites Structures (FY99 start); Development of Plastic Encapsulated Microcircuits for Military Applications (FY99 start); and Large Caliber Cannon Life Extension Via Tantalum Sputtering Manufacturing Technology (FY00 start).

Approved MTOs are managed by the AMC MSCs and require individual program management plans similar to those required for ATDs, and yearly validated economic analyses. Approved MTOs also become candidates for Defense Technology Objectives (DTOs) with multi-Service participation. More detailed and updated information on Defense MANTECH is available through the DOD MANTECH website at **http://mantech.iitri.com/**.

## COSSI

As the service life of military systems is extended, operations and support (O&S) costs become a larger portion of total system cost. Adapting commercial items for military use is often less expensive than using military-specific items. The intent of the Commercial Operations and Support Savings Initiative (COSSI) is to reduce O&S costs by adapting, testing, and implementing methods for inserting commercial items into fielded military systems on a routine and expedited basis. The use of commercial components allows DOD to reduce its inventories, obtain rapid delivery from commercial suppliers, and use the "modernization through spares" approach as new technology becomes available. Reducing O&S costs on fielded systems will make more resources available for procurement and is an essential ingredient in DOD's modernization strategy.

In FY97, the COSSI was first used to take advantage of available commercial technologies. It originated under DARPA, but was transferred to the Services for FY99 with the Office of the Secretary of Defense retaining a funding line to support joint efforts. It is a technology insertion program that solicits ideas from industry on ways to use commercial technologies to reduce the O&S costs of fielded systems. Once opportunities are identified, COSSI shares the costs of the nonrecurring engineering effort needed to adapt the commercial item for military use. The COSSI Program also assists in ensuring the application is successful.

COSSI is a two-stage process, as shown in Figure 2. In Stage 1, firms or teams, including at least one for-profit firm, submit proposals. A proposal must include the written support of a military customer who has the authority
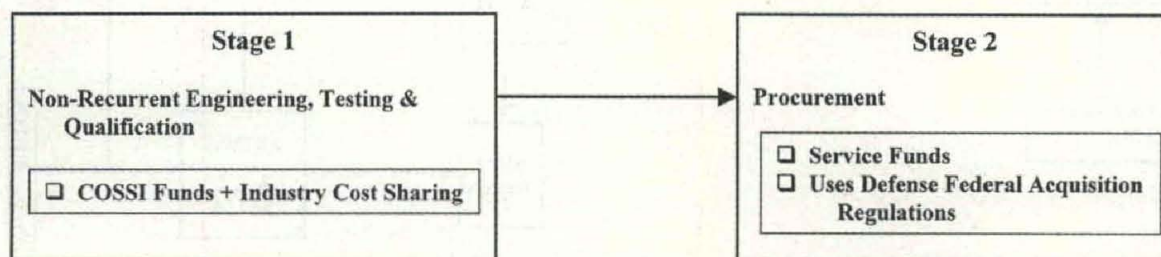


**Figure 2.**
*Army COSSI approval process.*

to modify the system and purchase the kits in Stage 2. In addition, just as in MANTECH, the Army will seek PM cost sharing for Stage 1 to ensure solid PM support.

During Stage 1, necessary modifications are made to the core commercial product to adapt it for military use. The item is then tested to ensure it performs satisfactorily in the selected application and operational environment, without degrading its overall performance. If Stage 1 is successful, the goal of the military customer in Stage 2 is to purchase the kits at a fair and reasonable target price without recompetition.

Thirty projects were selected DOD-wide in FY97 as part of the initial COSSI solicitation. They represent a Stage 1 cost to the government of $96.3 million. The proposers agreed to underwrite $89.9 million in additional costs of the Stage 1 projects. Upon successful completion of all Stage 1 projects by the Services, the government estimates it will avoid more than $4.6 billion in O&S costs during the next 10 years in Stage 2. For the Army, this effort includes 10 projects and represents an investment cost of about $30 million with an estimated O&S cost avoidance of $1.4 billion. More detailed and updated information on COSSI is available through the DOD Commercial Technology Insertion website at **http://www.acq.osd.mil/es/dut/**.

## RM&S

Similar to COSSI, the *Reliability, Maintainability, and Sustainability* (RM&S) Program is also designed to reduce O&S costs through reliability, maintainability, or other improvements to fielded weapon systems and/or major end items. In some cases, however, there may not be a commercial product that can be readily adapted to the Army's needs. The RM&S Program was established in FY96 by Program Budget Decision 714 (Depot Maintenance Reliability Program). Following establishment of the Program, the Services were asked to submit candidate projects. The RM&S Program was funded in FY97 under the Other Procurement Army (OPA) 3—Depot Maintenance and Other End Items program element. Funding, however, was zeroed out in FY98 because projects appeared to be geared to R&D rather than depot maintenance. As such, for FY99 and the outyears, the RM&S Program will be paid for through research, development, test and evaluation (RDT&E) funds under the same program element as MANTECH but as a separate project. This change in fund-

ing lines from OPA to Army RDT&E will allow Army activities to develop and demonstrate repair and sustainment technologies and process improvements in the RDT&E arena. In addition, RM&S projects will be evaluated concurrently with MANTECH and COSSI projects to avoid duplication.

The revised RM&S Program selection process is similar to that of the MANTECH Program, which includes the evaluation of technical objectives and demonstration projects. The RM&S projects are proposed by AMC's MSCs and depots in conjunction with Army Project Management Offices. The technical objectives are reviewed and selected by the MTTC and sent to the ASTWG for final approval. These technical objectives are selected based on technical merit, weapon systems program support, timeliness of technology insertion, return on investment, and cost avoidance and/or savings.

RM&S projects were chosen for FY00 as part of a larger process to identify projects to reduce life-cycle cost. Thirteen projects were selected to be evaluated in FY99 and FY00. These projects represent an investment cost of about $40 million to the Army with an estimated cost avoidance of $405 million during a 10-year period. Future projects for RM&S will be identified at the same time as the MANTECH request, and all will be presented to the ASTWG for final approval.

## Conclusion

The Army leadership is working diligently to ensure that America's soldiers are provided with the best weapon systems available. In the current climate of declining Defense budgets, downsizing, base closures, privatization, and sustainment of legacy weapon systems, affordability for DOD customers is more important than ever. In response, the Army has designed a three-pillar approach to identify and implement technologies for cost avoidance and savings. The MANTECH Program is used during the last phases of the R&D process, thus ensuring affordable new weapon programs. The COSSI and RM&S Programs support the introduction of new technologies to reduce increasing O&S costs for legacy systems. All three programs represent near-term, prudent investments to ensure affordability for modernization and the Army After Next. As affordability becomes a higher priority for DOD, the challenge is to address the high cost drivers of the Army. The revitalized approach to the Army's MANTECH, COSSI and RM&S Programs intends to do this.

*DR. JOHN F. AYALA, P.E., was a senior-level Industrial Engineer with the MANTECH Program at Corpus Christi Army Depot, TX, when this article was written. He is now a Logistics Management Specialist serving as the Combat Developer's Representative at the U.S. Army Medical Command at Fort Sam Houston, TX. He has both a D.E. in engineering and an M.S.I.E. from Texas A&M University, and a B.S.E.E. from St. Mary's University in San Antonio, TX. He is the 1998 recipient of the Army Materiel Command Engineer of the Year Award and the 1997 Hispanic Engineer National Achievement Award Conference winner for Military Technical Achievement.*

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# UNMANNED AERIAL VEHICLES DEMONSTRATED WHERE THEY'RE TESTED

## Chuck Wullenjohn

## Introduction

Advanced electronics technology, which has resulted in the miniaturization of computers, television cameras, navigation systems, and much more, has allowed the military to develop small, remotely piloted aircraft capable of taking over the jobs formerly performed by very expensive manned aircraft.

Known as unmanned aerial vehicles (UAVs), these small aircraft are cheaper to build and eliminate the huge costs of training and maintaining the skills of a human pilot. Small electronic systems can navigate the UAV to a point of interest, have it look down on enemy positions, and relay the information back to a military commander in a rear area.

UAVs have been under development for years, and recently at U.S. Army Yuma Proving Ground (YPG), in the Arizona desert, the U.S. Navy sponsored a demonstration of a new type of UAV—one able to take off and land vertically.

"The world of unmanned aerial vehicles is now reaching the state of stable maturity," said Dick Albert, Test Director at YPG, which is located adjacent to the Colorado River. Military systems of all types and sizes, including UAV prototypes, are regularly tested at the sprawling 1,300-square-mile installation.

"First and foremost, UAVs enable us to save lives," Albert explained. "With today's technology, UAVs can perform tasks that used to require a human pilot. Especially when missions are hazardous, it's a much better idea to risk a machine rather than a human life."

## Roles

Unmanned aerial vehicles can perform a wide variety of military roles. These include detailed area surveillance and reconnaissance, battle damage assessments, identifying targets, relaying communications, chemical or nuclear monitoring, and observing naval gunfire support.

Current operational UAVs typically launched and recovered from a ground station or ship often require a great deal of area or specialized equipment. According to U.S. Navy officials, there is an immediate need for UAVs to fly from confined areas, such as the decks of seagoing ships. Additionally, the decks of ships, unlike the ground, are generally moving, pitching, and rolling. It's a tough challenge to

> "With today's technology, UAVs can perform tasks that used to require a human pilot. Especially when missions are hazardous, it's a much better idea to risk a machine rather than a human life."
>
> —Dick Albert
> Test Director, YPG

land a UAV on a small platform, and for that reason, the Navy has decided to see what the world has to offer in UAVs that might meet that test.

"The current Navy UAV, the Pioneer, has been around since 1985," said LCDR Tom Stuart of the Navy's UAV Program Office. "It has 17,000 flight hours on it, and has proven an excellent asset, but it has definite limitations—mainly from inclement weather. Also, it must be launched by rail or on a prepared airstrip, then recovered in a net. A vertical takeoff and landing [VTOL] UAV would resolve these issues."

Current proposals call for VTOL UAVs to be able to operate from any flight-capable ship or unprepared airfield. In addition, based on tactical line-of-sight considerations, the aircraft must fly at 13,000-foot altitudes.

UAVs have proven equally attractive in many parts of the civilian world. For example, the Drug Enforcement Agency has looked at them as a means of providing unobtrusive border surveillance, and many police departments view them as an excellent way to survey traffic. Other uses include monitoring areas requiring environmental restoration and pipelines, and detecting unexploded ordnance. In addition, the U.S. Coast Guard is interested in them for search and rescue missions.

More than 20 military representatives from seven nations visited YPG May 13-14, 1998, to learn more about modern VTOL UAV capabilities. Sweden, France, Germany, the United Kingdom, Australia, Turkey, and Canada were represented.

After a full day of detailed briefings and discussions, the group visited "site eight" at YPG where a great deal of VTOL UAV development testing is taking place. They witnessed flights of two VTOL UAV prototypes: the CL-327 "Guardian," built by Bombardier of Montreal, Canada; and the "Eagle Eye," constructed by Bell Helicopter of Fort Worth, TX. The "Vigilante," a VTOL UAV designed and constructed by Science Applications International Corporation, was not available for the demonstration.

Shaped like an upright peanut, the CL-327 is a greatly upgraded version of the CL-227 UAV, which was designed and built many years ago. An aircraft featuring untraditional lines, the CL-327 "Guardian" had flown more than 20 flights as of May 14, 1998, and amassed more than 35 total hours. Achieving an airspeed of greater than 90 knots, it has successfully flown at altitudes higher than 10,000 feet. It first came to YPG for testing in early March 1998.

The "Eagle Eye" has the appearance of



Looking like something from the movie "Star Wars," the CL-327 "Guardian" hovers above YPG.

a conventional aircraft, with tilt rotors at the end of each wing that allow it to maneuver up and down, and hover. The aircraft has flown more than 30 times, for longer than 35 flight hours. It has achieved an airspeed of greater than 180 knots, with an altitude higher than 9,000 feet. It arrived at YPG in late February 1998.

Each current UAV carries approximately 200 pounds of payload. The payload can be modified for each mission, but can easily include items such as forward looking infrared radar, laser designators, and video (infrared and standard) equipment. Though U.S. Department of Defense doctrine requires current UAVs to be nonlethal, technology may lead to future armed UAVs that complement forces of armed helicopters, fighters and bombers.

"Both private companies have learned a great deal about their UAVs while at YPG," said Albert. "Our restricted airspace enables them to fly great distances in realistic conditions. And they do it every day for 5 days each week. The developers really like it here because of our good weather, the abundant range time we offer, and our fully instrumented ranges allow them to verify their systems."

These instruments include radar, laser tracking, detailed meteorological data, and video tracking from the proving ground's portable kineto tracking mounts. These mounts permit cameras to use very long lenses that provide excellent close-up photography of the systems in action.

The YPG demonstration progressed

well, with the foreign guests asking many questions and obtaining a great deal of firsthand information. According to MAJ David Fallon, a visitor from the Australian army, the event proved to be quite valuable in relation to current events.

"UAV development is taking place very quickly," said Fallon. "Nations throughout the world are looking at them as real options, whether it be for military use or police-type operations. As a result, many contractors are going into the UAV arena and developing all sorts of options."

LTC Bob Scott, Canadian Forces Defense Attaché, says UAVs could be particularly appropriate for United Nations or coalition peacekeeping operations.

"We want the capability to protect our troops and see what's happening on both sides of a conflict," Scott said. "We're more interested in this than in the UAV's warfighting abilities at this time."

More detailed testing will take place in future months before the VTOL UAVs are ready for fielding. According to Test Director Dick Albert, a large portion of the testing, if not most of it, will take place at the proving ground.

*CHUCK WULLENJOHN is Chief of the Public Affairs Office at the U.S. Army Yuma Proving Ground. A frequent contributor to this magazine and other military publications, he is a graduate of Humboldt State University, CA.*

# 'SUPER USER' IMPAC CARDS FOR CONTINGENCY CONTRACTING OFFICERS

## CPT Tim J. Strange

## Introduction

The issuance and use of the Super User IMPAC card is a major step toward the government's goal of paperless contracting.

During a recent mission in the Kingdom of Tonga, a platoon of engineers from the 84th Engineer Battalion, and other soldiers from the 25th Infantry Division, Schofield Barracks, HI, constructed a multipurpose community building on the island of Nuku'alofa. This humanitarian construction mission was part of the U.S. Army, Pacific (USARPAC) Expanded Relations Program. It was also a special mission because it was the first time in the USARPAC area of operations that all contract payments were made using the contracting officer's Super User IMPAC card.

This article addresses how the Super User IMPAC cards were implemented, procedures for using the cards, government security provisions, potential cost savings, and other benefits of the Super User IMPAC cards.

## Implementation

With the exception of higher spending limits, the Super User cards are exactly the same as the IMPAC cards issued to most company supply sergeants and requiring activities.

The USARPAC Principal Assistant Responsible for Contracting (PARC) Office, in coordination with the U.S. Army Garrison-Hawaii (USAG-HI) Directorate of Contracting, authorized the issuance of Super User IMPAC cards. In January 1998, these cards were issued to all four Army Contingency Contracting Officers (CCOs) in Hawaii. Each card was set up in accordance with the particular CCO's warrant limit.

For the USAG-HI CCOs, the cards have a $200,000 single payment or purchase limit and a $5 million monthly cap, which mirrors the simplified acquisition threshold for declared contingencies. For nondeclared contingencies, the CCO imposes a $100,000 limit. This gives the CCO the flexibility to use the card whenever and wherever possible.

During the construction mission in Tonga, the IMPAC card was used for some micropurchases and as the sole method for all contract payments.

## Procedures For Use

Using the Super User card as a contract payment option is quite simple. Obligations above $2,500 are procured using a purchase order, delivery order, or another approved contractual instrument. In concert with the contract, the CCO must ensure funds availability and state that all payments will be made with the IMPAC card. Once the contractual obligations are completed by the vendor, the CCO uses the IMPAC card to authorize contract payment.

Payment can be authorized from any location. This is an added benefit of the card since neither the CCO or the paying agent needs to be in the same location or country where the vendor is located. For the Tonga mission, a contracting officer's representative (COR) who was in Tonga for the entire mission was appointed to track all ongoing contracts. The COR collected invoices, filled out receiving reports and then faxed them to the CCO, who authorized the Tongian vendors to charge the IMPAC account. All of this was accomplished while I was in Hawaii.

To track and process contract payment authorizations, CCOs should keep a log of all payments or purchases made with the card. The log should include the fund cite used for each payment or purchase. When CCOs receive their monthly IMPAC billing statement of account (SOA), they should reconcile it to ensure that all charges are valid. Charges should be consolidated and totaled by fund cite to create a line item for each separate fund cite used during the month. Since the Defense Finance and Accounting Service (DFAS) charges by line item, this process ensures that the Army pays the minimum possible fee for processing.

