



ARMY AL&T

May - June 2005



SCIENCE & TECHNOLOGY INNOVATIONS



From the Army Acquisition Executive

How S&T Is Enabling the Current and Future Force

One of my job's privileges is the opportunity to meet the courageous men and women who serve our Nation. They are smart, resourceful and confident. They wield with extraordinary ease the most technologically advanced weaponry on Earth, and they do so with great skill. Our Soldiers take the technology that we provide them and use it — not only in the way it was designed, but in other innovative ways as well. Let me give you an example.



I enjoy trivia, and one of my favorite factoids involves a picture of Soldiers on horseback. My question: "When was the horse last used in combat?" I get various answers, but the right one is "during *Operation Enduring Freedom*." In the early days of the war in Afghanistan, we saw our Special Forces on horseback using satellite communications to connect 19th century horse cavalry with 20th century B-52 bombers to produce a 21st century capability that put bombs on target with precision. It was a very dramatic example of our application of technology combined with the resourcefulness and skill of our warfighters.

Our Soldiers embrace new technology. In their drive on Baghdad, the 3rd Infantry Division (3ID) took with them every piece of new technology available. We saw the Army's first combat employment of Blue Force Tracking (BFT) — satellite communications on the move — and it was a huge success. For example, during a blinding sandstorm that lasted for several days in late March 2003, a U.S. radar plane detected an Iraqi Republican Guard unit maneuvering near U.S. troops. Bombers moved in to attack using satellite-guided bombs that were unaffected by poor visibility. BFT ensured that commanders knew the locations of friendly units. Both our ground forces and our aircraft pilots praised this situational awareness (SA) tool.

Many advancements have been made in the last few years, including the comprehensive, Joint and rapid work to combat improvised explosive devices (IEDs) through the Joint IED Defeat Task Force; to provide improved individual Soldier equipment through the Rapid Fielding Initiative; and to introduce new technological solutions to the battlefield through Rapid Equipping Force initiatives.

Early last year, nearly every IED attack resulted in a coalition casualty. Today, through personal body armor, improved protection in vehicle up-armoring, electronic countermeasures, greater SA and better training and operational focus, we have significantly reduced this ratio to about one casualty for every four IED detonations — and we will continue to drive down this ratio. We do this through a holistic approach to force protection — personal body armor, vehicle armor and electronic shields.

The Army has balanced materiel solutions with innovations in both the organization of our forces and in unit level tactics and training. At Fort Polk, LA, every Army Soldier bound for Iraq now undergoes training to counter roadside bomb attacks.

Our Soldiers are better protected and better trained because of the smart application of technology.

Remote-controlled robots inspect bombs up close and keep our Soldiers out of harm's way. These robots, and others like the PackBot that was first used to clear caves in Afghanistan, are making a huge difference.

It is clear that we have to think out of the box when it comes to force protection. A new, low-cost, unmanned drone equipped with high-quality surveillance is now being tested at Yuma Proving Ground, AZ. For a moving convoy, this technology would provide a live video feed directly from the drone flying above to tell our Soldiers what danger might be down the road before they encounter it.

Because of our experiences in Iraq, we are getting a clear picture of what kind of power a fully networked system could bring to the commander and the Soldier. In the same way the 3ID leveraged new technology in its drive on Baghdad, we will take the Future Combat Systems (FCS) components as they become available and spiral them into the Current Force and reorganize the Current Force into modular forces. FCS is our largest, most promising science and technology investment. It consists of 18 systems, plus the continued expansion of the network and capabilities to the Soldier — all designed to function as a single, integrated system. Fielding FCS is essential to providing the kind of lethal, agile forces we envision are required for future full-spectrum operations.

As ongoing operations in Iraq and Afghanistan illustrate, our technological and training superiority is a critical ingredient to our battlefield success. It must be maintained. By focusing development efforts on promising technologies and spiraling these enhanced capabilities into the Current Force, our Soldiers retain technological overmatch. Just as our Soldiers are adapting to meet challenges of contemporary, asymmetric operating environments, our Army is also changing how innovative technologies are being developed and introduced to our combatant commanders and their warfighters.

It is very important that we work hard together to provide our Soldiers what they need as quickly as possible. As Army Vice Chief of Staff GEN Richard A. Cody says, "All our Soldiers ask of us is great leadership and the right equipment and training. We can't let them down."

Claude M. Bolton Jr.
Army Acquisition Executive



ARMY AL&T

May - June 2005

ACQUISITION, LOGISTICS & TECHNOLOGY

PB 70-05-03

CLAUDE M. BOLTON JR.

Assistant Secretary of the Army for Acquisition, Logistics and Technology and Army Acquisition Executive

EDITORIAL BOARD

LTG JOSEPH L. YAKOVAC JR.
Director, Army Acquisition Corps

LTG STEVEN W. BOUTELLE
Chief Information Officer, G-6

LTG RICHARD A. HACK
Deputy Commanding General, AMC

MARK LEWIS
Assistant DCS, G-1

COL JAMES A. ROMANO
Acting Commanding General
U.S. Army Medical Research
and Materiel Command

TINA BALLARD
Deputy Assistant Secretary
for Policy and Procurement
Office of the ASAALT

WIMPY PYBUS
Deputy Assistant Secretary for ILS
Office of the ASAALT

DR. THOMAS H. KILLION
Deputy Assistant Secretary
for Research and Technology
Office of the ASAALT

DR. MICHAEL O'CONNOR
Director of R&D
U.S. Army Corps of Engineers

THOMAS E. MULLINS
Acting Deputy Assistant Secretary
for Plans, Programs and Resources
Office of the ASAALT

MICHAEL I. RODDIN
Executive Secretary, Editorial Board

EDITORIAL STAFF

MICHAEL I. RODDIN
Editor-in-Chief

MAJ DENNIS B. ELLISON
Operations Officer/Technical Editor

CYNTHIA D. HERMES
Executive Editor

ELIZABETH CONNELL
Managing Editor

DEBBIE FISCHER-BELOUS
Departments Editor

WHITNEY F. KOENIGER
Deputy Departments Editor

MEG WILLIAMS
Web Editor

NOJAE KIM
Layout and Graphic Design

To contact the Editorial Office:

Call (703) 805-1034/1035/1038/1007 or
DSN 655-1034/1035/1038/1007

Articles should be submitted to:
DEPARTMENT OF THE ARMY, ARMY ALT, 9900
BELVOIR RD, SUITE 101, FORT BELVOIR, VA 22060-5567.

Our fax number is (703) 805-4218.
E-mail: army.alt.magazine@asc.belvoir.army.mil.

Army AL&T (ISSN 0892-9657) is published bimonthly by the ASAALT. Articles reflect views of the authors and not necessarily official opinion of the Department of the Army. The purpose is to instruct members of the Army acquisition workforce relative to AL&T processes, procedures, techniques and management philosophy and to disseminate other information pertinent to their professional development. Private subscriptions and rates are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 or (202) 512-1800. Periodicals official postage paid at Fort Belvoir, VA, and additional post offices. POSTMASTER: Send address changes to DEPARTMENT OF THE ARMY, ARMY ALT, 9900 BELVOIR RD, SUITE 101, FORT BELVOIR, VA 22060-5567. Articles may be reprinted if credit is given to *Army AL&T* and the author. Unless specifically requested, photo credits are not given. Approved for public release; distribution is unlimited.

Cover Story



The Army's Science and Technology Strategy

Dr. Thomas H. Killion and
Dennis Schmidt

Page 4

Features

Army Basic Research

Dr. John A. Parmentola

Page 10



Ensuring the Army Maintains Its Technological Edge

Steven Schehr and Antonio F. Fiuza

Page 21

Soldier S&T Initiatives Support Current Operations and Future Force Warrior Technological Development

Philip Brandler and Edward Crivello

Page 26



Measuring Human Performance in Battle Command 16
Dr. Carl W. Lickteig, William R. Sanders, Dr. Paula J. Durlach and Dr. James W. Lussier

Improving Soldier Learning and Performance Through Simulation and Training Technologies 31
Robert A. Sottolare

Military Infectious Disease Research — Preventing Debilitating Disease and Developing Response Strategies 36
COL (Dr.) Kip Hartman and Gary Wheeler

Leveraging Combat Casualty Care Solutions Today 39
MAJ Robert M. Wildzunas



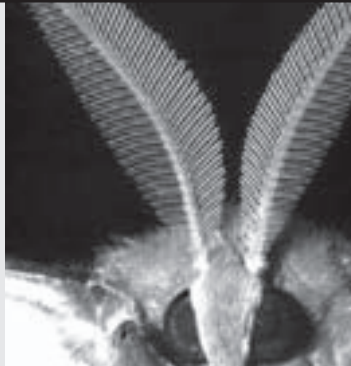
**ARMY
AL&T**
May - June 2005

ACQUISITION, LOGISTICS &
TECHNOLOGY

Army AL&T Magazine Editor-in-Chief Wins Secretary of the Army Award

Secretary of the Army Francis J. Harvey and Army Vice Chief of Staff GEN Richard A. Cody presented the Secretary of the Army Editor of the Year Award (Departmental) to *Army AL&T* Magazine Editor-in-Chief Mike Roddin at a ceremony held at the Pentagon May 9, 2005.

Roddin was recognized for his outstanding writing and editing skills while redesigning and rejuvenating *Army AL&T* Magazine. For more information, see the article on Page 66.



Army Basic Research – Creating Extraordinary Opportunities for a Capabilities-Based Army

Dr. John A. Parmentola and Irena D. Szkrybalo

Page 44

Corps of Engineers Research Addresses Training Range Sustainability

John H. Ballard, Paul M. Loechl and Elisabeth M. Jenicek

Page 50



LTG Joseph L. Yakovac Jr. Discusses Key Workforce Issues

Cynthia D. Hermes

Page 54

The 2005 Army Acquisition Workforce Conference 60
Cynthia D. Hermes

Army AL&T Magazine Editor-in-Chief Wins Secretary of the Army Award 66

Call for AAEA Nominations. 67

Departments

Career Development Update 68

News Briefs 72

Contracting Community Highlights 82

For more news, information and articles, please visit the ASC Web site at <http://asc.army.mil>. Click on **Portal** and then click on the **AL&T Magazine** link under **Publications**.

This medium is approved for official dissemination of material designed to keep individuals within the Army knowledgeable of current and emerging developments within their areas of expertise for the purpose of enhancing their professional development.

By order of the Secretary of the Army
PETER J. SCHOOMAKER
General
United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the Secretary of the Army
0514502

SCIENCE AND TECHNOLOGY INNOVATIONS

This special edition of *Army AL&T Magazine* focuses on the Army acquisition community's uniformed and civilian scientists, researchers and engineers whose latest technological developments, research, experimentation, skillful innovation and engineering design and development integration are swiftly transforming the Army from the Current to Future Force. The articles herein focus on the landmark research and development initiatives taking place at the Army's technical, testing and engineering centers and research laboratories. The Army's science and technology (S&T) community serves one overarching purpose — to enhance the lethality, survivability and sustainability of our Soldiers wherever the battlefield or mission takes them.

In partnership with industry and academia, Army scientists, researchers and engineers are making a difference every day in the lives of our warfighters through dedicated research; project management; and new product development, testing, evaluation and fielding. As the Army adapts to meet the omnipresent threats of global terrorism, urban warfare and an increasingly complex battlefield, the S&T community is harnessing tomorrow's technological advances today to provide world-class, network-centric weapons and communications systems that support a campaign-quality Army with a Joint and expeditionary mindset.

Emerging technological developments and innovations are helping to rapidly spiral solutions to fulfill combatant commanders' battlespace requirements while also providing enhanced force protection, security and logistics and medical support for our deployed brigade combat teams and units of action. The S&T community is the premier integrator and developer of strategically responsive, highly supportable warfighting, intelligence and communications systems that provide Army and Joint organizations with unprecedented capabilities to successfully engage the enemy in full-spectrum operations worldwide in any environment and under any weather conditions, night or day.

I invite you to read these articles — and others in our Web Edition at <http://asc.army.mil/pubs/alt/default.cfm> — to gain a better understanding and appreciation for these men and women of vision whose innovations are helping map and better define the unexplored reaches of the science and technology frontier.

Editor-in-Chief

Soldiers from the 725th Ordnance Co. (Explosive Ordnance Disposal (EOD)) deploy a robot to investigate a possible IED outside Al Iskandariyah, Iraq, March 26, 2005. Robotic and electronic warfare technology are helping our Soldiers defeat radio-controlled IEDs and mines from safe stand-off distances. (U.S. Air Force photo by Airman 1st Class Kurt Gibbons III.)

The Army's Science and Technology

Dr. Thomas H. Killion and Dennis Schmidt

With our Army at war, the Army's science and technology (S&T) strategy is to mature technology to ensure our Soldier's dominance on the battlefield today and in the future. As the S&T community simultaneously invests in research and development (R&D) to create new understanding, it is translating that research into militarily useful mature technology that is relevant to today's operational environments. Today's S&T investments are essential for exploiting technology opportunities that will speed solutions for enhancements to Current Force systems and better enable a technologically advanced Future Force. The S&T strategy is implemented through a diverse and dynamic investment portfolio that is synchronized with warfighter needs to ensure responsiveness.

DARPA's S&T investments in spiraled, mature technology have led to networked battle command systems that enable shared SA and improved battlefield decision making. Here, Soldiers from B Co., 1st Battalion, 5th Infantry Brigade, 25th Infantry Division (Light) Stryker Brigade Combat Team use networked SA to relay information to the command group while on patrol near Mosul, Iraq, March 31, 2005. (U.S. Air Force photo by TSGT Mike Buytas, 1st Combat Camera Squadron.)

and Technology Strategy

The Army is maintaining its commitment to transform into a lighter, more lethal and strategically responsive force. The Army's transformation is framed to support the overall DOD transformation and is focused on building a campaign-quality force with Joint and expeditionary capabilities. Similarly, the S&T program is synchronized with developments across DOD, other federal agencies, academia and industry partners in the United States and abroad. The Army S&T program is contributing to the global war on terrorism (GWOT) today by enabling limited fielding of advanced technologies and providing in-theater technical expertise.

S&T Contributions to GWOT

Army S&T supports our Soldiers fighting the GWOT in three ways:

- We are benefiting today from technologies that emerged from past R&D investments.
- We are exploiting transition opportunities from ongoing S&T efforts.
- We are leveraging the expertise of Army scientists and engineers to develop solutions for potential challenges.

To better illustrate how returns on past investments are benefiting Soldiers on the battlefield today, let's examine the groundbreaking R&D done at the Natick Soldier Center (NSC) in advanced fiber technologies. Since the mid-1980s, in partnership with industry, NSC has labored to create lighter weight ballistic protection for Soldiers. This research produced the technologies to develop the outer tactical vest and components for the Small Arms Protective Insert plates (SAPI plates) that are used by Soldiers deployed worldwide today. In fact, we've increased our industrial base capacity from making 1,200 sets of SAPI plates a month to 25,000 sets per month.

Another example of how the S&T community is helping wage the GWOT is by exploiting technologies from current investments. Radio frequency jamming technology solutions from investments in our electronic warfare technology program have been incorporated into the family of Warlock systems that are being used to defeat radio-controlled improvised explosive devices (IEDs) in

Afghanistan and Iraq. This new technology has saved countless Soldier and civilian lives from insurgent-placed IEDs.

Likewise, by leveraging S&T expertise to solve unforeseen or potential problems, engineers at the Army Research Laboratory (ARL) and Tank

Automotive Research, Development and Engineering Center (TARDEC) have gained extensive experience in designing armor and appliques for Army combat vehicles. This team rapidly responded to a critical battlefield need by designing and demonstrating armor survivability kits (ASKs) for Humvees as

well as M939 and M35 series vehicles to provide protection against small-arms fire and IED fragments. (Editor's Note: See the Nov-Dec 2004 issue of *Army AL&T Magazine*, Pages 68-70.) These ASKs have now been installed on more than 12,000 Humvees and nearly 1,500 medium and heavy trucks deployed to support the GWOT.

Collectively, these efforts are enhancing Current Force capabilities for fighting the GWOT by applying

The Army is maintaining its commitment to transform into a lighter, more lethal and strategically responsive force.

relevant technologies to satisfy existing and emerging operational requirements.

S&T Contributions for the Future Force

Soldiers are the center of the Army's transformation focus. Army S&T supports the Soldier-as-a-System (SaaS) concept to equip Soldiers with integrated modular ensembles that can be tailored to specific missions. These ongoing efforts are described in the NSC article on Page 26 of this issue of *Army AL&T Magazine*. More specifically, S&T efforts in training and leader development have led to breakthrough training management tools to improve the effectiveness of interactive distributed training systems and methodologies that use realistic synthetic experience to accelerate the development of critical thinking and interpersonal communication skills. The Army Research Institute and the Simulation and Training Technology Center describe several of these efforts in the article on Page 31.

Future Combat Systems (FCS)

We have a significant S&T investment in FCS technology. The FCS system development and demonstration program is taking advantage of past Army S&T investments as well as those jointly developed with the Defense Advanced Research Projects Agency (DARPA) to achieve initial fielding in 2014. Today's S&T program continues to pursue FCS technologies for spiral insertions. Key FCS S&T investments include:

- Networked battle command systems that enable shared situational awareness (SA) and improved decision making.

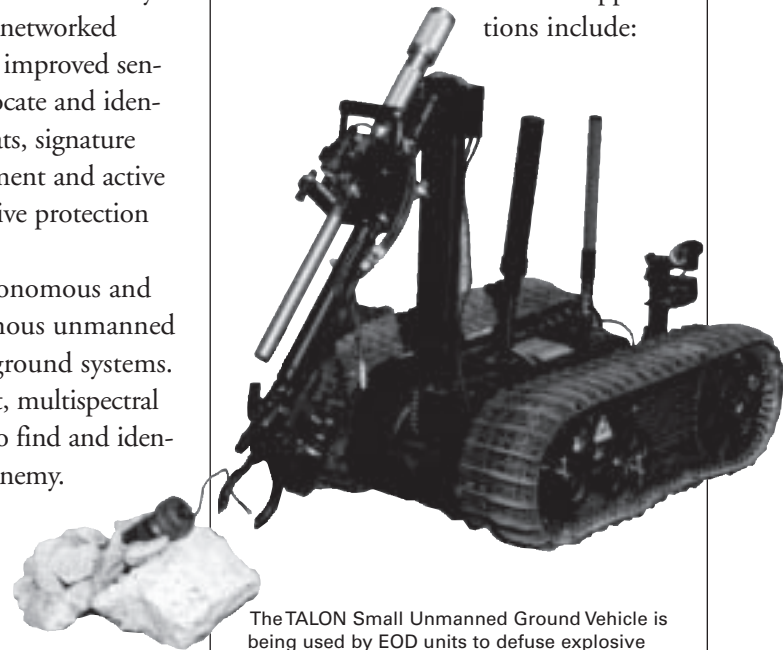
The Army S&T program is contributing to the global war on terrorism today by enabling limited fielding of advanced technologies and providing in-theater technical expertise.

• Networked lethality through standoff precision missiles and gun-launched munitions.

- Enhanced survivability through networked lethality, improved sensors to locate and identify threats, signature management and active and passive protection systems.
- Semiautonomous and autonomous unmanned air and ground systems.
- Low-cost, multispectral sensors to find and identify the enemy.

reduce risks to Soldiers while simultaneously reducing logistics demand generated by operational requirements.

Potential applications include:



The TALON Small Unmanned Ground Vehicle is being used by EOD units to defuse explosive ordnance. In addition, radio frequency jamming technologies have been incorporated into the family of Warlock systems that are being used to defeat radio-controlled IEDs. (U.S. Army photo by Mike Roddin.)

Unmanned Aerial and Ground Systems

The FCS-equipped Unit of Action (UA) will be the first Army organization designed to integrate unmanned systems and manned platforms into ground maneuver combat operations. Army S&T is developing unmanned and robotic capabilities that include: unmanned aerial vehicles (UAVs), unmanned ground vehicles, unattended sensors and unattended munitions. These systems' capabilities will be modular in design for rapid adaptation to changes in mission needs.

The unmanned and unattended systems can be used in maneuver, maneuver support and maneuver sustainment roles to augment Soldier capabilities. The unmanned systems and technology applications provide for capabilities that are not available today and

• Increased standoff detection capabilities of FCS-equipped UAs to improve commanders' ability to shape the battlespace and set conditions for decisive operations in less time.

- Increased UA capabilities for extended periods during economy of force and distributed operations.
- Ability to allocate solely unmanned systems with lethal capabilities in selected battlespace areas through networked battle command.
- Sustained UA maneuver operations through standoff mine detection and neutralization.

The FCS-equipped Unit of Action will be the first Army organization designed to integrate unmanned systems and manned platforms into ground maneuver combat operations.

Force Protection

Our first priority is to provide the best available technology to

protect our Soldiers. Our system-of-systems approach includes: Interceptor Body Armor, electronic countermeasures (Warlock) and lightweight armor kits for tactical vehicles. Other examples include:

- Acoustic and radar sensors for detecting and locating the source of rocket, artillery and mortar fire.
- Infrared technology for countersniper operations, providing warning and locations for counter fire.
- Medical technology to protect Soldiers from endemic diseases and

APS will significantly increase the survivability of lightweight platforms. We are funding both close-in and standoff protection systems to defeat chemical energy and kinetic energy munitions.

provide rapid treatment to save lives, such as the Chitosan Bandage and one-handed tourniquet.

The S&T community continues to make significant progress in maturing the sensor and kill mechanism technologies to enable full-spectrum active protection systems (APS). APS will significantly increase the survivability of lightweight platforms. We are funding both close-in and standoff protection systems to defeat chemical energy and kinetic energy munitions. We are sustaining investments in APS technologies and

advanced lightweight armors to enable an integrated survivability suite for FCS and other lighter weight combat systems.

In the past year, we demonstrated the ability to defeat rocket-propelled grenades (RPGs) fired from very close ranges. Our APS technology defeated the following RPG threats in two different scenarios:

- A single RPG fired against a moving vehicle.
- Two RPGs fired nearly simultaneously at a stationary vehicle.

Other S&T Initiatives

The Army's diverse S&T portfolio invests in a range of technologies to provide solutions across a spectrum of desired capabilities beyond those already discussed for FCS and SaaS. These

ARL and TARDEC engineers and scientists have gained extensive experience in designing armor appliques for Army tactical vehicles. ARL/TARDEC-designed ASKs for Humvees and other medium and heavy trucks help provide protection against small-arms fire and IEDs. (U.S. Army photo.)



other initiatives pursue technology solutions to satisfy capability gaps across the entire force. Examples of these investments include:

- Mobile, secure and self-organizing networks for seamless Joint operations.
- Countermine and counter-IED technology for combat and stability operations.
- Lightweight, multimission equipment packages for unmanned systems.
- Immersive simulations and virtual environment technologies for Soldier, leader and unit mission rehearsal and training.
- Embedded prognostics and diagnostics to reduce logistical demands for materiel systems.

- Expedient protective designs, lightweight/blast-resistant materials, pre-detonation screens and other protective barriers for base protection from rocket, artillery and mortar attacks.
- Alternative and variable lethality mechanisms including high-power microwave, high-power lasers and electromagnetic guns.
- Medical technology for self-diagnosing and treating “uniform” ensembles.
- Genomic, DNA-based vaccines to sustain Soldier and unit combat effectiveness.

Technology Partnering

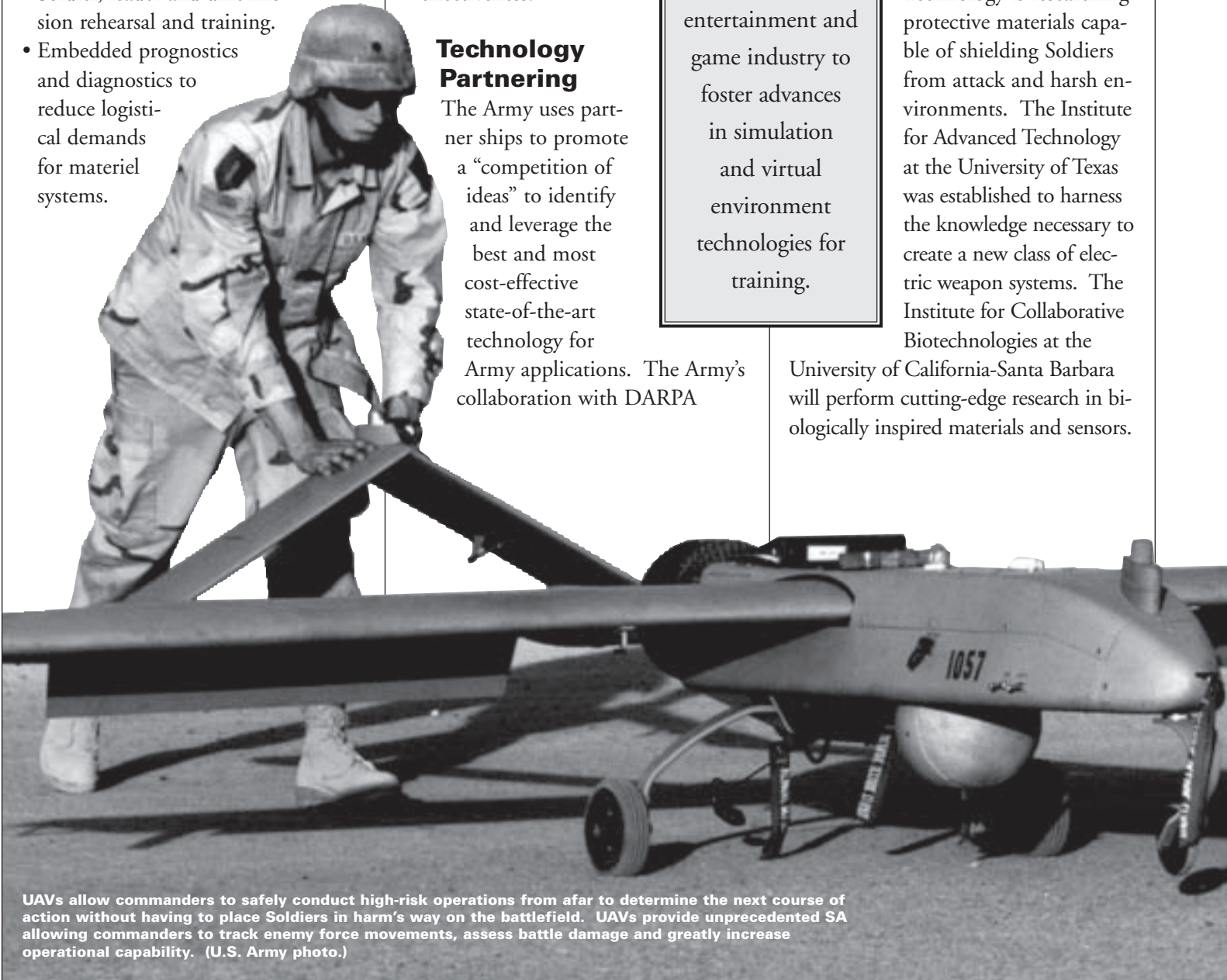
The Army uses partnerships to promote a “competition of ideas” to identify and leverage the best and most cost-effective state-of-the-art technology for Army applications. The Army’s collaboration with DARPA

on FCS is an outstanding example of technology partnering. In addition, the Army has established University Affiliated Research Centers (UARCs) to address paradigm-shifting technologies in cooperation with academia and industry. The Institute for Creative Technologies (ICT) at the University of Southern California leverages the resources of the entertainment and game industry to foster advances in simulation and virtual environment technologies for training. The Insti-

ICT leverages the resources of the entertainment and game industry to foster advances in simulation and virtual environment technologies for training.

tute for Soldier Nanotechnologies at the Massachusetts Institute of Technology is researching protective materials capable of shielding Soldiers from attack and harsh environments. The Institute for Advanced Technology at the University of Texas was established to harness the knowledge necessary to create a new class of electric weapon systems. The Institute for Collaborative Biotechnologies at the

University of California-Santa Barbara will perform cutting-edge research in biologically inspired materials and sensors.



UAVs allow commanders to safely conduct high-risk operations from afar to determine the next course of action without having to place Soldiers in harm’s way on the battlefield. UAVs provide unprecedented SA allowing commanders to track enemy force movements, assess battle damage and greatly increase operational capability. (U.S. Army photo.)

The work being orchestrated by the UARCs and other major R&D efforts in the Army's research program are described more fully in articles on Army basic research programs in this issue of *Army AL&T Magazine*.

The Army's new Flexible Display Center at Arizona State University-Tempe (see Page 72) will partner with industry, other universities and the government to advance flexible display technology and manufacturing for unique Soldier applications. The Army's goal is to demonstrate the technology for rugged, low-power flexible displays that will provide enhanced information and SA for Soldier and vehicle platforms.

The Army has also aggressively pursued a business innovation to exploit technology opportunities through a venture capital corporation (VCC). The VCC's goal is to develop "better collaborative ties with the young, small, growth-oriented companies that take risks and push innovation." The Army VCC focuses on its investment activities with companies

and programs developing power and energy technology applicable for individual Soldier requirements. This effort's first success is the development and fielding of a battery state-of-charge indicator, enabling Soldiers to start a mission with confidence that the batteries they carry are charged and mission capable.

Manufacturing Technology (MANTECH)

The Army MANTECH program's goal is to make advanced technology affordable and producible. Ultimately,

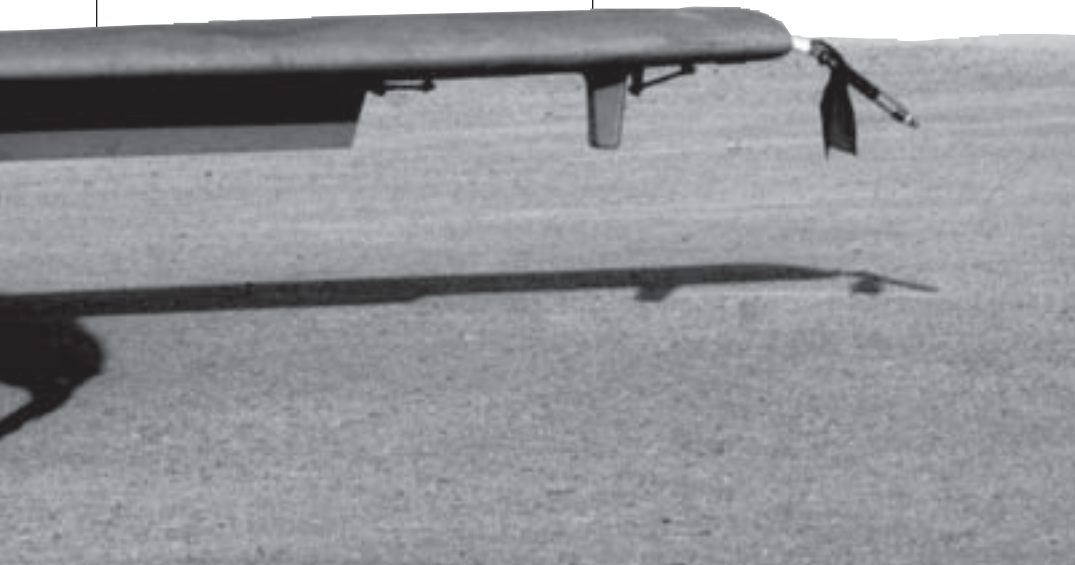
The Army's goal is to demonstrate the technology for rugged, low-power flexible displays that will provide enhanced information and SA for Soldier and vehicle platforms.

the Army benefits from enhanced capabilities and reduced total ownership costs. The Army focuses its MANTECH program on manufacturing challenges in armor, electronics/power systems, munitions and sensors to overcome barriers to affordable production and to increase the production yield of advanced technologies for Current and Future Force systems. MANTECH investment strategy advocates transitioning technology directly to acquisition program managers and industry.

The Army's scientists and engineers are focused on achieving results. Our results-oriented approach relies on a close partnership with our warfighting customers and the wider S&T community. Our pursuit of innovation exploits technical capabilities in the other services, agencies, international resources, industry and academia. The Army's focused and balanced S&T portfolio is providing solutions for the Current Force today while investing in and demonstrating technologies for the Future Force.

DR. THOMAS H. KILLION is the Army's Deputy Assistant Secretary for Research and Technology (R&T)/Chief Scientist. He earned B.A. degrees in psychology and English from Saint Mary's College and a Ph.D. in experimental psychology from the University of Oregon. Killion oversees the Army's R&T program, which encompasses all Army laboratories and research, development and engineering centers.

DENNIS SCHMIDT is the Director, S&T Integration, Office of the Deputy Assistant Secretary for R&T. He assumed this position after a fellowship at the National Defense University's Center for Technology and National Security Policy. He holds a B.S. in aeronautical science from Embry-Riddle Aeronautical University and an M.A. in business management from Central Michigan University.



Army Basic Research

Dr. John A. Parmentola

“The vastness of return is illustrated by the fact that the total cost of all basic research, from Archimedes to the present, is less than the value of 10 days of the world’s present production.”

Victor Weisskopf
Physics Today, August 1969

Basic research is a process that seeks to discover certainty in an uncertain world. This is achieved through the integrated application of systemic observations, theories, experimental methods and models of natural phenomena and instrumentation to make precise measurements of fundamental phenomena. An important outcome of basic research is the understanding of, and the ability to reliably predict, natural phenomena. When exploited through human imagination, this knowledge creates a future rich in innovative technologies for both military and commercial applications. Basic research’s fundamental role has been demonstrated numerous times throughout human history and accounts for the vast majority of technologies and capabilities we enjoy today.

Three ARL scientists work on a II-VI Molecular Beam Epitaxy (MBE) machine that is used at ARL to create thin layers of mercury cadmium telluride for infrared sensors. (Photo courtesy of ARL.)

Below are some examples of Army-funded basic research that resulted in entirely new discoveries and enabled revolutionary capabilities:

- The principles for the maser and laser by Dr. Charles Townes (Columbia University), 1964 Nobel Prize winner in physics; and development of non-linear optics and laser spectroscopy by Drs. Nicolaas Bloembergen (Harvard University) and Arthur Schawlow (Stanford University and Bell Labs), who shared the 1981 Nobel Prize in physics for this work. These three scientists' efforts have made the laser ubiquitous in weapon systems across the battlefield and in commercial applications throughout the world.
- Fundamental work on atomic beams, including work that provides the basis for modern timekeeping, conducted by Dr. Gerald Zacharias. Another Army-supported researcher, Dr. Hans Dehmelt, who won the 1989 Nobel Prize in physics, developed some of the early ideas for laser cooling, which have now led to super-precise ion clocks. Dr. Steven Chu, 2001 Nobel laureate in physics, also supported by the Army, developed Zacharias' fountain clock concept into a reality using laser cooling ideas. This is currently the most accurate time standard in the world (used by the National Institute of Standards and Technology and DOD). Ultra-precise time is the foundation for the Global Positioning System, essential for today's navigation and precision-guided munitions.

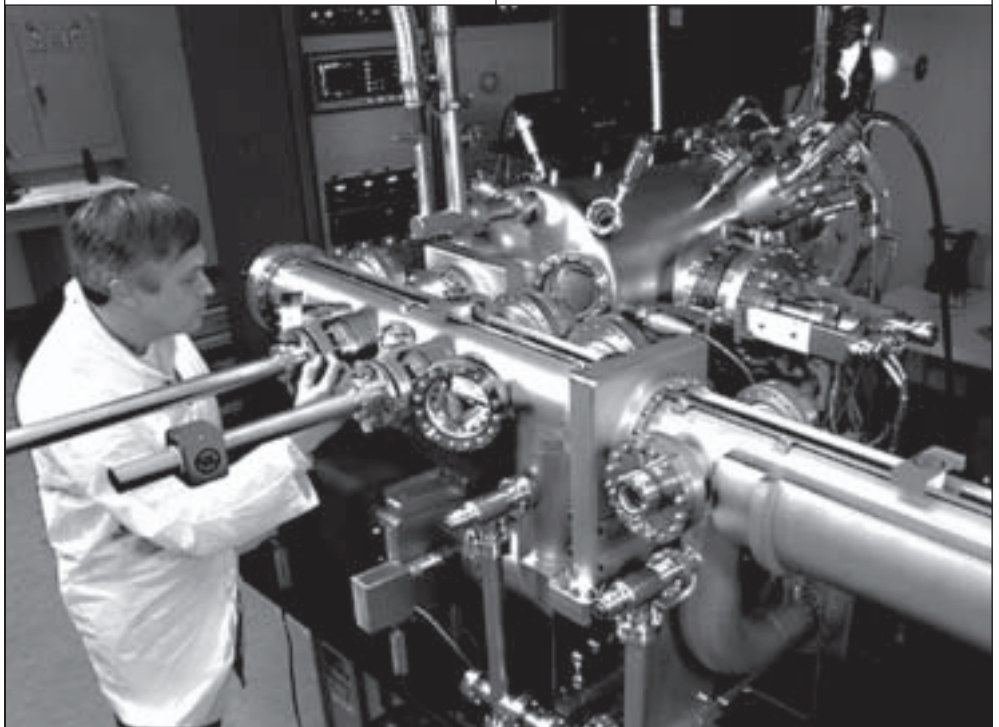
The combination of integrated circuits with semiconductor heterostructure devices has revolutionized all DOD electronic and optoelectronic systems, providing compact, ruggedized Army communication and sensor systems with increased functionality at lower cost.

- Development of the universal Computer Aided Design of integrated circuits (IC) and the IC process modeling tools by Drs. Donald Pederson and Robert Dutton; and the development of semi-conductor heterostructures used in all modern semiconductor high-speed electronics, detectors and light emitters by Herbert Kroemer (University of California-Santa Barbara), who won the 2000 Nobel Prize in physics for this work. The combination of integrated circuits with semiconductor heterostructure devices has revolutionized all DOD electronic and optoelectronic systems, providing compact, ruggedized Army communication and sensor systems with increased functionality at lower cost.

Army basic research's goal is to ensure that the Army has overwhelming land-warfighting capabilities unmatched by any future adversaries. This goal's achievement will be accomplished through the investment in talented and knowledgeable people, state-of-the-art equipment and facilities and basic research areas judged relevant to the Army's mission. This strategy ensures that the Army is at the forefront of knowledge exploitation essential to its land-warfare mission. A wide range of investments supporting this strategy involve numerous academic, industrial and Army in-house organizations that are involved in the discovery and maturation of new knowledge for the purpose of advancing Soldier capabilities.

Army Educational Outreach Program (AEOP)

The Army's investment in people begins with programs geared to spark the interest of middle and high school students in the areas of science, mathematics and technology (SMT). AEOP



An ARL scientist works on a III-V MBE machine, one of four at ARL. The III-V MBE machines are used to create several kinds of semiconductor materials and structures, including gallium arsenide-based materials for Quantum-Well Infrared Photodetectors, gallium antimonide/indium arsenide for Type II Superlattice detectors and semiconductor lasers and gallium nitride-based materials for ultraviolet sources and detectors. (Photo courtesy of ARL.)

encourages young people to engage in Army-sponsored SMT competitions and provides opportunities for them to work with researchers at Army-funded universities. The AEOP includes programs that provide interaction between students and researchers at Army laboratories to become familiar with the pioneering research work performed by Army scientists and engineers in support of our Nation's defense.

Outreach to Academia and Industry

Approximately 60 percent of the Army's basic research funding is "extramural," directed mainly toward academia and industry. The Army funds basic research activities in academia through its Single Investigator Program (SIP), Army University Affiliated Research Centers (UARCs), University Research Initiatives (URIs) program and Army Centers of Excellence (COEs). Each of these investments emphasizes various aspects of fundamental basic research, education and training. For the next generation of scientists and engineers, the Army supports graduate education and training programs at scores of U.S. universities and colleges. Graduate students trained in the disciplines of basic research generally go on to work in industry, Army labs or leading universities.

SIP

The SIP involves support of focused research challenges within Army-relevant research disciplines led by senior faculty members at universities. Typically, these investigations involve a small team of supervised graduate and postdoctoral students seeking to advance knowledge on the frontier of Army-relevant disciplines, while achieving their goal of furthering their scientific training. These efforts are modestly funded and long-term, involving multiyear research grants in relatively focused areas of research.

UARCs

Occasionally, opportunities arise to advance a major new capability through a sustained long-term multidisciplinary effort. To exploit these opportunities, the Army has created UARCs in the areas of Soldier protection, hypervelocity lethality, simulation and training and full-spectrum dominance. Each center brings together a collection of specific basic research disciplines to focus on significant technical challenges involving a sustained effort over time. The centers partner with industry and Army labs to transition new knowledge and novel technology concepts for further development. The centers also take advantage of knowledge and expertise that reside within Army labs and industry to further advance their research work.

URIs

Through the Army's URIs, virtual centers are created to address more focused research challenges involving shorter term multidisciplinary efforts. These research efforts cut across a number of universities with faculty members who are experts in specific disciplines. They are modestly funded and typically involve 5-year efforts.

COEs

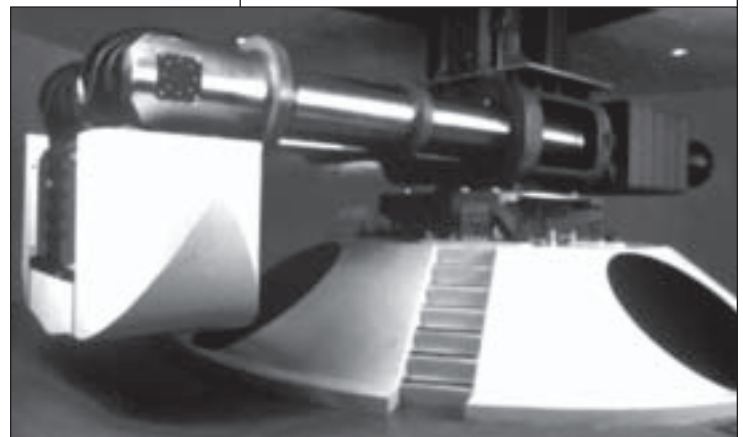
While creating new technological opportunities is important in realizing new

capabilities, there are technology areas for which the Army has enduring needs, such as rotorcraft, automotive, microelectronics, materials and information sciences. Graduate student training is critical to maintaining state-of-the-art capabilities in these areas. For this reason, the Army has created COEs that focus research efforts on expanding knowledge frontiers in these enduring areas.

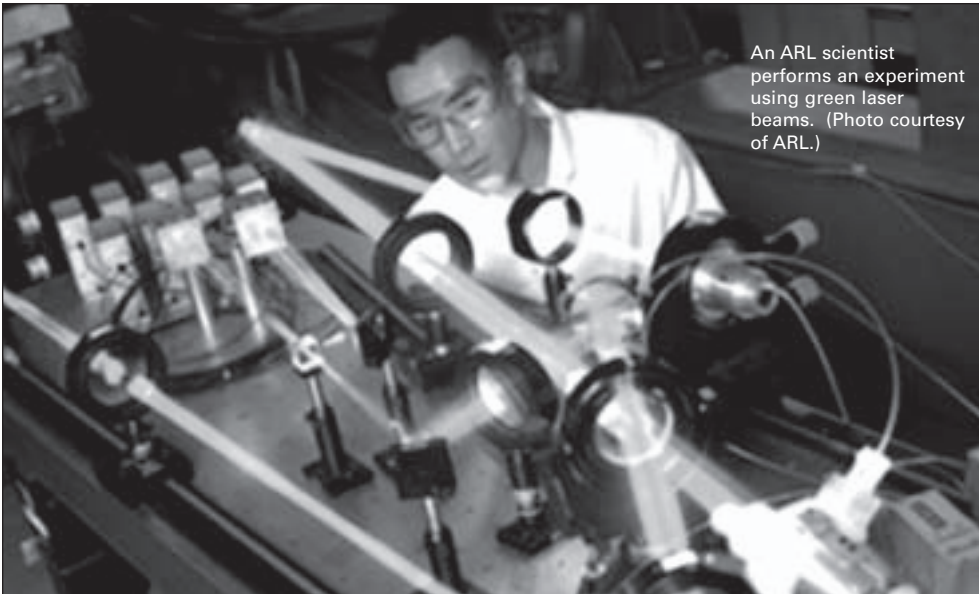
Some basic research areas, while of great interest to the Army, involve relatively large investments from the commercial sector. These key areas include networks and communications,

robotics, power and energy, sensors and decision aids. To leverage these large investments, the Army has created Collaborative Technology Alliances that involve partnerships between industry, academia and the Army Research Laboratory (ARL). This strategy incorporates the practicality of industry, knowledge expansion in these areas by our universities and Army scientists and engineers, who interpret, shape, mature and transition this research to Army programs.

Another example of Army-unique research is the work conducted at the Medical Research and Materiel Command, the lead DOD organization for infectious disease research and combat casualty care.



This USACE centrifuge has a 6.5-meter radius and has been tested to its maximum payload of 8,000 kilograms at 143 g's of acceleration. It is the largest centrifuge in the world and greatly reduces the elapsed time required to conduct environmental science experiments. (Photo courtesy of USACE.)



An ARL scientist performs an experiment using green laser beams. (Photo courtesy of ARL.)

against landmines, the development of new forms of armor for combat vehicles and the individual Soldier and novel penetrators to combat emerging threats. It also uses these testing and research facilities to develop unique approaches to defeating penetrators, which threaten the survivability of Army combat systems.

ARL is also developing an understanding of insensitive propellants and explosives that are insensitive to detonation but maintain their desired energetic characteristics. While it has a substantial in-house program, ARL constantly reaches out to the broader research community to ensure that it has the latest knowledge in critical areas as well as the most advanced research tools available today. ARL also provides technical and analytical products to its extended research community, which includes the Army

Approximately 40 percent of the Army's basic research program is conducted in-house in Army labs. The overwhelming majority of this work is Army-unique research conducted at labs with specialty facilities. For example, the U.S. Army Corps of Engineers (USACE) has the world's largest centrifuge that is used to reduce the time required to perform experiments in environmental science for which USACE is the lead DOD organization. USACE also has unique testing and research facilities in the areas of force protection, situational awareness and mobility assurance. For example, force protection facilities are used to experiment with new materials for various aspects of construction, with cumulative work conducted at these facilities over the years having played a critical role in the Pentagon's renovation that resulted in lives saved on Sept. 11, 2001.

Additionally, USACE's diverse fundamental and applied research business portfolio supports battlespace environments, military engineering, environmental quality and installations and civil works.

Another example of Army-unique research is the work conducted at the Medical Research and Materiel Command (MRMC), the lead DOD organization

for infectious disease research and combat casualty care. At Fort Detrick, MD, MRMC has the only Level 4 containment facility in the Nation that is used to handle life-threatening microorganisms for which there are no vaccines or treatments. These facilities were used to expeditiously identify the anthrax bacterium strain disseminated in envelopes after 9/11. MRMC also performs basic research that supports our Soldiers throughout their life cycle, from entry into the Army to discharge, as well as their health care needs thereafter.

ARL

The largest component to the Army basic research program is performed at ARL, which conducts fundamental and applied research in the areas of weapons, materials, sensors and electronic devices, computational information sciences, man-machine interfaces and vehicle technology. ARL also conducts experiments in the ballistics area at its unique testing and research facilities. This research involves improving vehicle protection

ARL conducts fundamental and applied research in the areas of weapons, materials, sensors and electronic devices, computational information sciences, man-machine interfaces and vehicle technology.

Research, Development and Engineering Centers and the Army acquisition community.

The most important warfighting system in the Army is the individual Soldier. In addition to the equipment a Soldier relies upon when going into battle, the Soldier's preparation through training is extremely important. Soldiers today are expected to be multi-skilled and ready to conduct missions spanning major theater wars and small-scale contingencies, as

well as stability and support operations.

ARI

The U.S. Army Research Institute (ARI) for the Behavioral and Social Sciences' role is to conduct basic



An ARL scientist performs X-ray analysis. (Photo courtesy of ARL.)

research that provides the foundation for selecting, training and developing our Soldiers and leaders. In addition, the program is developing human performance models that capture human behavior under a wide range of

anticipated battlefield conditions. Because the Army is such a human-intensive organization, understanding human behavior through the work conducted at ARI is fundamental and critical to Army readiness and mission success.

To ensure the constant pool of innovative ideas in the pipeline of technology development, the Army basic research program funds In-house Laboratory Independent Research (ILIR). ILIR is used by Army labs to perform high-risk research and to attract eager young minds with state-of-the-art research knowledge and tools to work with senior Army scientists and engineers to stimulate innovation in the technology development process.

Prioritizing Basic Research

The key to success in basic research is selecting the right research challenges,

choosing the right people to do the work and providing the right level of resources to maximize the likelihood of success. There are many factors that go into making judgments with respect to these issues. Prioritizing basic research challenges in terms of investment depends upon both internal and external factors. Research challenges are driven by questions that are significant to the particular field of investigation. The answers to these questions provide the next major advancement in knowledge that could significantly increase understanding within a scientific discipline or sub-discipline. The challenge is choosing questions that can be answered in one's lifetime. One is often reminded of the famous statement by Max Born, Nobel laureate in physics, "I know when I am doing research — when I don't know what I am doing." Uncertainty is a fact of life for those who perform



Past Army Basic Research investments provide the weapons, communication systems and protective body and vehicle armor Soldiers need today. Here, SPC Graig Harmeling, 940th Military Police Co., patrols the streets of Dawanyah, Iraq, March 31, 2005. (U.S. Army photo by SGT Arthur Hamilton.)

basic research, regardless of the context and scope of their expertise. Additionally, external factors play a significant role in deciding on investing in basic research.

Metrics

Likewise, metrics play an important role in measuring progress in basic research. Metrics typically involve quality, productivity, leadership and relevance — both to the field of investigation and to the organization performing the work. The reliability of basic research knowledge depends upon its openness to public scrutiny and criticism. This factor plays a very important role in assessing the quality of basic research work. It manifests itself in various forms of recognition after the work has been published through citations, invited talks, keynote speeches and awards.

The National Academies have looked at this issue many times and its Committee on Science, Engineering and Public Policy has published metrics that provide the appropriate measurements of quality. Quality of research before the work is undertaken is decided through peer review involving leading professionals in the appropriate disciplines and subdisciplines. Such peer reviews also address relevance to the field of investigation.

Productivity

Productivity is often one of the most contentious issues because of the pressures to justify investments through results in the near term. It's

ILIR is used by Army labs to perform high-risk research and to attract eager young minds with state-of-the-art research knowledge and tools to work with senior Army scientists and engineers to stimulate innovation in the technology development process.

a fundamental fact of life that basic research is an inefficient process by its very nature. The odds of success are overwhelming against those who perform basic research, because there are vastly more ways to imagine how nature works versus the actual way it does. Trying to tinker with making basic research investigations more efficient is more likely to impair the progress of discovery than improve it. Nevertheless, return on investment (ROI) is extraordinarily high, even given this “inefficiency.”

Productivity can be measured by the number of papers published in professional journals, number of graduate students produced and number of conference proceedings published, among others. The open availability of basic research results to public scrutiny and criticism account for its great strength over human history. Over the long term, ROI can be judged, and studies indicate that ROI is greater than 25 percent — even taking into account failures.

The relevance of basic research is decided by knowledgeable project/product managers who are connected to the broader research community and their customers for the work performed. Basic research customers are the materiel developers who perform the more downstream aspects of research and development. The vast majority of basic research results have relatively broad application across technology areas, and this accounts for the great leverage derived from the investment.

Unlike other professions, those people involved in basic research tend to thrive on uncertainty because it fuels their intellectual curiosity. Richard Feynman, Nobel laureate in physics, once told a group of students attending his lectures, “Maybe some of you would like to join us on the greatest adventure the human mind has ever begun.” For the Army, there is another very important reason for basic research. Our basic research investments will enable us to overcome the many technical challenges associated with Army transformation but, more importantly, will ensure that when our Soldiers are called upon to defend freedom and liberty anywhere in the world, they will come home safe and victorious.

DR. JOHN A. PARMENTOLA is Director for Research and Laboratory Management, Office of the Deputy Assistant Secretary of the Army for Acquisition, Logistics and Technology. He has a B.S. in physics from the Polytechnic Institute of Brooklyn and a Ph.D. in physics from the Massachusetts Institute of Technology.



Measuring Human Performance in Battle Command

Dr. Carl W. Lickteig, William R. Sanders,
Dr. Paula J. Durlach and Dr. James W. Lussier

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is the Army's lead laboratory conducting research, development and analysis on training, leader development and Soldier issues. ARI's focus is on the entire Soldier life cycle of recruitment, selection, assignment, training, retention and mission performance. ARI provides the behavioral science and technology (S&T) tools to help the Army of the future realize its goals for superior performance across the full spectrum of conflict in all operational environments.

Battle command and human performance during sustained operations in harsh, unpredictable environments is a key focus for ARI. Here, Soldiers from Charlie Co., 2/162d Infantry Regiment perform a quick response force mission in Sadr City, Iraq. (U.S. Air Force photo by SSGT Ashley Brokop.)

The rapidly evolving strategic environment and continuous advances in technology — particularly the digitization of information systems — demand new approaches to applied research and development (R&D) in the personnel arena as well as in weapon systems development. Factors such as organizational redesign, as represented by the Army Campaign Plan, will also have ripple effects in terms of training strategies at all levels. There are probably no S&T programs that do not have to take these factors into account by simultaneously working to solve today's problems while anticipating tomorrow's challenges. Clearly, the optimum

ARI provides the behavioral science and technology tools to help the Army of the future realize its goals for superior performance across the full spectrum of conflict in all operational environments.

outcome is achieved by implementing a mutually reinforcing balance to answer present and future needs. ARI adopted this approach in many of its programs, of which one prominent example was the measurement of human performance for the Defense Advanced Research Projects Agency (DARPA)/ Communications-Electronics Research, Development and Engineering Center Future Combat Systems Command and Control (FCS C2) Program.

To assess the human performance essential for battle command in FCS, ARI joined the program for an iterative series of commander-in-the-loop experiments.

ARI focused on four command group (cmd grp) members — commander, information manager, battlespace manager and effects manager — located in a mock-up C2 vehicle as they planned and executed more than 40 virtually simulated battle runs across 4 experiments. Objective and subjective measurement methods developed by ARI were used to quantify and understand how a future cmd grp might perform the basic battle command functions of plan, move, see and strike.