The reconciled SOA, receipts, and

payment log are then forwarded to the approving official, who reconciles the monthly billing statement, attaches the consolidated list of fund cites, and totals the amount to be paid against each fund cite. The billing statement and fund cites are then forwarded to DFAS for payment.

Vendor capabilities must be assessed in advance of the mission. This can be accomplished with a reconnaissance by checking vendor databases for the area, by reviewing previous mission after-action reports, and by conducting phone and fax surveys. For the mission in Tonga, a leader's reconnaissance was conducted 3 months before the mission began. All potential vendors were surveyed. Survey results indicated that almost all vendors either accepted the VISA card or would be willing to do so if they were awarded a contract.

The Super User IMPAC cards have also been used on a limited basis by CCOs on missions to Thailand and the Philippines. It is important to note, however, that many countries are not ready to use the IMPAC card as the sole method for contract payments.

## Government Security

Credit cards always come with the potential for unauthorized charges. A troubling concern is the potential for vendors to make unauthorized charges using the CCO's VISA number. To minimize the government's risk, the CCO should ensure that several security checks are followed:

• The CCO should explain to each vendor the proper payment procedures and the penalty for unauthorized card use.

• CCOs should not release their VISA card number to the vendor until the first contract payment is authorized.

• CCOs should carefully scrutinize their monthly IMPAC card billing statements to ensure that every charge listed was authorized and that the correct amount was billed to the correct vendor. The CCO needs to submit any billing questions to the bank. The government has 60 days from the statement date to dispute charges. This dispute process protects the government from unauthorized charges.

In all cases, the government's interests are protected as long as CCOs follow proper procedures and use common sense.

## Potential Cost Savings

Contingency contract payments are usually made by a deployed paying agent or by the nearest American Embassy paying office. In either case, the IMPAC card can offer significant cost savings. On a 90-day deployment to Tonga, one paying agent could incur more than $14,000 in travel and per diem costs. With the Super User card, CCOs can authorize contract payments to be charged to the IMPAC card, thus eliminating the need for an onsite paying agent. As a result, the government saves the per diem costs associated with deploying a paying agent on the mission.

Costs may also be incurred when either an embassy or paying agent processes payment vouchers. The exact costs of processing payment vouchers depend on the number of vouchers and the channels through which they are processed. A good source for estimating these cost savings is the 1996 U.S. Army Audit Agency study. It showed that each IMPAC card purchase saved $92 compared to a purchase order. Contingency purchase orders are usually not input into the regular audit agency computer system. Thus, it is reasonable to assume that using the IMPAC card for contingency contract payments would yield comparable savings.

On the deployment to Tonga, the CCO's IMPAC card was used to make 31 contract or delivery order payments with a combined value of more than $170,000. Several of the delivery order payments exceeded $20,000. At $92 each, 31 payments using the IMPAC card would yield estimated savings of more than $2,800. The U.S. Army as a whole pays a bill to DFAS for processing contract payments. The use of the IMPAC card reduces this bill. Additionally, there are rebates available for increased use of the IMPAC card. While the savings for this mission alone were small, the potential savings on future missions could be significant.

## Other Benefits

Other benefits of the Super User IMPAC card include reduced CCO and paying office time, better mission control, and improved relations with foreign vendors. With the card, the CCO can pay and close out contracts in a matter of days instead of the weeks that would be required if a paying office were used. As mentioned above, CCOs can make contract payments from any location. This gives the CCO the flexibility to go into foreign countries to set up contracts, make the required arrangements, and then leave even if contract performance is ongoing.

Foreign vendors are usually more satisfied with IMPAC payments than the traditional U.S. Treasury check. Vendors, by international VISA policy, must receive payment in their bank accounts within 3 days. On previous deployments to Tonga, some vendors had to wait more than 45 days to receive Treasury checks from the embassy paying office. Relations with vendors turn sour quickly when payment problems like this occur. The Super User IMPAC card alleviates problems related to vendor invoices, government receiving reports, the government paying office, and the geographical disparities of those involved in the transaction.

One potential drawback for vendors is the fee charged by their bank for processing VISA payments. The exact fee that vendors pay is set by the bank they use to process their VISA receipts. Traditionally, the fee is about 2 to 3 percent of the total amount of each purchase and vendors have the ability to shop around for the bank with the lowest processing fees. Most vendors believe that the fee is worth paying to get a guaranteed quick payment, to obtain more government and local business, and to avoid the cost of waiting for payments when they have already reimbursed their suppliers.

## Conclusion

The Super User IMPAC card is a very valuable tool for CCOs. It can be used to authorize contract payments or to make purchases for planned deployments, emergency deployments, and natural disasters. The Super User IMPAC card gives CCOs the flexibility to act as their own paying agents and save the government thousands of dollars in costs associated with contract payments. For these reasons, the card should be seen as a positive change for the future of government contracting.

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*Partnering For Technology Solutions . . .*

# DEPARTMENT OF ENERGY OAK RIDGE COMPLEX

Richard G. Scott

## Introduction

The Department of Energy (DOE) Oak Ridge complex in Tennessee, perhaps unlike anywhere else in the world, combines world-class research and development efforts with unique advanced manufacturing capabilities in one location. The Oak Ridge complex is a large, diverse multidiscipline enterprise that spans the technology development continuum from purely basic science to full-scale prototype development. It consists of four primary elements:

• A manufacturing and fabrication facility, known as the Y-12 Plant. Its primary missions include dismantling nuclear weapon components, maintaining a nuclear production capability, and stockpile support.

• The Oak Ridge National Laboratory (ORNL), a premier multiprogram research institution.

• A site formerly used as a uranium enrichment facility, which is undergoing transition from a government-controlled environmental remediation site to an industrial park with partners from the private sector.

• The Advanced Technologies activity, which includes the National Security Program Office, the Data Systems Research and Development Organization, and the Hazardous Waste Remedial Actions Program. Advanced Technologies is involved in activities related to imaging research, command and control development, telemedicine development, and nonproliferation.

## Integrating Research And Manufacturing

The changing requirement for nuclear weapons has also mandated a change in the unique manufacturing and processing skills to produce these weapons. The Oak Ridge Centers for Manufacturing Technology have played a key role in this transformation. The centers serve as a conduit for leveraging and integrating the massive research capabilities of ORNL, the world-class manufacturing and fabrication capabilities of the Y-12 Plant, the environmental and waste management research activities, and capabilities of the Advanced Technologies organization. Each of the 19 Oak Ridge centers focuses on a specific basic technology, organized through a matrix structure into four wide-ranging core technology areas.



*DOE Oak Ridge, TN, manufacturing and fabrication facility known as the Y-12 Plant.*
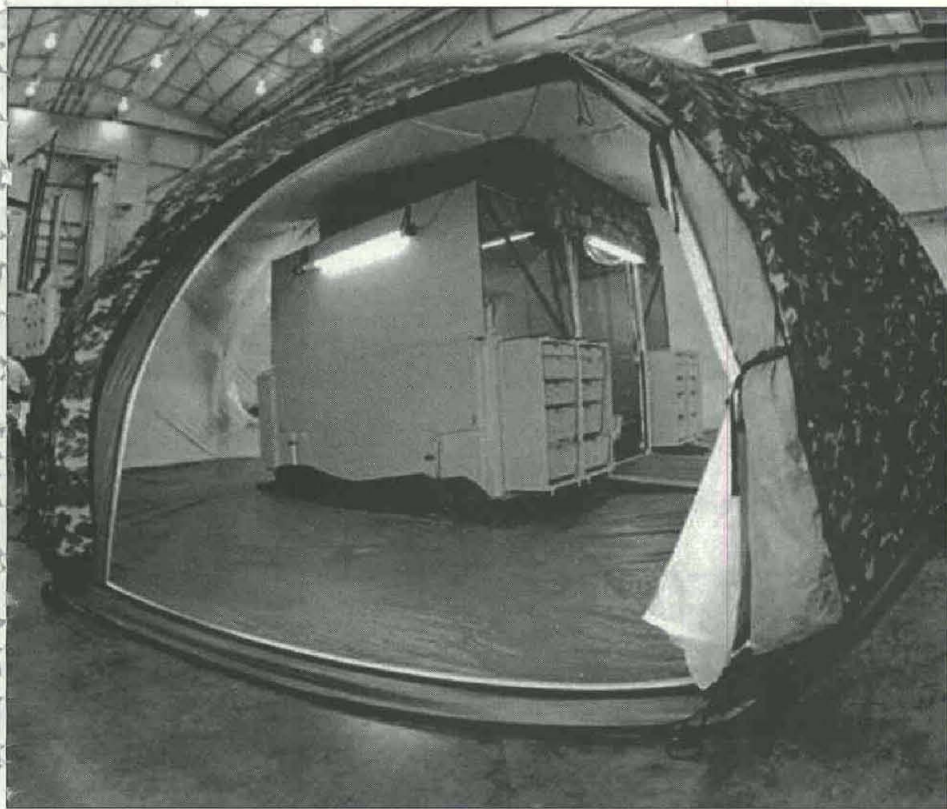
*Advanced Surgical Suite for Trauma Casualties.*

## The National Prototype Center

Congressional confidence in Oak Ridge is evident from the 1998 Defense Authorization Bill, which designates the Oak Ridge Y-12 Plant as the National Prototype Center. This designation establishes a single site where government and industry can find all the capabilities, skills and resources for turning innovative ideas into useable and affordable manufactured products. The combination of high-tech manufacturing facilities and broad experience in materials and process development at the Oak Ridge complex is unique for both industry and the Department of Defense (DOD). The Oak Ridge complex also has the value-added ability to draw expertise from all facilities, combine it, and use it to address difficult technical and manufacturing challenges.

## Prior Accomplishments

The capabilities of the complex have resulted in a significant number of "win-win" situations for the DOD, DOE and other organizations in the last few years. Oak Ridge has delivered technology applications cheaper and faster than could have been delivered by industry; concurrently, DOE's national security mission has been enhanced by the development and application of advanced technologies. For example, the Navy enlisted the Oak Ridge complex to build a full-scale prototype propulsor for the new Seawolf submarine, a project employing advanced materials and technologies to achieve extremely close tolerances. The scope of the project involved integrating design and simulation, advanced numerically controlled programming, complex machining and fabrication, special welding processes, and advanced inspection techniques. The Navy described the successful completion of the project, which was done ahead of schedule and within budget, as instrumental in commissioning the first submarine of this class in 1997.

Oak Ridge's value to DOD is demonstrated in another prototype development effort known as the Advanced Surgical Suite for Trauma Casualties (ASSTC). This system provides immediate care to wounded troops who could not survive the trip to a military hospital without resuscitative surgery in close proximity to the battlefield. Oak Ridge was selected to build the prototype because of its concurrent engineering expertise combined with knowledge of novel materials, composites, ultralight materials, and rapid prototyping capability. ASSTC was developed 10 months after initial presentation of the concept, and is currently being assessed for use by other DOD organizations.

When commercial sources estimated it would take 3 years to develop a police command and control system for the 1996 Olympic Games in Atlanta, GA, Oak Ridge was enlisted to develop the system just 13 months prior to the start of the Games. Using a rapid application development process that stressed incremental prototyping, Oak Ridge successfully developed the system on time and within budget. The system was described in the report to the president on preparations for the Games as "pioneering technology."

Major Defense contractors can also make use of Oak Ridge's capabilities. For example, General Dynamics Land Systems, the prime contractor for the Advanced Amphibious Assault Vehicle demonstration and validation effort, is using Oak Ridge as a major subcontractor to build three prototype hulls. Integrated product teamwork, advanced welding technology, and machining and inspection capabilities were factors stated in the selection of Oak Ridge for the effort.

## What Does The Future Hold?

The Army After Next (AAN) demands a "lighter" Army, the development of effective alternative fuels and power sources, and vastly improved logistical processes, to name just a few needs for the 21st century. The Oak Ridge complex can contribute to meeting some of the demanding challenges faced in acquiring appropriate technologies for Army XXI and the AAN. The next section of this article contains just a glimpse of some key areas in which Oak Ridge can participate to provide solutions for future Army requirements.

*Microsensors.* Recent developments in micro cantilever-based technology promise reliable, low-cost sensors with the potential to provide lifesaving solutions in the detection of chemical and biological agents. Basically, the technology coats economically manufactured silicon cantilever arrays with

substances known to react in the presence of other chemicals. Efforts are underway to enhance the functioning of the sensors by equipping the same cantilever chip with transmitters, and to reduce the manufacturing cost of the chips.

*Data Fusion.* Data fusion capabilities of the complex can benefit the Army in land-mine detection. Data from such diverse sensors as conventional metal detectors, infrared cameras, ground-penetrating radar, and chemical detectors are combined automatically to improve the capability to reliably identify buried land mines. On a larger scale, Oak Ridge's data fusion technology can be instrumental in assisting future field commanders to quickly sort and interpret the overwhelming amount of electronic intelligence on the future battlefield.

*Integrated Prognostics and Diagnostics.* Advances in predictive maintenance, condition-based monitoring, and machine health monitoring can enable major reductions in future Army logistics burdens. This is possible through two focus areas. The first is manufacturing and testing of high-quality optics, innovative sensors, enhanced signal processing and the associated requirements for system integration. The second is development of new materials such as silicone rubber optical fiber for potential military applications.

*Composites and Advanced Materials.* Significant improvements in the economy and durability of lightweight materials, including metal-, ceramic-, carbon-, and polymer-matrix composites, are expected. The advances will reduce the weight and increase the performance of structural, engine, and weapon components. The reduced weight and increased durability of the advanced materials can extend the life of components in systems as well as contribute to significantly lighter vehicles and more fuel-efficient engines, thus providing the opportunity to decrease both total life-cycle costs of weapon systems and the Army's logistics burden.

*Alternative Power Sources.* Potential applications for thin-film microbatteries as primary integrated power sources for electronic devices are numerous. Microbatteries can be fabricated directly onto a semiconductor chip or onto any portion of the chip carrier, meeting the requirements of any particular applica-

> *The Army After Next demands a "lighter" Army, the development of effective alternative fuels and power sources, and vastly improved logistical processes, to name just a few needs for the 21st century.*

tion and considerably reducing the logistics burden. Another technology, considering radioisotopes as a long-life power source for low-power electrical devices, has the potential to dramatically change the field of micropower units. Molecular hydrogen electrochemical fuel cells demonstrating highly efficient fuel consumption without the constraints experienced by batteries, show promise for future military applications. They include quiet engines and situations where a reliable, long-lasting energy source is required.

*Advanced Propulsion Technology.* Oak Ridge is involved in technology development, characterization, integration and evaluation of new technologies for internal combustion engines and power trains, including research in alternative fuels, new engine materials, diagnostics and controls. It is currently participating in the development of a fuel-flexible, energy-efficient, near-zero emissions, heavy-duty diesel engine technology. All propulsion research is supported by a significant infrastructure of laboratory equipment.

## How The Work Is Accomplished

DOE uses several negotiable contract mechanisms to work with industry and government agencies to meet the nation's technology requirements. Regulations require that work be consistent with the mission and special expertise of the DOE Oak Ridge facilities, not affect the achievement of DOE work requirements, and not directly compete with the domestic U.S. private sector. Provisions are also in place to handle intellectual property issues and propri-

etary data. Some means for achieving the required efforts are as follows:

• "Work for Others" Program, where DOE charges minimum administrative costs on a full recovery cost basis either through a contract mechanism or an interagency agreement;

• Cooperative Research and Development Agreement, an agreement with a nonfederal partner to jointly pursue a common project that promises to yield benefits to DOE and the industrial partner;

• Small Business Initiatives, which provide assistance to U.S. companies of fewer than 500 employees through various program elements; and

• Other mechanisms such as use of Oak Ridge facilities and licensing of appropriate technologies are available.

Information regarding any Oak Ridge process or procedure can be obtained by calling 1-800-356-4USA.

## Conclusion

The limited length of this article precludes discussion of a multitude of additional potential Oak Ridge technology developments. Robotics, advanced displays, signature reduction, future training scenarios and improved armor are just some additional technologies for which Oak Ridge offers significant expertise. Oak Ridge is a multibillion-dollar infrastructure comprised of a pool of extremely knowledgeable and talented scientists. It will continue to provide significant support to the Army for solutions to critical technology issues.

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# COCKPIT DISPLAY SYSTEM

## Dr. Scott Harris

## Introduction

The Aviation Technical Test Center (ATTC), Fort Rucker, AL, is one of several test centers assigned to the U.S. Army Test and Evaluation Command. ATTC's mission is to plan, conduct, analyze, and report on airworthiness qualification and developmental tests of aircraft, aviation systems, and related equipment throughout the entire acquisition life cycle. One of the ways that this mission is being accomplished is by developing new, state-of-the-art, flight test instrumentation. This article describes one of these developments, a new Cockpit Display System for presenting instrumentation data while in flight.