Experimental Design

To explore new approaches for battle command, the design iteratively raised cmd grp responsibilities and FCS capabilities across experiments based on lessons learned in prior experiments. The design systematically varied battle run complexity (medium, high and too high) within and across experiments by increasing enemy force activity and size, eliminating friendly

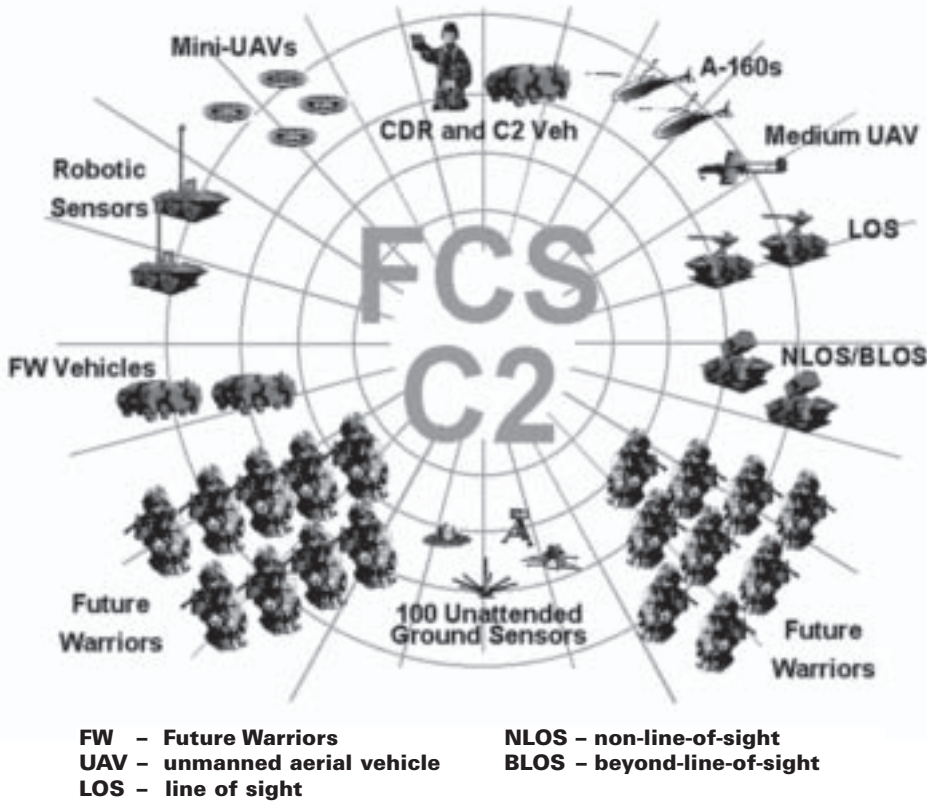


Figure 1. Organization of the unit cell.

automated HCI measures. The construct is depicted in Figure 1.

Verbal communications by the cmd grp in the C2 vehicle were a near-continuous activity, occurring 93 percent of the time during the execution phase of each run. A pattern of steady conversation occurred despite participants' common access to a visually rich and timely battlefield situation depiction on their C2 displays. By far, the majority of communications were devoted to "seeing" the battlefield by collecting and interpreting data from multiple ground and air sensors to construct an accurate battlefield situation understanding.

HCI analysis revealed that more than 1,000 separate HCI actions were typically performed by the cmd grp during the battle run's execution phase. Detailed analysis of HCI data quantified and related the demands placed on each cmd grp member to accomplish the basic plan, move, see and strike battle command functions. The HCI assessment revealed the importance of examining how task demands changed within and across battle runs as well as

assets and inserting civilians on the battlefield. Complexity was used to gauge the performance limits of the cmd grp members and a notional FCS organization. The design also stressed a deliberate practice approach — the repetition of similar runs with feedback — to ensure experimental results were based on a proficient cmd grp. Typically, the four primary experiments lasted 10 days each, beginning with 3 days of training followed by 10 battle runs with planning and execution phases requiring approximately 60-90 minutes per phase.

Human Performance Results

The FCS concept calls for an unprecedented human-machine alliance that will require warfighters to employ a network-linked force of unmanned systems in concert with manned systems to perform future missions. To measure human performance in future FCS cmd grps, ARI developed objective measures

for the cmd grp's verbal communications and human-computer interactions (HCI). Subjective measures were developed to assess key issues including workload, training, system performance and human performance. Efforts were also made to develop and validate

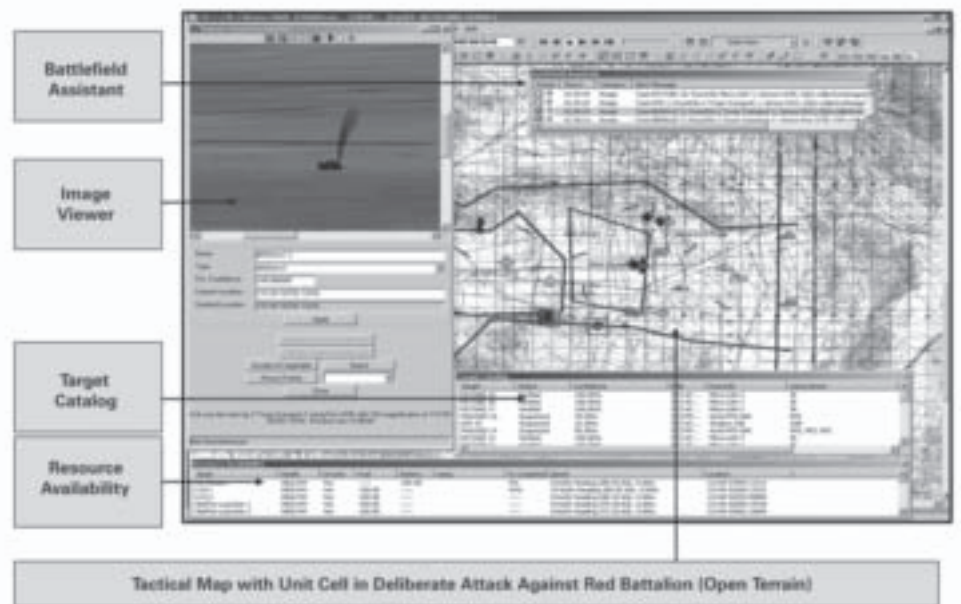


Figure 2. Sample screen view of a C2 prototype interface.

how the cmd grp learned to reallocate tasks across members to cross-level the workload. Figure 2 provides a sample view of the screen information cmd grp members used during the battle runs.

Subjective measures of workload helped assess the FCS goal to reduce the cmd grp's size for a small unit with numerous robotic elements. Moderate to high levels of workload were reported by the information and battlespace managers who directed the actions of multiple sensors while interpreting and sharing the battlefield intelligence obtained. As workload increased at the "too high" level of complexity, the information and battlespace managers' performance ratings sharply declined. System performance ratings by participants were also captured to refine current features and to add new features and more automation to the simulated FCS across experiments.

Automated measures of HCI are important tools for understanding cmd grp performance requirements. However, the vast amount of HCI data available cannot be readily captured through manual recording methods. Efforts to develop automated HCI measures were only partially successful, underscoring the need for more development to ensure such data are captured for future FCS training and evaluation efforts.

Novice versus expert cmd grp performance was also examined. A key FCS C2 program feature was the commitment to create an expert cmd grp of lieutenant colonels (LTCs) for the four primary experiments to explore future battle command concepts. An

As workload increased at the "too-high" level of complexity, the information and battlespace managers' performance ratings sharply declined.

excursion experiment was also conducted with a novice cmd grp comprising U.S. Military Academy and Reserve Officers' Training Corps cadets. Comparisons of novice versus expert

performance based on the ARI measurement approach found that novices:

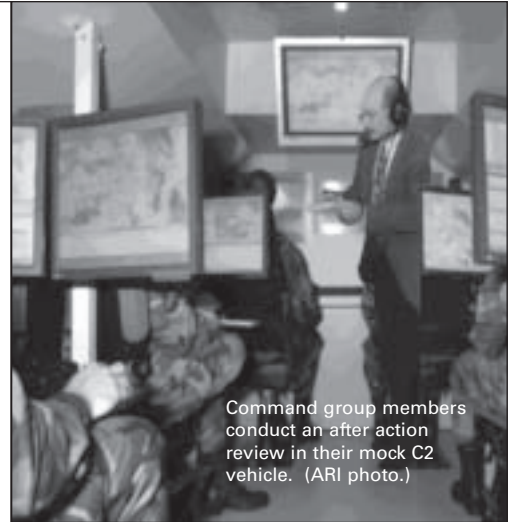
- Spent more time in silence, less time collaborating.
- Talked more about firing, less about seeing.
- Talked more about own troops, less about enemy.
- Talked more about enemy location, less about enemy size, type and disposition.
- Performed fewer computer interactions to recognize and identify targets.
- Performed more computer interactions to assess battle damage.

Overall, the novice group seemed to approach their C2 roles with a hasty "find-and-kill" mindset — not unlike a video game mentality — while the more expert cmd grp deliberately strove to build an accurate and complete battlefield situational understanding before engaging the enemy.

Human Performance Issues

The research shed needed light on key human performance issues associated with the introduction of advanced and complex technologies. Some conclusions on workload, training and proactive research are discussed below.

The ultimate value of a C2 system is determined not so much by technology per se, but by shaping technology to complement human performance.



Command group members conduct an after action review in their mock C2 vehicle. (ARI photo.)

Workload is a serious concern with the emergence of numerous unmanned and complex systems, including ground/air sensors and beyond-line-of-sight weapons. Technology may overwhelm the cmd grp's ability to provide robotic and human force C2 while being inundated with potential deluges of battlefield information. Objective and subjective data confirmed increasingly high levels of workload as battle runs became more complex. Increased levels of automation can reduce workload, but they can also increase it.

A pattern of decreasing workload based on objective and subjective data during the first three experiments was attributed to technology — the iterative insertion of new and more automated features across experiments. However, this pattern was reversed in the fourth experiment despite the LTCs' increased expertise and their advanced FCS capabilities.

The reversal may reflect a recurrent finding that expectations about doing more with technology often result in greater burdens on warfighters.

Training is the glue that will hold FCS and the Future Force together. FCS

cmd grps will require extraordinary levels of tactical and technical expertise. A small cmd grp with robotic elements must reformulate battle commands into computer commands. Today's succinct verbalizations, such as commander's intent and guidance, entail many implied tasks for humans. In the future, unmanned systems may require directives issued in computer-mediated formats with more explicitly and precisely defined tasks. Furthermore, expertise may be more perishable as C2 system software changes quickly to meet evolving requirements. Even though the LTCs helped design their C2 system, they had difficulty in understanding complex input requirements and the operational consequences of highly automated functions. The LTCs stressed that training was required to provide more hands-on experience in tactical scenarios, more emphasis on employment techniques and more opportunities to devise and in-grain standard operating procedures.

Proactive Research. Historically, Army materiel researchers have had difficulty conducting adequate early assessments of

the human dimension in system performance. Human performance is critical for FCS because empowering commanders through advanced C2 systems is at the heart of the FCS concept. The revolutionary nature of the Army's transformation — as embodied in the FCS acquisition program — increases the risk of relying exclusively on traditional assessment methods such as C2 hardware and software component tests or the outcomes of simulation without warfighters-in-the-loop. ARI's measurement methods and the results on human performance provided reliable and empirical data for important and timely decisions on training, materiel, manpower and personnel. Findings were readily transitioned to acquisition efforts through DARPA's dual roles in FCS simulation and acquisition. The FCS C2 program was cited by the FCS Integrated Product Team for Training as a key contributor to their design planning. The human performance findings shaped the C2 prototype showcased in the Capstone Demonstration prior to FCS Milestone B. The Army recognized ARI's contribution to the human

dimension of battle command with the 2003 Research and Development Achievement Award.

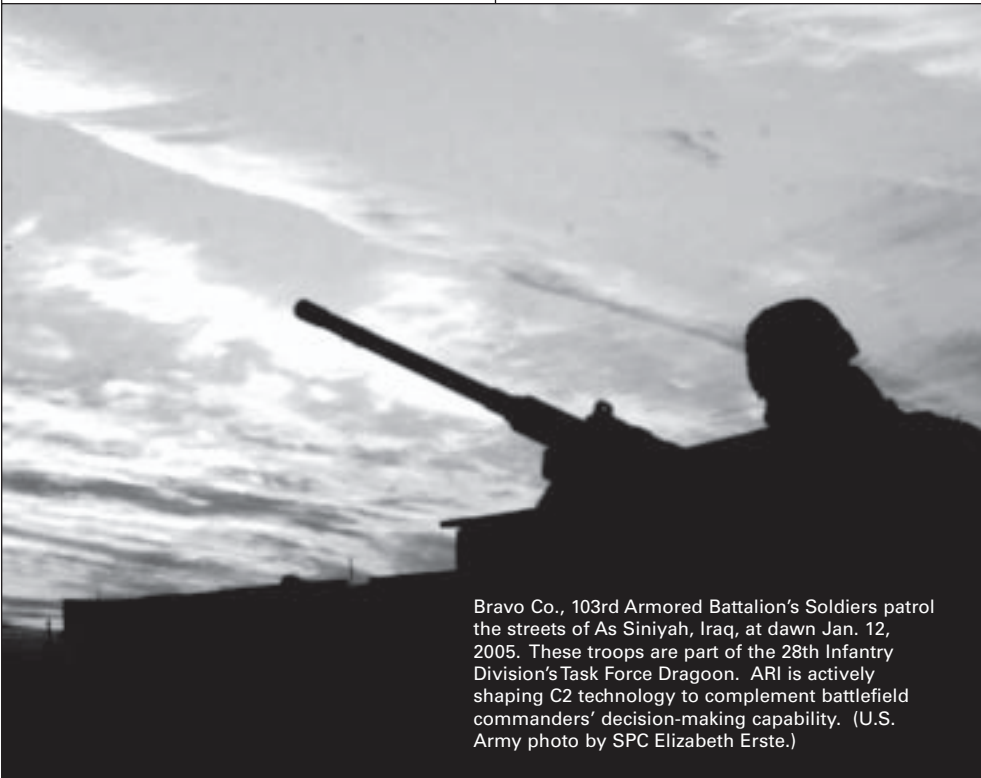
With respect to the human performance essential to battle command, the ultimate value of C2 R&D programs is determined as much by the investment in training and evaluation as the investment in simulation. The ultimate value of a C2 system is determined not so much by technology per se, but by shaping technology to complement human performance.

DR. CARL W. LICKTEIG is a Senior Research Psychologist for ARI at Fort Knox, KY, with expertise in training, evaluation, human performance and the application of digital technology. He has a B.A. in social psychology from Bellarmine University and both an M.A. and Ph.D. in experimental psychology from the University of Louisville.

WILLIAM R. SANDERS is a Research Psychologist for ARI at Fort Knox, with expertise in skill acquisition, skill retention and human performance measurement. He received his B.A. in industrial/organizational psychology from the University of California-Berkeley and his M.A. in industrial/organizational psychology from Ohio State University.

DR. PAULA J. DURLACH is a Research Psychologist for ARI in Orlando, FL, with expertise in associative learning, individual differences and training. She earned B.A. degrees in psychology and mathematics from Swarthmore College and both an M.A. and a Ph.D. in psychology from Yale University.


DR. JAMES W. LUSSIER is the Team Leader for ARI at Fort Knox, with expertise in battle command training methods and tactical training of future leaders. He received his B.A. in psychology from Columbia University and both an M.A. and Ph.D. in experimental psychology from Fordham University.



Bravo Co., 103rd Armored Battalion's Soldiers patrol the streets of As Siniyah, Iraq, at dawn Jan. 12, 2005. These troops are part of the 28th Infantry Division's Task Force Dragoon. ARI is actively shaping C2 technology to complement battlefield commanders' decision-making capability. (U.S. Army photo by SPC Elizabeth Erste.)

Ensuring the Army Maintains Its Technological Edge

Steven Schehr and Antonio F. Fiuza



Today's operational environment, with increasingly sophisticated asymmetric threats, urgency of needs and rapid technological advances in potential solutions, presents significant challenges in solving materiel systems integration issues under compressed time schedules. At the same time, technology for these solutions must be programmed into the Army's materiel solutions for future equipment that is fully supported by complementary doctrine, requirements, organization structure, leadership and training. To manage and focus this complex effort, the U.S. Army Research, Development and Engineering Command (RDECOM) has established a Deputy Commanding General for Systems of Systems Integration (DCG SOSI), who works collaboratively with all RDECOM labs and centers to coordinate the best-integrated technologies and solutions for both the Current and Future Force. Many of these organizations have successfully transitioned technology and several are involved in ongoing technology development in survivability and networks.

Soldiers from the 725th Ordnance Co. (Explosive Ordnance Disposal (EOD)) deploy a remotely controlled EOD robot near Al Iskandariyah, Iraq, March 26, 2005, to incapacitate/detonate an IED. New S&T breakthroughs such as this robot are enhancing Soldier survivability on the battlefield. (U.S. Air Force photo by Airman 1st Class Kurt Gibbons III.)

Survivability

The integrated Survivability Science and Technology (S&T) program is improving the protection of Soldiers, weapons, vehicles and supplies, while simultaneously deceiving the enemy and avoiding detection. It has addressed proposed and existing programs to enhance survivability for current operations vehicles and personnel. Key Current Force survivability S&T programs include the four recently fielded items described below.

- **Armor Survivability Kit (ASK).**

Humvee ASK development and fielding was in response to a U.S. Central Command-issued Operational Needs Statement requesting an

increase in survivability against small-arms fire. An armored solution to the cloth and plastic door versions of the Humvee was required because of the change in its use in reconnaissance, military police activities, convoy escort and resupply missions. RDECOM organizations designed an armored survivability life-saving kit that included armored doors, fortified windows and armored rocker and rear panels in only 3 months. Originally intended as a temporary solution to threats in Iraq, the kit has become a standard stocked item in the Army inventory.

- **Warlock.** RDECOM organizations were instrumental in providing equipment to defeat improvised

explosive devices (IEDs), supporting Warlock fielding. Warlock emits a radio frequency that jams the communications signals used to detonate IEDs. In less than 3 years, more than 3,000 Warlock systems were fielded by a dedicated RDECOM and Program Executive Office (PEO) Intelligence, Electronic Warfare and Sensors/Product Manager Crew-Served Weapons (PM Crew) engineer and support staff that has grown from 5 to 80 personnel. PM Crew, supported by RDECOM engineers, manages the development and fielding of more than five different systems in parallel production and research and development (R&D), with the Joint Spectrum Center

The well-cam system (see inset) reduces risk when Soldiers look for hidden weapons or munitions caches in wells or irrigation tunnels. The well-cam provides a 360-degree view of the well's interior, alerting Soldiers to potential booby traps or mines. (U.S. Army photo.)



providing test support. RDECOM and the Rapid Equipping Force have just completed a fast-track risk-reduction development and test program of an advanced jammer for PM Crew Spiral 2 production. It demonstrated an enhanced survivability in a smaller, lighter, lower prime power and lower cost system. To support the aggressive R&D program, the Communications-Electronics Research, Development and Engineering Center (CERDEC) has created two specialized exploitation and test facilities at the Intelligence and Information Warfare Directorate, Fort Monmouth, NJ. An A Co., 458th Engineer Battalion, specialist commented recently, "We know the Warlock system works, we don't go outside the wire without it. We are members of the Combat Engineers Road Clearance team, and [we] rely on our Warlock just as we rely on our weapons when we are out clearing the roads of mines and IEDs."

- **Lightweight Counter Mortar Radar (LCMR).** Our forces in Iraq must contend with the enemy's widespread mortar use, which can easily be replaced, fired and moved. The LCMR was needed to counter enemy mortar fire. Stringent design criteria resulting from weight and size constraints and the need for exacting performance created an engineering challenge for RDECOM. By leveraging advances in lightweight materials, RDECOM met the challenge and delivered approximately 30 man-portable LCMRs.
- **Vehicle Body Armor Support System (V-BASS).** Survivability

engineers responded to a need to protect truck crews from small-arms fire and IED fragments. Initially, they sent 112 V-BASS units to the theater for operational evaluation. They then leveraged a Congressional plus-up program to quickly develop the V-BASS body armor for use in the M915 Family of Vehicles (FoV). V-BASS body

armor is strapped to a vehicle seat and remains there until moved or consumed. The vehicle seat absorbs most of the armor weight so wearers experience less than 2 pounds of spine loading.

Future Force Survivability

For Future Force support, the survivability team is working on integrated survivability technologies that include signature management, advanced armors, electronic warfare sensors/countermeasures and hard-kill active protection systems (APS).

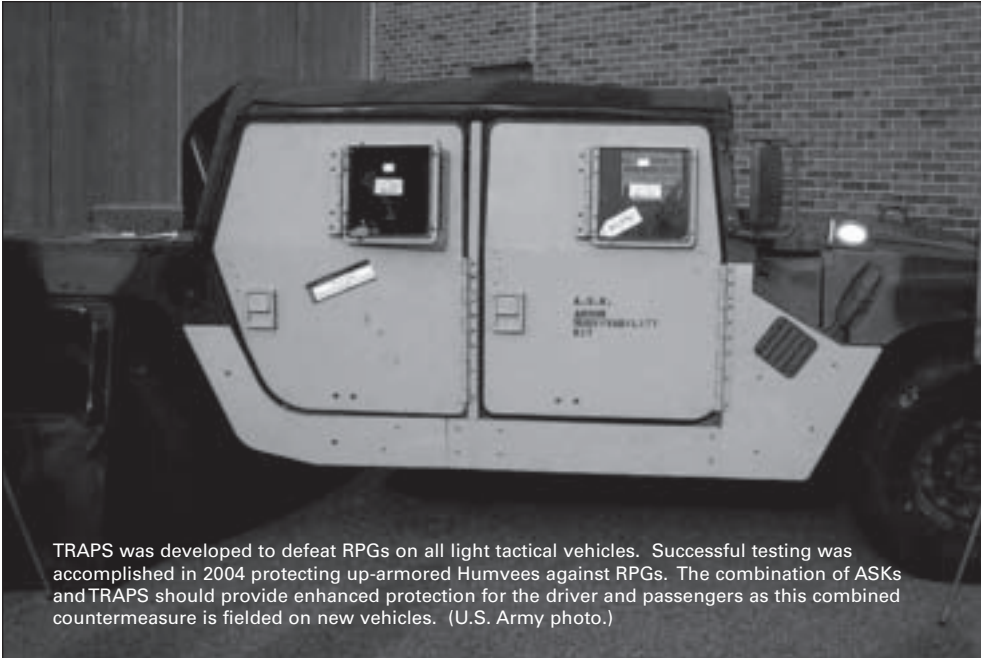
These technologies will be integrated onto a vehicle and tested as part of the Army's Integrated Survivability Advanced Technology Demonstrator program. The team has supported PM Future Combat Systems Unit of Action (FCS UA) and PEO Ground Combat Systems with technology road mapping for worldwide APS. It provided data on the systems and developed road-mapping tools to help determine what system could be spiraled into Current and Future Force vehicles as follows:

- **Integrated Army Active Protection System (IAAPS).** The IAAPS uses soft-kill electronic sensors and countermeasures (jammers and decoys) and a hard-kill APS (physical interruption)

The IAAPS uses soft-kill electronic sensors and countermeasures and a hard-kill APS to protect a vehicle from direct-fire chemical energy and top attack threats. It also has growth potential for kinetic energy threat defeat.

to protect a vehicle from direct-fire chemical energy and top attack threats. It also has growth potential for kinetic energy threat defeat. The IAAPS was built and put through its first subsystem level tests in FY01. In August and September 2002, it was integrated on a Ground Combat Vehicle for a series of static/moving system-level end-to-end threat defeat tests against anti-tank guided missiles (ATGMs), rocket-propelled grenades (RPGs) and tank-fired high-explosive anti-tank (HEAT) threats. Static defeat had a 62 out of 71 shots (87 percent) success rate. On-the-move defeat had an 11 of 13 attempts (85 percent) success rate. The system has undergone numerous improvements and upgrades — most notably, the MK-2 energetic interceptor integration. The IAAPS is a perfect 3 for 3 against ATGMs during testing with the new interceptor. Final IAAPS validation testing to provide hemispherical protection against RPGs, top attack munitions and tank-fired HEAT rounds will continue during FY05.

- **Full Spectrum Active Protection Close-In Layered Shield (FCLAS).** The FCLAS provides active hemispherical protection to ground combat and tactical vehicles against multiple threats encountered at short range. The FCLAS concept has three main components: the counter-munition, launcher and display and controls. Self-contained within each munition is a search sensor, proximity fuze, signal processor, countermeasure and propellant, which pushes the round out of the dispenser. These elements provide the ability to detect, track, classify and destroy an incoming threat. The launcher design is flexible and can be adapted to meet the needs of each platform integrating FCLAS. Tubes can be aimed with tight angle separations for more overlap of coverage



TRAPS was developed to defeat RPGs on all light tactical vehicles. Successful testing was accomplished in 2004 protecting up-armored Humvees against RPGs. The combination of ASKs and TRAPS should provide enhanced protection for the driver and passengers as this combined countermeasure is fielded on new vehicles. (U.S. Army photo.)

from countermunition to counter-munition or wide angles to reduce the number of countermunitions needed for 360-degree coverage. The system controller maintains control over the FCLAS launchers and countermunitions. Exclusion zones can be set up if the vehicle crew knows where supporting dismounted troops or friendly vehicles will be operating relative to the vehicle. Each component processes data and communicates with the other pieces of the system. Onboard processing at each component spreads the computational load across multiple processors. This allows for parallel processing of critical functions, such as threat tracking, while other processing can still occur, such as handling user commands. The system has undergone a series of RPG defeat tests with more than 10 successful engagement defeats. Additionally, the system has undergone a series of upgrades including decreasing the interceptor's size. Final FCLAS validation testing will continue during FY05.

- **Tactical RPG Airbag Protection System (TRAPS).** TRAPS was developed to defeat RPGs on all light tactical vehicles. Successful testing

was accomplished in 2004 protecting up-armored Humvees against RPGs. TRAPS uses inexpensive radar to detect the threat and initiate the counteractions. The radar feeds data to the processor that controls the deployment of the countermeasure via an inflatable airbag. The deployed countermeasure covers the side of the vehicle and defuses the threat so the shaped charge does not form. The inflated airbag ultimately catches the defused RPG's carcass and keeps the threat from harming the vehicle or the occupants. Therefore, the threat is defused before it hits the Humvee door. This represents the least expensive countermeasure for protecting the Humvee against the RPG threat. The door absorbs the threat's energy, eliminating penetration into the crew's compartment. The threat then collapses upon itself, jamming the time-out fuse and causing no problems or door penetration. The TRAPS tested at the Socorro, NM, Test Range has shown to be very effective in proof-of-concept component-level testing.

- **Electromagnetic Armor (EMA).** Defeat of incoming threats was demonstrated in live-fire testing of

an EMA package fully integrated on a hybrid-electric drive combat vehicle demonstrator. The EMA package successfully defeated a shaped-charge threat during live-fire testing Feb. 22, 2005, at Aberdeen Proving Ground, MD. The successful completion of EMA package live-fire testing on a hybrid-electric vehicle demonstrator illustrates the type of multi-hit capability that can be integrated into vehicle systems at significantly lower weight to provide a protection level similar to that of reactive packages. EMA technology can significantly enhance the vehicle systems' survivability as part of a layered approach ultimately aimed at increasing Soldier protection. EMA uses high voltages and currents to defeat shaped-charge warheads such as those from RPGs. Research in reliable power management and delivery at lower volumes and weights for pulse forming networks allows the system-level EMA integration, experimentation and demonstration on a combat vehicle.