## Overview

For a flight test engineer, cockpit instrumentation data displays can be vital to the testing process. The ability to monitor key aircraft parameters while in flight can be essential to proper flight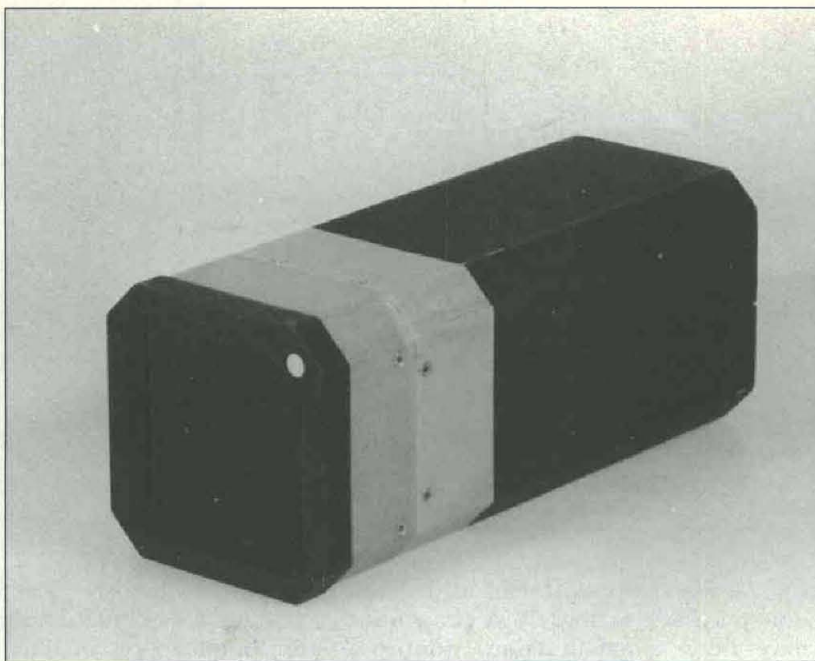 testing. Until now, helicopter cockpit displays used for instrumentation purposes in flight test programs have been single-function, nonprogrammable readouts and analog gauges. Also, because very little space has been available in the cockpit for displays, and each parameter requires its own display, the test engineer had a limited number of data parameters that could be displayed during a particular test flight. If a new parameter was required during a test, it meant costly downtime to install a new display. In addition, calibration between raw data parameters and displays had to be performed periodically, requiring additional manpower and costs.

ATTC has developed a new, general-purpose electronic Cockpit Display System that gives the test engineer maximum flexibility to select data parameters such as environmental data, engine performance data, specialized vibration data, and aircraft attitude and position, for display during flight. The system also allows the user to create fully programmable, customized digital displays for optimal presentation of the data during a test flight, and to change the display parameters from one flight to another without having to modify the aircraft.

Data to drive the displays are input to the Cockpit Display System via an Inter-Range Instrumentation Group 106 standard Class I time-division-multiplex serial pulse code modulation (PCM) data stream. The user must have a data acquisition system onboard the aircraft to supply this PCM stream. Any data word from this PCM stream can be displayed by the Cockpit Display System, with programmable update rates of less than 1 update per second, 1 to 10 updates per second, or 10 to 20 updates per second. The data words can be scaled in real time, and checked for maximum and minimum values. The data may also be filtered, which is useful in eliminating the vibration-

*The new Cockpit Display System will give the test engineer a unique capability for in-flight data display, and will enhance ATTC's reputation as a world-class, fixed- and rotary-wing aircraft testing facility.*

*Multifunction display.*

## System Configuration

The Cockpit Display System consists of several different components: a display processor unit, one or more multifunction displays, and one or more banks of multifunction pushbuttons.

The display processor unit consists of three electronic printed circuit cards: a single-board computer, a PCM data acquisition board, and a display interface board.

The PCM data acquisition board removes data from the PCM stream and outputs it to the single-board computer where the data are manipulated under program control. The data are then sent to the multifunction displays via the display interface board, along with the particular display-type information. Data transmission between the display processor unit and the multifunction displays is accomplished through the ARINC 429 asynchronous serial protocol, which is an industry standard for transmission of data between avionic systems elements. Up to 16 multifunction displays can be connected to the display processor unit at one time.

The multifunction display is a matrix flat panel indicator in a 3-inch standard aircraft instrumentation package. A multifunction display can store up to five "instruments" and switch among them on command. The multifunction display can be configured to simulate one or more of eight instruments

induced harmonic frequencies of the helicopter main rotor blades that might be contained in the data.

(single-handed round dial, two-handed round dial, vertical strip, horizontal strip, digital graphic, XY plot, bipolar XY plot, and intersecting lines) with a maximum 20-hertz update rate. A typical installation might have four or five multifunction displays for the pilot, and two or three for the engineer. The multifunction display can also be made compatible for use with night vision goggles.

As previously mentioned, the multifunction display can switch from one set of display type and/or parameter to another set on command. This feature allows the pilot/flight engineer the ability to see one set of instrumentation data during one part of a flight and another set during another part. For example, during part of the flight, a multifunction display might be required to show airspeed, rotor speed, and engine speed. During another part of the same flight, the same multifunction display might show altitude, vertical acceleration, and engine speed.

The multifunction pushbuttons are used for auxiliary alphanumeric data display and to signal an action to the display processor unit. Each multifunction pushbutton contains a light-emitting diode dot matrix display that can be organized as two lines of six characters or one line of three large characters. Display luminance control and blinking modes are available, and they can also be made compatible for use with night vision goggles. Communication with the display processor unit is accomplished

via an RS-422 serial data channel, and up to 12 multifunction pushbuttons can be connected at one time.

Programming the multifunction displays and the multifunction pushbuttons is done using a ground version of the display processor unit. The various display and parameter types for a particular flight program are developed by instrumentation engineers on the ground, and transferred to the airborne unit using a personal computer flash memory card.

## Current Status

Prototypes of the display processor unit have been built and tested at ATTC. Personnel in the Data Systems Directorate at Fort Rucker are in the process of working with the Air Force Flight Test Center at Edwards Air Force Base, CA, to fabricate a ruggedized chassis to house the display processor unit.

The multifunction displays and the programmable multifunction pushbuttons are available as off-the-shelf items. At the time this article was written, the Cockpit Display System was scheduled for fielding in late 1998.

## Conclusion

ATTC has once again led the way in the development of state-of-the-art instrumentation for helicopter flight testing. The new Cockpit Display System will give the test engineer a unique capability for in-flight data display, and will enhance ATTC's reputation as a world-class, fixed- and rotary-wing aircraft testing facility.

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# A COAT OF PAINT DOES MORE THAN LOOK GOOD

## David A. Davison

The Coatings Research Team at the Army Research Laboratory's (ARL) Weapons and Materials Research Directorate, Adelphi, MD, can tell you that there is a lot more to a coat of paint than meets the eye.

The benefits of painting Army equipment to camouflage it and to slow corrosion are obvious. What may be less obvious is that paint is one of the Army's first lines of defense against chemical warfare, according to Jeffrey L. Duncan, a Materials Engineer. Duncan and two of his colleagues, Kes Chesonis and John A. Escarsega, both Research Chemists, make up the Coatings Research Team, the only such group in the Army. They are responsible for developing the paint that goes on all Army equipment and ammunition. These three men are also responsible for validating that every batch of paint used on Army equipment meets environmental requirements and Chemical Agent Resistant Coating Program standards.

"The idea is if equipment goes into an area where it is exposed to chemical warfare agents, the paint does not absorb these agents. If they [chemical warfare agents] do get into the paint, it makes decontamination very difficult and prolongs the troops' exposure to the agents. If the agents don't penetrate the paint, they can be taken off and neutralized," Duncan says.

Duncan describes the protective coatings as a "system" consisting of a high-quality epoxy primer covered by a high-quality polyurethane paint that does not permit chemical agents to penetrate. "It's the system together that gives the protection that is needed from the chemical warfare threat and also provides exceptional durability," Duncan says. He adds that coatings last from 5 to 7 years, but Army equipment is often refinished unnecessarily for aesthetic reasons because the very flat gloss required by the Army becomes marred.

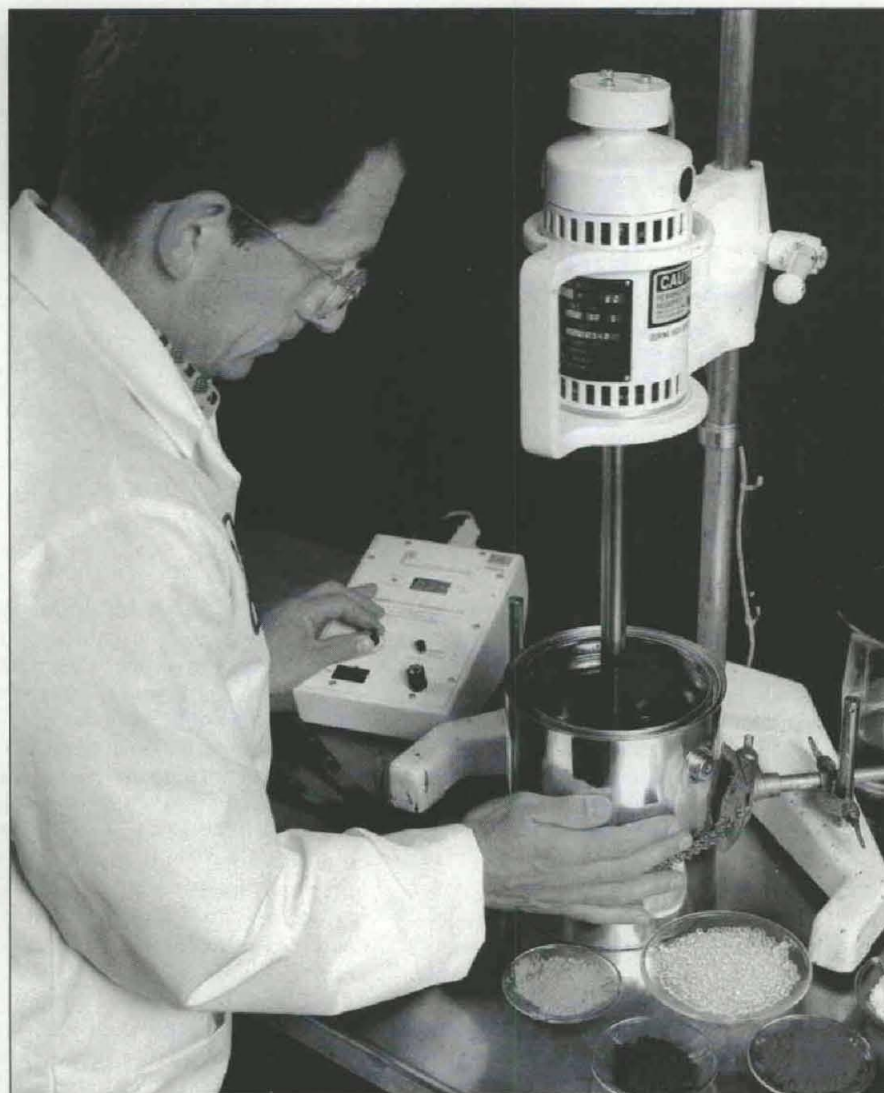Chesonis points out that although the team works with manufacturers and suppliers in the paint industry, what they do is unique. "Industry has no need for chemical agent resistance, so it's not something you can go to the private sector to get," he says.

Environmental considerations is an area in which the team does collaborate with industry and the other military Services. "We all deal with the same environmental regulations, and changing environmental regulations is the major reason that we have made changes in the coatings over the years," Duncan points out.

This has included removing heavy metals from primer coatings, reducing the amount of solvent in the paint, and reducing hazardous air pollutants because of more stringent clean air regulations. "Most of what we have done in the last 15 to 20 years has involved keeping the performance of the paint that the Army needs while ensuring that it complies with both current and future environmental regulations," Duncan says.

> "The Army has to have paint. What we've done for the last several years is make it safer to apply, less hazardous to the environment, and better performing."
>
> —Jeffrey L. Duncan
> Materials Engineer
> Coatings Research Team
> Army Research Lab

*John A. Escarsega, a Research Chemist, mixes pigments and other materials that provide color, flexibility and durability.*

the road for environmental compliance, we felt we could continue making small steps with solvents, but we would forever just be meeting requirements and not really advancing the technology. So we pursued water-reducible urethane technology and were able to meet the need for chemical agent resistance and improve performance," he says.

In addition, they substituted polymer beads for silicon materials in the pigment package and further enhanced the coating for mar and weather resistance, and flexibility (resistance to cracking).

"We are really excited," Escarsega notes. "The bottom line is we have developed an environmentally compliant material that has dramatically enhanced performance."

In the past, the team also had to develop a higher performance coating for painting ammunition. The Army paints its larger rounds of ammunition for color coding and corrosion protection during long periods of indoor or outdoor storage. The problem was that the protective coating had to be only 1- to 1½-mils thick (a mil is 1,000th of an inch) since the round must fit inside the gun chamber; therefore, a primer coat could not be used. The coating developed needed to provide the corrosion protection, not fade when stored outdoors, and be inexpensive. "It was a tough nut to crack, but over the years we have developed coatings that do the job," Duncan says.

Since the team members basically have control over Army coatings from development to application, they are in an excellent position to find and solve problems quickly. "We have to service what we sell, so if there are any problems we find out pretty quickly," Chesonis says.

The coatings team has been in existence for a long time. For example, Duncan is the senior team member with 27 years of experience. They take a no-nonsense, matter-of-fact approach to their mission.

As Duncan sums up, "The Army has to have paint. What we've done for the last several years is make it safer to apply, less hazardous to the environment, and better performing."

All three agree that interaction with industry is vital. "We are in a very good position in that we work with the raw material suppliers and provide insight to the paint vendors. The vendors, in turn, give us feedback helping to determine which technology is feasible and what it will cost us in time and dollars," Escarsega says.

"We leverage private industry to maximize the small number of us you see here. We make sure the Army is up to speed with the latest technology," Chesonis points out. He adds that the team also leverages the diverse capabilities available in the Weapons and Materials Research Directorate. "Working in a polymer group will help us find out more about how our paints perform because of the capabilities and expertise we have here," he says.

The team recently patented a new advance in coating technology that permits the substitution of water for about half the hydrocarbon chemicals normally used as solvent. Hydrocarbons react with sunlight when released into the atmosphere to form ozone, a pollutant. Substituting water cuts in half the volatile organic content of the coating, making it better for the environment while providing an improved finish. It is currently undergoing field tests, and the team believes it will change the lifecycle process for coatings since it will last longer and not mar easily.

Escarsega explains that the solvent in paint provides proper package viscosity to keep the pigments from settling and provides the flow and spray qualities desired when it is applied. "When we were looking at what was coming down

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# INTEGRATION OF THE ARMY NATIONAL GUARD AND ARMY RESERVE INTO THE ARMY ACQUISITION CORPS: THE NEXT STEP

> *"Change alone is unchanging."*
> — **Heraclitus**

## COL Michael A. Gorman

## Introduction

The transition to Army XXI and then to "Army After Next" poses significant challenges for the Army. These challenges must be overcome in an environment replete with many diverse opinions concerning the role and composition of the Army. Serious discussions may occur as each of the components vie for a niche in the final equation.

True unity comes only with a vastly improved relationship among the components and with an interdependence that results from teamwork. Today, the wisdom of exploiting the total force concept goes beyond the conditions that created it. The Active and Reserve components of the Army are literally fighting for survival in the fiscal battles in Washington. It makes sense, therefore, to pool the political influence of each component as the Army attempts to obtain resources more closely aligned with its workload. It also makes sense to capitalize on the wide array of talent in the Army.

Acquisition is one area in which Army components can achieve the intent of the total force. This article reviews the current initiatives to integrate the U.S. Army National Guard (USARNG) and U.S. Army Reserve (USAR) into the Army Acquisition Workforce. It is only by continuing the effort to increase integration that the Army can leverage capabilities to improve military preparedness and provide a seamless total force.

In October 1996, then Director of the Army Acquisition Corps, LTG Ronald V. Hite, established a Process Action Team (PAT) to review and provide recommendations for the establishment, integration, training, management and use of Reserve component Acquisition Workforce members. Additionally, the PAT was tasked to ensure that the Reserve components met the certification, training and experience requirements of the Defense Acquisition Workforce Improvement Act. The PAT included representatives from all affected organizations.