Networks

The Network S&T program focuses on command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) technologies for rapid transition to acquisition programs, conducting comprehensive assessments of current and proposed C4ISR S&T programs and evaluating technical performance of commercial technologies via live demonstrations. A major thrust is to ensure that proposed and current programs can be integrated and interoperable with current and future architectures.

Current Force transitions include the following:

- The well sensor camera (well-cam) was created to meet a specific need in

Afghanistan. The enemy was using irrigation tunnels ending in wells to move around the area of operations. Sending a Soldier down the well on a rope many feet below the surface to investigate was extremely dangerous. Thus, RDECOM developed a lightweight device that is lowered into the well and provides a 360-degree view of the well casing's interior, thereby reducing Soldier risk.

- The high operational tempo during *Operation Iraqi Freedom* strained existing ground combat and control systems. As a result, RDECOM and PM Ground Combat Command and Control worked closely to develop and field an advanced suite of decision aid software tools that enables collaborative mobile command and control — the Combined Arms Planning and Execution Monitoring System.
- The U.S. Army Night Vision and Electronic Sensors Directorate has developed a Change Detection Workstation (CDWS) to help find IEDs, one of the leading causes of casualties in Iraq. The U.S. Marine Corps purchased five CDWSs during FY04, one of which was recently shipped to Al Asad Air Base, Iraq. The CDWS works on the principle that a human analyst can readily identify changes by

comparing before and after imagery of the same location. If a road has been safely used recently, the analyst can focus on only the changes and assess each change to determine if it is a potential IED. When the IED threat developed in Iraq, this capability was evaluated for its IED detection effectiveness. The CDWS will help Marines find IEDs by rapidly processing imagery collected from an F-18 Advanced Tactical Air Reconnaissance System sensor, and by allowing the analyst to compare the most current imagery with imagery collected at an earlier date. The CDWS has also been successfully demonstrated with several other manned and unmanned aircraft platforms and various visible and infrared sensors.

Analysis of network communications requirements for the UA and Unit of Employment has resulted in modifications of existing programs to better address performance predictions and critical technology shortfalls. RDECOM's Multifunctional On-the-Move Secure Adaptive Integrated Communications program successfully demonstrated and transitioned mobile communications technologies such as bandwidth management and adaptive protocols for infrastructure mobility. These protocols will assist in meeting technology shortfalls in the command, control, communications and computers area for future networks. Additional S&T efforts include:

- Developing a robust voice and data communications Soldier Radio Waveform to support sensor-to-shooter tactical linkages for the Future Force Soldier.
- Using the Head Tracked Sensor Suite program to provide FCS vehicle commanders with a rapid day-and-night quick-reaction dome of situational awareness coverage in

both urban and complex terrain, permitting long-range target acquisition while on the move.

- Developing a capability for a highly mobile and transportable medium-to long-range, ground-based, multi-mission radar for air defense, field artillery, mortars, rockets and weapons location for fire control and air traffic control.

Transitioning RDECOM organizations' survivability and network technologies to the Current Force has made our Soldiers safer. RDECOM has met and continues to meet its goals of collecting and analyzing information and data on technologies and products that can improve our Army's capability. The resulting recommendations from assessments and integration provide a firm and timely basis for acquisition and fielding decisions.

STEVEN SCHEHR is the Associate Director for Survivability within the U.S. Army Tank Automotive Research Development and Engineering Center, Research Business Group. He holds a B.S. in electronics engineering from Michigan State University. He is also a graduate of the Army Program Managers Course. Schehr is Level III certified in program management; systems planning, research, development and engineering; test and evaluation; as well as Level II certified in information technology.

ANTONIO F. FIUZA is the Associate Director for Technology in the CERDEC Space and Terrestrial Communications Directorate and the Chairman of the RDECOM Network Integrated Product Team. He holds a B.S. in electrical engineering from the New Jersey Institute of Technology, is an Army Acquisition Corps member and a recipient of the Commanders Award for Civilian Service.



V-BASS, initially designed for the M915 FoV, protects truck crews from small-arms fire and IED fragments. (U.S. Army photo.)

Soldier S&T Initiatives Support Current Operations and Future Force Warrior Technological Development

Philip Brandler and Edward Crivello

The Natick Soldier Center's (NSC's) Soldier Science and Technology (S&T) effort focuses on enduring challenges facing the Soldier System. The Future Force Warrior (FFW) Advanced Technology Demonstration (ATD), the Army's flagship Soldier S&T program, is leading the charge for systemized development and integration of enhanced Soldier capabilities in survivability, sustainment, mobility, command and control and lethality. As the FFW ATD proceeds, feeder S&T efforts are spiraling toward planned insertions while making near-term transitions to support current operations wherever possible.

A Soldier models the new lower extremity protection prototype designed to provide leg and thigh protection from fragmentation. (NSC photo by Sarah Underhill.)

NSC Soldier S&T efforts cover the full range of Soldier-as-a-System (SaaS) technologies. Here, we will discuss some recent transitions to the Current Force and their associated long-term research areas related to survivability and sustainment.

Survivability – Enhancing Personal Protection

Personal body armor is issued and used by all troops deployed to *Operations Enduring Freedom (OEF)/Iraqi Freedom (OIF)*. The NSC-developed Interceptor Body Armor (IBA), setting the standard for protection, has benefited from numerous NSC S&T improvements to overcome the weight and producibility issues of previous forms of body armor. However, the improvised explosive device threat in Iraq poses increased challenges, most notably protection to arms and legs. Extremity armor to provide upper arm and deltoid protection has been recently

fielded through Program Executive Office Soldier’s Rapid Fielding Initiative.

Originally proposed by a medical unit in the 82nd Airborne Division operating in Iraq, protection is provided to the upper shoulder and underarm, areas that have shown to be vulnerable to injury for drivers and passengers of wheeled vehicles. That work is now being extended to provide lower extremity protection.

Prototypes are being evaluated that provide leg and thigh protection from fragmentation. A particular challenge in these systems is maintaining Soldier flexibility, dexterity and mobility while wearing the protection.

Balancing the trade-offs between improved survivability and increased

Soldier-borne loads becomes easier with the emergence of new material technology. New high-performance fibers are the primary enabler for lighter weight body armor systems. One example is known as M5 Fiber, which is expected to provide a 30-percent reduction in the soft component of body armor (as well as helmet armor) and to reduce the rigid plate’s weight by 15 percent. Improvements of this

order will help protect against current threats and enable emerging threats to be addressed as well.

Another aspect of Soldier survivability is protection from harsh environments. One of the most significant non-enemy threats in Iraq has been the hot, humid environment, which causes extreme

NSC S&T offers many other avenues for improved Soldier survivability with new material solutions for combat clothing and equipment.



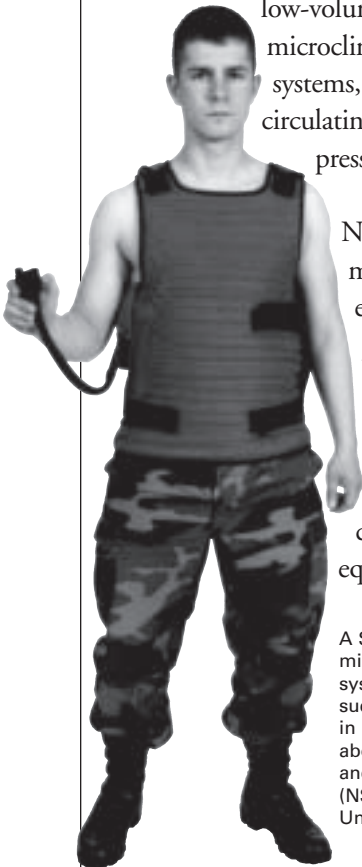
NSC-developed body-worn combat ensemble will enhance dismounted Soldiers’ battlefield effectiveness in the near future, leveraging and integrating technological advances as never before. (Image courtesy of NSC.)

heat buildup in vehicles and heat burden to warfighters wearing body armor. In recent years, microclimate-cooling solutions have been successfully fielded for use in rotary-wing aircraft, on ships and by explosive ordnance disposal (EOD) personnel. The Army developmental community has come together to focus on cooling systems for Humvee occupants.

Systems providing either conditioned cabin air or microclimates to the crewman's body have been developed and evaluated, and limited quantities are being bought and fielded for forces in Iraq. The long-term goal is to develop microclimate-cooling solutions common to multiple tactical and armored vehicles. These innovations may also apply to the dismounted warrior with the advent of micropower generating devices. Near-term passive ventilation and active air blower systems are also being evaluated for Soldiers in IBA. Future activities include S&T investments focusing on the development of very lightweight, low-volume active microclimate-cooling systems, such as liquid circulating vapor compression systems.

NSC S&T offer many other avenues for improved Soldier survivability with new material solutions for combat clothing and equipment.

A Soldier models the microclimate-cooling system that has been successfully deployed in rotary-wing aircraft, aboard Navy vessels and by EOD personnel. (NSC photo by Sarah Underhill.)



The FSR is formulated to provide Soldiers with high energy for short-duration missions. These rations are being field tested by SOF Soldiers participating in OEF/OIF. Three FSRs can effectively replace nine MREs. (NSC photo by Sarah Underhill.)



Some of these improvements include fire-resistant clothing at reduced weight and cost; antimicrobial protection in battle dress items to reduce odor or the risk of infection to open wounds from prolonged wear; a universal camouflage pattern; and wrinkle-free technology for easy care of combat uniforms. Additional improvements include the introduction of electrotiles into materials and garments to take the place of power-conducting and data-transmission cables, as well as to act as antennas, physiological sensors and even power-generating devices to reduce the need for batteries. S&T efforts in these areas will provide significant improvements in battle dress performance and, when integrated into single layers of materials, will enhance multiple capabilities without adding the burdens of weight or bulk to combat clothing and equipment.

Soldier Technology for Special Forces

NSC develops items tailored to Special Operations Forces (SOF) applications, and successful transition of these items can yield benefits to the other services as well. The SOF fielding cycle, typically more rapid than the Army's, provides the necessary field experience to help accelerate adoption and fielding of Army and U.S. Marine Corps-equivalent items. Past efforts include development and fielding of the Advanced Combat Helmet (ACH), load-bearing equipment, boots, high-performance body armor and extreme cold weather clothing gear — all initially fielded to the SOF and ultimately adopted by the Army.

FFW ATD incorporates human-centered design, enhanced biomechanic effects, scientifically optimized load distribution, improved reliability and human-machine interfaces and reduced weight while potentially enhancing ground Soldier capabilities and performance.

The second-shot penetration of Small Arms Protective Inserts is largely due to cracks generated from first-shot impact. An example solution developed for SOF is the Crack Arrestor

Technology (CAT) for body armor. CAT uses a carbon stiffener to limit the armor plate's flexing upon bullet impact, reducing the cracking at impact and improving the probability to prevent second-shot penetration. The plate's overall weight remained the same and no additional cost was added. NSC-developed technology solutions in support of the U.S. Special Operations Command allow the Army and other services to leverage the experience gained from SOF rapid developments. Ultimately, these SOF programs save the Army money, shorten product development time and help to standardize combat clothing and equipment across services.

Sustainment – the First Strike Ration (FSR)

Soldiers typically tailor their combat load for specialized missions. One technique is to field-strip rations based upon personal preferences for missions lasting up to 72 hours. This approach, while practical, can result in insufficient nutrition to meet the mission's physical demands, thereby reducing Soldier performance. To reduce this

negative effect, the NSC Combat Feeding S&T produced the FSR. The FSR is to be issued on a one-per-day basis. The intent is to provide a full day's nutrition in one meal to substantially reduce the weight as compared to the standard Meal, Ready-to-Eat (MRE).

FSRs are designed for short-duration, high-energy missions and do not have sufficient balance of nutritional elements for extended use. The FSR has been successfully tested by SOF Soldiers during *OEF/OIF*, and with the Army in Germany and Afghanistan. For a 72-hour mission, three FSRs could effectively replace nine MREs. Longer-term efforts include developing technology for the nutritionally optimized FSR, which will provide a novel nutrient delivery system to improve energy intake (20 percent) and cognitive/physical performance (20 percent) compared to the FSR.

NSC's balanced S&T portfolio continues to produce spiral insertion for products and systems, further enhancing Soldier capabilities during current operations.

FFW ATD

The FFW ATD is the Army's leading Soldier System S&T effort. Providing connectivity with the network and Future Combat Systems (FCS) to improve individual Soldier and small combat unit effectiveness, the FFW ATD also addresses four enduring challenges of the Soldier System concept — weight, power, fightability and affordability. With the goal of maximizing combat performance within human physical and cognitive limits, FFW ATD incorporates human-centered design, enhanced biomechanic effects, scientifically optimized load distribution, improved reliability and human-machine interfaces and reduced weight while potentially enhancing ground Soldier capabilities and performance.

The body-worn combat ensemble has many unique features to enhance the dismounted Soldier's combat



Because of climatic conditions in Afghanistan, Iraq and Kuwait, the Army developmental community has redoubled its efforts to provide more effective cooling systems for up-armored Humvees and other tactical vehicles. Long-term focus is on development of lightweight, low-volume active microclimate-cooling systems that employ liquid circulating vapor compression. (U.S. Air Force photo by SSGT Ashley Brokop.)



CWO Bill McCoy, a UH-60 Black Hawk helicopter pilot flying in an operation near Baghdad, Iraq, Jan. 23, 2005, benefits from the latest microclimate-cooling systems as he transports people and supplies across the hot desert expanses of Iraq. (U.S. Air Force photo by SSGT Angeliqne Perez.)

effectiveness. The body armor system has been integrated with a load carriage that creates a chassis for distributing loads across the entire torso. Furthermore, the design includes a series of pads to permit individual sizing and allow for passive cooling, with the added advantage that the standoff provided helps mitigate behind-armor effects. Load distribution also includes ballistic protective chaps, which enable load carriage across the thigh's large muscles. The chaps address the need for ballistic protective features for extremities to supplement the thoracic protection currently provided by IBA.



NSC specifically developed the ACH for SOF applications. The design was so effective that the Army and U.S. Marine Corps adopted it for general troop issue. (NSC photo by Sarah Underhill.)

Even the batteries will be ergonomically shaped and body conformal. Integrated into the ensemble is a suite of physiological status monitors that will allow individual Soldier health monitoring as well as remote triage by combat medics. New helmet designs will provide standard ballistic protection and accept radios, antennas and sensors on a plane through the center mass of the body rather than as currently placed, offset away from the helmet straining the neck muscles.

The ultimate goal is to develop novel, state-of-the-art technology prototypes that can detect and measure cognitive states and to identify how they can be integrated into command, control, communications, computers and intelligence systems. Identifying our warfighters' cognitive status will enable appropriate resource allocation to better adapt Soldiers to their current task environments.

The FFW ATD is critically important to the Army in developing and demonstrating a Soldier System-of-Systems (SoS) concept, with accompanying operational and system/technical architectures that directly support the FCS-equipped Unit of Action,

netted communications and collaborative situational awareness. The ATD leverages and integrates technologies from across the Research, Development and Engineering Command, Defense Advanced Research Projects Agency and other government agencies. Likewise, it provides an SaaS technology foundation that can transition to the Land Warrior program and that supports a Soldier System modernization strategy addressing the Current and Future Force. The program will also initiate concept development for other SaaS variants (mounted and air) to meet FCS spiral insertion schedules for the Soldier System.

NSC's balanced S&T portfolio continues to produce spiral insertion for products and systems, further enhancing Soldier capabilities during current operations. At the same time, this portfolio maintains its focus on achieving unmatched future capabilities through integrated SoS technology development for the FFW ATD.

PHILIP BRANDLER is Director, U.S. Army NSC, Natick, MA. Under his leadership, the Department of the Army recognized NSC as the 2001, 2003 and 2004 Research and Development Organization of the Year — Small Laboratory Category. Brandler has a B.A. in physics from Columbia College, an M.S. in physics from Brown University and an M.S. in industrial engineering as well as an M.B.A. from Northeastern University. He is an Army Acquisition Corps member and is Level III certified in systems planning, research, development and engineering (SPRDE).

EDWARD CRIVELLO is Executive Assistant to the NSC Director. He holds a B.S. in chemical engineering from Worcester Polytechnic Institute and is Level III certified in SPRDE.

Improving Soldier Learning and Performance Through Simulation and Training Technologies

Robert A. Sottolare

Soldiers today are becoming proficient through advanced technology that is blurring distinctions between live and virtual training. These technologies are being pursued in Orlando, FL, at the Simulation and Training Technology Center (STTC), part of the U.S. Army Research, Development and Engineering Command (RDECOM).

AW-VTT provides Soldiers with virtual experiences to improve competencies in simulated urban, jungle or desert environments in preparation for live-fire exercises (LFX) and combat operations. Here, Soldiers from the 16th Cavalry Regiment, Fort Knox, KY, train during an LFX at Fort Knox's St. Vith Range. (U.S. Army photo by Mike Roddin.)

STTC engineers are making a difference in the way Soldiers learn by developing simulation technology that provides critical capabilities that increase warfighters' battlefield readiness and performance. Through a concept called "simulation-enabled learning," developers create the enhanced technology that makes simulations and training better for Soldiers. This article describes several STTC research and development (R&D) programs that are getting technology to warfighters faster.

Because the AW-VTT is able to represent a variety of realistic operational environments and threats, this training tool has the ability to represent many aspects of human interaction, including changes in facial expressions.

and Engineering Network. The AW-VTT provides Soldiers with virtual experiences to improve competencies in operations against asymmetric threats in simulated urban, jungle or desert environments. This tool provides Soldiers the ability to train interactively with other Soldiers at home stations, in transit or in their area of responsibility. The degree of realism is depicted in Figure 1 and serves to orient Soldiers faster than

ability to represent many aspects of human interaction, including changes in facial expressions. These representations can be accurately tailored to represent characteristics unique to different cultures or religions. These capabilities have already shown their value by preparing Soldiers for operations in Afghanistan and Iraq by giving them "cultural experiences" at their home stations before deployment. User assessments have been made by the 101st Airborne Division (Air Assault) (101st Abn Div) and the Illinois National Guard. A server capability will be available later this year to enable distributed training and user assessments at the U.S. Army Infantry Center, Fort Benning, GA.

Cultural Familiarization Through Internet-Based Simulations

Asymmetric Warfare-Virtual Training Technology (AW-VTT) uses computer-based Internet simulation training or through a secure wide area network such as the Defense, Research

other types of training venues.

Because the AW-VTT is able to represent a variety of realistic operational environments and threats, this training tool has the

The CTPS consists of networked patient simulators that allow medics to train individually or as teams. The CTPS electronically stores the patient profile and tracks all treatment at each level of patient care, starting at the point of injury and throughout the casualty care cycle.

Combat Trauma Patient Simulations (CTPS)

Army medics in training prepare for upcoming deployments by treating simulated combat casualties in conditions so realistic that they incorporate the look, sound and smell of war. CTPS patients (dummies) bleed and secrete fluid, providing realistic training to prepare medics to treat casualties in real-life scenarios including combat trauma, mass casualty situations

and stabilization and Soldier and civilian evacuation. Medics report that these simulators provide realistic training because they breathe, blink their eyes and have pulses that can be felt. Simulated patients can "die" if given incorrect or insufficient care. The simulator can be restarted, providing medics with feedback and the opportunity to try again. The CTPS consists of networked patient simulators

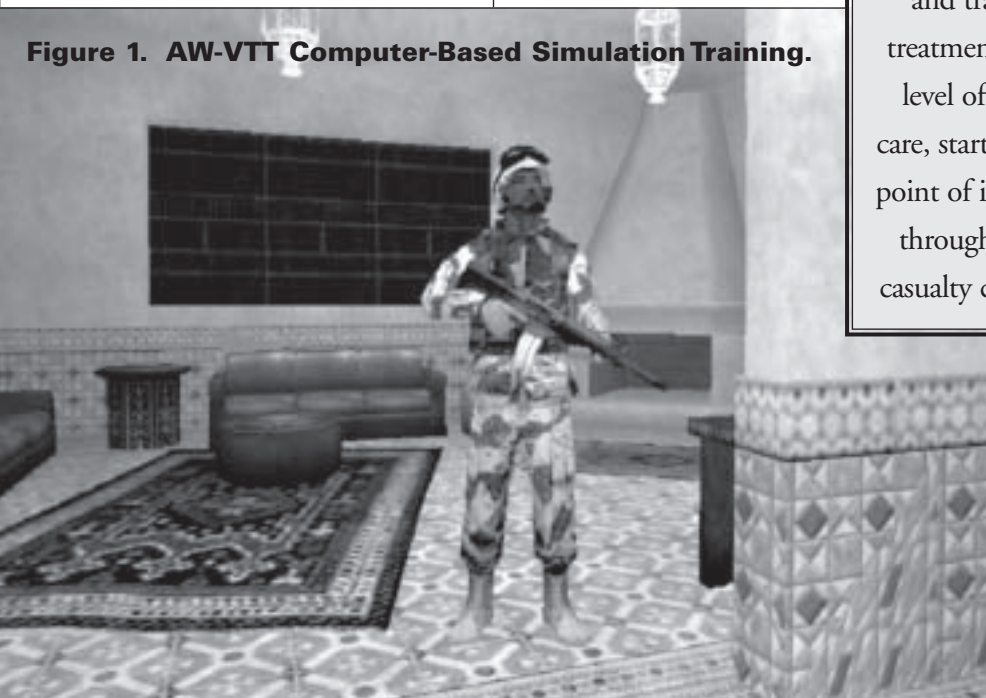


Figure 1. AW-VTT Computer-Based Simulation Training.

An AW-VTT simulation graphic of a Soldier searching a building in Southwest Asia depicts the degree of realism and attention to detail that Soldiers will experience in this interactive virtual training environment. (Image courtesy of STTC.)



This Southwest Asia urban setting helps trainees develop better cognitive judgment skills, observational acuity and heightened awareness of their surroundings. (Image courtesy of STTC.)



Figure 2. SLIM/ES3 Training Module.

- and requires no external facilities or infrastructure to operate.
- An interface that integrates with the Ground Soldier System (GSS).
- Embedded systems that easily attach to Soldier equipment to provide seamless capability.
- Two hardware subsystems — Soldier Station and Wireless Access Point.
- High-resolution graphics hosted on a lightweight, low-power portable, interactive computer system, which can host both GSS software and DAGGERS simulation software.

that allow medics to train individually or as teams. The CTPS electronically stores the patient profile and tracks all treatment at each level of patient care, starting at the point of injury and throughout the casualty care cycle.

The CTPS has trained more than 6,000 Soldiers and is fielded at the Department of Combat Medic Training, U.S. Army Medical Department Center and School, Fort Sam Houston, TX; Southeast Regional Medical Command, Fort Gordon, GA; and Field Medical Service School, Camp Pendleton, CA — which recently received a mini-CTPS system — and the Army National Guard, Fort Indiantown Gap, PA, which has had CTPS assets since 1998. The 1st Cavalry Division developed two patient simulators in Iraq to provide premission training for its combat medics.

Additional training sites are planned for Fort Benning;

Fort Rucker, AL; Fort Riley, KS; Fort Bragg, NC; and Fort Campbell, KY.

DAGGERS is the first step in realizing a fully embedded, portable, 3-D simulation for dismounted Soldiers. The augmented reality capabilities in DAGGERS also have potential applications for first responder training in homeland defense, special weapons teams, law enforcement and civilian medical training.

Dismounted Soldier Simulations on the Move

The Distributed Advanced Graphics Generator and Embedded Rehearsal System (DAGGERS) is a proof of concept for a dismounted embedded training system. The prototype was evaluated last year at Fort Benning and will be used to generate concepts and requirements for embedded training applications for dismounted Soldiers. DAGGERS includes:

- Squad-level self-contained training that is Soldier worn, battery powered



A Soldier demonstrates DAGGERS. Its major components include the helmet-mounted display, wearable computer and instrumented weapon. (Photo courtesy of STTC.)



16th Cavalry Regiment Soldiers reassemble their weapons during a break in the action following a morning LFX at St. Vith Range. AW-VTT will build upon actual live-fire training exercises in preparation for combat operations. (U.S. Army photo by Mike Roddin.)

DAGGERS is the first step in realizing a fully embedded, portable, 3-D simulation for dismounted Soldiers. This capability will enable Soldiers to conduct realistic training and mission rehearsal through augmented reality and scaled One Semi-Automated Forces (OneSAF) to represent virtual elements in a live training or mission-rehearsal environment. The augmented reality capabilities in DAGGERS also have potential applications for first responder training in homeland defense, special weapons teams, law enforcement and civilian medical training.

‘Every Soldier Is a Sensor’ Training

The Self-directed Learning Internet Module (SLIM), Every Soldier a Sensor Simulation (ES3) was developed in only 90 days. This project, developed at the Institute for Creative Technologies at the University of Southern California, addresses the

requirement to provide a security presence training tool for U.S. ground forces in current and future deployments. The tool provides practice in active surveillance and threat indicator identification as depicted in Figure 2 (Page 33), a screen capture from the actual training module. SLIM was developed with the close cooperation of the U.S. Army’s Office of the Deputy Chief of Staff for Intelligence, G-2, and is intended to be distributed over the Internet.

In actual SLIM training modules, trainees navigate urban terrain populated with civilians, security personnel and insurgents, seeking to detect threats of varying significance while attempting appropriate interaction with those whom they

encounter. Players work from a menu of actions that records their observations,

allows them to check maps, takes Global Positioning System readings and even takes digital photographs. Scenarios are time-limited — each action has a time cost. Skillful players will commit more observations to memory as the cost of investigating or recording every observation runs the clock out more rapidly. Following the patrol, the trainee prepares a report and is provided with a scored result, including success in civilian interactions. SLIM requires users to emphasize cognitive judgment and observational acuity to heighten

awareness of elements in their surroundings while prioritizing, reporting and honing memory skills.

SLIM requires users to emphasize cognitive judgment and observational acuity to heighten awareness of elements in their surroundings while prioritizing, reporting and honing memory skills.

Enhancing Virtual Training in an Immersive Environment

The Virtual Integrated MOUT (Military Operations in Urban Terrain) Training System (V-IMTS) allows Soldiers to conduct virtual training in an immersive environment using a virtual database and the OneSAF, as planning and rehearsal tools in preparation for live training exercises.

Soldiers from the 101st Abn Div were the first to train using virtual MOUT training capabilities during live training exercises at Fort Campbell. The results of the combined live and virtual training were remarkable. Assistant Division Commander for Operations BG Michael Oates attended the training evaluation and commented that the V-IMTS "does for MOUT training what instant replay did for the National Football League years ago." Oates explained how the simulation could be

used to improve Soldier tactics and dismounted infantry training. Another benefit was that the virtual training exercises assisted in the preparation for the conduct of the situational training exercises and the virtual reality technology improved tactical decision making of all squad members. Finally, the virtual reality after action review system significantly improved feedback to capture lessons learned.

The V-IMTS allows Soldiers to conduct virtual training in an immersive environment using a virtual database and the OneSAF, as planning and rehearsal tools in preparation for live training exercises.