## Initiatives

Since the inception of the integration effort, many positive steps have been taken. The management and identification of the Reserve component Acquisition Workforce have been greatly improved. Reserve component officers will soon be assigned as program or product managers (PMs) in acquisition program management positions. In addition, a detailed study of contingency contracting is underway.

## Management

An acquisition-qualified USAR major general has been appointed as the Assistant Military Deputy to the Assistant Secretary of the Army for Research, Development and Acquisition.

An Acquisition Functional Area Personnel Management Officer has been appointed at the Army Reserve Personnel Center. This officer is responsible for overseeing USAR acquisition personnel assignments.

A senior USARNG officer (O-5) was recently assigned to the Acquisition Career Management Office (ACMO) to serve as the USARNG Proponency Officer. This officer works for the Director of the ACMO, and is responsible

> *Successful teams acknowledge the existence of ingrained individualism but persist with team accountability to strengthen interdependence.*

for liaison with the USARNG and for providing input for policy formulation affecting the USARNG. In addition, in concert with USARNG Personnel Directorate, this officer provides acquisition personnel oversight, which includes accession and career management responsibilities.

Within the National Guard Bureau, the Principle Assistant Responsible for Contracting is responsible for oversight and administration of USARNG contracting functions and is the alter ego of the Head of the Contracting Activity for all delegated responsibilities described in the Army Federal Acquisition Regulation Supplement. This individual is a member of the National Guard Bureau Joint Staff and is responsible for both Army and Air National Guard contracting programs.

## Identification

The Reserve Acquisition Position List Board for FY99 was held the week of March 16, 1998. The board, comprised of Active and Reserve members, reviewed 171 USAR and 64 USARNG positions. The results of the board were published in the July-August 1998 issue of *Army RD&A* magazine.

## Acquisition Program Management

In FY99, four PM positions will be filled by Reserve component officers. This is a huge step forward! Keith Charles, Deputy Director, Acquisition Career Management, has made a commitment to the Reserve component to continue to allow competition for these key leadership positions. More and more PM positions will be designated for fill by the best qualified individual in the AAC. This includes the Army,

Reserve, and civilian components.

## Contingency Contracting

There is no doubt the Army needs assistance in the area of contingency contracting. Presently, an integrated product team has been chartered to draft doctrine, review personnel requirements, and recommend organizational structure for contingency contracting operations. The team will investigate the potential use of Reserve component acquisition personnel for contingency contracting operations. The USAR and the USARNG are both represented on the team, which began conducting meetings in April 1998.

## Trust And Teamwork

These initiatives all provide opportunities for teamwork. As stated before, true unity comes only with a vastly improved relationship among the components and with an interdependence that results from teamwork.

To perform as a team, the components must improve the level of trust between them. Depending on each other to achieve a common goal is unlikely without an extreme effort. The natural tendency seems to support independent, rather than interdependent actions. By working together and becoming familiar with the unique cultures possessed by each partner, the components can build trust.

Team research by Jon R. Katzenbach and Douglas K. Smith *(The Wisdom of Teams: Creating the High-Performance Organization)* emphasizes the need for "significant performance challenges" to energize teams. A sense of mission or an overarching purpose, along with some sense of urgency seem to be the main ingredients for most successful

teams. The Army should take advantage of the present opportunities to excel with acquisition efforts and survive declining budgets to provide that "significant performance challenge."

Mutual accountability is another condition necessary for successful team formation. Commitment and trust are underlying requirements to facilitate mutual accountability. Successful teams acknowledge the existence of ingrained individualism but persist with team accountability to strengthen interdependence. Because all components of the Army depend on each other, mutual accountability is a condition that must be improved. Integration of Active and Reserve component acquisition forces will strengthen mutual accountability.

## Conclusion

The Army acquisition community and the Reserve components can lead the way toward a more seamless total force by pushing forward with integration efforts. The rewards to each component are significant. The Reserve component can take advantage of tremendous opportunities to become more relevant and gain more control over Reserve component equipment acquisition programs. Within the Active component, there are required military acquisition positions, only a certain percentage of which will be filled. One way to address the resultant shortfall is using qualified Reserve component personnel who are certified as acquisition professionals.

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# REENGINEERING FIELD MAINTENANCE TROUBLESHOOTING PROCEDURES

## Introduction

Currently, field maintenance of Department of Defense (DOD) weapon systems relies heavily on troubleshooting procedures (TPs) published in paper technical manuals. These TPs, however, are in a "flow chart" format of fault trees and are static; that is, they are highly structured around a predetermined sequence of tests and they do not grow "smarter" over time with the use of maintenance historical data. Moreover, the TPs are sometimes incomplete and/or inaccurate in performing diagnostics; they are cumbersome; and they are poorly integrated with embedded test and automated test procedures. These factors result in a significant maintenance burden for DOD.

Because of DOD's shrinking budget and government downsizing, reengineering TPs to reduce this maintenance burden is a must. In 1995, the Advanced Technology Office (ATO), U.S. Army Test, Measurement, Diagnostic Equipment Activity (USATA), U.S. Army Aviation and Missile Command, Redstone Arsenal, AL, initiated a research and development effort to reengineer TPs. In December 1996, ATO teamed with the Logistics Support Engineering Directorate, the Armaments Research, Development and Engineering Center, and the Giordano Automation Corp. (GAC) to investigate and develop an enhancement methodology for reengineering TPs contained in technical manuals.

## Shortcomings

TPs in technical manuals have the following shortcomings that reduce their effectiveness and result in a significant maintenance burden:

• Most troubleshooting logic is represented in the flow chart format of a fault tree. The result of one test leads to execution of the next test, and that result leads again to the next test. The sequence of tests is predetermined and inflexible.

• Fault trees are developed as part of the technical manual development process

## Dr. Li Pi Su

and are based on a specified set of fault conditions. They are static, do not adapt to new or unplanned fault modes, and do not improve over time based on field experience.

• Fault trees' static logic is limited to a "single fault assumption," and in multiple fault situations, can become very unreliable. This results in incomplete and/or inaccurate diagnoses.

• The TPs and technical manuals are often very cumbersome and poorly integrated with embedded test and automated test procedures. This results in ineffective maintenance or no maintenance solution.

## Enhancement Goals

The goal of the research and development effort was to resolve the four issues listed above to significantly improve the TPs and technical manuals, thus reducing total maintenance costs.

During 1992-93, the ATO-USATA initiated a new paradigm of model-based diagnostics reasoning concept and technology, DARTS (Diagnostic Analysis and Repair Tool Set), co-developed with GAC. By 1994, DARTS was significantly enhanced and renamed the Diagnostician. This diagnostics software can eliminate complex diagnostic logic paths and receive and dynamically interpret any test results from any source, in any order, and with any number of test results.

Diagnostician's overall object-oriented structure and open architecture concept enables the independent diagnostic logic contained in the software object to be rehosted to any platform without difficulty. A highly robust Interactive Electronic Technical Manual (IETM) authoring and display package integrates the diagnostics logic, the test procedures and routines,

technical manual information, and other required maintenance information to provide an interactive interface between users, systems, test resources, maintenance functions, and a full complement of dialogs. In addition, this IETM authoring and display package complies with the Continuous Acquisition Life-cycle Support (CALS) standard.

## Reengineering Process

Diagnostician's diagnostics knowledge bases (DKB) are derived from the system's design information. For legacy systems, the paper technical manuals and their TPs are the primary source of information that pertains to diagnostics. To cost effectively reengineer the TPs into dynamic knowledge bases for use with Diagnostician, the following three steps are taken: capture diagnostics logic from paper technical manuals; reengineer test ordering constraints and information; and seamlessly integrate field experience data into model-based diagnostics. A brief summary of each step follows:

*1. Capture diagnostics logic from paper technical manuals.* Most paper technical manuals do not have the Electronic Design Interchange Format (EDIF) "netlist" data. Four alternatives were developed to capture diagnostic data from technical manuals. Any step or combination of steps can be used to cost effectively capture the diagnostic data.

• *Capture Standard Generalized Markup Language (SGML)-tagged data.* Automated software routines were written to extract diagnostic logic from SGML-tagged data. The Army's 2361 Document Type Definition (DTD) was analyzed with respect to data content of troubleshooting logic. A standard format was developed that allows conversion tools to be tailored for use with other DTDs while retaining the same basic content.

• *Capture information from paper-based troubleshooting trees.* A reengineering methodology and supporting tools were developed to analyze the fault

tree structure representation of TPs and represent that tree structure in a knowledge base format. The methodology includes generating the diagnostic model, defining each test procedure, and incorporating the test path to each fault using the tools inside the Diagnostician's diagnostic profiler.

• *Capture information from "expert" technicians.* A diagnostic model can be created from captured expert technicians' information by directly authoring the fault conditions and correlating the test results or symptoms to those fault conditions, thus defining how tests "cover" faults.

• *Capture information from schematic data.* If detailed schematic data and/or information on test coverage are available, use a schematic capture program to enter schematics and output EDIF netlist files. These files can be directly imported to the diagnostic profiler.

**2. Reengineer test ordering constraints and information.** Additional test ordering services were added to Diagnostician to make it truly serviceable for reengineering legacy TPs contained in technical manuals. A set of conditions and associated constraints or actions was developed to generate tests dynamically.

**3. Seamlessly integrate field experience data into model-based diagnostics.** After the legacy TPs are reengineered into model-based diagnostic logic, inferences can be structured in an object-oriented, database-type software architecture, and the underlying data can be easily improved and updated. There are many useful data sources and situations that can improve diagnoses, such as data on the frequency of parts failures, failure modes, new or unforeseen or unmodeled failure modes, new or unforeseen or unprofiled test data, and mismatches in DKBs based on incorrect design data modeling and/or test coverage input.

Data can be collected locally and automatically incorporated into the diagnostic reasoning process for current and/or local diagnostic sessions. The collected data would be processed and coordinated by a central facility. This field data would be analyzed with automated tools and the system DKB would be updated accordingly. The updated information would then be redistributed to each active site.

## Diagnostics-Driven IETM Integration

After studying four IETM authoring systems, we chose Raytheon's (formerly Hughes) Advanced Integrated Maintenance Support System (AIMSS) IETM authoring and display package to develop diagnostics-driven IETMs. The AIMSS, a truly interactive authoring system, supports a full complement of dialogs and processes that can be embedded in interactive procedures.

In the Windows environment, the Diagnostician inference engine is a Dynamic Link Library (DLL). It is structured as a library of functions that provides diagnostic services to a client program. Using the IETM authoring tool, the Diagnostician's DLL functions were integrated through the Process Editor "Class V" process (full hierarchical database structures with an "intelligent" diagnostic system). The Class V process acts as a "gateway" to all Diagnostician services. The Diagnostician contains about 40 DLL functions.

With these basic functions, no matter how large the system or how complex the diagnostic logic, a single "WHILE loop" is all that is needed to incorporate the diagnostic processing with the Diagnostician.

## Benefits

The benefits of reengineering TPs are as follows:

• *Troubleshooting procedures are replaced by a dynamic and more robust diagnostics capability.* Diagnostician provides dynamic diagnostic reasoning instead of static troubleshooting trees. During a maintenance session, the test results can be input to Diagnostician in any order and from any source individually or in combination. Any number of test results can be input at any one time. Diagnostician identifies the causes of faults and never leaves the technician hanging in the middle of a tree! Diagnostician identifies multiple faults, only requests tests that have diagnostic significance based on a "snapshot" of current fault possibilities, and will decrease overall repair time and increase diagnostics accuracy.

• *Diagnostic procedures can be continuously improved using historical maintenance data.* Data logging of maintenance history was defined for continuous system diagnostic learning. Diagnostician creates a log of session profiles. This log is used by the "run-time smartener" (RTS) utility to mature diagnostic capability over time. The RTS performs statistical analysis on session history data to identify trends and actual field failure rate data.

• *Built-in-test (BIT) data are used for maintenance.* Most BIT data are designed to support operations. BIT data focus on fault detection at the functional level as opposed to diagnostics at the replaceable item level. Diagnostician can interpret any BIT data and correlate BIT results to a component- or item-oriented model of the system. Diagnostician extends BIT data into a maintenance mode to enhance field diagnostics and maintenance.

• *Paper technical manuals can be replaced by Class V diagnostics-driven IETMs.* A much more user friendly IETM capability was developed, providing the ability to store expert technician diagnostics information in a form that novice technicians can use.

Two additional benefits are recognized by IETM developers:

• *IETM authoring of diagnostics is greatly simplified.* The author simply creates one WHILE loop to manage the dialog with Diagnostician instead of the complex "IF THEN...GOTO" logic associated with structured diagnostic trees.

• *SGML tagging of troubleshooting logic can be eliminated.* SGML tagging for diagnostics is very complex and requires extensive content tagging. This can be eliminated by creating the DKB from design data or from an engineering analysis of the troubleshooting trees directly.

## Conclusion

ATO successfully created a methodology for reengineering TPs into dynamic model-based diagnostics. The new paradigm for diagnostics, the Diagnostician, and the AIMSS IETM authoring and display package worked very efficiently together to accomplish the reengineering task. The TPs from the technical manual for the Army's Fox nuclear-biological-chemical (NBC) reconnaissance vehicle were used as a testbed. A diagnostics-driven IETM was successfully completed for the Fox. The maintenance school is using it as a training tool. This methodology to reengineer TPs in technical manuals is generic and can be reused by both DOD and commercial industry for other legacy systems.

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# FIRE SUPPORT FOR THE ARMY AFTER NEXT: WILL THE EARLY ENTRY FORCES HAVE ENOUGH?

## COL Theodore J. Janosko

The Army has many difficult decisions ahead in determining the force structure for the Army After Next. Army forces must have seamless fire support coverage of the entire battlespace, that is, continuous coverage from close combat to the maximum range of our systems. What are the appropriate fire support systems for the Army After Next? What types of fire support will each Service provide and from what platforms? Will the early entry forces have enough fire support?

### Background

In February 1996, Chief of Staff of the Army GEN Dennis J. Reimer established the Army After Next Program to provide a long-range view of the Army's future and to encourage leaders to think "outside the box." The Army After Next must employ smaller, lighter forces with increased lethality; increased speed of deployment; and successful application of information technology. The Army of 2025 must be extraordinarily capable and adaptable at the lower end of the conflict spectrum as well as in a major theater war.

The focus of fire support for the Army After Next will be on effects rather than platforms and will emphasize precision rather than mass. The proliferation of precise, cost-effective guidance systems in warheads and smart munitions will ensure that fire support assets hit where they are aimed. Advances in precision fire will enhance the military's ability to engage specific targets and limit collateral damage even in an urban environment. Nonlethal fire support will play a bigger role in the Army After Next as the need to neutralize enemy sensors, optics, and communications becomes increasingly important. Many suggest that fire support will be different as the shock action and devastation of massed artillery will be replaced with large numbers of individual vehicles being destroyed simultaneously at long ranges.

### Field Artillery Systems

The Army and the Field Artillery Center at Fort Sill, OK, have improved old and fielded new fire support systems during the past 30 years. A few of the success stories are the Multiple Launch Rocket System (MLRS), the upgraded M109 Self-Propelled Howitzer (Paladin), the Army Tactical Missile System (ATACMS), and the work on both the High Mobility Artillery Rocket System (HIMARS) and the Crusader. The current towed howitzer systems will be replaced by upgraded systems such as the Lightweight 155 (LTWT 155) and the Future Direct Support Weapon (FDSW), with increased range and onboard computers. The Field Artillery Center is also improving the accuracy, range, and capabilities of ammunition. Improved munitions and platforms will permit the Crusader to range 50 kilometers, the MLRS more than 60 kilometers, and the ATACMS to 499 kilometers. Smart munitions such as Sense and Destroy Armor (SADARM) and BAT (Brilliant Antitank) will seek out and destroy enemy targets. The Field Artillery Center has a modernization plan to keep these legacy systems viable through the year 2025 with platform and ammunition improvements. The question remains will these legacy systems be adequate for the Army After Next, and can the Army afford the new systems?

### Advanced Systems

There are several advanced systems that will give the maneuver commander additional options to destroy enemy targets. The Advanced Fire Support System is a stand-alone unmanned rocket system with a range of 50 kilometers. The Enhanced and Advanced Fiber-Optic Guided Missiles (E-FOGM and Advanced FOGM) are additional extended-range man-in-the-loop tank killers. The Line-of-Sight Antitank (LOSAT) employs leap-ahead technology to provide the early entry forces a devastating direct fire antitank weapon.

The emphasis on air mechanization and dispersion will increase the importance of aeronautical attack. Although current plans indicate that the Longbow Apache and Comanche helicopters will still be around in 2025, many recommend that a new aircraft, the Advanced Attack Airframe (AAAF), replace all rotary aircraft. The AAAF is a fixed wing/tilt rotor aircraft capable of vertical takeoff and landing. It will perform both attack and armed reconnaissance aircraft roles.

### Additional Combat Support

The Navy will support the Marines (and other land combat forces) operating in dispersed units far from the sea. The Marine Corps envisions that future operations will require sea-based firepower capable of delivering area, precise, and smart munitions. Although naval gunfire will range 63 nautical miles with extended range munitions, it appears that the Navy will invest in a family of land attack missiles (5-, 10-, and 21-inch) that can be fired from their Vertical Launch System tubes. The largest of these missiles can range 600 kilometers.

The Air Force, which continues to improve the accuracy and lethality of its munitions, will retain many of its present functions, with no potential adversary likely to challenge the United States' dominance of the skies. The Air Force will continue to use precision engagement to destroy or neutralize strategic targets. The Air Force will complement land power by striking deep operational targets and using precise fire support in close. The aircraft of the 2025 timeframe will be the F-16, the Joint Strike Fighter (JSF), and the B-1 and B-2 bombers.

The U.S. Army Space and Missile Defense Command is tailored to support Army efforts in space. Space vehicles and sensors will provide critical targeting information for deep operations. It is expected that loitering munitions and space vehicles capable of providing lethal or nonlethal fire support in terms of directed energy or other ordnance will be available by 2025.

## Testing And Experimentation

The Army is now testing many new systems in a series of Army Warfighting Experiments. The Army of 2010 will be a knowledge-based force. It is expected that the Army After Next Program will provide the future Army with the speed and physical agility to complement the mental agility of Army XXI. Ongoing futuristic war games demonstrate the need for an increased reliance on expeditionary or early entry forces. The diffusion of threats and budgetary constraints will cause the United States to maintain fewer forces, but have them strategically mobile to counter threats in a wide variety of locations. Many experts expect the early entry forces of the Army After Next to comprise about 30 percent of all Army forces. The other 70 percent would be the heavier follow-on forces of the Army XXI variety. It appears that follow-on forces will have adequate fire support with such systems as the Paladin, Crusader, MLRS, and ATACMS. The early entry forces will not have as much organic fire support. It is critical that the early entry forces be able to obtain intelligence information, and to coordinate and direct all means of fire support from land, sea, air, or space. The Army must ensure that the war games have tough realistic scenarios to help determine the adequacy of fire support in the Army After Next.

## Fire Support For Early Entry Forces

Early entry forces, the first to enter the conflict, are the first priority for the Army After Next. These forces, which will be strategically deployed within 120 hours, are the lightest and in the greatest need of fire support. To support this effort, the Army must devote fire support resources to the following four areas, in priority: the Effects Control Center (ECC), the Advanced Fire Support System (AFSS), advanced decisive operations systems, and munitions improvements.

The ECC will be critical to manage and control the various fire support assets of the early entry forces in engaging multiple targets efficiently. The ECC will have visibility over all joint sensors and potential attacks, including space systems, to maximize seamless support to the maneuver commander. Building on joint demonstrations such as the Theater Precision Strike Operation Advanced Concept Technology Demonstration, the ECC should quickly become a reality. The ECC must be accepted by all the Services to benefit the early entry forces and enable the maneuver commander to communicate and direct all means of fire support, from the Army's own systems as well as those in space, in the air, or at sea.

The Advanced Fire Support System shows a lot of promise and should be the second priority. The AFSS will house 24 rockets, each with a range of 50 kilometers. The AFSS will give the maneuver commander great flexibility in tailoring a fire support package. Most early entry force maneuver commanders will want some sort of organic fire support, but they will not sacrifice the strategic airlift to have the heavy MLRS and Crusader systems available. The FDSW, LTWT 155, and HIMARS will give the early entry forces increased range and the ability to shoot a wide range of munitions, but they also require a strategic airlift. The AFSS offers a lightweight (7,000 pounds) mobile fire support system without a manning requirement. In addition, the AFSS can be easily emplaced by air or ground and has the potential to make every transport vehicle a firing platform.

The Army must provide early entry forces with the advanced decisive operations systems to make them lethal. These systems will give the commander the ability to defeat armor and other targets at ranges exceeding 15 kilometers. The most important of these systems are the Enhanced Fiber-Optic Guided Missile (E-FOGM), the Line-of-Sight Antitank (LOSAT), and the improved 120 mm mortar (Precision Guided Mortar Munition). The E-FOGM, with a range of 15 kilometers, allows the commander to defeat enemy armor in an indirect mode. The Advanced FOGM will range 50 kilometers. The LOSAT is a hypervelocity kinetic energy weapon that can overmatch and outrange any known enemy armor. The LOSAT can destroy bunkers and priority hard targets at ranges up to 5 kilometers. The improved mortars will have smart munitions, digital links, and twice the range of the current 120 mm mortar. The commander can choose the most appropriate weapon systems based on the threat.

The Army must maintain emphasis on improving the accuracy, range, and capabilities of ammunition. The improvements in miniaturizing the Global Positioning System and inertial guidance systems virtually guarantee first round fire for effect. The increased range, particularly for the MLRS and ATACMS, will allow the commander to reach out and destroy the enemy at greater distances. The advances in munition capabilities, such as the smart anti-armor munitions SADARM and BAT P3I (pre-planned product improvement), will give the maneuver commander more options for defeating future enemies. Sufficient funding should be devoted to improve non-lethal fires to reduce collateral damage and give the commanders more options, especially given the increased probability of fighting in urban terrain.

## Conclusion

The Army must be prepared to deploy on short notice and be appropriately structured and equipped for a wide range of missions in the future. The early entry forces that enter the conflict must be resourced with accurate, devastating, and responsive fire support systems to protect our soldiers and prosecute our nation's battles.

*COL THEODORE J. JANOSKO is the Commander of the 30th Field Artillery Regiment at Fort Sill, OK. He holds a B.S. in civil engineering from The Ohio State University and an M.S. in operations research and systems analysis from the Naval Postgraduate School. He recently completed an Army War College Fellowship at the University of Texas at Austin.*

# ARMY ACQUISTION WORKSHOP HONORS PMs AND ACQUISITION COMMANDERS OF THE YEAR

Awards recognizing outstanding achievements of the Army's project manager of the year, product manager of the year, and two acquisition commanders of the year were presented this past August at the annual Army Acquisition Workshop in Fort Monmouth, NJ. The awards were presented by Paul J. Hoeper, Assistant Secretary of the Army for Research, Development and Acquisiton (ASARDA), and LTG Paul J. Kern, Military Deputy to the ASARDA, and Director of the Army Acquisition Corps.

## Project Manager Of The Year

COL William D. Knox, PM for the Javelin Project Office, received the FY97 Project Manager of the Year Award.

The Javelin Project Office is responsible for developing, acquiring, fielding, and sustaining the world's first manportable, fire and forget, shoulder-fired, antitank missile system. Knox was specifically cited for managing the Javelin Project Office with focus and foresight in the successful fielding of the Javelin Antitank Missile System to the 82nd Airborne Division. Through superb management, the Javelin System was fielded to the division 8 months ahead of schedule in response to a serious deficiency in that

unit's ability to counter armored threats. Furthermore, the accelerated fielding was completed without additional cost and with improved reliability. Knox also successfully initiated and instituted a preplanned product improvement strategy to maintain the Javelin System as the premier medium antitank system for the Army After Next, including a lethality enhancement program that increases kill probability by 30 percent with no increase in cost or program delay. His implementation of an automated logistics system, JAV-TRAK, provided a real-time database of failures, repairs, repair parts, location of equipment, and other logistic activity that resulted in a savings of $2.8 million in repair parts the first year.

## Product Manager Of The Year

The Product Manager of the Year Award was presented to LTC John D. Mahony, PM for Combat Identification (CID). The Office of the PM-CID provides centralized management of the Army's overall combat identification architecture (ground-ground, airground mission areas) including the design, development, testing, acquisition, and fielding of assigned Army-designated Horizontal Technology Integration (HTI) Programs to maxi-

mize combat effectiveness on the battlefield. The Office of the PM-CID also serves as the U.S. technical advisor and leader to the NATO Combat Identification Working Group and coordinates ongoing interoperability efforts with France, Germany and Great Britain. Some specific highlights of Mahony's achievements include restructuring a group of independent CID programs into an operational architecture that provides the Army a cost-effective system of systems approach to solving the fratricide problem on the battlefield. Mahony also achieved a $103 million reduction in the projected cost of the Battlefield Combat Identification System (BCIS). He was responsible for enhancing the support structure for Task Force XXI to effectively integrate the BCIS on 62 combat platforms. Through effective organization, Mahony led an Integrated Product Team that combined the Land Warrior, MILES (Multiple Integrated Laser Engagement System) training equipment, and dismounted soldier proponents that produced an innovative and affordable HTI solution to like requirements.

Shown above from the left in all three photos are LTG Paul J. Kern, Military Deputy to the ASARDA, and Paul J. Hoeper, ASARDA. In the far left photo, they present the Product Manager of the Year Award to LTC John Mahoney, PM-CID. The center photo shows COL William Knox, PM-JAVELIN, receiving the Project Manager of the Year Award. COL Edward Cerutti is shown in the far right photo receiving the Acquisition Commander of the Year Award for accomplishments as Commander of DCMC Raytheon. A photo of LTC David Miller, also a recipient of a Commander of the Year Award, was not available.

## Acquisition Commanders Of The Year

COL Edward A. Cerutti and LTC David P. Miller each received the Acquisition Commander of the Year Award for FY97. Cerutti and Miller are the first recipients of the award, which recognizes the achievements of acquisition commanders at the O-6 and O-5 levels.

Cerutti was recognized for his accomplishments as the Commander of the Defense Contract Management Command (DCMC), Raytheon. While serving as the Contract Administration Office Commander, Cerutti administered more than 2,700 contracts valued in excess of $41 billion, to include 14 Acquisition Category (ACAT) I and 22 ACAT II/III programs at the Raytheon Systems Company. His assigned contracts included missile systems, radars and electronics for all three Services, other federal agencies, and foreign governments. His cited accomplishments included ensuring maximum practicable competition and overall price reasonableness for the acquisition of systems, supplies, services, end items, and spare parts. Among the many single process successes led by Cerutti were contractor self-oversight, where factory

floor oversight functions were turned over to the contractor for management and monitoring through a set of rigorous metrics; packaging, which allowed for the use of commercial packaging processes; and low volatile organic compounds, which significantly reduce Raytheon's emissions of environmental pollutants. After Raytheon purchased Texas Instruments, and in cooperation with Hughes Corp., Cerutti led a joint contractor/government team that included all 10 DCMC commanders having cognizance over elements of the new Raytheon entity. That team reengineered the DCMC Management Council process. (Cerutti is now Director of the Acquisition Career Management Office in the Office of the Assistant Secretary of the Army for Research, Development and Acquisition.)

Miller was recognized for his accomplishments as the Commander of the Defense Contract Management Command, Phoenix, Boeing Mesa. He is responsible for contract management of critical Department of Defense systems that include Army AH-64D Longbow, AH-64A, Special Operations helicopters, and 25 mm and 30 mm Area Weapon Systems. Miller's office is

also responsible for spare parts production, depot maintenance, contractor logistical support, training devices, technical manuals, and research and development activities. Miller was cited as the first commander at Mesa to establish a lasting continuous forward pricing rate agreement that enabled accelerated contract award and closeout, thereby eliminating customer complaints. Through his leadership, Mesa developed a prototype parametric pricing methodology to improve the accuracy and responsiveness of contract proposals by 40 percent. As a result of a pricing team effort with Boeing, customers, and the Defense Contract Audit Agency (DCAA), cost estimating relationships were redesigned, monitored, and adjusted monthly to maintain system confidence. Miller was also actively involved with Boeing in implementing lean manufacturing techniques to lower production labor costs an average of 25 percent. He also established an Integrated Product Team environment at all levels with Boeing and DCAA that provides mutual exchange of critical management and program data to improve performance and lower costs.

# ARMY RESEARCHERS DEVELOP FIBRIN BANDAGE

## COL John R. Hess, MC

## Introduction

Bleeding is the most common cause of death for soldiers wounded on the battlefield. Most soldiers "killed in action" (i.e., those who die before they reach surgical care) die quickly. Forty percent die instantly, 65 percent are dead in 5 minutes, and 80 percent are dead within 30 minutes of wounding. These statistics have not changed since the Civil War. Even for soldiers who reach the hospital, injuries to the central nervous system and uncontrolled bleeding are the leading causes of death among those who die of wounds. Devices or techniques that slow or control bleeding and are usable far forward on the battlefield have the greatest potential to save lives.

## Bandage Development

Scientists at the U.S. Army Medical Research and Materiel Command and clinicians at the Army Medical Command, working in conjunction with the American Red Cross, have developed a dry fibrin sealant bandage to address the need to control bleeding. It is made from the last two proteins in the human blood coagulation cascade, which are freeze-dried on an absorbable backing.

The resulting bandage is about 4 inches by 4 inches and one-quarter-inch thick. It has the consistency of a meringue baked on a piece of cloth. The bandage is applied with direct pressure, crushing the meringue-like substance into the wound, where it quickly dissolves and coagulates. The pressure slows bleeding, maintains high local concentrations of the active ingredients, and the clot "sets" within 1 minute.

The bandage is lightweight and can be stored at room temperature. It must, however, be packed in a watertight seal or it will clot in the bag by absorbing water from the air.

Research in animals shows that the bandage can reduce blood loss 50 to 85 percent and prevent shock normally associated with blood loss from battlefield wounds. This research points out the potential for the far-forward use of these dressings by medics and fellow soldiers in the field. In the hands of forward surgical team members, the dressings will improve the survival chances from serious liver injuries by allowing surgeons to avoid the risks of packing a wound and then operating again to remove the packing.

## Conclusion

The fibrin bandage concept was created by Army physicians working in the Combat Casualty Care Program. The U.S. Army Medical Materiel Development Agency currently manages a cooperative agreement with the American Red Cross to further improve the bandage technology. The Red Cross is developing manufacturing techniques and plans to choose a manufacturing partner this year. Within the next 3 years, they will conduct clinical tests of the manufactured product and seek an FDA license for the bandage.

*COL JOHN R. HESS, MC, is the Commander of the Blood Research Detachment, Walter Reed Army Institute of Research. He received his Doctor of Medicine from the University of Washington. He serves as Associate Professor of Medicine at the Uniformed Services University of the Health Sciences and is the inventor of dry fibrin sealant technology.*

# From The Director
# Acquisition Career
# Management Office

As you may have read in the September-October 1998 issue of *Army RD&A* magazine, I recently reported as the new Director of the Acquisition Career Management Office (ACMO). Several years ago, I was part of the reengineering effort to revitalize the civilian component of the Army Acquisition Corps (AAC) and Army Acquisition Workforce (AAW). In my previous assignment as the Commander, Defense Contract Management Command, Raytheon, I kept informed of the exciting AAC initiatives during the last few years through personal contacts, by reading *Army RD&A* magazine, and by logging onto the AAC home page. I am amazed at how close we've come to "One Integrated Corps," not just with the civilian and active duty military components, but also with the Army National Guard and Army Reserve components. Be sure to read the article on integration of the Army National Guard and Army Reserve into the AAC in this issue.

In September, my Deputy and I had the privilege of briefing the AAW in Natick, MA, on behalf of Keith Charles, Deputy Director for Acquisition Career Management. The establishment of regional Acquisition Career Management Advocates (ACMAs) was intended to ensure that members of the AAW receive coherent, timely information on acquisition programs and initiatives, education, training, and competitive opportunities. The ACMA at Natick has gone one step further by establishing local programs that encourage the efforts being driven by the AAC to build leaders, and has truly made a difference in getting our message to the Acquisition Workforce in that region.

One of the very exciting new opportunities that will soon be available to members of the AAW is operational experience. Some members of the ACMO and year group (YG) 97 Competitive Development Group (CDG) recently took advantage of an operational experience training opportunity at the National Training Center (NTC), Fort Irwin, CA. To read about their experience, please see the article on the NTC visit in the Career Development Update section of this magazine.

Congratulations to the 20 Acquisition Corps officers selected for Senior Service College and the 29 graduates of the Materiel Acquisition Management (MAM) Course at the U.S. Army Logistics Management College, Fort Lee, VA, who are listed in this issue. We really need your assistance in providing input to the MAM Course. Please take a few minutes to complete the survey on the AAC home page, or see the July-August 1998 issue of *Army RD&A* magazine and fill out the survey, tear it out and mail it in. Your responses are crucial to our effort to make sure the MAM Course offers the very best in professional development.