Global Partnerships

In addition to their in-house research and development program, STTC takes a global approach to leverage and support allied technology programs, commercial technology, other government agency programs, industry R&D and academic research to better support Soldier training capabilities. STTC is working closely with the Army Research Institute for the Behavioral and Social Sciences, the Air Force Research Lab, Defence R&D Canada and the

United Kingdom's Ministry of Defence on a program to support coalition mission training through Internet-based simulation. These initiatives and partnerships will ensure that RDECOM STTC continues to provide Soldiers and leaders the most advanced simulation and training technologies that industry has to offer.

ROBERT A. SOTTILARE is the Chief Technology Officer at RDECOM STTC where he oversees horizontal integration of STTC's science and technology program, and the transition of STTC's research and technology development to acquisition programs for the warfighter. He has B.S. degrees in electrical and civil engineering from the University of Central Florida and the University of Florida. Sottolare is an Army Acquisition Corps member who is Level III certified in both systems planning, research, development and engineering as well as program management. He is also a graduate of the Defense Acquisition University's Advanced Program Management course and is certified as a team trainer by the state of Florida.

Did You Know?


The 2005 Acquisition Senior Leaders and Army Materiel Command Commanders Conference is scheduled for Aug. 22-25 in Detroit, MI. For more information, visit the Army Acquisition Support Center Web site at <http://asc.army.mil>, or contact Betisa Brown, Conference Chairperson, at (703) 805-2441 or betisa.brown@us.army.mil.



An STTC evaluator solicits Soldier feedback following V-IMTS training at Fort Campbell. These 101st Abn Div troops were the first to train using virtual MOUT simulations to augment actual live training in a field environment. (Photo courtesy of STTC.)

Military Infectious Disease Research – Preventing Debilitating Disease and Developing Response Strategies

COL (Dr.) Kip Hartman and Gary Wheeler



The U.S. Army Medical Research and Materiel Command's (MRMC's) Military Infectious Disease Research Program (MIDRP) focuses on prevention, diagnosis and treatment of diseases that can seriously hamper military mobilization, deployment and effectiveness. MIDRP's 330 scientists have military, civil service or commercial experience and leverage their research dollars by collaborating with industry and academia through more than 100 cooperative research and development (R&D) agreements.

CPT Keith Blout, an entomologist deployed with the 332nd Expeditionary Medical Group at Tallil Air Base in Iraq, sorts sand flies and mosquitoes for analysis. He examines the sand flies to identify the DNA of parasites that cause cutaneous leishmaniasis, which causes skin sores. (U.S. Air Force photo by MSGT Lance Cheung.)

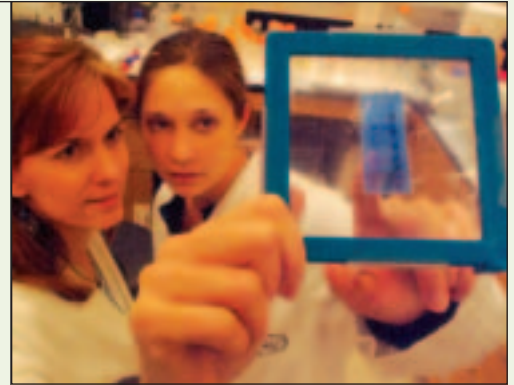
MRMC MIDRP products include licensed vaccines for hepatitis A, Japanese encephalitis, typhoid fever adenovirus, meningococcal meningitis, rubella and influenza. Malaria still causes more than 1.5 million deaths per year worldwide. Military infectious disease researchers have played significant roles in developing all synthetic antimalarial drugs licensed in the United States. Many of these drugs are used around the world by militaries and civilians to prevent and treat malaria infections.

MRMC researchers have also developed the current dosing regimen for treating cutaneous leishmaniasis with the drug pentostam. Leishmaniasis infections resulted in a battalion-sized loss of combat strength during the first phase of *Operation Iraqi Freedom*. The program has developed other innovative products, such as a DEET-based standard insect repellent and a camouflage face paint insect repellent for protecting servicemen and women from disease-spreading insects.

Malaria still causes more than 1.5 million deaths per year worldwide. Military infectious disease researchers have played significant roles in developing all synthetic antimalarial drugs licensed in the United States. Many of these drugs are used around the world by militaries and civilians to prevent and treat malaria infections.

MRMC Research in Kenya

MRMC's OCONUS laboratories such as the U.S. Army Medical Research Unit-Kenya (USAMRU-K) are valuable resources in this program's global approach to protecting warfighters from infectious disease threats. The program, conducted under a cooperative agreement with the Kenyan government, funds eight infectious disease research laboratories, accredited animal lab facilities, biosafety containment labs, a pilot vaccine facility and clinical trial units. USAMRU-K's mission is to develop and test improved means for predicting, detecting, preventing and treating infectious disease threats to the African people. USAMRU-K's primary objectives are to help develop and test malaria and human immunodeficiency virus (HIV) vaccines, as well as antimalarial drugs. USAMRU-K is one of two principal overseas commands that conduct research in tropical infectious disease. Major efforts are summarized below.



WRAIR researchers Lisa Ware (left) and Sally Robinson examine a malaria vaccine antigen. (Photo courtesy of the U.S. Army Medical Command.)

One such USAMRU-K initiative is in malaria immunology research. The Malarial Immunology Program's mission is to test and develop drugs and vaccines for the prevention and treatment of malaria and to increase our understanding of how malaria causes death and disease by studying semi-immune and nonimmune populations in malaria-endemic areas. The program relies heavily on funding from partnerships between DOD, nonprofit organizations such as the Malaria Vaccine Initiative and industrial partners such as Glaxo-SmithKline. The Malaria Pathogenesis program in immunology is intended to provide a better understanding of the pathogenesis of severe malarial anemia and cerebral malaria, two of the deadliest complications of *P. falciparum* malaria. A major area of research is in the role of red cell complement regulatory proteins and complement in the pathogenesis of these two conditions. The program is supported by grants from the National Institutes of Health (NIH), the Fogarty International Center (FIC) and the World Health Organization (WHO).

Antimalarial R&D Leads to New Agents

The Malaria Drug Screening Laboratory conducts research aimed at malaria drug discovery and drug resistance. Malaria drug discovery efforts currently test natural products — both as



Kenya-Kowemba Clinic, site of the USAMRU-K Malaria Immunology Program. (U.S. Army MRMC photo.)

Army and international scientists, doctors and researchers are actively conducting screening and prevention programs in Kenya, Nigeria, Cameroon, Uganda and Tanzania to develop more effective vaccines against HIV and malaria. (U.S. Army MRMC photo.)



plant extracts and purified compounds — for their ability to kill the malaria parasite in culture. These efforts may identify natural products that can be transitioned into advanced development as a new antimalarial drug. The Molecular Malaria Laboratory conducts scientific research into drug-resistant molecular mechanisms. This program is supported by grants from NIH, FIC and WHO.

Strategies to Prevent HIV Infection

USAMRU-K conducts research to develop and test vaccines based on the genetics and subtypes (clades) of the viruses prevalent in this region, to help develop HIV vaccines. Clinical testing of vaccines in Africa will permit evaluation of the role clades A, C and recombinants have in varying proportions to the HIV epidemic. Current research projects include:

- Estimating the incidence and prevalence of HIV.
- Characterizing the risk factors associated with HIV infection.
- Determining the viral clade and

recombinations of HIV-1 in Kenya.

- Characterizing the kinetics of HIV-specific immune responses, CD4 counts and viral loads in early HIV infection and in the face of malaria co-infection.

USAMRU-K is the primary field station for the U.S. Military HIV program and provides regional coordination between our programs in Uganda, Tanzania, Cameroon, Nigeria and Kenya. In addition to conducting research, USAMRU-K also sponsors HIV prevention programs.

Global Emerging Infection Surveillance (GEIS)

The GEIS project at USAMRU-K will provide a dynamic public health surveillance system to address all of DOD's GEIS mission needs, emphasizing diseases that are uniquely suited to study in sub-Saharan Africa. USAMRU-K has developed and established a robust infectious disease surveillance program consisting of well-equipped and staffed international surveillance sites, capable central laboratory facilities, a strong educational program and dedication to

infrastructure development within our host nations. The GEIS project will allow collection, analysis and dissemination of data in near-real-time.

MRMC is pursuing a broad range of research into prevention, diagnosis and treatment of infectious diseases, both at home and abroad. USAMRU-K is the only DOD infectious disease laboratory in sub-Saharan Africa. It is uniquely positioned to test improved products for the diagnosis, treatment and prevention of infectious disease threats to deployed service members. It also undertakes surveillance activities to identify and develop response strategies for emerging infections that have the potential to disrupt military readiness. Collaborations with host nation institutions and with regional medical resources are key to this mission's success.

COL (DR.) KIP HARTMAN is the former Associate Director, Walter Reed Army Institute of Research (WRAIR) for Overseas Operations. He received his M.D. from the University of South Florida.

GARY WHEELER is Program Manager, WRAIR, Overseas Operations. He holds a B.S. in mechanical engineering from California State University-Long Beach and an M.B.A. from National University, San Diego, CA.



Leveraging Combat Casualty Care Solutions Today

MAJ Robert M. Wildzunas

The rapid growth in the size and number of urban centers, particularly in regions of political instability, means that the Army will increasingly conduct operations in urban areas, as evidenced by the ongoing hostilities in Iraq. This environment requires the Army to transform its doctrine, weapons and technology to ensure peace, as well as to transform its medical support to save Soldiers' and civilians' lives.

Patients are transported by helicopter from the 86th Combat Support Hospital, Baghdad, Iraq, Feb. 10, 2005. Several technology solutions are being examined to collect data on injuries, treatment and the equipment that was worn from point of injury through Level III and IV treatments. (U.S. Air Force photo by MSGT Dave Ahlschwede, Green Zone, Baghdad, Iraq.)

Battlefield wounds come in many shapes, sizes and degrees of severity. Medical personnel must train for and expect to treat casualties as a result of:

- Direct fire and fragmentation injuries, including injuries from small arms and armored vehicles, rocket-propelled grenades, improvised explosive devices and ricochets.
- Indirect fire from mines, artillery, rockets, mortars and Scud missiles.
- Blasts, flame weapons and incendiary devices.
- Crushing injuries, falls from heights and injuries from falling debris, concrete, glass, heavy wood and metal.

Medical personnel will also need to be prepared for increases in injuries resulting from such diverse threats as:

- Suicide bombers.
- Ground vehicle and helicopter accidents.



SPC Michael P. Gustetic, a military policeman with the Multinational Force-Iraq, takes instructions as he gives an intravenous injection during the combat lifesaver course at the Camp Victory Troop Medical Clinic in Iraq, March 17, 2005. (U.S. Army photo by SPC Mary Rose.)

- Non-life-threatening injuries from incidental contact with civilians.
- Blunt trauma from nonbattle injuries and other noncombatant injuries.

COL Kevin V. Wilkerson, Director, Infantry Futures, has articulated several challenges specifically directed toward the U.S. Army Medical Research and Materiel Command's (MRMC's) Combat Casualty Care Research Program (CCCRP). From the infantry warfighter's perspective, combat medics need:

- Strategies for ground, air and mounted Soldiers to be better trained and equipped to be first responders.
- An enhanced first-aid kit for first responders.
- A warfighter physiological status monitoring system.
- Better hydration, pulse and respiration management such as wristwatch monitors and silent vibration alarms.
- Hand-held or man-portable systems that allow medics on the ground to query competent medical professionals to assist in casualty triage.
- The capability to extract wounded Soldiers while under fire.
- Clotting agents that have a longer shelf life and can be carried by the field medic.
- Blood substitutes to replace or sustain casualties until they can receive transfusions.
- The ability to conduct data collection of injuries, treatment and equipment worn from point of injury through Level III and IV treatments.
- Biomedical mapping of the body, including extremities, for use in designing protective equipment.

MRMC researchers envision that many products used today by medics will eventually be pushed forward to combat lifesavers and individual Soldiers on the forward battlefield.

MRMC is leveraging technological advances in casualty care to ensure that research solutions get into the lifesavers' hands today and to provide medical teams with the best technologies avail-

able to reduce battlefield trauma and casualties. Combat casualty care researchers are evolving ideas from the laboratory bench to products that can save lives on the battlefield.

Training and Equipping First Responders

The Army has three levels of training for combat medical treatment. All Soldiers receive training in fundamental first-aid skills. Combat lifesavers are trained in advanced

first aid with 3 days of instruction and yearly skills validation. Combat medics (91W) are similar to civilian emergency medical technicians. They receive 16 weeks of training, including clinicals and field training exercises, sustainment training and twice-yearly skills validation.

MRMC researchers envision that many products used today by medics will eventually be pushed forward to combat lifesavers and individual Soldiers on the forward battlefield. The MRMC CCCRP focuses on enabling medics with technology currently in the hands of only physicians and nurses. Farther out on the technology horizon, the Defense Advanced Research Projects Agency's (DARPA's) Soldier Self-Care program may represent the next revolution in tactical combat casualty care. DARPA's goal is to develop technologies that allow warfighters to administer self-aid for minor to moderate injuries, thereby significantly reducing the requirements



Run on a hand-held PDA, the BMIS-T helps gather information as part of a semiautomated trauma triage capability that will provide critical casualty information remotely and continuously to battlefield medics. (U.S. Army photo by Larry Sorcher.)

for medic support and/or evacuation. Advances in military medical technology will provide individual Soldiers, combat lifesavers and combat medics with the ability to reduce hemorrhage, control pain and stabilize injuries for further treatment by medical staff.

The new Individual First-Aid Kit (IFAK) will increase the abilities of individual Soldiers and combat lifesavers to perform more of the lifesaving and treatment functions that only medics are able to do today. Weighing only 1.08 pounds and measuring 1.28 cubic inches, the IFAK includes these expendable items:

- A roll of 4-inch gauze.
- A roll of 2-inch tape.
- Four latex exam gloves.
- A nasopharyngeal airway.
- An Israeli pressure dressing.
- A combat application tourniquet.
- A lightweight pouch.

DARPA's goal is to develop technologies that allow warfighters to administer self-aid for minor to moderate injuries, thereby significantly reducing the requirements for medic support and/or evacuation.

The IFAK is being considered as an item that will be issued to every Soldier through the Soldier-as-a-System Rapid Fielding Initiative. The Army Medical Department has also developed the improved Combat Medic Vest System (CMVS) that has 40 percent of the surgical instruments and supply sets in the vest

to free the medic's hands for treating Soldiers. The CMVS has completed testing and is in production.

Warfighter Physiological Status Monitoring (WPSM)

The WPSM system of wearable physiological sensors will provide physiologic data useful to Soldiers, medics and commanders. Specific WPSM system capabilities targeted include monitoring of core and skin temperature, water intake,

heart rate and ventilation and the metabolic demands of marching and sleep (activity/inactivity). A new sensor system capable of detecting ballistic

impact and vital life signs will be integrated into the WPSM to permit the combat medic to remotely identify wounded Soldiers.

Additional refinements will include algorithms and predictive models to meet requirements for remote triage using the ballistic impact detection system and life-sign detection system, plus blood pressure, respiratory function and neurological status. Additionally, force health protection monitoring — including thermal stress risks, hydration state, sleep status, mental alertness status, metabolic status/energy reserve and altitude adaptation — will be integrated into the WPSM. Long-term WPSM plans include chemical and biological agent exposure monitoring as well.

Remote Triage and Casualty Evacuation

During the Vietnam War, the killed-in-action (KIA) rate was twice as high for combat medics as for infantrymen. As many as 25 percent of the medics who were KIA died attempting to reach a casualty who was not saveable. The contemporary urban battlefield is even more lethal to warfighters and medics. Several future products under development will remotely identify and triage injured Soldiers and remove them from lines of fire.



A Soldier with the 2nd Battalion, 6th Infantry Regiment, renders aid for a simulated gunshot wound during urban combat training in Baghdad, Iraq. (U.S. Army photo by SGT Vernon Freeman. Used with permission from the U.S. Army Medical Command.)

In addition to WPSM-generated information, microimpulse radar (MIR) technology will enable medics to monitor respiratory rate and heart rate through clothing, chemical and biological protection equipment and body armor. A computer-assisted acoustic sensor system will help identify a pneumothorax (PX). Both PX and MIR vital sign detectors can be integrated into a hand-held personal digital assistant (PDA) application — the Battlefield Medical Information System-Telemedicine (BMIS-T). Information gathered from these physiological signals will help develop a semiautomated trauma triage capability that will provide critical casualty information remotely and continuously to battlefield medics.

Advances in robotics, artificial intelligence and navigation software/hardware will also assist military first responders, especially in reducing or eliminating first responders' exposure

to fire, chemical or radiation contamination, gunfire and weapons of mass destruction. Likewise, robotic and telerobotic surgical capabilities may save the lives and limbs of combat Soldiers and civilian emergency personnel by enabling more rapid surgical attention to casualties — even at the injury scene.

Although no formal requirements currently exist for such medical robotics or unmanned systems, the DOD Joint Robotics Program chartered the Family of Integrated Rapid Response Equipment Integrated Product Team (IPT) in 2004. The IPT's first designated goal was to design a system that includes casualty location, assessment, extraction, treatment and evacuation. DARPA and the MRMC Telemedicine and Advanced Technology Research Center have initiated several research and development programs to investigate these concepts.

Clotting Agents and Blood Substitutes

Acute hemorrhage remains the leading cause of battlefield deaths. The CCCRP has had several successes with improved hemostatic products such as a dry fibrin sealant dressing, a Chitosan Bandage and IV injectable clotting agents such as rFVIIa. However, the optimal fluid and resuscitation strategy remains unknown. MRMC is investigating component products derived from whole blood. The components selected must be as effective as blood, available for all levels of fluid resuscitation, stable for long periods of time at ambient combat conditions and have no requirement for matching or typing.

Once MRMC scientists identify the critical blood components, they will partner with commercial entities to provide component therapies and clotting agents that can be carried by field medics. One promising candidate,



SFC Ralph E. Hurley II (left), First Army Command Surgeons Office, supervises as Navy Gas Turbine Mechanic Jonathan W. Cummins practices IV insertion during combat lifesaver training, Williamsburg, VA, Jan. 17, 2005. (Photo courtesy of First Army Public Affairs.)



A fourth-year student at the Uniformed Services University of the Health Sciences treats a simulated casualty during *Operation Bushmaster*, Camp Bullis, TX. Students from the Army, Navy and Air Force applied clinical and tactical skills during the 72-hour training exercise. (U.S. Navy photo by SN Kory Kepner.)

freeze-dried (powdered) plasma, offers potential as a volume expander to sustain a casualty to definitive care. It helps resuscitated patients to clot better, has nearly 100 percent of fresh plasma's clotting factors, replaces frozen plasma, and has a shelf life of up to 1 year.

MRMC is also investigating a rapid sterilization system that will use whole blood from volunteers and prepare it for donation to a patient within a few hours, making blood available anywhere on the battlefield. Pending successful clinical trials that demonstrate safety and efficacy, blood substitutes are another very attractive option under consideration that offer the potential of providing both volume resuscitation and oxygen delivery.

Trauma Data Collection, Registry and Biomedical Mapping

Several technology solutions — from electronic storage devices (ESDs) such as “thumb drives” to personal information carriers (PICs) and the BMIS-T — are being examined to collect data on injuries, treatment and the equipment that was worn from point of injury

through Level III and IV treatments. The PIC and ESDs allow a Soldier's medical record and treatment history to be downloaded anywhere on the battlefield. The ESDs must be:

- Compatible with all types of computer hardware.
- Capable of securely storing text, voice, video and digital data.
- Designed to allow the system to evolve with technology.
- Able to run on a wireless, hand-held PDA.

The BMIS-T will ultimately evolve into a medical diagnostic device that will enable first responders and other healthcare staff to quickly and accurately capture, integrate, transmit and display data from medical histories/physical examinations, medical reference libraries, diagnostic and treatment decision aids, medical sustainment training and medical mission planning.

Regardless of the source, de-identified field records are being abstracted, coded and entered into a theater trauma data registry. MRMC generates monthly reports on epidemiologic

analysis of body area, nature of injury and causative agent. Information is intended for use as feedback within the theater treatment facilities to monitor injuries. Outside the theater, the information has utility for combat epidemiology, materiel developers' design of wearable protective devices, medical response systems, capabilities and staffing. Future refinements include hyperaccurate digital coordinate data obtained from computed tomography images for all penetrating injuries. Materiel developers will then be able to use these digital coordinates for designing new equipment based on frequency and maps of injury severity.

Future battles in complex, urban terrain will continue to involve highly mobile forces, highly lethal weaponry, violent close combat, continuous maneuver and decentralized battle command. As the enemy adapts to U.S. operations and tactics, U.S. forces will have to counteradapt, and future warfare will surely increase to a level of fluidity and lethality previously unknown. Medical forces must keep up with supported combat units and prepare now to anticipate implicit future battlefield challenges. Close coordination with warfighters and an understanding of their medical challenges must be an institutional priority for MRMC as medical researchers continue to support the warfighters' efforts by leveraging combat casualty care solutions today.

MAJ ROBERT M. WILDZUNAS is Research Director, U.S. Army Institute of Surgical Research, San Antonio, TX. He holds a Ph.D. in physiological psychology from Louisiana State University.

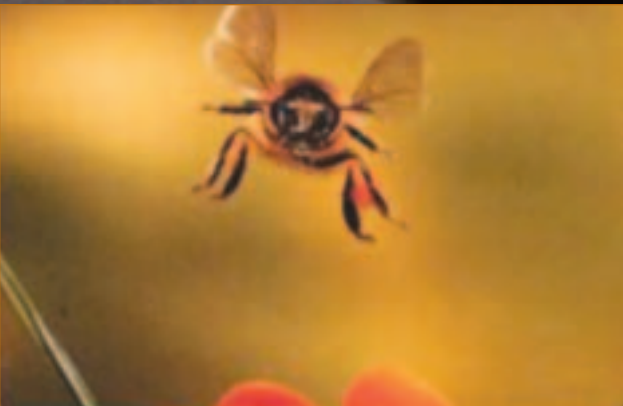


Smaller is definitely better! Micro-UAVs will help keep Soldiers out of harm's way and still enable them to gather information and track enemy movements – nearly undetected – on the battlefield. (Images courtesy of M.J. Tarascio and I. Chopra, University of Maryland.)

Army Basic Research – Creating Extraordinary Opportunities for a Capabilities-Based Army

Dr. John A. Parmentola and Irena D. Szkrybalo

The tragic events of 9/11 and our Nation's response to these horrifying acts of terrorism through the war in Afghanistan and the current conflict in Iraq are causing major changes to our national security strategy. DOD's *Quadrennial Defense Review (QDR)* process is addressing the current global security environment's challenges and is considering significant force changes. Exploitation of key technology areas such as advanced sensors, information processing, biotechnology, nanotechnology, cyber technology and directed energy is being assessed within the *QDR* from the perspective of both U.S. capabilities and vulnerabilities.



The flight of the bumblebee is helping scientists and researchers better understand navigational capabilities and advancements necessary to accommodate for instabilities and turbulence encountered by airframes in flight, particularly during take-offs and landings. (Image courtesy of M.V. Srinivansan, M. Poteser and K. Kral, Australian National University.)

The Army Basic Research Program has been investing in these areas by tapping into expertise resident within Army laboratories, academia and industry worldwide to expand our fundamental knowledge underlying these areas and to investigate promising innovative applications that would produce paradigm-shifting capabilities to enhance the Current Force and enable the Future Force. This article highlights Army investments in some of these revolutionary science and technology (S&T) areas.

Biotechnology

Through biotechnology, we have a real opportunity to take advantage of 4 billion years of evolution. After all, why invent a new sensor when evolution has already done it for you?

Biological systems exhibit remarkably high-performance capabilities in detection and identification unequaled

by human engineering. Researchers at the Army's Institute for Collaborative Biotechnologies (ICB) at the University of California-Santa Barbara are exploring

Male moth's antennae provide unprecedented "homing" capability. (Image courtesy of Dr. Daniel Morse, University of California-Santa Barbara.)

the mechanisms of precision sensing found in nature. Through evolution, biological systems have evolved sensor capabilities that can detect chemical and other signals with sensitivity and specificity that are a million times greater than present man-made counterparts. As depicted below left, the chemical sensors in a male moth's antenna are capable of detecting a single female sex pheromone molecule, causing the male to home in on a mate from distances as much as a mile away — an excellent standoff capability.

The human eye can detect a single photon of light. ICB investigators, using tools of modern biotechnology, are dissecting these sensory systems to reveal the underlying secrets of these remarkable capabilities. They've discovered the two fundamental principles responsible for this high performance:

- In biological systems, signals received are amplified before being transferred to central processing systems.
- In biological sensory systems, the incoming and amplified information is transferred through the nervous system to a processor (i.e., the brain) through a series of molecular relay elements or transducers that fit together with a lock-and-key precision (mediated by molecular recognition) that has previously been unattainable

through human technology efforts. The result is lossless transfer of information from antenna to the processor. Researchers at the ICB are now translating sensory mechanisms into revolutionary new means of signal amplification and signal transduction to enable a new generation of sensors with greatly increased sensitivity and

specificity. In a similar way, researchers at the ICB are working to develop lighter and more efficient portable systems for energy generation and storage for the Soldier. The quantum efficiency of photovoltaic generation performed during photosynthesis by every living plant on Earth is virtually 100 percent. In contrast, the best man-made solar energy converters today operate at approximately 10-20 percent. Again, using modern biotechnology tools, ICB investigators have dissected and revealed the underlying molecular mechanisms responsible for this remarkably high efficiency of energy generation, storage and use in biological systems. The principles discovered are being used to develop new materials for solar energy and lightweight batteries.

Biotechnology holds promise for the engineering and manufacturing of new materials for sensors and other electronic devices useful for ultra-rapid, ultra-smart information processing for use in targeting and threat avoidance. ICB's Dr. Angela Belcher has pioneered important breakthroughs by tapping into the biological self-assembly capabilities of phages (viruses that infect bacteria) to build highly precise, functioning electrical circuits with nanometer-scale dimensions. A nanometer is about 50,000 times smaller than the diameter of a human hair. By allowing genetically engineered phages to self-replicate within bacteria cultures over several generations, as depicted in the graphic on Page 46, Belcher has been able to identify and isolate those phages that are able to bind to particular semiconductor molecules with high affinity and high specificity. These phages can then self-assemble into a network on a substrate, forming exquisitely precise semiconductor arrays. The ultimate goal is to replace current suboptimal

electronic, magnetic and optical materials fabrication methods by genetically engineering microbes to build nanoscale circuits with exquisite nanoscale precision based on codes implanted in their DNA.

Using animals as detection devices isn't a new concept. The U.S. Army Medical Research and Materiel Command has developed a technique using common freshwater Bluegill sunfish to successfully monitor water quality in several towns across the country. Common Bluegill sunfish are wired with electrodes so their bodily functions can be precisely monitored on a computer display using signal processing algorithms for threshold detection in response to toxic chemicals in water. The system was used to successfully detect, in real time, a diesel-fuel spill from a leaking fuel line at a New York City reservoir. Fortunately, the reservoir intake was off-line at the time of the incident and no contaminated water reached consumers.