I encourage you to read the interview with GEN Dennis Reimer, Chief of Staff of the Army, which discusses the integration of the Active and Reserve components as well as the importance of building leaders for the 21st century and the AAC's role in the Army.

The application window for the YG99 CDG has closed. We are looking forward to announcing the selections next year for this highly successful career development program. You can read about one YG97 participant's perspective on the program in this issue.

I look forward to continuing our efforts to integrate the military, civilian and Reserve components with the goal of delivering affordable world-class weapon systems and services years before any adversary can acquire comparable technological capability.

COL Edward Cerutti
Director
Acquisition Career
Management Office

# AAW Roadshow Update

The Army Acquisition Workforce Roadshow continued with a visit to Natick, MA, in September. The roadshow included a briefing entitled "Making the AAC Vision a Reality" by COL Ed Cerutti, the new Director, Acquisition Career Management Office (ACMO), and Mary Thomas, ACMO Deputy Director. The roadshow included a session with supervisors, and an extended visit by the Mobile Acquisition Career Management Office (MACMO). The MACMO provided onsite information and assistance with acquisition career management issues.

# 29 Graduate From MAM Course

Twenty-nine students graduated in August from the Materiel Acquisition Management (MAM) Course, Class 98-004, held at the U.S. Army Logistics Management College, Fort Lee, VA. The graduates included one officer from Greece.

The Distinguished Graduate Award was presented to CPT Eric Stierna, assigned to the Naval Postgraduate School, Monterey, CA, and the Outstanding Graduate Award was presented to Bradley Beohler, assigned to MacDill Air Force Base, FL.

The 7-week MAM Course provides a broad knowledge of the materiel acquisition process. Course areas include acquisition concepts and policies; research, development, test and evaluation; financial and cost management; integrated logistics support; force modernization; production management; and contract management. Emphasis is on developing midlevel managers who can effectively participate in the management of the acquisition process.

Research and development, testing, contracting, requirements generation, logistics, and production management are examples of the materiel acquisition work assignments offered to these graduates.

**MAM Graduates**

| | |
|---|---|
| Anderson, Larry S. | Hamilton, Andrew B. |
| Archambault, Bruce A. Jr. | Hayes, Derrick G. |
| Barber, Creighton R. | Hicks, Mark A. |
| Bennis, Darrell J. | Hilton, Norman A. |
| Beohler, Bradley A. | Lewis, Leslie L. |
| Cormier, Robert G. | Lopez, Harold W. |
| Cote, Jeffrey | Metts, Mel M. |
| Darrow, Keith R. | Norris, David L. |
| Davila, Tony O. | Passapera, Pedro R. |
| Fletcher, Janet A.L. | Reim, John T. Jr. |
| Gloor, Thomas B. | Richburg, Wilbur D. |
| Grein, Alfred J. | Sioras, Aristeidis |
| Grier, Robert B. | Stierna, Eric J. |
| Grosenheider, Craig L. | Watiti, Tom W. |
| Hall, Joseph R. | |

## ACMO, YG97 Members Visit National Training Center

Although members of the Army Acquisition Corps routinely deal with development of various weapon systems, they rarely get the opportunity to view these systems in action. Recently, however, several members of the Year Group (YG) 97 Competitive Development Group and the Acquisition Career Management Office (ACMO) were given an upfront and personal opportunity to view the soldier "at war" during a visit to the National Training Center (NTC) at Fort Irwin, CA.

The benefit of such exposure for our Acquisition Workforce is tremendous. The NTC provides a realistic joint training environment that focuses on sharpening the warfighting skills of soldiers, leaders, and units for the 21st century battlefield.

Shortly after arrival at Fort Irwin, the group was enthusiastically greeted and escorted to the Command Briefing Room to hear about the goals and objectives of the installation and the NTC mission. They viewed a videotape of actual training maneuvers from previous 28-day training exercises held 10 times a year for "real-world" training in a battlefield environment. They toured the Operations Center to learn how exercises are monitored, what kind of information is tracked, and how feedback is provided to training units upon completion. The group also received a demonstration of MILES (Multiple Integrated Laser Engagement System), the system used at NTC to simulate the overall battlefield and track equipment and personnel casualties.

At the conclusion of the first day, some individuals were given an opportunity to experience the theater of war. Suited up with the necessary equipment, they were transported out to the battlefield, where they observed firsthand the condition of equipment, how it was maintained, and the integral part it plays in combat. They caught a glimpse of life in the field, interacting with soldiers and sleeping on cots "under the stars." The group joined a Nevada National Guard unit on their 2-week rotation, so rather than being relegated to eat meals, ready-to-eat, they ate hot "chow line" meals that night and the following morning, gaining an appreciation for the need to adapt to one's surroundings.

Before dawn the following day, the group joined the unit in several engagements with the opposing force. Riding along in two battles as loaders in the M1 Abrams Tank or in Scout vehicles, they saw first hand how the equipment operated and how



Sue Winkler, ACMO, observes the repair of a tank by troops from Fort Hood.

the soldier executed tasks in conjunction with the equipment. The group gained a better appreciation for the limitations currently facing our fighting forces. Situation awareness and clear communications are not easily accomplished while in battle in a dusty dessert, being fired upon, and traveling at high speed in vehicles. Most in the group were "killed" at least once with assistance of the MILES equipment. After each battle, a mini "hot-wash" after-action review was held with participants, where NTC observers and controllers provided on-the-spot feedback concerning what went right, and how to modify future actions for better results. That experience clearly demonstrated the importance of what we do to support the soldier, and the need for many of the capabilities currently being developed within PM offices.

For the rest of the group not sleeping in the field, the second day began early in the morning with a brisk ride out to the battlefield on the back of a High Mobility Multipurpose Wheeled Vehicle (HMMWV). Traversing the desert terrain at multiple troop locations, the group witnessed the maintenance and repair of tank equipment and viewed combat support team operations while "under attack." The last stop was the Tactical Operations Center (TOC), the nerve center of the fighting organization. The group saw many of the systems used for intelligence gathering, aerial detection, force tracking (both friendly and foe) and situation assessment. In addition to seeing the tangible items, the group had an opportunity to experience the challenges facing the fighting soldier and the environment in which he or she must operate.

At the conclusion of the visit, the group rode HMMWVs back to their gathering point much more enlightened and with an increased admiration for our soldiers.

NTC offers unique and very rewarding operational training opportunities to Army Acquisition Workforce members. This training provides participants an opportunity to gain firsthand experience of how the Army operates in a field environment. The NTC offers realistic and demanding training for acquisition personnel who will be provided unfiltered insight into the employment and support of Army systems and equipment. The training opportunities described below can be tailored as necessary to fit the selected individual's needs.

• A standard orientation visit to the NTC lasts 2 to 4 days. It includes orientation briefs on day 1, an opportunity to observe



Glen Berg, a Competitive Development Group member from Picatinny Arsenal, takes aim using MILES.

war gaming exercises on day 2, and an overnight bivouac with the enemy force. Orientation visits are for groups only. Group size will depend on facilities available. The orientation is mandatory for individuals desiring to participate in observer or controller assignments.

• Observer and controller assignments use acquisition personnel as augmentees to the NTC observers and controllers in support of Army training missions. Assignments last up to 60 days and include classroom and training opportunities.

• Science Advisor assignments, lasting 2 to 4 months and designed for one individual per visit, offers acquisition personnel a rotation through the Command's Science Advisor Office. Individuals in this role serve as a vital communications link between the soldier and the research and development community.

These training opportunities will be formally announced in November 1998, including procedures for the application process. Following this announcement, a board will convene in January 1999 to select qualified candidates for the various training opportunities that will be offered. The ACMO anticipates assigning candidates to their positions in March 1999.

# Perspectives Of A Competitive Development Group Participant

## Carlton Brewer

***Editor's Note:*** *Carlton Brewer is a Year Group 1997 Competitive Development Group participant. The following relates his personal experiences.*

A late cousin of mine shared a story with me about an incident that occurred during his tenure in a boot camp back in the late '70s. One morning, after days of rigorous training and exercise, a drill sergeant hastily walked up to a group of weary trainees and asked if anyone of the nice gentlemen in the group had a driver's license. A number of them raised their hands in anticipation of escaping the exhausting physical activity that they knew loomed just ahead. The drill sergeant picked four or five of them to follow him. As they rounded the corner of the building looking for jeeps or trucks to drive, they encountered a stack of brooms. The drill sergeant said, "Here, drive these around for a while and get this place cleaned up!"

Even armed with that lesson of life, I volunteered to take a 120-day developmental assignment on the Headquarters, Department of the Army (HQDA) Staff. The Acquisition Career Management Office (ACMO) prepared the way by making certain that the Systems Management and Horizontal Technology Integration Directorate had a job for me to do and that I had a place to land afterward where the Army and I both would benefit from my HQDA experience. The assignment, however, did not begin in Washington. It began with me leaving my initial Competitive Development Group (CDG) position in the Air Defense Command and Control Systems Project Office and moving to the Army Tactical Missile System-Brilliant Antiarmor Submunition (ATACMS-BAT) Project Office. The purpose of this brief stint was to learn the system and, more importantly, learn

about the people who manage it before going off to represent them and eventually returning to work with them. Then it was off to Washington for an assignment as a Department of the Army System Coordinator (DASC) for ATACMS-BAT systems in the Missiles Division of the Systems Management and Horizontal Technology Integration Directorate.

The DASC position is primarily one of extensive coordination of acquisition management issues among program managers and other elements of the Office of the Assistant Secretary of the Army for Research, Development and Acquisition (OASARDA), other Army agencies, the other Services, the Office of the Secretary of Defense, and Congressional staffs. The interaction and visibility of these DASC positions have made them much sought after by up-and-coming Army acquisition officers. The Army Acquisition Corps (AAC) CDG Program provides its participants easy access to these positions. This is one of many opportunities the ACMO is offering to develop a more well-rounded corps of civilian acquisition professionals.

After 2 months in OASARDA, I was notified that my counterpart in the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) was reassigned, and I volunteered (again) to serve as the ATACMS-BAT System Integrator in the Fire Support Division of the Requirements Directorate in the ODCSOPS. This job required the same extensive coordination efforts as my DASC assignment, but focused on the requirement rather than the solution to the requirement. The flexibility of the AAC CDG Program and its focus on developing rather than exploiting the individual made it possible for me to switch assignments midstream following a couple of phone calls.

Both experiences were fantastic. The opportunity to serve in the acquisition "trenches" with future product managers, project managers, and program executive officers is something no one in the acquisition business should pass up. The chance to work with warfighters who will soon return to the field and possibly take our weapon systems into battle was also a very rewarding experience, and should not be passed up by acquisition civilians. What made both jobs most rewarding is that each office made me a part of its team. I strongly encourage anyone in the field to seek out these types of assignments because of the camaraderie they provide with their HQDA counterparts.

During my final days in the Pentagon, I asked (volunteering yet again) to "shadow" a senior leader on the HQDA Staff. Arrangements were made for me to spend a couple of days shadowing the Assistant Deputy for Systems Management and Horizontal Technology Integration. This assignment, too, proved invaluable. Listening to discussions and decisionmaking at senior Army levels strongly reinforced a key observation I made during my 120 days at HQDA. That is, when those of us in the field or our bosses receive those panicked, late-afternoon phone calls and e-mails, we must respond in a timely manner with accurate and concise information. In the Pentagon, decisionmakers operate at a rapid pace using the facts they have at hand, whether it is their intuition or information papers. If we want our information to be considered, we must provide the leadership with what they need when they need it. Had I heard this before going to HQDA? Sure, but I lived it and witnessed it during this assignment. That was, after all, the point! Wasn't it?

With that experience behind me, I've returned to the ATACMS-BAT Project Office at Redstone Arsenal, AL where I support the product and project managers responsible for the life-cycle management of the ATACMS-BAT family of systems.

## FY99 PEO/DSA/PM Regional And Annual Acquisition Workshops Scheduled

Plans are underway for the FY99 PEO/DSA/PM regional and annual acquisition workshops. Attendees at the regional workshops will include the Army Acquisition Executive; Director for Acquisition Career Management; Deputy Director for Acquisition Career Management; Director of Information Systems for Command, Control, Communications and Computers; Deputy Commanding Generals for the U.S. Army Materiel Command (AMC) and the U.S. Army Space and Missile Defense Command; Program Executive Officers; Deputies for Systems Acquisition; Direct Reporting PMs; and those PMs and Acquisition Commanders in the host geographic region. Attendees at the annual workshop will also include all PMs and Acquisition Commanders regardless of geographical region. This will be a joint initiative between the Office of the Assistant Secretary of the Army for Research, Development and Acquisition (OASARDA) and AMC. Three regional workshops are planned, culminating with the annual workshop in Huntsville, AL.

*The FY99 schedule is as follows:*

| DATE | Location | POC |
|------|----------|-----|
| Nov. 23-24, 1998 | White Sands Missile Range | OASARDA |
| Feb. 24-25, 1999 | U.S Army Tank-automotive and Armaments Command | AMC |
| May 4-5, 1999 | Fort Monmouth, NJ | AMC |
| Aug. 24-26, 1999 | Huntsville, AL | OASARDA |

*Workshop Coordinators are as follows:*

| | | |
|---|---|---|
| OASARDA | Teresa Wright-Johnson | (703) 604-7174/DSN 664-7174 |
| | Karen Walker | (703) 604-7112/DSN 664-7112 |
| AMC | COL Lee Parker | (703) 617-9196/DSN 767-9196 |

## The 1998 AAC Ball

The Assistant Secretary of the Army for Research, Development and Acquisition, Paul J. Hoeper, cordially invites all members of the acquisition community to attend the 1998 Army Acquisition Ball. The ball will be held at the Fort McNair Officer's Club Dec. 11, 1998. Watch for upcoming details on the Acquisition Corps home page.

Point of contact is LTC Dan Gallagher, (703) 681-9479, DSN 761-9479, e-mail: **gallaghd@sarda.army.mil**.



# What The Army Acquisition Corps Seal Symbolizes

The Army Acquisition Corps seal routinely appears in black and white on the front cover of every issue of *Army RD&A* magazine, but have you ever wondered what it symbolizes? Displayed in full color on the cover of this issue, the seal entwines the Greek letters "Alpha" and "Omega" to emphasize an intricate and continuous process. The more predominant element of the seal, the eagle, our national symbol, represents vigilance and military preparedness, while the laurel denotes honor and achievement. The colors of the seal have special significance as well. Black symbolizes dependability and solidarity, while gold and silver signify excellence and integrity.

## PERSCOM Notes ...

# Army Congressional Fellowship Program 2000 Announced

Headquarters, Department of the Army (HQDA) has announced the establishment of the U.S. Army Congressional Fellowship Program to provide congressional training to top Army officers and civilians. The new program supersedes all previous Congressional Fellowship Programs, and will begin August 1999 and end December 2000.

Selectees will begin their fellowship by participating in a HQDA orientation, including attendance at the Force Integration Course from August 1999 until December 1999. Following the orientation, fellows will complete a classroom phase and then serve as staff assistants to members of Congress.

Fellows are typically given responsibilities for drafting legislation, arranging congressional hearings, writing speeches and floor statements, and briefing members for committee deliberations and floor debate. Military fellows will incur a service obligation and, within 5 years of completing the program, be assigned to a position that requires knowledge of congressional activities.

The Army Selection Board will convene Feb. 10-11, 1999, to select fellows. Military and civilian supervisors are encouraged to submit the names of their top candidates for this prestigious opportunity. Interested individuals should follow the appropriate guidance below.

*Active Duty.* Eligible nominees must hold the rank of major or lieutenant colonel, have accrued Active federal commissioned service of not more than 19 years as of September 1999, be a Military Education Level B graduate, be branch qualified, have no adverse actions pending, meet Army height and weight requirements, and have potential for future military service. Those interested must request and receive permission to compete from their career assignment officer at the U.S. Total Army Personnel Command (PERSCOM). Requests must be in letter format and be endorsed by the first field supervisor. Any questions should be submitted to Joel Strout at: **strout@hoffman. army.mil.**

*Reserve.* Majors and lieutenant colonels must request and receive permission to compete from the Full Time Support Management Directorate at the U.S. Army Reserve Personnel Center (AR-PERSCOM). Those given permission to compete must then formally apply for the program to AR-PERSCOM via DA Form 4187 through their current assignment activity. Applications must be received no later than Jan. 9, 1999. To apply, contact MAJ Jeff Graber at 1-800-325-4118, extension 5171.

*Army National Guard.* Title 10 Army Guard Reserve majors and lieutenant colonels must contact the Army National Guard (ARNG) Personnel Secretariat at the Army National Guard Readiness Center, DSN 327-9790, for approval to compete. Those given permission to compete must then formally apply for the program through their respective approval agency using DA Form 4187. The ARNG Personnel Secretariat must have applications no later than Jan. 9, 1999.

*Department of the Army Civilians.* Civilians, GS-13 through -15, must submit an application in accordance with the Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs) *FY99 Catalog of Army Civilian Training, Education and Professional Development Opportunities, 1998.* Candidates must submit applications through their respective major command or independent report activity chain of command. Applications must be addressed to Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs), ATTN: SFCP-COA, 200 Stovall Street, Alexandria, VA 22332-0310, and be received no later than Dec. 8, 1998. Civilian applicants should contact Vernessa Carter at DSN 221-2456.

Questions from either civilian or military applicants regarding the program in general can be directed to the Executive Officer, Office of the Chief Legislative Liaison, at (703) 695-3524.

# FY99 Army Experimental Test Pilot Board

One of the responsibilities of the U.S. Total Army Personnel Command's (PERSCOM's) Acquisition Management Branch (AMB) is to manage the Army's Experimental Test Pilot Program. Under this program, active duty Army aviators are selected and trained to become qualified experimental test pilots.

An Officer Personnel Management Directorate Selection Board will convene in early February 1999 to select those aviators best qualified to participate in the Army Aviation Experimental Test Pilot Training Program. This board will review and select both commissioned and warrant officers. Commissioned officers selected to attend the U.S. Naval Test Pilot School (USNTPS) are automatically accessed into the Army Acquisition Corps where they will serve for the remainder of their careers. Selected warrant officers will continue to be managed by the Warrant Officer Division at PERSCOM.

Applicants for the experimental test pilot training must submit an application to Commander, U.S. Total Army Personnel Command, ATTN: TAPC-OPB-E, 200 Stovall Street, Alexandria, VA 22332-0411. Applications must be received by Jan. 15, 1999, and include the following:

• Official transcript of college credits;

• A copy of the aviator's most current DA Form 759; and

• Endorsements from an instructor pilot/standardization instructor pilot with a thorough appraisal of that applicant's flying ability, operational experience, motivation, adaptability, and ability to communicate orally and in writing.

All Army aviators selected for the Experimental Test Pilot Training Program will incur a service obligation of 4 years under the provisions of AR 350-100, irrespective of course completion.

Experimental test pilot assignments will be based on the needs of the Army. Initial tours will be served at the Aviation Technical Test Center at Fort Rucker, AL. USNTPS graduates will serve in experimental test pilot or organizational staff positions that directly affect the type, design and configuration of Army aircraft.

For additional information or a sample memorandum of how to apply for the program, contact: Latesha Holloman, (703) 325-2757, DSN 221-2757 or e-mail **hollomal@hoffman.army.mil;** Eric Glenn, (703) 325-2800, DSN 221-2800 or e-mail **glenne@hoffman.army.mil;** or CW3 Randy Grunow, (703) 325-5251, DSN 221-5251 or e-mail **grunowr@hoffman.army.mil.**

# FY98 Major Promotion Board Results

The FY98 Major Promotion Board results were released Sept. 29, 1998. Board members reviewed the files of 122 Army Acquisition Corps (AAC) officers in the primary zone. From this population, 92 were selected by the board for promotion to major. The primary zone selection rate of 75.4 percent was slightly below the Army competitive category primary zone

average of 77.0 percent. In addition, the board selected two AAC officers from below the zone and three AAC officers from above the zone, bringing the total to 97 officers.

## Statistics for Selected Officers

| Functional Area | Primary Zone Considered | Primary Zone Selected | Primary Zone Percent |
|---|---|---|---|
| 51 | 60 | 42 | 70.0 |
| 53 | 31 | 22 | 70.9 |
| 97 | 31 | 28 | 90.3 |

### Promotion Trends

After the assignment officers re-reviewed the files of all AAC officers considered for promotion to major, the following trend or "formula" emerged:

MAJ = Above Center of Mass (ACOM) Command
+ Center of Mass (COM)
+ overall performance

Selection to major is a reflection of how an officer performed in branch assignments. At the time of consideration by the board, most AAC officers had few, if any, officer evaluation reports (OERs) from acquisition assignments. Many officers are still completing basic branch assignments, Reserve Officer Training Corps/recruiting, Active component/Reserve component assignments, or attending advanced civil schooling. As a result, AAC officers are judged against the same criteria as basic branch officers.

The Army is more competitive today than ever before. There were minimal differences between the files of year group (YG) 87 (officers in last year's primary zone) and YG88 (officers in this year's primary zone). The continued upward ratings trend in OERs was readily apparent with implementation of the new OER for the Officer Personnel Management System for the 21st Century. For evaluation purposes, OERs for second lieutenant were removed from officers' files. All OERs were critical in determining the overall trend in performance and evaluation potential.

### Command

The most important discriminator continues to be company command OERs. Board members appear to use command OERs as the measure of an officer's potential ability to succeed as a major. With most officers receiving "one block" command OERs, the senior rater profile and narrative played an important role in determining if an OER was truly "top block." Because many officers received "top block" senior rater profiles, the board was often required to determine if a top block OER was ACOM or COM. Senior rater narratives that quantified an officer's performance when the profile did not, sent a clearer picture to the board on the "true block check" (i.e., best officer in a command, top 1 percent, 1 out of 10.) Additionally, senior rater narratives that focused on the potential of the officer were more critical in determining a true top block command OER than narratives that focused on how the officer performed in a specific assignment. Officers with ACOM files and "two block" COM command OERs were not selected for promotion. Officers with COM files and top block COM command OERs were at risk for promotion.

Performance in basic branch assignments appeared to be the board's focus. The message is clear: seek company command, do well, and maintain a high level of performance on all other assignments.

## Major Promotion Selectees And Functional Areas

| | | | | | |
|---|---|---|---|---|---|
| Alexander, Scott E. | 51 | Hager, Jeffrey E. | 51 | Raftery, James J. | 51 |
| Backman, Robert E. | 97 | Hannah, Robert J. | 51 | Ramsey, Craig A. | 51 |
| Bailey, David B. | 53 | Hannon, John P. | 97 | Rashid, Quenton T. | 97 |
| Balda, John S. | 53 | Harper, Robert D. | 51 | Revell, Everett C. | 51 |
| Banks, Thyris D. | 97 | Harris, Benjamin M. | 97 | Richards, Clyde E. | 51 |
| Barnes, James R. | 51 | Harris, Mae F. | 51 | Riordan, Matthew | 97 |
| Barrett, Eugene | 51 | Harvey, Keith D. | 51 | Roden, Edward T. | 97 |
| Baxter, Timothy R. | 53 | Haug, Gregory M. | 51 | Rodeschin, Darrin H. | 97 |
| Blanchette, Robert | 51 | Haythorn, Mark E. | 53 | Rogers, Stuart K. | 97 |
| Blanco James A. | 97 | Kalainov, John C. | 51 | Ruiz, Alvin | 51 |
| Branch, Alexander P. | 97 | Keller, Winfield R. | 51 | Schnaidt, Matthew C. | 53 |
| Brashear, James B. | 51 | Kopp, John J. | 97 | Sears, Greg L. | 97 |
| Brown, Anthony T. | 51 | Lewis, John W. | 51 | Shanklin, John E. | 51 |
| Bruning, Walter J. | 51 | Martino, Charles D. | 97 | Shere, Kelly Jo | 97 |
| Capobianco, Joseph | 51 | Martinson, Philip A. | 97 | Spielman, Jack R. | 51 |
| Carter, Charles A. | 51 | Mason, Edward E. | 97 | Statham, Alan T. | 53 |
| Chapman, David W. | 51 | Mcvay, Robert G. | 51 | Stephens, Gary D. | 97 |
| Claiborne, Ronald G. | 53 | Metts, Mel M. | 97 | StJohn, Terry C. | 97 |
| Cullen, Jeffrey L. | 53 | Miller, Michael G. | 97 | Stoddard, Kevin P. | 51 |
| Cunningham, Daniel | 51 | Minus, Joseph S. | 53 | Strange, Timothy J. | 97 |
| Dailey, John S. | 53 | Moffatt, James A. | 51 | Swanson, Edward J. | 51 |
| Dodge, Ronald C. | 53 | Mohney, Eric V. | 53 | Utroska, William T. | 53 |
| Eiseman, Brenda K. | 97 | Monis, Michael J. | 51 | Vergez, Norbert E. | 51 |
| Epple, Theodore M. | 97 | Murphy, Terryne F. | 53 | Vozzo, Nicholas J. | 97 |
| Faieta, Phillip J. | 51 | Murphy, Wayne | 97 | Waild, Thomas L. | 51 |
| Field, William E. | 51 | Nydam, David A. | 53 | Wallington, Clinton | 53 |
| Flint, Jeffrey L. | 51 | Olsen, Robert J. | 53 | Washington, Gail L. | 51 |
| Fortunato, Edward M. | 51 | Oregan, John M. | 51 | Wells, Charles A. | 53 |
| From, Jeffrey D. | 51 | Petermann, Wolfgang | 97 | Willhelm, Stephan T. | 53 |
| Garland, William A. | 53 | Pollack, John F. | 53 | Wilson, Veronica A. | 97 |
| Grinsell, Christian | 51 | Proctor, James M. | 51 | Witteveen, David M. | 51 |
| Guilford, Daniel J. | 51 | Pustarfi, Stanley H. | 53 | Zimmerman, Ronald E. | 97 |

## 20 Acquisition Corps Officers Selected For Senior Service College

The results of the Senior Service College (SSC) Selection Board were released on August 27, 1998. Twenty members of the Army Acquisition Corps (AAC) were selected to attend SSC during academic year 1999-2000. The names of those officers are listed below.

LTC Damian P. Bianca
LTC Steven J. Cox
LTC David B. Cripps
LTC Joseph A. Durso
LTC Matthew J. Fair
LTC Bruce D. Jette
LTC Michael E. Johnson
LTC Mark W. Jones
LTC Nickolas G. Justice
LTC Phillip D. Macklin

LTC John D. Mahony
LTC Harry W. McClellan
LTC Charles F. McMaster
LTC John A. Merkwan
LTC Ainsworth B. Mills
LTC Tommy E. Newberry
LTC Robert D. Ogg
LTC Carl M. Tegen
LTC Dwight E. Thomas
LTC James D. Wargo

The AAC had 405 officers eligible for selection to SSC and had a selection rate of 4.9 percent. The selection rate for the Army was 6.4 percent. The following chart shows the functional area (FA) and year group of the selected officers:

| FA | 1976 | 1977 | 1978 | 1979 |
|----|------|------|------|------|
| 51 | 1 | 5 | 7 | 2 |
| 53 | 1 | | | |
| 97 | | 2 | 1 | 1 |

The most common factor among the officers chosen for SSC attendance is that each officer is a former or current command-designated position list (CDPL) product manager or acquisition commander. This confirms what the U.S. Total Army Personnel Command has stated previously: the path to SSC selection includes a successful CDPL product manager or acquisition command tour.

Selectees will receive a memo with course descriptions of each available SSC and Fellowship and be given the opportunity to inform the Chief, Acquisition Management Branch as to which SSC they want to attend.

# NEWS BRIEFS

# Joint Warfighter Complex Slated For Aberdeen Test Center

A Joint Warfighter Range Complex (JWRC) is under development at the U.S. Army Aberdeen Test Center (ATC), Aberdeen Proving Ground, MD. This complex will interlink current and future joint warfighter capabilities through enhancement programs in a strategically postured geographical grid that will serve as a platform for next generation field maneuver operations. JWRC accommodates and/or mirrors the four operational concepts of Joint Vision 2010 (dominant maneuver, precision engagement, full dimensional protection, and focused logistics) by providing a reconfigurable, highly instrumented land, air, sea, and amphibious platform with unlimited capability to joint Services warfighting requirements.

The JWRC grid is described as a sectional alignment of unique assets: Littoral Warfare Complex (water surface and subsurface and amphibious platforms with a juxtaposed shipyard, reconfigurable beachheads, and urban terrain platforms as required for military operations in urban terrain (MOUT)); Power Projection Test and Training Complex (airfield, automated road network offering high-speed highways, urban streets, cross-country terrain, and a reconfigurable MOUT platform); and an Instrumented Dismounted Soldier Maneuver Area (troop maneuver coordination, situational awareness through player position tracking, soldier systems effectiveness (helmet, communications, and protective clothing), and weapon systems effectiveness (target scoring and small arms live fire)).

The JWRC will encompass approximately 20,000 acres, 100 miles of roadways, 33 miles of beachhead, controlled waterways and airspace, a C5A airfield, and indefinite MOUT constructs that will be completely interlinked through seamless computer networking to provide JWRC-to-customer test site integration. The complex will provide senior-level decisionmakers with an effective tool for cooperative gaming exercises.

The decisionmaking requirements that fundamentally determine the readiness and effectiveness of the fighting force will be supported through JWRC at the ATC. According to officials at the ATC, the JWRC will eventually be expanded with additional assets and will serve as an annex to the current complex.

*The preceding article was written by Judith Wettig, a Mechanical Engineering Technician at the U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD.*

# From The Acquisition Reform Office...

## Vice President Views Army Business Opportunities Online

In a July 1998 visit to Insight Technologies, Vice President Al Gore cited the importance of educating American workers on technology, and preparing them for the challenges of the next century. One of those challenges will be the use of paper-free contracting by the turn of the century, as called for by the Deputy Secretary of Defense. The Army is committed to meeting the goal of this Defense reform initiative, and has begun to develop the tools necessary for paperless contracting. Among these is a World Wide Web interface where industry can search for and respond to new business opportunities within the Army. The address for this site is **http://www.army-acquisition.net/**.

The vice president was shown this web site, known as the Business Opportunities Page, on his trip to Insight Technologies. After using the system for approximately 5 minutes, he was very impressed, and commented that he was glad to see that the Army was using current commercial technologies to support its business processes.

## IMPAC Card Continues To Make An Impact

Army and Department of Defense (DOD) efforts to reduce merchant fees associated with accepting the Government Purchase Card for large payments are finally paying off. Both Master Card and VISA approved new lower merchant interchange rates (fees) for government transactions in the $4,000-$5,000 range. This reduction in the average 2 percent fee merchants pay on each card purchase will pave the way for increased use of the card by the government. The Boeing Company was asked to evaluate the feasibility of accepting the card for payments. At the time, Boeing was quoted a fee (interchange rate) of 2 percent or more on card purchases and, therefore, would have had to increase the cost of their products. Boeing also found it could save as much as $100 if it did not have to process the DOD-unique invoice (DD250) through the Defense Finance and Accounting Service (DFAS). Boeing would save as much as .75 percent of the value of the purchase if payment were made within 72 hours vs. 30 days from invoice submittal. The bottom line is that reduced merchant costs result in reduced customer costs.

### TACOM

The U.S. Army Tank-automotive and Armaments Command (TACOM) Armament and Chemical Acquisition and Logistics Agency (ACALA) Executive for Contracting appointed two automated data processing equipment (ADPE) specialists as ordering officers. These ordering officers will be able to solicit offers and place oral or written delivery orders to achieve the best value for the government. In addition, the ordering officers will be able to place orders up to $25,000 and use an IMPAC card as a method of payment. These appointments are part of an ongoing effort to streamline the acquisition of ADPE for TACOM-ACALA.

### Fort Dix

Prior to implementing use of the IMPAC card, the Fort Dix Directorate of Contracting had received numerous complaints from contractors seeking payment through centralized DFAS payment offices. Use of the IMPAC card has resulted in an average turnaround time of 5 days from invoice submission to payment on large dollar value contracts. These procurements cover all formal acquisitions over the simplified purchase limit of $100,000. Contractors who have chosen the IMPAC card method of payment have been pleased.

## Smart Buying Nets 7 Extra ACEs

When the Army has a set budget to procure as many vehicles as possible, it must find creative ways to minimize unit costs. This was the case when the M9 Armored Combat Earthmover (ACE) Program Office formed an integrated product team that applied the Alpha process. The Alpha process is where the government and contractor develop a contract together for a sole-source purchase. Relative to the ACE, the team applied performance-based contracting, and principles of Cost As An Independent Variable to the production contract. The result was a 16-percent cost savings, which translated into seven additional M9 ACEs for the troops in the field. Use of remanufactured engines vs. new engines was a key factor in the cost savings effort. The ACE engine, a 500-horsepower Cummins V903, was no longer a production item, and its unit price had jumped in recent years from $36,000 to $44,000. A surplus of 500-horsepower engines was available, however, because the M2/M3 Bradley had been upgraded to 600-horsepower engines. The Bradley Program Office agreed to "donate" their old engines. Using a horizontal and Alpha contracting approach and commercial pricing, TACOM teamed with Cummins Corporate and Cummins ReCon in the remanufacture and conversion of 51 diesel engines. The work was completed in 1 month, and resulted in a savings of $962,000, or about $19,000 per vehicle.