Similar activities that use living organisms as sensors are underway worldwide. The Belgian research organization, APOPO, has developed a potential solution to the detection of

land mines using African giant pouched rats. In Tanzania, these rats have been trained to detect land mines with extraordinary high detection probabilities. Ongoing research is also being conducted using parasitic wasps to detect explosives, using rats as a fast and cheap detector for early diagnosis of pulmonary tuberculosis and using dogs to detect certain types of cancer in humans.

Nanotechnology

The Army is also pursuing novel approaches using nanomaterials for the warfighter ensemble to improve Soldier protection against ballistic projectiles, chemical and biological attacks, and enabling the ensemble to perform triage through the use of active control materials and diagnostic sensors. An immediate challenge is injury to Soldier extremities. The

The Army Basic Research Program has been tapping into expertise resident within Army laboratories, academia and industry worldwide to expand our fundamental knowledge and to investigate promising innovative applications that would produce paradigm-shifting capabilities to enhance the Current Force and enable the Future Force.

at the University of Delaware, has developed a new garment based Kevlar® through the application of sheer thickening fluids to the material. These sheer thickening liquids are composed of nanoparticles of silica suspended in a liquid such as polyethylene glycol. When a high-speed projectile is injected into these liquids, the small nanoparticles are unable to get out of the way and are compressed into an essentially rigid mass that resists projectile penetration. At slow speeds, these nanoparticles are able to move around the projectile so there is little or no resistance to the incoming projectile. This has resulted in a version of Kevlar that is completely stab resistant while maintaining normal garment flexibility. The full potential of this new garment is being explored to assess its ability to limit

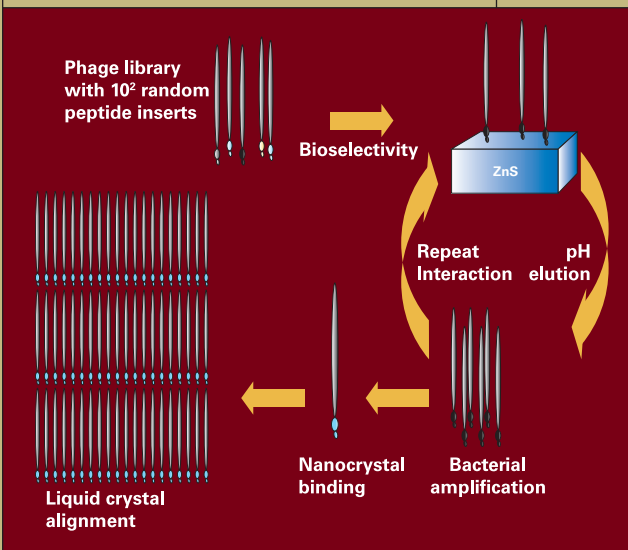
most prevalent battlefield injuries from *Operation Iraqi Freedom* include:

- Extremities (legs, arms, hands and feet), 62 percent.
- Head, neck and thorax, 24 percent.
- Abdomen and back, 13 percent.
- Other, 1 percent.

The Army Research Laboratory (ARL), in collaboration with the Army Center of Excellence in Materials

certain types of extremity injuries to our Soldiers.

Recently, the Army's Institute for Soldier Nanotechnology at Massachusetts Institute of Technology (MIT) discovered a novel active control material dubbed exomuscle. This material has potential use as a prosthesis to aid Soldiers in handling and lifting heavy objects. Another potential application involves embedding this material into the Soldier ensemble along with physiological monitoring and diagnostic sensors so that the Soldier's uniform can act as a tourniquet to limit blood loss or to perform CPR when needed.



Scientists are attempting to use phages to genetically engineer microbes to build nanoscale circuits with exquisite nanoscale precision based on codes implanted in the microbes' DNA. (Image courtesy of Dr. Angela M. Belcher, MIT.)

We will also be embarking on the development of much smaller complex machines such as nanobots to perform microsurgery, to serve as prostheses to enhance Soldier capabilities, to enhance human physical endurance or to go into places that humans cannot. Nanoparticles can serve as encapsulating agents or platforms for hosting sensor and therapeutic biomolecules. Maintaining nanoparticles in circulation in the body, however, is a major challenge. Intravascularly injected nanoparticles are cleared from circulation within minutes by a system of cells

ICB is investigating mechanisms by which novel, long-circulating biodegradable nanoparticles can be used for applications in continuous detection of metabolic markers, pathogenic threats or delivery of agents.

threats or delivery of agents.

found in the liver, spleen, lymph nodes and bone marrow that engulf and destroy bacteria, viruses and other foreign substances (phagocytosis). Red blood cells, however, can usually circulate for about 120 days before they are removed via phagocytosis in the liver and spleen. ICB is investigating mechanisms by which novel, long-circulating biodegradable nanoparticles can be used to adhere to red blood cells for prolonged periods of time for applications in continuous detection of metabolic markers, pathogenic

Technology Trends

There are certain technology trends evident today that will persist well into this century. *Time compression* is one of these trends. For the Army, time compression applies to the conveyance of information at the speed of light but, more importantly, to the ubiquitous availability of high-performance computing (HPC) to process information very rapidly. These capabilities are key to situational awareness (SA) through knowledge management, data processing, data interpretation, information routing and link restoration, for network-centric warfare and Future Force operations. By embedding HPC capabilities into multisensor systems, execution of real-time multisensor data fusion processing will be possible, as well as high-confidence pattern recognition of images of ever-increasing complexity. This will also have very important



U.S. Army Soldiers from 2nd Battalion, 70th Armored Regiment, 1st Armor Division, patrol through Mamadia, Iraq, March 28, 2005, with soldiers from the 1st Presidential Iraqi Army. In the future, Soldiers will be able to disperse small, inexpensive sensors (Smart Dust, see inset) by the handful over operational areas to obtain information or maintain vigilance. (Photo by SPC Ronald Shaw Jr., 55th Signal Co. (Combat Camera); Smart Dust image courtesy of Dr. Kenneth Pister, University of California-Berkeley.)



Miniaturization will have a major impact on future operations, particularly in the area of flexible display technology for Soldier faceplates as depicted in the inset photo. (Inset image courtesy of Eric Forsythe and David Morton, ARL.)

consequences for achieving autonomous unmanned systems and reliable autonomous seekers for smart munitions.

Further advances in silicon-based HPC are likely to be overtaken by the rapidly developing area of 3-D molecular electronics and possibly DNA and *quantum computing* with speeds that will make our current supercomputers seem like ordinary pocket calculators. Famous inventor and futurist Dr. Ray Kurzweil has studied technology trends for the past 2 decades. He and his research team gather critical measures of technology in different areas and develop mathematical models of how technology evolves. He has concluded that

Time compression applies to the conveyance of information at the speed of light but, more importantly, to the ubiquitous availability of high-performance computing to process information very rapidly.

the battlefield through *predictive capabilities* involving sophisticated prognostic and diagnostic systems, all connected and communicating on mobile wireless networks. Further advances in miniaturization will also

genetics, nanotechnology and robotics will be the major paradigm-shifting technologies for this century. Kurzweil predicts a steady exponential progression in computing power, so that by the year 2050, our ability in computing will exceed that of all human brains — not just one, but all on the planet. Based on the Kurzweil prediction, the prospects are exceedingly good for achieving embedded HPC with remarkable speeds within the next decade.

Another current trend is *miniaturization*. Space continues to be “compacted by the inclusion of more and more functions into smaller and smaller spaces. This will also have a major impact on time compression as well. On the horizon are golf-ball-sized systems with greater functionality to include advances in microelectronic-mechanical systems that will impact sensor systems, low-cost inertial navigation systems, diagnostics, prognostics and microcontrol systems, among others.

Logistics benefits will be realized by managing the real-time maintenance of warfighting systems on

result in inexpensive self-contained disposable sensors, such as “Smart Dust” as indicated in the graphic on Page 47. Soldiers will be able to disperse these small, inexpensive sensors in handfuls over an area where they will self-organize and self-configure to suit the particular application.

Miniaturization will have a major impact on flexible display technology. The Army has taken the lead in this area through its newly formed Flexible Display Center at Arizona State University. Because flexible displays are conformal, they can be placed on a Soldier’s faceplate or wrapped around a Soldier’s arm. Within this decade, we expect to realize a wireless device contained within a 6- to 8-inch tube with a 1-inch diameter as indicated in the adjacent graphic. Given expected advances in miniaturization, computer memory, computational speed and speech recognition, researchers will develop compact devices with video recording, speech recognition, embedded mission rehearsal exercises, library storage, wireless communications and real-time SA through flexible displays — all in a compact form factor that will easily fit into a Soldier’s pocket.

It is within our grasp to realize truly “*micro*” *unmanned aerial vehicles* (UAVs) that are human-hand-sized, or even smaller as depicted at the top of Page 44. These micro-UAVs will help keep our Soldiers out of harm’s way while enabling them to gather information about various threats and to provide both lethal and nonlethal capabilities. We can take our inspiration for this system from the bumblebee as depicted on the bottom of Page 44. This small creature has a horizontal thrust five times its weight, is capable of 50-kilometer (km)-per-hour speeds with a 16-km range and has a body weight that is essentially 100-percent nectar (or payload).

Recently, we have been able to unravel the mystery of its navigation system — the bumblebee balances information flow from its left and right optical systems to navigate. Our current challenge is to understand the control system that enables this small creature to land precisely with zero velocity under modestly turbulent conditions. Achieving this capability will require extensive research in understanding small-scale instabilities at low Reynolds numbers, the development of lightweight durable materials and sophisticated control systems that work in turbulent environments. We must also learn how to develop active control materials that are highly efficient and low-noise propulsion systems with compact power and energy sources that can provide operational endurance.

ICT is pursuing innovative research of simulation technologies to create virtual immersive environments for Soldier and leadership training, mission planning and rehearsal in the safety of virtual reality.

Immersive Environments

A U.S. Army training objective is to exploit emerging technology and live, virtual and constructive simulation to offset the restrictions imposed upon live training, and use of high-technology weapons systems that result from safety considerations, environmental sensitivities and higher training costs. The Institute for Creative Technologies (ICT), located at the University of Southern California-Los Angeles, is pursuing innovative research of simulation technologies to create virtual immersive environments for Soldier and leadership training, mission planning and rehearsal in the safety of virtual reality. ICT is creating high-fidelity virtual humans, called avatars, to

interact with people in an immersive virtual scenario. The avatars are synthesized using a wide range of software technologies such as speech recognition, artificial intelligence (AI), dialogue management, perception, animation and emotions. Simulated battlefield scenarios include the integration of a story line, filmed live action, computer-generated imagery and models. Soldiers learn by interacting with avatars that are able to adapt and learn in this dynamic immersive environment. ICT is leveraging the resources and talents of the entertainment and game development industries as well, and works collaboratively with computer, graphics, simulation and AI professionals to advance the state of immersive training and simulation technologies.

Army Educational Outreach Program (AEOP)

We won't achieve any of these marvelous things for our Soldiers without a highly capable future workforce that is well-versed in science, mathematics and engineering. An important strategic initiative in the Army S&T program is AEOP, which will help reverse trends that reveal a substantial erosion of our national prowess in science, mathematics and engineering. AEOP's goal is to increase the interest and involvement of U.S. students and teachers in science, math and engineering at all proficiency levels and backgrounds, including underrepresented and economically disadvantaged groups. In addition, AEOP is structured to provide sustained exposure of students and

teachers to learning and teaching aids and to Army labs, scientists and engineers throughout their educational lifetime.

One such initiative is eCYBERMISSION, a fully Web-based science, math and technology national competition for 6th through 9th grade students. Established by the Army in 2002, 1,583 students participated in its first year, exceeding those of all other competitions of its kind in their first year. Currently, 6,886 students are participating, a greater than four-fold increase in just 3 years. A student team project by a 2003 eCYBERMISSION national winning team received the Presidential Environmental Youth Award presented by President George W. Bush at a White House ceremony April 22, 2004. The Army S&T program is committed to identifying, growing and developing future generations of Army scientists and engineers by instilling in our youth a fascination for the wonder and beauty of scientific knowledge and discovery.

DR. JOHN A. PARMENTOLA is Director for Research and Laboratory Management, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. He has a B.S. in physics from the Polytechnic Institute of Brooklyn and a Ph.D. in physics from MIT.


IRENA D. SZKRYBALO is a Senior Technology Advisor with Dynetics Inc. She has a B.S. in aeronautical engineering from Wayne State University and an M.S. in commercialization of science and technology from the University of Texas-Austin.



Corps of Engineers Research Addresses Training Range Sustainability

John H. Ballard, Paul M. Loechl and Elisabeth M. Jenicek

Among the Army's most urgent issues is to ensure that training ranges remain sustainable for both current and future generations. The U.S. Army Engineer Research and Development Center (ERDC), comprising the U.S. Army Corps of Engineers' (USACE's) laboratories, researches all facets of military land sustainability. Three important initiatives include unexploded ordnance (UXO) detection, range risk prediction and encroachment modeling.

A photograph of a soldier in a green uniform operating a machine gun mounted on a tank. The tank is olive green and has several large wheels visible. The background is a clear blue sky.

UXO items consist of large munitions such as 105mm and 155mm projectiles; medium munitions including 60mm and 81mm mortars and 70mm (2.75 inch) rockets; and a variety of smaller munitions including grenades and submunitions. New detection systems are helping live-fire range controllers detect and remove UXO more efficiently and effectively. (U.S. Army photo by Mike Roddin.)

UXO Detection Technology at Standardized Demonstration Sites (SDSs)

Traditional technologies used to detect buried UXO on closed, transferring and transferred military ranges cannot reliably discriminate between UXO and natural or man-made clutter. As a result, some 75 percent of range remediation costs are associated with removing non-UXO anomalies. Efficient, cost-effective remediation of UXO from ranges is an Army priority.

ERDC teamed with the Army Environmental Center (AEC), Aberdeen Test Center (ATC), MD, and USACE's Huntsville Engineering and Support Center, AL, to address this requirement. The team is developing and evaluating new, innovative detection systems and UXO discrimination algorithms with the goal to provide 95-98 percent detection of ordnance and 75-90 percent rejection of clutter.

To test these new technologies under standardized conditions, demonstration sites were created at Aberdeen Proving Ground (APG), MD, and Yuma Proving Ground (YPG), AZ.

These sites are used to evaluate

and compare government and commercially developed UXO detection, discrimination and positioning systems under controlled and well-documented conditions. SDSs provide consistent, scientifically defensible scenarios.

The APG and YPG site areas are about 8 hectares (20 acres) and 7 hectares (17 acres), respectively, and are divided into calibration, blind grid, open field, mogul and wooded (APG) or desert extreme (YPG) areas. Each site contains

targets buried at different depths and orientations. Some locations have multiple targets such as UXO near UXO, UXO near clutter and multiple clutter targets. Many targets were installed using an angle auger to decrease disturbance of site soils. Thus, the soil above a buried target is undisturbed, giving no surface indication to UXO detection system operators that the systems are traversing near or over targets.



An ATC employee conducts a Geophex GEM-3 equipment demonstration at the APG SDS. (U.S. Army photo by Rick Fling, ATC.)

Standard UXO targets buried in the calibration area are representative of target anomalies found at the SDS. Calibration targets were buried at varying depths and orientations for each type of standard target. The calibration areas also have UXO buried near other UXO or clutter (natural and man-made). The UXO items consist of large munitions such as 105mm and 155mm projectiles; medium munitions including 60mm



YPG employees conduct a Geonics EM-63 equipment demonstration at the YPG SDS. (U.S. Army photo by Rick Fling, ATC.)

and 81mm mortars, 57mm projectiles and 70mm (2.75 in.) rockets; and small munitions comprising 20mm and 40mm projectiles, 40mm grenades and submunitions.

Numerous UXO detection systems are currently undergoing evaluation at the UXO technology SDS. During FY04, 122 UXO detection systems were demonstrated at APG and YPG. The work is being conducted as a partnership of the Army Environmental Quality Technology (EQT) program, the DOD Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology program. More information about UXO detection and discrimination technology development is available at: <http://el.erdcc.usace.army.mil/uxo/index.html>.

Information on the Standardized UXO Technology Demonstration Site program and results of technology demonstrations are available at <http://www.uxotestsites.org>.

Range Design Risk Evaluation Model™ (RDREM)

ERDC has developed a range design risk evaluation tool for live-fire ranges to help installations identify environmental compliance risks along with ramifications to range sustainment, and select mitigation strategies to reduce risk. RDREM targets high-priority environmental issues that impact mission sustainment and captures risk factors from previous information, research and demonstrations.

RDREM considers resource characteristics for locating a proposed or operational range, including vulnerabilities external to the proposed site that may be affected. These characteristics can be data such as weather, soil, vegetation and habitat, or they can come from geographic information system (GIS)

RDREM models the risks of siting new training facilities in particular locations, such as this live-fire urban training site currently under construction at Fort Campbell, KY. (U.S. Army photo by Dana Finney, ERDC.)



overlays or model output from soil erosion or trafficability studies. The characteristics can also be entered through a set of structured questions to the model.

The model applies a particular range's characteristics to the resources in the selected site to derive a representation of the impact construction and/or standard range operation might have on the resources. The potential for mitigation to reduce impacts and risk is added to the equation. A measure of risk to range sustainability, however, is more than a mapping of physical aspects and impacts. The installation's external environment — including the local community, regulators and local and national interest groups — also plays a role. So does the installation's capacity to manage both physical and external aspects of range operation.

RDREM works as an expert system, layered over a GIS, that responds to information about a proposed range

project at one or more potential locations. Up to 15 risk criteria can be selected for the system to analyze. Users can provide additional weighting to individual risk criteria if they feel a particular issue or environmental impact warrants special significance at their installation.

Risk calculations for each criterion are presented in a matrix of risk criteria against range activities for construction and operation. The level of risk is depicted as red, amber or green in the matrix. The model then provides a range project map at the proposed site showing where potential risks are located, such as cultural

resources, wetlands and important habitat. A text report follows that discusses each risk issue and the rationale for its particular rating. The text report also provides mitigation strategies that could be employed to reduce a risk rating.

RDREM calculates and reports the risk level for various issues. Resolving

Resolving risk prior to range construction — typically through planning and design changes — is the key to ensuring successful long-term range use and lower overall operating costs.

risk prior to range construction — typically through planning and design changes — is the key to ensuring successful long-term range use and lower overall operating costs. RDREM's benefits relate to cost avoidance against future compliance and mission impact. This includes costs associated with mission operation constraints, relocation and any reduced operational tempo.

Applied research to develop the tool is complete. AEC is testing RDREM during 2005. Field-testing at installations, in part through range project planning charrettes, is also planned to obtain user interface review and feedback. The work is being conducted as part of the Army EQT program.

New Tool Assesses Encroachment Risks

An ERDC-developed Web-based tool draws on national databases to gauge the region surrounding a military installation's future sustainability in light of encroachment risk factors. Called "Sustainable Installations Regional Resource Assessment" (SIRRA™), it helps planners make decisions that will avoid or limit constraints to DOD activities.

SIRRA assesses an installation's regional sustainability based on nine sustainability issues: air; energy; urban development; threatened, endangered and sensitive species; locational issues (e.g., seismicity); water; economics; quality of life; and infrastructure. These issues are analyzed through GIS maps produced from nationally maintained databases owned by agencies such as the U.S. Census Bureau, Geological Survey, Environmental Protection Agency (EPA) and Federal Aviation Administration. SIRRA shows both national and regional results, allowing installation, local and regional planners to collaborate on decisions



Competition for scarce resources such as airspace can lead to encroachment at DOD installations as depicted by this SIRRA assessment.

in collaboration with the Army Environmental Policy Institute's effort to support the Army's Strategy for the Environment through development of a regional sustainability assessment methodology. The SERDP funded early SIRRA development efforts.

An ERDC Technical Note for SIRRA is available on the Construction Engineering Research Laboratory's (CERL's) Web site at: http://www.cecer.army.mil/TechReports/Jenicek_SIRRA_TN/Jenicek_SIRRA_TN.pdf.

JOHN H. BALLARD is a Research Physicist in the ERDC Environmental Laboratory with extensive experience in airborne and ground-based sensor development. He has a B.S. in physics and mathematics and an M.Ed. in mathematics, all from Mississippi College.

PAUL M. LOECHL is the Project Manager for the Sustainable Army Live-Fire Range Design and Maintenance Project at ERDC-CERL. He is also the principal investigator for RDREM. He has a B.S. in biology and an M.B.A. from Northern Illinois University and an M.L.A. from the University of Illinois.

ELISABETH M. JENICEK is a Research Engineer/Principal Investigator at ERDC-CERL. She earned a B.S. in marine engineering from the U.S. Merchant Marine Academy and an M.A. in regional and urban planning from the University of Illinois at Urbana-Champaign.

with long-term benefits. Such cooperative dialogue is critical to heading off potential encroachment problems.

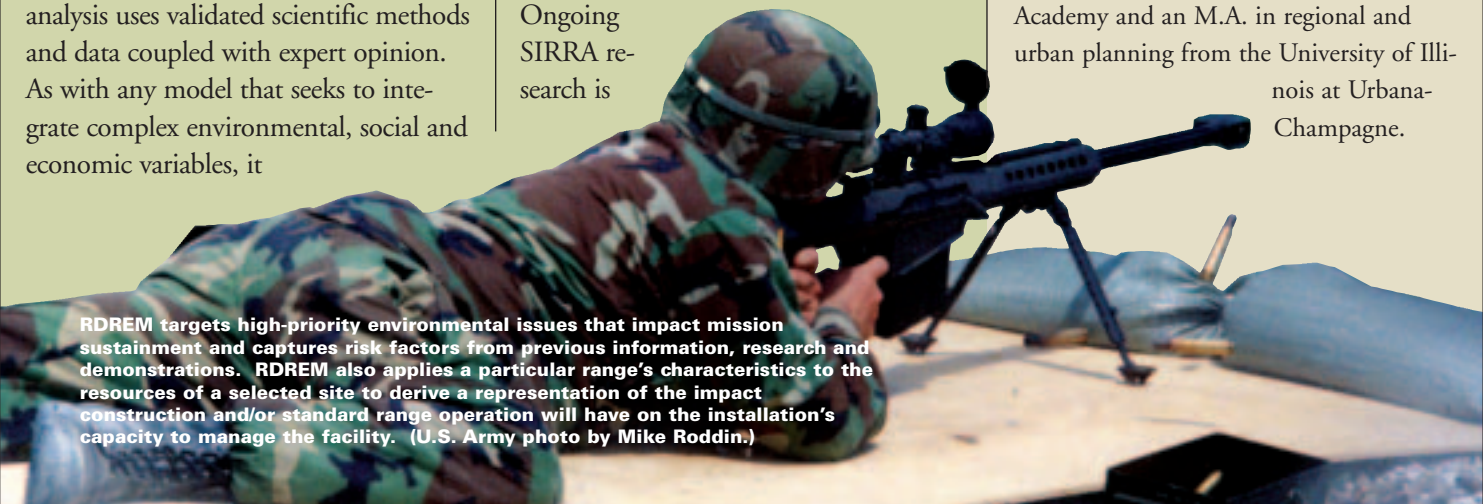
Each sustainability issue includes indicators that contribute to the risk. For example, quality of life weighs elements such as crime rate, housing, healthcare, educational opportunities and commuting times. Air sustainability assesses risk from noise complaints and noncompliance with EPA criteria for pollutants.

SIRRA allows planners to list results using red, amber or green to show high, medium or low sustainability risk. The analysis uses validated scientific methods and data coupled with expert opinion. As with any model that seeks to integrate complex environmental, social and economic variables, it

has limitations depending on how it is used. SIRRA alone does not provide Army leaders with answers but it does contribute a very important element as DOD integrates all factors influencing and predicting installation sustainability.

SIRRA Version 1A was released in July 2004 and is producing regional sustainability assessments for 308 DOD installations in CONUS. SIRRA has already supported several important efforts, such as providing auditable data for the Army stationing analysis. An enhanced version of SIRRA is due out in July 2005.


Ongoing SIRRA research is



RDREM targets high-priority environmental issues that impact mission sustainment and captures risk factors from previous information, research and demonstrations. RDREM also applies a particular range's characteristics to the resources of a selected site to derive a representation of the impact construction and/or standard range operation will have on the installation's capacity to manage the facility. (U.S. Army photo by Mike Roddin.)

LTG Joseph L. Yakovac Jr. Discusses Key Workforce Issues

Cynthia D. Hermes



On March 29, 2005, Military Deputy (MILDEP) to the Assistant Secretary of the Army for Acquisition, Logistics and Technology (AL&T) and Director of Acquisition Career Management (DACM) LTG Joseph L. Yakovac Jr. provided his thoughts on key workforce issues.

LTG Joseph L. Yakovac Jr., MILDEP/DACM, discusses technology integration with MG Michael R. Mazzuchi, Communications-Electronics Life Cycle Management Command Commanding General, at Fort Monmouth, NJ. (Photo by Greg Brower.)

Q. Why is counseling a supervisor's most important duty? What can supervisors do to help you grow future AL&T Workforce leaders?

A. Counseling is an unnatural act. It makes us uncomfortable and nobody likes to do it. In most cases, we — both military and civilian — find all the excuses in the world to avoid it. It's just not pleasant. In fact, historically, we normally only counsel those folks who have done something so bad that they need counseling, and it's obvious to everyone within the organization that they need it. But when it comes to performance counseling in general, we collectively do a very poor job of it. Now in the aggregate, I don't think we will ever be able to break the code of getting people to be comfortable with counseling. Even with as much work as the Army has done on its Officer Evaluation Report system — and making counseling and mentoring a

mandatory part of it — it's been very difficult for the Army to execute effective counseling on the green suit side. I have no unrealistic expectations that I can change how people view counseling overnight.

There are 40,000-plus civilians in the AL&T Workforce and no one person can manage that many people. There has to be a core group of workers out there who — from a supervisory standpoint — are the ones who current supervisors know from their personalities, desires and drives would rise to the challenge of moving up into acquisition leadership positions. Some people don't want the challenge. They've reached a plateau, are perfectly comfortable being

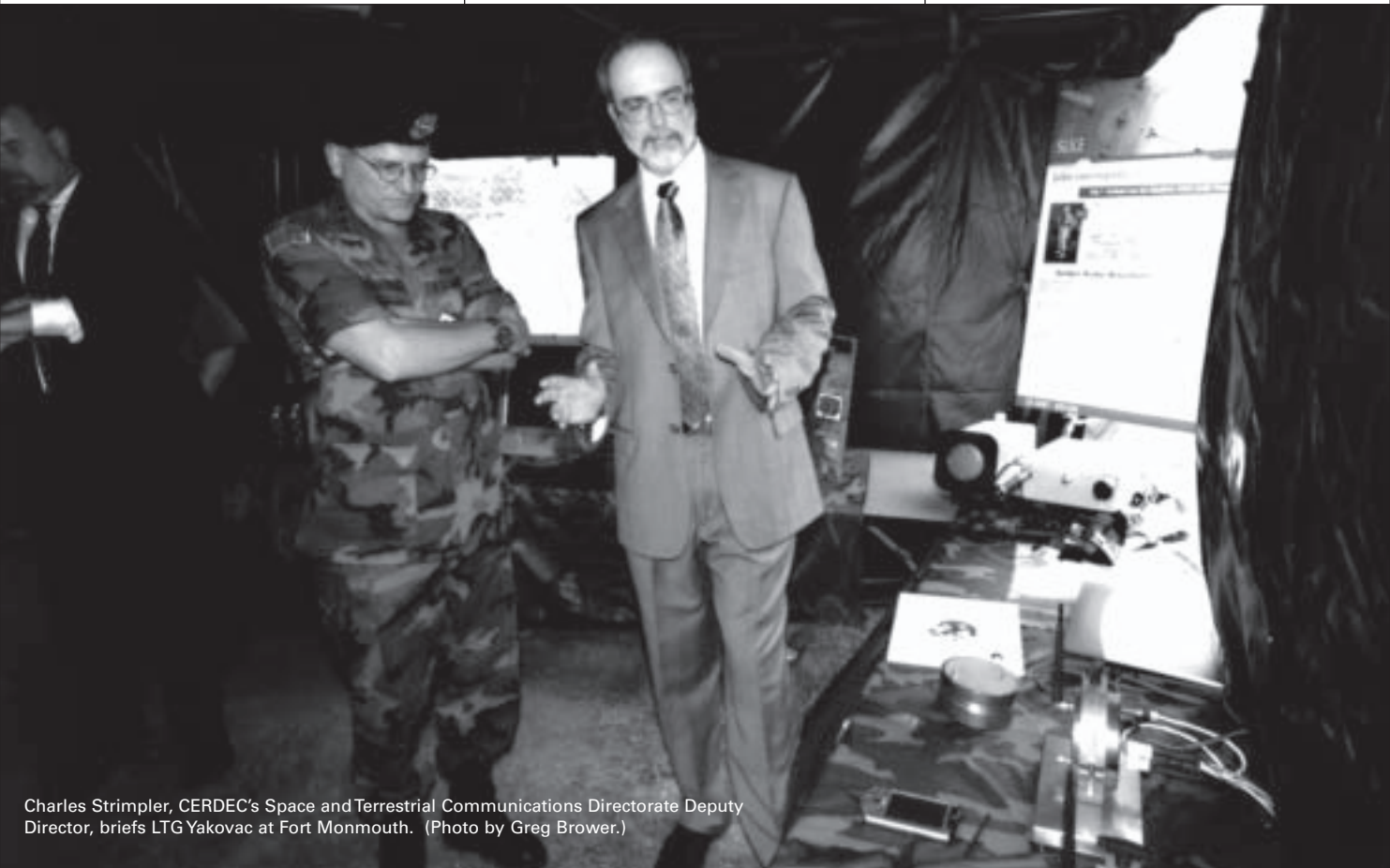
a GS-14 and don't want to be a product or project manager (PM).

What I'd like to do, in terms of counseling, is to seek out those AL&T

Workforce members who want to take on PM responsibilities and become the Army Acquisition Corps' (AAC's) future leaders. Not everyone wants to do that. So for the core group of people who do, we can focus on their professional development and training to help them shape their careers and leadership potential for tomorrow's AAC challenges.

It's much easier to manage the military workforce because there are only 1,600 acquisition officers. We shape their careers by diverse assignments and, by

We must educate people more to the fact that everything we do today is not about a single entity as an end item. It's more about integrating entities across the entire battlespace.



Charles Strimpler, CERDEC's Space and Terrestrial Communications Directorate Deputy Director, briefs LTG Yakovac at Fort Monmouth. (Photo by Greg Brower.)



LTG Yakovac emphasizes a point during a Meet the MILDEP presentation. Visits such as these help the DACM put the “personal back in personnel management” as he discusses pertinent workforce issues and professional development policy initiatives with acquisition community members. (Photo by Greg Brower.)

frequently moving them, we get a broader base of people evaluating them over time. In contrast, our civilians, in most cases, have just one supervisor evaluating each one over a longer period of time.

For the future, what we must do is make a commitment to the civilians displaying the most potential to be future leaders. We must manage them differently and say, “Look you’re going to stay with me for 3 years, but then I want to get you a job over here.” This process will only be successful through the use of quality performance counseling.

Good performance counseling can make a significant impact on career management by discovering the ambitions of those who want to be PMs or AAC leaders. If we can get that message instilled in our current civilian leaders, I believe we can begin focusing on a narrow band of civilians whom we will more closely manage. I think

you can see the importance of taking this challenge on. It’s hard to do and, in some cases, people are going to have to say that one person is better than another. This is definitely something that people shy away from doing.

Q. Why have you asked the Acquisition Career Management Advocates (ACMAs) to assist with workforce transformation and what do you expect them to accomplish?

A. I’ve been in this business for a while now and I didn’t really know what ACMAs were and what they were supposed to do. I’ve met some ACMAs over the years who have been very active in trying to shape their local workforce within their responsibility, both by looking at career management and by being a source of information. In other areas, ACMAs have been almost foremen.

There’s been no attempt by these ACMAs to try to reach out to the workforce or to establish themselves as a resource to help acquisition professionals move along in their careers. So if we have someone with the ACMA title and responsibility, then I must encourage and somehow support them in doing that job more effectively. The idea is to try to get them together to establish their position within the acquisition and personnel processes, and then they can help me better grow the civilian workforce leaders needed for the future.

Obviously, every place you go has a different culture and a different methodology for growing people. It shouldn’t be “cookie cutter” either.

But how do we get the ACMAs to better support their populations in a positive way and go out and be proactive and help me identify some subset of the total AL&T Workforce that may want to take on additional challenges? That’s the problem.

If you read the papers, there’s a lot to be said about how the civil service has changed over the years and the issue of general service versus pay banding. Are we getting what we need in terms of professional government civilians who have the skill sets to effectively do their government jobs into the foreseeable future as technological demands become more complex? And so, unlike days of yore, I think we must have quality people out there who push continual education, professional develop-

“Transformational” means to me that our products are going to be different, but our skill sets and how we manage them will be different as well. I expect that both military and civilian leaders of this organization would begin to reflect that in their actions and management styles.

ment and certification to better ensure that our workforce is qualified to be 21st-century employees. And if you think the only people who really worry about career management are located here in Washington, I don’t think we can manage that many people — or influence them — from here. So we must have a cadre of people forward deployed with the workforce who can actively discuss, then influence, the career development of Army acquisition civilians.

Q. What is your current focus for change leadership and acquisition transformation initiatives in the short term?

A. I’ve come to realize that there’s no way a small group of senior leaders can effectively manage a workforce of more than 40,000 people. So there’s got to

be some subset of people who we can go out and touch. And what we want that small subset of people to do is be the ones willing to stand up and be more aggressive in pursuing opportunities for PM positions and be willing to move from job to job to take on more responsibility and challenges. We must identify those folks and then determine how to provide them professional opportunities for growth.

I've listened to our workforce members when they've said, "I'd be more interested in taking on PM positions if I didn't have the mobility requirement." So I've taken the mobility requirement away. If members decide to compete for PM positions and are selected, unless they've chosen to be mobile, we will position them in an

What we're asking people to do across the battlespace is to think and act differently. This will mean contracting and funding programs differently, and growing workforces that are much more comfortable in handling more complex and diverse programs.

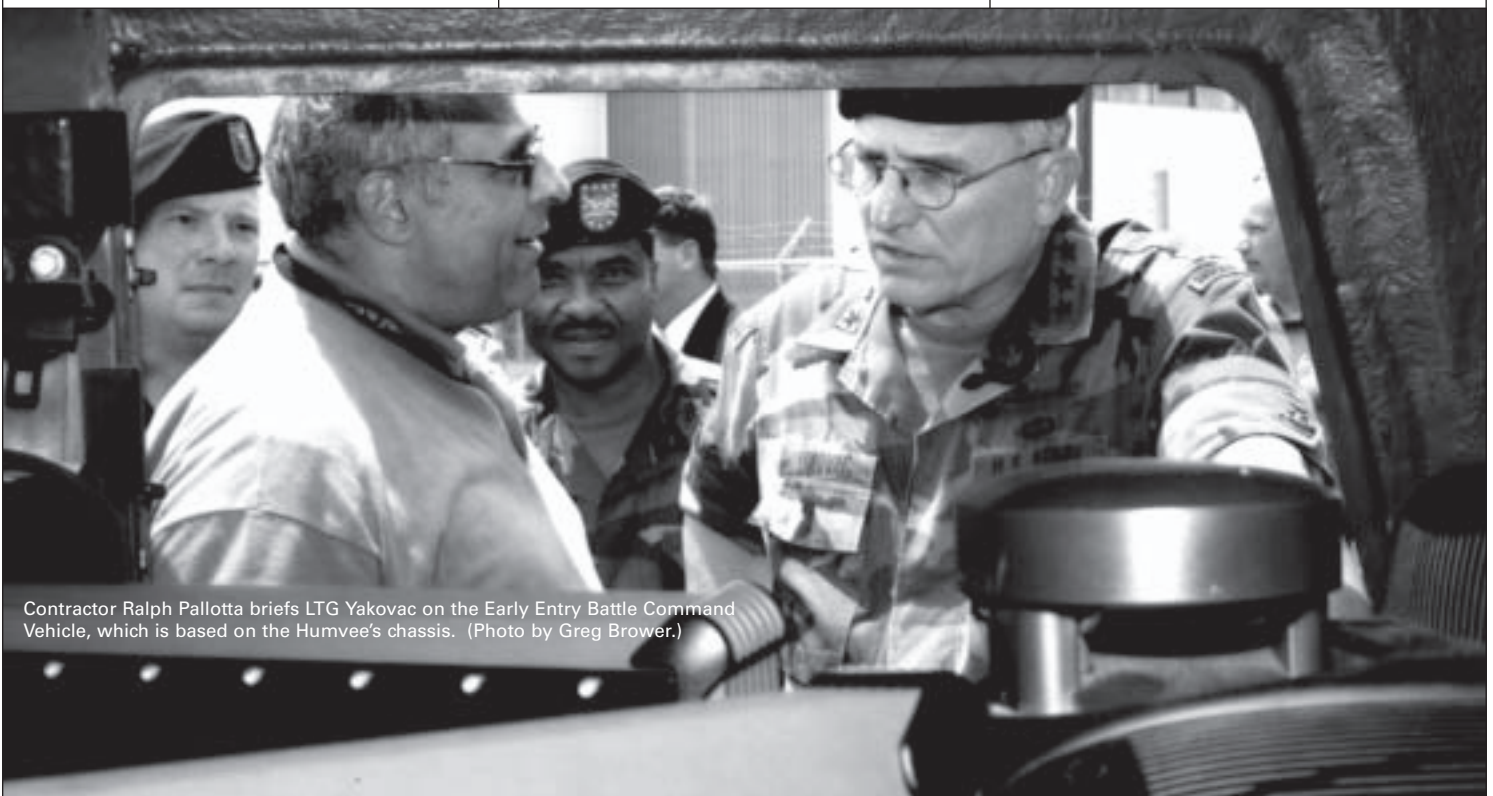
office where they've said they would like to be. It may not be the exact job, but it's in the place they said they want to be.

Military folks can retire at 20 years, but civilians can't, so once they've completed the hard jobs, what's next? Getting the local community involved, I think. If our most motivated workforce members take the hard jobs, we must continue to develop jobs that are increasingly challenging. Unfortunately, the competitive system that we're in today doesn't guarantee anyone a job, but I think there are ways we can set aside positions for people to continually give them more responsibility. That being said though, even for military officers coming out of PM positions, they don't historically go to more

challenging jobs. The difference though is that they can retire and their civilian counterparts may not be eligible yet. So there won't always be a job ladder to climb. Positions may be of equal value. However, these jobs should attempt to give employees a broader perspective as they continue to move up the management chain, while also developing a diverse background of management skills and capabilities.

Another potential inequity we've examined is the GS-14 making "X" amount of dollars who says, "If I take on a PM position, I get more responsibility without any additional money." We have the means within the current personnel system for a PEO [program executive officer] to give a civilian taking on a PM job what I would call the equivalent of a bonus or incentive. This incentive would not be permanent, but paid out during the job assignment as long as the job is performed well.

We can't give permanent promotions or pay raises, but we can, in fact, reward civilians for taking on the harder



Contractor Ralph Pallotta briefs LTG Yakovac on the Early Entry Battle Command Vehicle, which is based on the Humvee's chassis. (Photo by Greg Brower.)

acquisition jobs. We're working through that policy now and we tell PEOs that if they have a civilian PM, my idea is to give them "X" number of dollars when they start. During the time they are there, we will set objectives and, if they achieve them, under the Acquisition Demonstration Project, we can ensure that their contribution award is higher than everyone else's. And if they're successful, it clearly should be better. In this way, we can continue to move them up a bit — salary- and responsibility-wise. And in the end, if they perform well enough, we can give them another incentive of "X" dollars. These incentives are all available within our current personnel system, but we must get people to think about how to use them appropriately when the situation warrants.

We must educate people more to the fact that everything we do today is not about a single entity as an end item. It's more about integrating entities across the entire battlespace, so people must be more comfortable with understanding how to take programs that used to be very much unto themselves, but now need to be fully integrated into various technologies that interface with other programs — especially when it comes to networks. So "transformational" means to me that our products are going to be different, but our skill sets and how we manage them will be different as well. I expect that both military and civilian leaders of this organization would begin to reflect that in their actions and management styles.

For example, if you look at the PM Unit of Action [UA] that is FCS [Future Combat Systems]-phased, you see a new management structure. Within that management structure is a new way of doing business. So a product or project manager within PM UA is

not a classic product or project manager. I've asked them to think and work differently.

Likewise, we have a new Lead Systems Integrator not a prime, which changes how we do business. So, not only must we change in terms of our ability to manage complexity in technology, we must also think about a different way of working with industry and of being different than we were. When I was PM Bradley, I had a prime and I was the PM, and we did everything between us two. Today, rarely is there such a clear relationship where you have a prime and the PM and they have the relationship that I had when I was a PM.

What we're asking people to do across the battlespace is to think and act differently. This will mean contracting and funding programs differently, and growing workforces that are much more comfortable in handling more complex and diverse programs. At the end of the spectrum, we still have our classic PMs who will do what they have historically done with one-on-one relationships with the prime. In other areas, we're going to have what I call a "nontraditional relationship" either in support of another program or in a relationship with a contractor in how we're providing a capability. So leaders must change how they do business as well as how they view their roles and how they partner with industry.

Unfortunately, the window of opportunity to access them [promotable captains and majors] is very short — between the 6- and 10-year mark. Then we have about 6 years to qualify them and get them to the point where they're competing for PM. That's not a lot of time when you throw in mandatory schooling and certification requirements.

Q. What is your current focus for civilian career management, post-utilization, regionalization and compensation?

A. From a civilian career management standpoint, the hardest thing here for civilians — who have much longer careers than military personnel do — is the post-utilization issue. If the expecta-

tion is that every job is going to have more responsibility than the last, I'm not sure that can ever be done workforce-wide. But, again, under a 40,000-plus population, we must identify those jobs that are more challenging than others. Once the jobs are identified, we must find ways to ensure that the people who've said they want to be more challenged get the opportunity, down the road, to take them. Again that goes against the competitive structure we now have, but I've got to believe there's a way we can provide that opportunity to those who ask for it.

Regionalization is more of a military view in which, historically, I've sent officers to specific jobs. For example, in a lot of cases, new officers come in and get their first assignment as Assistant PM [APM]

for Program X. For 3 years, the officer served as the APM for Program X. Now if Program X is a research and development (R&D) program, the officer learns a lot about R&D but nothing about procurement.

Likewise, depending on what he or she did as APM, and whether the APM



LTG Yakovac discusses Light Combat System Survivability during his keynote address to the 24th Army Science Conference held Nov. 29 – Dec. 2, 2004, in Orlando, FL. (U.S. Army photo by Larry Shank, ARL.)

position was for a specific piece, the officer learned a lot about that piece but didn't learn anything about testing or contracting. So I must provide officers more broadly based assignments because when they become PMs, they may now, for the first time, face an R&D program. And if the only experience they ever had was in production, they are ill-prepared to do their new jobs.

My plan is simple. We must put them into a region where there are multiple opportunities to put the "personal" back in the personnel system by having that region's leader — a general officer (GO) in most cases — be responsible for developing that young officer. Rather than have an officer come to a job and perform that same job for "X" number of years, we can assign the officer to a region and over the same period of time he or she is there, rotate him through three

developmentally challenging jobs. So it's incumbent upon the GO to understand what's going on in that region and what the needs of the other people in that region are so that acquisition officers are put into jobs where they can learn and grow. This ensures that officers will have a diverse base from which they can draw upon when assigned different jobs in the future.

This program ideology doesn't pertain to lieutenant colonels and above. It's really an attempt to get a more competitive group of people in the grade of captain promotable and major who will eventually compete for product and project management positions.

Unfortunately, the window of opportunity to access them is very short — between the 6- and 10-year mark.

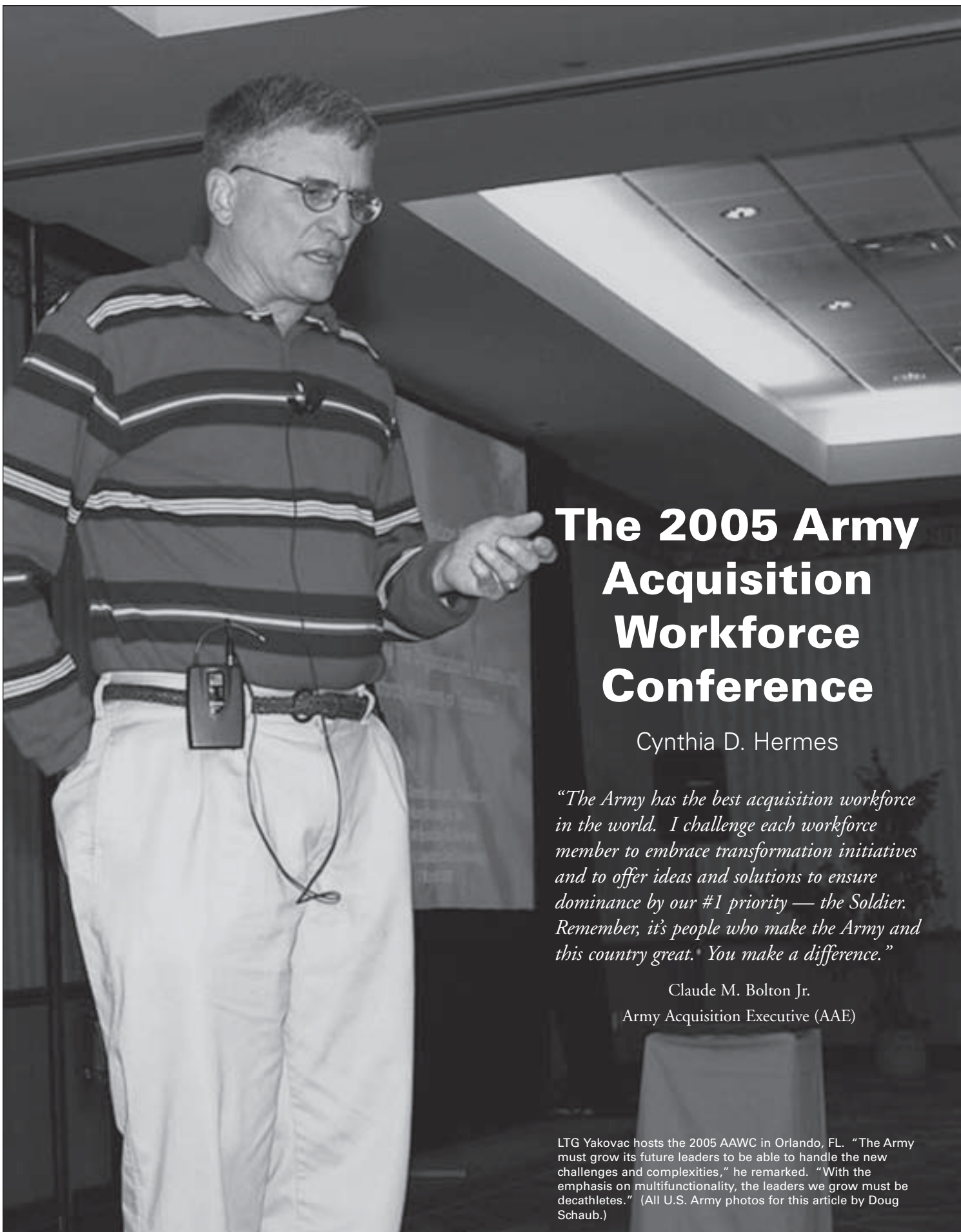
Then we have about 6 years to qualify them — 8 in some cases — and get them to the point where they're successfully competing for PM. That's not a lot of time when you throw in mandatory schooling and certification requirements. So we must provide them with a broader based experience so that if they do get selected to be a PM, they have learned the basics and have a better foundation by which they can actually manage that program. So regionalization has more impact for the military than it currently does our civilians. The idea is to grow diverse, multitalented individuals who know more about the acquisition business.

On a day-to-day basis, most of us give the personnel business very little time, yet it is one of the most important things that we must do as leaders. But how do we do it? Typically, we let the system — the personnel system — take care of itself rather than us being actively involved in making it a more personal system. So days, weeks, months and years go by before we ask

ourselves, "When was the last time that I sat down with my young officers or civilians and asked them what they wanted to do with their careers?" If nothing else, just asking them what they want to do or what they want to be is enough for them to realize that we really care about them. I never thought about that before. They may respond with, "You want me to do what? Well, I'm willing to do that, but here are my concerns." I don't care if you call that performance counseling or just talking. It's results that really matter at the end of the day. We're so busy every day coming in and just putting out the highest flames so we don't get burned that we give very little thought about our most precious asset — people.

Because we are the government and we're a bureaucracy, we have a personnel system that we have basically put on autopilot. We hope and pray at the end of the day that this system will produce the type of leaders and managers we need for the future. In some cases it works, but I think we can do a better job of trying to put a personal touch back into the personnel system and develop better military and civilian acquisition leaders to guide the AL&T Workforce into the 21st century.

CYNTHIA D. HERMES is the Executive Editor of *Army AL&T* Magazine. She has more than 25 years of government service with the U.S. Army and U.S. Navy. She is currently pursuing a business management degree.



The 2005 Army Acquisition Workforce Conference

Cynthia D. Hermes

“The Army has the best acquisition workforce in the world. I challenge each workforce member to embrace transformation initiatives and to offer ideas and solutions to ensure dominance by our #1 priority — the Soldier. Remember, it’s people who make the Army and this country great. You make a difference.”*

Claude M. Bolton Jr.

Army Acquisition Executive (AAE)

LTG Yakovac hosts the 2005 AAWC in Orlando, FL. “The Army must grow its future leaders to be able to handle the new challenges and complexities,” he remarked. “With the emphasis on multifunctionality, the leaders we grow must be decathletes.” (All U.S. Army photos for this article by Doug Schaub.)

“Transforming the Organizations, Leaders and Workforce of Tomorrow” was the theme for this year’s Army Acquisition Workforce Conference (AAWC), held Feb. 28 - Mar. 3, 2005, in Orlando, FL. The “invitation-only” conference was sponsored by the U.S. Army Acquisition Support Center (ASC) and hosted by LTG Joseph L. Yakovac Jr., Military Deputy (MILDEP) to the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT).

Master of Ceremonies Laurie Porras, ASC Southern/Western Region Team Leader and Acquisition Career Manager (ACM), began the formal events with administrative remarks and ASC’s Tammy Hughes, National Capital Region Career Management Support Specialist, sang the National Anthem. ASC Director/Deputy Director Acquisition Career Management COL Genaro J. Dellarocco provided welcoming remarks and stated that the conference’s mission was to provide change leadership training, invest in ourselves as true agents, share strategic vision, exchange information, propose solutions and conduct course corrections on personnel and professional development policy.

With the sound of Sheryl Crow’s “A Change Will Do You Good” in the background, ASC 51C Proponency Officer MAJ Joy Kollhoff led the Army Acquisition Corps (AAC) Transformation Update Open Forum,



ASC Director COL Genaro J. Dellarocco welcomes more than 170 attendees to the 2005 AAWC.



LTG Yakovac recognizes Randall L. Williams, ASC Acquisition Project Specialist, at the 2005 AAWC.

which briefed the MILDEP’s vision for AAC transformation. She discussed the first-year focus and progress made to date, including launching the transformation effort, identifying areas in which to implement immediate change, establishing strategic alliances and developing an operational concept.

Change Leadership

ASC Support Contractor Carl Sublett discussed the difference between change management and change leadership and identified three types of change leadership: developmental, transitional and transformational, which is the type applicable to the AAC.

ASC Support Contractor Quinn Pinckney briefed the “Process of Creating Major Change,” identifying eight common errors that can prevent transformation:

- Being complacent.
- Failing to create a guiding coalition.
- Underestimating the power of vision.
- Undercommunicating the vision.
- Permitting obstacles to block the vision.
- Failing to create short-term wins.
- Declaring victory too soon.
- Neglecting to anchor changes.

ASAALT Videoconference

The afternoon sessions began with a videoconference by AAE/ASAALT Claude M. Bolton Jr., who stated, “The Army has the best acquisition workforce in the world. I challenge

each workforce member to embrace transformation initiatives and to offer ideas and solutions to ensure dominance by our #1 priority — the Soldier. Remember, it’s people who make the Army and this country great. You make a difference,” he concluded.

Johari Window Briefing and Exercise

Following Bolton’s address, Sublett provided a “Johari Window Briefing” and discussed homework exercises that attendees completed prior to the conference. The Johari Window serves as a helpful tool in describing the human interaction process. This tool helps individuals learn to communicate more effectively and opens a communication window for giving and receiving information and gaining knowledge.

Change Leadership Ground Truth Session

BG Ed Harrington (U.S. Army, Retired), leading the “Change Leadership Ground Truth Session,” remarked that the acquisition workforce enables warfighters to win on the battlefield. He described tools that leaders need such as a personal sense of responsibility to change the way they are and to determine how they can change the way they act for the betterment of their Soldiers. He added that leaders must be clear, lead by example and treat others as they’d like to be treated themselves — with dignity and respect.

In discussing how to deal with resistance, Harrington explained how difficult it is for people to leave their comfort zones. He suggested that leaders must make their people part of the solution process and that there must be more two-way communication. “It’s not enough just to have a vision — you must talk with your operators to see if it will work,” he concluded.



MAJ Joy Kollhoff, ASC 51C Proponency Officer, introduces the AAC Transformation Update Forum and discusses the AAC transformation program's first-year focus and progress.

Barriers to Change and Cultivating Bridging Leadership

ASC Support Contractor Regina Hamilton presented "Barriers to Change" to assist attendees in understanding how barriers hinder change and how neglecting to address "antibodies" may result in failure. To overcome transformation barriers, leaders must have a clear vision, cultivate continual improvement, show a spirit of shared ownership, be patient and celebrate short-term wins.

Continuing Hamilton's theme, Sublett covered the topic of overcoming barriers to change by "Cultivating Bridging Change Leadership Skills." Bridging brings valued results through collaboration of multiple stakeholders, creates new types of relationships, builds structures using tools that enable organization direction and transformation, creates and allows communication, spans organizational and cultural differences and creates opportunities.

Bridge leadership provides the necessities of bridge building, conquers those obstacles that divide the organization, plans assignment rotations, capitalizes on emerging technology, develops well-rounded leaders, allows continuous information flow and builds trust and coalitions. The bridging conflict resolution and management discussion covered primary causes of conflict, constructive and destructive aspects of conflict and strategies for conflict

resolution through negotiation, mediation, arbitration and adjudication.