## NRDEC Supports Troops In Bosnia

By implementing acquisition reform initiatives, the U.S. Army Soldier Systems Command's Natick Research, Development and Engineering Center (NRDEC) was able to expedite the manufacture and delivery of critical life-saving items for use by our troops in Bosnia.

NRDEC received verbal requests for these items from U.S. Army Europe and the Office of the Army Deputy Chief of Staff for Operations. Teaming with other organizations and industry, NRDEC responded within 3 days of these requests with a contract award for the manufacture of 350 Ranger Body Armor vests and 180 Body Armor Sets, Individual Countermine. All items were delivered to Bosnia within 45 days.

The numerous ballistic hazards in Bosnia also required the expeditious delivery of several other items totaling $2.8 million. These deliveries included Ballistic Protective Combat Boots, Interim Small Arms Protective Overvests and the Concealable Sniper Vest. Waterproof (moisture vapor permeable) socks were also provided for cold-wet environment protection.

The points of contact for this article are Karen Brown (**kbrown@natick-emh2.army.mil**) or Deirdre Townes (**dtownes@natick-emh2.army.mil**).

## Strategic Management Of Teams

By David I. Cleland
John Wiley & Sons, 1996

*Reviewed by LTC Kenneth H. Rose (USA, Ret.), a Project Manager with the Waste Policy Institute in San Antonio, TX, and a former member of the Army Acquisition Corps.*

Teams. Teaming. Team building. The market is awash with books whose titles trumpet these or similar words. Among them, *Strategic Management of Teams* stands out as a single source of practical information on the foundation, application, and benefit of teams in today's dynamic organizations.

In the Preface, Cleland states the book was written for university use at the senior undergraduate or graduate level. Readers should not relegate this book to the halls of academe, nor should they pick and choose among individual chapters for those that seem to be of particular interest. The text should be taken in its entirety, for its great strength and unique contribution is its systems-thinking linkage of project outcomes as the goal, project management as the means, and alternative teams as the medium.

The book is divided into four progressive parts. Part I, consisting of Chapter 1, provides an essential foundation of strategic management that Cleland describes as a balance among operational competence, strategic effectiveness, and functional excellence. To achieve this balance, Cleland suggests an 11-point roadmap. The first point, foresight, reveals the relevance to military readers. " ... the challenge is to come up with products and services not yet envisioned by existing customers—and do it before the competitors get there." Replace some of the words with terms such as "military capabilities," "military forces," and "threat forces" and you have a succinct statement of Army research, development, and acquisition goals.

Chapter 1 also sets the stage for future discussion by defining 12 types of alternative teams, and providing a concise table that addresses the output/contribution and timeframe for each type. The chapter includes much more and ends, as all chapters in the book do, with a summary that puts all the key points in one place for wrap-up review and easy future reference.

Part II, a collection of four chapters, provides preparatory guidance for improving organization performance through teams. Chapter 2 is aimed at organizations. It introduces the term "teamocracy" to describe the use of teams to accomplish cross-functional and cross-organizational work. Cleland introduces a five-phase life cycle of team design and execution that is more strategically oriented than the often-quoted personal interaction model of forming, storming, norming, and performing. He describes "trigger effects," borrowing James Burke's term for events that lead to a series of subsequent, interconnected events. The use of teams changes traditional supervisor-subordinate roles and, beyond that, has profound effect on reward systems, organizational design, and the execution of fundamental management functions.

Chapters 3 through 5 address team preparation, team development, and team culture, respectively. Taken together, these chapters, which address motivation, measurement, conflict resolution, leadership, characteristics, and operational strategies, prepare the reader for the application steps that follow.

Part III, "Using Teams," gets to the nitty-gritty of team implementation. It begins with an overview in Chapter 6 that describes how teams are a key to improving organization com-

petitiveness. The remaining chapters address teams for reengineering, concurrent engineering, and benchmarking. Self-managed production teams—probably the greatest leap for structured, hierarchical organizations—get solid treatment in Chapter 8. Readers should not assume that the team title limits it to the factory floor. The concepts and benefits could easily transfer to a nonmanufacturing environment. Chapter 11 addresses a variety of teams on a smaller scale, including task forces, quality teams, crisis management teams, and plural executive teams. Each plays a role under special circumstances.

One of the most far-reaching effects of team implementation is the change in the role of management. Chapter 12 explores this issue, boldly describing the traditional command-and-control manager as an anachronism. Teams define new environments and relationships, which demand new knowledge, skills, and abilities. Teams will shake a traditional organization to its core, and make it better for the experience.

But teams are neither a guaranteed path to success nor a fix for all the operational and strategic problems an organization may face. Cleland presents the downside of teams, discussing the many pitfalls and providing a preventive prescription for trust, loyalty, conviction, and commitment at the outset.

The final chapter hammers home the benefits of teams with specific examples from experience in achieving productivity increases, quality improvement, cost reduction, and a number of other benefits important to any enterprise.

There are many books that discuss teams from various aspects. Some address the "how," and others address the "what," "why," and "when." David Cleland's *Strategic Management of Teams* does it all in a way that provides a foundation for understanding, a roadmap for application, and a doorway to additional resources and learning.

**Dear Editor:**

The July-August 1998 *Army RD&A* magazine "Career Development Update" [articles on PM/Acquisition Command Boards, Pages 123-125] was very informative, if you do the avoided math on percent of civilians promoted to PM jobs. For the COL/GS-15 PM jobs, 63% (shown) of (46) military applicants and 10.8% (not discussed) of (37) civilian applicants were selected. For the LTC/GS-14 PM positions, 15.1% of (259) military applicants and 2.2% of (44) civilian applicants were selected. Only two civilian selectees were [picked] for the COL/GS-15 positions.

These "sad" selection rates for civilians were conveniently ignored in the discussion. There were 6 military and 2 civilians on the COL/GS-15 board, numbers not given for the LTC/GS-14 board, but the results imply majority rules!

It is obvious that the AAC has duped or misled the AAC civilian population (GS-14s and -15s) into believing that they can compete for the PM jobs! What does appear true is that the civilian AAC workforce is justifying PM positions for the military to fill!

The sustaining forces behind Acquisition, the Acq Corps, and Acq Workforce are civilians. They provide consistency and length of experience, necessities to successful acquisition, but not the qualities that apparently make for promotion to top positions!

**Disillusioned AC Member!**
**J.W.**

*Response From The Acquisition Career Management Office:*

Dear Sir,

We appreciate your concerns about civilian employee selections for project or product manager (PM) positions. We need to remember, however, that the selection board has been carefully configured to be a Best-Qualified (BQ) Board. This ensures that the individuals (military or civilian) selected to serve in the difficult and critical position of PM are the most highly qualified. This is the primary reason why we do not support setting floors for civilian selections.

We would also like to emphasize an important factor not cited in your letter: the "available eligible population." The 46 (COL)/259 (LTC) PM applicants who were military represent a large portion of the eligible population. Of the 37 (GS-15)/44 (GS-14) civilian applicants, however, the eligible population was approximately 4,200/5,900 civilian employees respectively. That corresponds to less than 1 percent of the eligible population. With such a large disparity for all potential eligible applicants, the civilian selection rates are not as surprising as one might have originally thought.

Those of us in the Acquisition Career Management Office, and our counterparts, continually strive to assist civilian employees so that they may better compete in BQ Selection Boards. Ongoing efforts such as the AAC's Roadshows and accompanying Acquisition Workforce briefings are provided on a year-round basis to disseminate information on how to produce a competitive package for these board opportunities. In addition, we are supporting a pilot program to regionalize the PM application process to encourage more highly qualified civilians to apply. While we cannot comment on the selection or nonselection of individual selection board applicants, we remain committed to the process of selecting the best qualified applicants for PM positions.

*Response From The Total Army Personnel Command:*

A number of factors affect the selection rate of civilians vs. military personnel. One of the most obvious is the small number of civilians applying for these positions. Several initiatives are being implemented to encourage a greater number of civilians to apply. Some of these initiatives may be available to PM applicants as early as the FY00 board.

In general, however, because civilians tend to remain in one job and location for extended periods, they are less competitive with their military counterparts because of their chosen career paths. Another key issue is training and education. Military personnel view training and education as part of their career while civilians tend to view it as an interruption to their career. Previous after-action board reports indicate that the configuration of the board file is important. We've revised the layout of the board file to make it more closely resemble the military file. We've also added the requirement for a Senior Rater Potential Evaluation (SRPE), which is helping to make the civilian file similar to the military file. We recognize that the SRPE is a new concept for our employees and the senior raters, and that more training is needed to ensure that the ratings are a valuable resource for the board members.

The U.S. Total Army Personnel Command works very closely with the Acquisition Career Management Office and the Office of the Deputy Chief of Staff for Personnel to ensure that acquisition civilians receive fair and equitable consideration by every board. In addition, senior civilian acquisition professionals sit on all boards where civilians are considered.

# PERSONNEL

# Link Takes Over As Army Materiel Command DCG

LTG James M. Link, former Chief of Staff, U.S. Army Materiel Command (AMC), has assumed new duties as AMC Deputy Commanding General (DCG).

A veteran of more than 30 years military service, Link has served in a broad range of assignments, including Commanding General, U.S. Army Missile Command (now the Aviation and Missile Command), Redstone Arsenal, AL; Deputy Commander, 21st Theater Army Area Command, U.S. Army Europe and Seventh Army, Germany; DCG, U.S. Army Missile Command, Redstone, AL; Deputy Commander for Training Development, U.S. Army Combined Arms Support Command, Fort Lee, VA; and Commander, 16th Corps Support Group, U.S. Army Europe and Seventh Army, Germany.

His academic credentials include an M.B.A. degree in business administration from the University of Tennessee and a B.A. degree in history from Methodist College. He has also completed the Ordnance Officer Basic and Advanced Courses, Supply Management Officer Basic Course, U.S. Army Command and General Staff College, and Industrial College of the Armed Forces.

Link is a recipient of the Distinguished Service Medal, Legion of Merit with three Oak Leaf Clusters (OLCs), Bronze Star Medal with two OLCs, Meritorious Service Medal with three OLCs, Army Commendation Medal with OLC, Army Achievement Medal, Senior Parachutist Badge, and the Army Staff Identification Badge.

# Le Moyne Takes Over As Assistant DCSPER

MG John M. Le Moyne, former Chief of Staff, U.S. Army Europe and Seventh Army, Germany, has succeeded MG David H. Ohle as Assistant Deputy Chief of Staff for Personnel, Department of the Army.

With more than 29 years of active military service, Le Moyne has served earlier tours as Deputy Chief of Staff for Operations, U.S. Army Europe and Seventh Army, Germany; Executive Officer to the Supreme Allied Commander, Europe, Supreme Headquarters, Allied Powers Europe; Assistant Division Commander, 2d Armored Division, Fort Hood, TX; Exchange Student, British Royal College of Defense Studies, London, England; and Commander, 1st Brigade, 24th Infantry Division (Mechanized), Fort Stewart, GA.

He holds an M.S. degree in public administration from Shippensburg State College and a B.S. degree in business administration from the University of Florida. In addition, he has completed the Infantry Officer Basic Course, the Armor Officer Advanced Course, the U.S. Marine Corps Command and Staff College, and the U.S. Army War College.

Listed among his military honors are the Defense Distinguished Service Medal, Legion of Merit (with two Oak Leaf Clusters (OLCs)), the Bronze Star Medal with "V" devices (with two OLCs), the Bronze Star Medal (with three OLCs), the Purple Heart, the Meritorious Service Medal (with four OLCs), the Army Commendation Medal with "V" devices (with OLC), the Army Commendation Medal (with two OLCs), and the Army Achievement Medal.

## Ayala Receives Two Key Awards

Dr. John F. Ayala, a Department of the Army employee, received the 1998 Army Materiel Command (AMC) Engineer of the Year Award at the National Society of Professional Engineers (NSPE) annual awards luncheon earlier this year. Ayala was AMC's nominee for the NSPE Federal Engineer of the Year Award, which is presented to the outstanding Registered Professional Engineer from the federal sector.

Last year, Ayala received the 1997 Outstanding Technical Achievement Military Award at the Ninth Annual Hispanic Engineer National Achievement Award Conference. That award recognizes outstanding Hispanic engineers for their contributions in the engineering field and for their achievements as role models for Hispanic youths seeking engineering and science careers.

Ayala received both of these awards specifically for his contributions in revolutionizing manufacturing processes at the Corpus Christi Army Depot (CCAD). His implementation of the "Design of Experiments" Program on the T700 Engine Program (Blackhawk) improved overall product quality, reduced engine cycle time, and reduced production costs by $1.1 million annually. His leadership in the Rotary-Wing Aircraft Sustainment Project resulted in a long-range strategy for analyzing and applying leading edge technology to the repair and maintenance of rotary-wing aircraft. Additionally, his contribution to the statistical process control (SPC) for the Job Shop and Sustainment Operations Program will completely automate the SPC requirements for selected machining operations at the CCAD, thus improving cost effectiveness and overall operations.

Ayala recently completed a developmental assignment in the Office of the Assistant Secretary of the Army for Research, Development and Acquisition and has accepted a position as the Combat Developer's Representative at the U.S. Army Medical Command, Fort Sam Houston, TX. He has both a D.E. degree in engineering and an M.S.I.E. from Texas A&M University, and a B.S.E.E. from St. Mary's University in San Antonio, TX.

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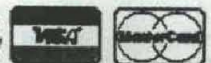Company or personal name _____ (Please type or print)

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# *ARMY RD&A* WRITER'S GUIDELINES

## About *Army RD&A*

*Army RD&A* is a bimonthly professional development magazine published by the Office of the Assistant Secretary of the Army (Research, Development and Acquisition). The address for the Editorial Office is: DEPARTMENT OF THE ARMY, ARMY RD&A, 9900 BELVOIR RD, SUITE 101, FT BELVOIR VA 22060-5567. Phone numbers and e-mail addresses for the editorial staff are as follows:

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## Purpose

To instruct members of the RD&A community relative to RD&A processes, procedures, techniques and management philosophy and to disseminate other information pertinent to the professional development of the Army Acquisition Workforce.

## Subject Matter

Subjects may include, but are not restricted to, professional development of the Army's Acquisition Workforce, RD&A program accomplishments, technology developments, policy guidance, information technology, and acquisition reform initiatives. Articles containing footnotes are not acceptable. Acronyms used in manuscripts and with photos must be kept to a minimum and must be defined on first reference.

## Length of Articles

Articles should be approximately 1,500 to 1,600 words in length. This equates to approximately 8 double-spaced typed pages, using a 20-line page. Do not submit articles in a layout format.

## Photos and Illustrations

A maximum of 3 photos or illustrations, or a combination of both, may accompany each article. Photos may be black and white or color. **Illustrations must be black and white, in PowerPoint, and must not contain any shading, screens or tints**. Not all photos and/or illustrations may be used and they will not be returned unless requested.

## Biographical Sketch

Include a short biographical sketch of the author/s. This should include the author's educational background and current position.

## Clearance

All articles must be cleared by the author's security/OPSEC office and public affairs office prior to submission. The cover letter accompanying the article must state that these clearances have been obtained and that the article has command approval for open publication.

*Offices and individuals submitting articles that report Army cost savings must be prepared to quickly provide detailed documentation upon request that (1) verifies the cost savings; and (2) shows where the savings were reinvested. Organizations should be prepared to defend these monies in the event higher headquarters have a higher priority use for these savings. All Army RD&A articles are cleared through SARD-ZAC. SARD-ZAC will clear all articles reporting cost savings through SARD-RI. Questions regarding this guideline can be directed to SARD-ZAC, Acquisition Career Management Office, (703)604-7103, DSN 664-7103.*

## Submission Dates

| Issue | Author's Deadline |
|---|---|
| January-February | 15 October |
| March-April | 15 December |
| May-June | 15 February |
| July-August | 15 April |
| September-October | 15 June |
| November-December | 15 August |

## Submission Procedures

Article manuscripts (in MS Word) and illustrations (in PowerPoint) may be submitted via e-mail to **bleicheh@aaesa.belvoir.army.mil**, or on a 3 1/2-inch floppy disk via U.S. mail to DEPARTMENT OF THE ARMY, ARMY RD&A, 9900 BELVOIR RD, SUITE 101, FT BELVOIR VA 22060-5567. Photos may be e-mailed *for review purposes only*, but glossy prints must be sent via the U.S. mail. All submissions must include the author's mailing address, office phone number (DSN and commercial), and a typed, self-adhesive return address label.

FORCE XXI