ACM Mission Change

Dellarocco concluded the first day's events with an ACM Mission Change briefing. He stated that the ACM focus would shift from workforce members to rating supervisors. "In the future," he forecasted, "ACMs will expend 70 percent of their effort with supervisors and senior leaders and about 10 percent with individual workforce members." Dellarocco reminded the audience that although workforce members are responsible for their own careers, supervisors must actively guide them and help them to achieve their individual professional development goals.

Workshops

On the second day, attendees split into groups to attend one of three Transformation Community Workshops. Summaries of these workshops are provided below.

Concept and Design of the Future AL&T Capability. Kollhoff and ASC 51A Proponency Officer MAJ Andrea Williams led this workshop, which discussed the personnel functions that are performed by ASC Fort Belvoir, the Human Resource's Command's Acquisition Management Branch (HRC's AMB) and ASC Combined Arms Support Command at Fort Lee, VA, under an ASC ALT Force Development Division. Another discussion topic was whether the quarterly Acquisition Career Program Board Working Group was needed and, if so, how to ensure that it effectively orchestrates civilian proponency developments. Proponency personnel require training to effectively support the military and civilian acquisition workforce. Kollhoff noted that ASC and HRC are out of synch and recommended that several formalized processes be implemented.

FA51 Leader Development Initiatives: Conversion of Army Acquisition Basic Course (AABC) into the FA51 Basic Qualification (Q) Course and the FA51 Intermediate Q Course. ASC 51R, 51S and 51T Proponency Officer MAJ Aaron Brown led this workshop, which outlined the FA51 Leader Development Plan for preparing acquisition captains and majors to execute their duties and responsibilities. The plan comprises two major components:

- Entry-level training to prepare newly accessed acquisition officers for assignment to any acquisition position.
- Training for field grade acquisition officers to prepare them for acquisition leadership positions.



ASC Support Contractor Carl Sublett led several enlightening discussions on change leadership, change management and bridging leadership.

Brown announced that a decision brief had been presented to, and approved by, Yakovac to expand the 9-week AABC into the 13-week FA51 Basic Q Course for entry-level training, and to institute a new 4-week FA51 Intermediate Q Course for officers to attend in conjunction with intermediate level education (ILE). The FA51 Basic Q Course is focused on certification training, while the FA51 Intermediate Q Course is focused on leadership development and instituting best business processes. The two courses will be established and operating by early FY06.

Brown noted that the Army is changing the way it handles officer career development. The next rewrite of *DA Pamphlet (PAM) 600-3, Commissioned*



USACE Deputy Director of Military Programs Dwight A. Beranek discusses the facilities engineering career field and the newly specified certification requirements.

Officer Development and Career Management, will require certification in multiple areas of concentration (AOCs) for acquisition officers in Year Groups 99 and later to compete for promotion and command. “We want to provide acquisition officers with multiple skills and to build diversity of experience,” Brown stated. The FA51 Basic Q Course will provide equivalency for Defense Acquisition University (DAU) courses to support Level II certification in multiple AOCs, and will also cover Army doctrine and lessons learned. The Basic Q Course is a demanding, condensed training course that cuts the time required to take the equivalent courses individually at DAU by almost half.

Referring to his discussion of ILE concepts with the MILDEP, Brown said, “The MILDEP believes that our ILE concepts have been too certification focused and should be more leadership focused.” The Intermediate Q Course will be offered at the University of Texas-Austin’s Institute for Advanced Technology, collocated with the War College Fellowship.

The optimal time for officers to attend the FA51 Basic Q Course is en route to their first acquisition assignment (generally before year 9), and the Intermediate Q course in conjunction with the Army’s Core ILE between years 9-12. However, the exact attendance period may vary depending on

when the officer is accessed into the AAC. Supervisors must understand that just like AABC, sending an officer to the Basic Q Course requires a change-of-rater Officer Evaluation Report, which may impact the rater’s profile.

Supervisor Outreach Program. ASC Southern/Western Region Director Maxine Maples outlined two initiatives: #13 ACM Supervisor Outreach program and #46 Civilian Leader Development program. Initiative #13 revitalizes the supervisor’s role in the AL&T Workforce. As a result, ACMs’ focus will shift from individual counseling to supervisory counseling and training. To implement this new approach, acquisition leaders must provide the necessary career management tools, develop training packets and establish accountability by adding to current inadequate performance standards.

Initiative #46 establishes a sequential leadership development plan, provides leadership training opportunities at every level on the civilian career path and uses the National Security Personnel System’s flexibility to recruit and retain leaders. Numerous leadership development studies are being reviewed, such as the Civilian Education System, DAU sensing session and the Senior Army Workforce (SAW). Maples discussed the similarities between the two initiatives and queried attendees about combining the two.

The afternoon sessions included two Community Information Workshops, which are summarized below.

Career Management Tools: Career Acquisition Personnel & Position Management Information System (CAPP MIS) Update and Future Initiatives. ASC Acquisition Project Specialist Randall L. Williams, ASC

Northeast/Central Division ACM Bob Sivalelli and ASC Acquisition Data Management Specialist Wen Lin led this workshop. Discussion topics included upcoming automation changes to the Individual Development Plan (IDP), Acquisition Career Record Brief (ACRB), Army Tuition Assistance Plan (ATAP) and “how-to” instructional movies. Williams noted that the IDP form needs updating and asked for suggested changes to its current format. He added that ASC/AMB is looking at ways to automatically post continuous learning points (CLPs) for DAU Training, developing a program where IDP/ACRB/CLP can be accessed in common desktop windows and designing a calendar program where supervisors can easily check an employee’s CLPs, certification and training.



COL Dellarocco presents BG Ed Harrington (U.S. Army, Retired) (left) with an ASC plaque in recognition of his leading the “Change Leadership Ground Truth Session.” Harrington remarked that what the AL&T Workforce does directly benefits Soldiers on the battlefield.

Sivalelli commented on ACRB changes that will empower employees to manage certain sections, which will minimize maintenance for regional ACMs. The streamlined ATAP application is now available online. To apply using this automated process, go to <http://asc.army.mil/programs/atap/announcement.cfm>. Additionally, the Acquisition Education Training and Experience and CP-14/-17 application processes will be automated in the Army Acquisition Professional Development System. A demonstration of video-streaming capabilities was presented and favorably received by conference attendees.

Workforce of the Future: DAWIA II Reform and Career Management Policy Updates. ASC Acquisition Propensity Specialist Trish Hopson led this workshop that discussed changes to the *Defense Acquisition Workforce Improvement Act (DAWIA) II* as a result of the *National Defense Appropriations Acts of FY04 and FY05*. Key changes included the establishment of a single Defense Acquisition Corps, decoupling of grade from Critical Acquisition Positions (CAPs) and eliminating the GS-13 minimum grade for AAC membership. CAPs were decoupled from GS-14 and replaced by senior key leadership positions (KLPs). Criteria for CAPs and KLPs are being worked, including a review of how non-AL&T Workforce members qualify.



AMRDEC Quality Assurance Specialist Glenda McLaurin informed conference attendees that the CP-15 new and improved ACTEDS will provide a career road map for personal growth and professional development for Army acquisition careerists.

The *Refined Packard* definitions have been rescinded and certification requirements have changed. AAC membership now requires Level II certification in 24 months. If this is not achieved, a waiver is required to stay in the position. Although mobility is encouraged, it is no longer required for AAC membership. Revisions to *AR 70-1, Army Acquisition Policy*; *DA PAM 70-1, Acquisition Procedures (replaces DA PAM 70-3, Acquisition Procedures)*; and *Career Management Handbook* should be completed by FY05's end. Furthermore, the Corps Eligible program is being canceled and those who qualify will be automatically accessed into the AAC.

The remaining afternoon sessions included a series of invitation-only Change Leadership Team sessions followed in the evening by an invitation-only Acquisition Career Management Advocate (ACMA) dinner.

Career Program Update: FCRs

The final day began with a panel of Functional Chief Representatives (FCRs) providing updates on their career programs. Deputy ASA for Integrated Logistics Wimpy Pybus (CP-17 Life Cycle Logistics) highlighted challenges facing today's logisticians. He noted that they are finding it harder to get professional development opportunities because of their workloads. U.S. Army Research, Development and Engineering Command Deputy Commanding General Dr. Robin Keesee (Systems Planning, Research, Development and Engineering) stated that we need to bring diversity into science and technology teams and discussed how to effect recruiting to accomplish this goal.

U.S. Army Corps of Engineers (USACE) Deputy Director of Military Programs Dwight A. Beranek stated that Facilities Engineering is a new career field and no one has been assimilated yet. He added that specific certification requirements are being developed and that identified courses include FE 201 and FE 301. Army Deputy Director for Test and Evaluation (T&E) Policy Larry Leiby provided an overview of the T&E Functional Integrated Product Team (FIPT) Working Group that will conduct a bottom-to-top review of the complete DAU T&E curriculum. Based upon the T&E FIPT's direction, DAU will reengineer its curriculum to better meet the needs of T&E engineers.

Deputy Director of Human Capital Management, Army Chief Information

Office/G-6, Anna Vitkauskas (Information Technology (IT)) discussed human capital and the need to be passionate about one's work. She said that IT careerists make IT happen. She added that IT enables a process to begin and then takes it to another level by becoming a multiplier.

ASC CP-14 Acting Division Chief Mitchell Colston (Contracting) discussed new contracting programs including the FAST TRACK student hire program and the Intern Program, which has been extended from 24 to 36 months. He also noted that CP-14 would hold its first professional intern workshop in May. Colston mentioned available educational opportunities funded by CP-14 such as the Commercial Business Program, Advanced Strategy Program and The Contracting Officer as a Business Manager.

U.S. Army Aviation and Missile Research, Development and Engineering Center (AMRDEC) Quality Assurance Specialist Glenda McLaurin (Production, Quality and Manufacturing) stated that the CP-15 new and improved Army Civilian Training Education and Development System (ACTEDS) provides a road map by which personnel can ensure personal growth and success throughout their Army careers. She added that CP-15 places great importance on its ACTEDS plan because it aids in



ASC Southern/Western Region Director Maxine Maples-Kilgore is presented a MILDEP coin by LTG Yakovac for leading initiatives #13 ACM Supervisor Outreach Program and #46 Civilian Leader Development Program discussions during the 2005 AAWC.



ASC CP-14 Acting Division Chief Mitchell Colston discusses the new contracting FAST TRACK student hire and Intern programs and the new education and professional development opportunities available through CP-14.

financial management of training funds. She noted that CP-15 subject matter experts are SAW Focus Group members and are active in the SAW initiative concept.

During a working lunch, Yakovac explained that the Army must focus on the uncertainty of where and when the next threat will come from and how we will cope with it. “The Army must grow its future leaders to be able to handle the new challenges and complexities,” he remarked. “With the emphasis on multifunctionality, the leaders we grow must be decathletes. Leaders who will one day go to war in, say, Iraq, must be capable of winning that war and, the next day, begin nation-building operations. To do this effectively, we must change the way we think about officer development and training,” Yakovac continued. “The same is true across the entire AL&T Workforce,” Yakovac reiterated. “As a community, the acquisition force that supports warfighters must mirror what their challenges are because we now have the same challenges. We must be able to handle uncertainty and have a way of adapting to the future.” Yakovac said that acquisition today is a team sport because we are dealing with so much complexity.

“Consider a complex system such as a tank,” he explained. “Today we are asking that piece of equipment, and its future replacement, to be much more

integrated across the battlespace. For example, the inherent survivability of a tank is no longer what we are after, we are after system-of-systems survivability, including providing across the battlespace those Future Force characteristics such as survivability, responsiveness, lethality, deployability and sustainability,” Yakovac remarked.

“In the past,” he continued, “we gave warfighters pieces of equipment and told them to figure out how to make them work together. We didn’t necessarily design them to be compatible. Today, we must integrate into the thought process that we are giving our Soldiers a ‘capability set’ across the battlespace not piece parts. It’s a whole new mindset and new way to budget, to do cost analysis and to think about logistics support and sustainment,” Yakovac stated.



COL Dellarocco presents Marge Hadbavny, Program Executive Office Simulation, Training and Instrumentation, with an ASC Certificate of Appreciation for her tremendous support and assistance in planning and orchestrating the 2005 AAWC.

“None of us are islands unto ourselves,” he explained. “We must be knowledgeable about others’ functions. We must be networked — that is key. It is scary to everyone, including Congress. They want to return to yesteryear where they could see a budget line. They want to grasp that concept and get their arms around it. But, they can’t do that with the unit of action and networked forces concept,” Yakovac continued.

“So this is why we are here — to try to determine how we can provide acquisition expertise in the transition

from all of us being connected to a singular system into more complex systems. How do we transition to provide this capability quickly in theater? We do it through rapid equipping and contingency contracting. We must also partner with our sister services and leverage those relationships to learn from each others’ acquisition and operational experiences. And we must go out and talk to people about why we must transform the Army and its acquisition corps. We must think about how to do things better together and think differently about what we do to support our combatant commanders and their Soldiers,” he concluded.

Outbriefs

Following the working lunch, transformation community and change leadership team workshop outbriefs were provided. A summary of recommendations is provided on ASC’s Web site at http://asc.army.mil/events/conferences/2005/acm_conference/briefings.cfm.

Dellarocco presented certificates, command coins and plaques to the myriad people who worked so diligently to make the conference a success. In summary, he noted that a lot of information was exchanged and problems resolved. “We are building a bridge to the future and, the next time we meet, there will be many more parts of the bridge built. We will no longer be walking under the lights of uncertainty,” he concluded.

CYNTHIA D. HERMES is the Executive Editor of *Army AL&T* Magazine. She has more than 25 years of government service with the U.S. Army and U.S. Navy. She is currently pursuing a business management degree.

Army AL&T Magazine Editor-in-Chief Wins Secretary of the Army Award

Congratulations to Army AL&T Magazine Editor-in-Chief Mike Roddin, who was presented the Secretary of the Army Editor of the Year Award (Departmental) by Secretary of the Army Francis J. Harvey and Army Vice Chief of Staff GEN Richard A. Cody at a ceremony held at the Pentagon, May 9, 2005.



Secretary of the Army Francis J. Harvey (right) confers Army Editor of the Year honors on Mike Roddin as GEN Richard A. Cody (left) applauds. (U.S. Army photo by Cindy Hermes.)

Roddin, who also serves as the U.S. Army Acquisition Support Center Strategic Communications Director, was recognized for his outstanding writing and editing skills while re-designing and rejuvenating *Army AL&T Magazine* with more color, photography and graphics to produce a superior magazine, at a lower cost to the Army.

Winning the award was a significant accomplishment for both Roddin and

his staff, who have worked tirelessly to produce a first-class Army publication.

“It was definitely an honor and a privilege to be recognized for this prestigious award by Secretary Harvey and GEN Cody,” Roddin said.

“I would like to thank Army Acquisition Executive Claude M. Bolton Jr. and the Editorial Advisory Board for their executive guidance, editorial direction and continued support of

the entire *Army AL&T Magazine* production team.”

“It was professionally rewarding to see *Army AL&T Magazine* selected for this achievement as a premier professional journal over hundreds of other Army peer publications. Magazine production is a team sport and I have been blessed with an extremely talented world-class editorial and production team.”

“Congratulations to the entire government and contractor editorial and production team for a job well done,” Roddin remarked. “Their concerted efforts, creativity and innovation have helped to transform *Army AL&T Magazine* into the publication it is today,” he observed. “In particular, I’d like to recognize Executive Editor Cindy Hermes whose editorial oversight has kept the production staff focused from issue to issue; Meg Williams, former managing editor (now Web Editor), for running daily operations and the production schedule; Debbie Fischer, consummate editor and the magazine’s institutional knowledge for the past 15 years; and Nojae Kim for his exceptional cover layouts and page design.”

“Likewise, I’d like to recognize the superior performance of our newest editorial staff members Elizabeth Connell and Whitney Koeninger,” Roddin praised. “Elizabeth runs daily operations as our new managing editor, and Whitney brings fresh journalistic energy to the magazine’s departments section.”

“Bolstering the production team’s performance behind the scenes are BRTRC Project Director Mara Gecan

whose expertise and insight keeps the *Army AL&T* Magazine government/contractor team running smoothly; and MAJ Dennis Ellison, who provides the weapons and communications program coordination with the PM [program/project/product management] community and the magazine's military technical expertise," he explained.

"I'd be remiss if I didn't also thank Army Publishing Directorate liaison Bill Creech for his dedicated assistance with press inspections, and Colorcraft's Tim Bowns for the exceptional production and printing expertise he and his staff bring

to our publication," Roddin commented. "Without their attention to detail, our publication wouldn't have the reader appeal it does."

"And last, but certainly not least, I'd like to thank our colleagues in the Acquisition, Logistics and Technology [AL&T] Workforce whose hard work, timely articles, informative news and eye-catching photography help us bring this community to life for our readers," Roddin continued. "Your collective expertise has helped us elevate this magazine to a higher level of precedence for the people who read our product and the organizations, programs and people we profile. Our charter is to tell the Army Acquisition Corps' and AL&T Workforce's story.

The recognition bestowed on the publication is a clear indicator that our editorial team is doing just that," Roddin concluded.



Call for AAEA Nominations



Army Acquisition Executive Claude M. Bolton Jr. recently created the **Army Acquisition Excellence Award (AAEA)**, which recognizes an Army Acquisition, Logistics and Technology (AL&T) Workforce individual or team whose performance and contributions set them apart from their peers in directly supporting Soldiers and Army transformation efforts.

The U.S. Army Acquisition Support Center (ASC) Director is calling for

AAEA nominations from all major commands, including major subordinate commands; program executive offices; field operating agencies; Joint and expeditionary organizations; and HQDA. A nominee can be any AL&T Workforce civilian employee or Active Duty — including Reserve Component — Soldier or team who made exceptional acquisition-related contributions from Jan. 1, 2004, to Dec. 31, 2004. All acquisition personnel — from senior management to newly hired interns — can be nominated.

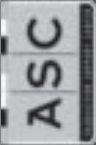
Two nominations, an individual and a team nomination, may be submitted from each organization in the following three categories: Equipping and Sustaining Our Soldiers' Systems, Information-Enabled Army and Transforming the Way We Do Business. Nominations should include a narrative explaining how the nominee

demonstrated excellence in exceeding the award criteria along with supporting documentation. Submissions may also include a 2-minute video clip describing the nominee's accomplishments and the organization's mission and location.

Nominations are due by July 1, 2005, and should be sent to Director ASC, ATTN: SFAE-HR, 9900 Belvoir Rd., Suite 101, Fort Belvoir, VA, 22060-5567.

For complete AAEA nomination procedures, go to http://asc.army.mil/info/awards/acq_excellence.cfm or contact Acquisition Project Officer Roberta McMillen at (703) 805-1017.

Winners will be announced in the November-December 2005 edition of *Army AL&T* Magazine.



From the Acquisition Support Center Director

CAREER DEVELOPMENT UPDATE

The changes we are undertaking within our own ranks as a civilian and military acquisition workforce are fundamental to our Soldiers' success in the future. LTG Joseph L. Yakovac Jr., Director of Acquisition Career Management (DACM), made many fine points when he addressed the 2005 Army Acquisition Workforce Conference in February.



He emphasized that we need to find a way to develop acquisition leaders who are more in tune with the challenges and uncertainties of the 21st century — leaders who are more flexible, multifaceted and well-rounded. We also need to shift our way of thinking from an “island” concept to a “networked” concept, and learn to work together to become more efficient in providing for our combatant commanders' and warfighters' needs.

LTG Yakovac is depending upon the Acquisition, Logistics and Technology (AL&T) Workforce to help drive the Army Acquisition Corps' (AAC's) transformation from a “designing and fielding single systems” focus to an integrated system-of-systems focus. This will be accomplished by rethinking how we educate and train Army acquisition leaders. Future leaders must become decathletes to keep up with the professional demands of a fast-paced acquisition environment. His direction is important to us at this crucial juncture in our history. Please turn to Page 54 to read LTG Yakovac's thoughts on AAC transformation, civilian career management, post-utilization and regionalization.

Post-Utilization Initiatives

The Army's senior leaders recognize the importance of developing civilian acquisition leaders for the future. Effective career management of key civilian leaders is a critical element of the Army's current capability and future success. Senior Service College (SSC) education prepares civilians for positions of greater leadership responsibility. Post-training placement efforts were launched by the U.S. Army Acquisition Support Center (ASC) for civilian AL&T Workforce SSC students who will graduate in June 2005. Program executive officers (PEOs), Deputy Assistant Secretaries of the Army and Life Cycle Management Commanders are identifying

management or staff positions within their organizations and reviewing SSC student résumés for possible placements.

The best way to capitalize on the investment that the Army has made in these graduates is to match these individuals with positions that will allow them to demonstrate and take advantage of their expanded skills. The goal is to manage these acquisition professionals as “pre-Senior Executive Service candidates,” ensuring they are assigned to the most challenging leadership positions. We will improve our AAC SSC selection and placement procedures to ensure that AAC's “best and brightest” attend SSC, and that post-utilization positions have been identified either before or early in their SSC education.

Another significant post-utilization initiative is identifying civilian and military line positions that are managing cost, schedule and performance, but are not currently designated as command selection list (CSL) project or product manager (PM) positions. These line positions can be designated as either project or product directors (PDs), based on the PEO's explanation of total cost and system complexity. The PD positions could be filled by either a colonel/GS-15 (or equivalent broadband) or a lieutenant colonel/GS-14 (or equivalent broadband) who has previously served as a CSL PM. The newly designated PD positions should ideally be rotated every 2-5 years, at the PEO's discretion. At present, charters from the Army Acquisition Executive will not be provided to PD positions. Potential PD positions for either civilian or military fill were identified and vetted during the CSL and Military Acquisition Position List review conducted April 11-15, 2005.

As the post-utilization process is further refined, it will expand to other organizations within the acquisition community. Our intent is to officially address post-utilization during an executive session at the 2005 Acquisition Senior Leaders and Army Materiel Command Commanders Conference, Aug. 22-25, in Detroit, MI.

Video Training

ASC is developing tools for supervisors to use as their duties expand under the DACM's directed changes. The Customer Service Offices are producing video training materials that cover:

- Army Training Requirements and Resources System Internet Training Application System (AITAS).
- Senior Rater Potential Evaluation.
- Acquisition Career Record Brief.
- Individual Development Plan.

The videos will be accessible online via the Career Acquisition Personnel and Position Management Information System (CAPPMIS) home page. So far, the AITAS film has been beta tested and it will be the first film available.

Our efforts are geared toward shaping a workforce that can manage complexity across the battlespace. The AL&T Workforce will continue to grow and transform, and we will accomplish this by changing AAC's structure and by changing how we train future leaders and recruit and retain career field employees.



COL Genaro J. Dellarocco
Director, U.S. Army
Acquisition Support Center

Army Acquisition Transformation Update

MAJ Joy N. Kollhoff

Task Force (TF) Acquisition, Logistics and Technology (ALT) was formed Nov. 1, 2004, as a dual-sponsored chartered modularity design team under LTG Joseph L. Yakovac Jr., Military Deputy (MILDEP) to the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT), and LTG Richard Hack, Deputy Commanding General, U.S. Army Materiel Command (AMC), to integrate ongoing modular concept and design efforts and address the Army's evolving requirements for the AL&T capability elements.

The initial outputs of TF ALT include an integrated AL&T capability and concept of support under a common design called the Army Field Support Brigade (AFSB). This AFSB includes an early-entry Deployable ALT Command Post Table of Organization and Equipment (TO&E) and an Army Contingency Contracting TO&E.

The new AFSBs are augmented by supporting Tables of Distribution and Allowance (TDAs) currently under design at AMC and will ultimately become units projected from the Army Field Support Command, AMC's operational arm. For additional information, please review Page 46 of the March – April 2005 *Army AL&T* Magazine at <http://asc.army.mil/pubs/alt/default.cfm>, which provides a detailed

explanation about the evolution of the new AL&T capability currently undergoing Armywide field staffing under the expedited Force Design Update (FDU) process.

2005 Army Acquisition Workforce Conference

The 2005 Army Acquisition Workforce Conference, "Transforming the Organizations, Leaders & Workforce of Tomorrow," was held Feb. 28 - Mar. 3, 2005, in Orlando, FL, at the Sheraton Safari Hotel. The 4-day event hosted 160 Army Acquisition Corps (AAC) and U.S. Army Acquisition Support Center (ASC) leaders, Acquisition Career Management Advocates, AL&T Workforce members and strategic partners from around the world. Highlights from the conference included:

- Change Leadership (CL) Training.
- CL Workshops.
- Transformation Community Workshops.
- Community Informational Workshops.
- Certifying Official Workshops.
- Career Management Tools.
- Additional training on Career Acquisition Personnel & Position Management Information System (CAPPMIS) composition, computer generated certificates, Acquisition Position List points of contact, Senior Rater Potential Evaluation, Acquisition Career Record Brief process, facilities engineers status, Acquisition Demonstration Project, best practices, National Security Personnel System and online board application process.

The conference was an enormous success and left all inspired, regenerated and engaged to continue improving for the future of the Army and the AL&T Workforce. Army Knowledge Online (AKO) virtual collaboration sites have been set up on the MILDEP Transformation Public site found on the MILDEP AKO Web page. This site's purpose is to continue the "Ground Truth" dialogue, the problem solving and tool exchange initiated at the conference. Please join us in threaded discussions to share as a community and build your transformation tool kits. To access the Ground Truth dialogue:

- Log into the AKO home page at www.us.army.mil.
- Click on the Files icon in the yellow upper right box.
- Click on **U.S. Army Organizations** in the far left box highlighted in white.
- Click on **Acquisition**.
- Click on **Military Deputy**.
- Click on **AAC Transformation and ALT**.
- Click on the **AAC Transformation (Public)** cabinet.
- Click on the **Ground Truth Session** folder.

If you are unsubscribed to any of the knowledge centers required to follow these steps, place a check next to the knowledge center and use the Subscribe icon on the gray tool bar. Once subscribed you will have access to the Ground Truth Session folder.

Plans are also ongoing for the 2005 Acquisition Senior Leaders and AMC Commanders Conference to be held Aug. 22-25, 2005, in Detroit, MI.

TF ALT Tiger Teams

TF ALT Tiger Teams met Feb. 15, 2005, to continue integrating modular concepts, force designs and applicable processes to create the footprint for our new AL&T capability. The meeting summarized the AFSB FDU and AL&T Military Occupational Specialty (MOS) meeting at the U.S. Army Combined Arms Support Command, Fort Lee, VA, Feb. 4, 2005, to discuss the FDU. All updates to the FDU were submitted to the Combined Arms Center at Fort Leavenworth, KS, Feb. 25, 2005. TF ALT members scrubbed the FDU and specifically updated the package to reflect the name change from the AL&T Support Brigade to AFSB, including communication and vehicle equipment justifications, and to refer to the development of the AL&T series of MOSs XXA (Program Management), XXL (Life Cycle Logistics) and XXC (Contracting). The new MOSs will be pursued through a separate but parallel Army process effort. The estimated completion date for FDU expedited field staffing is April 14, 2005. The approximate implementation timeline for the FDU decisions is between 1 and 3 months.

MAJ Joy N. Kollhoff is an ASC Proponency Officer and the TF ALT G-3 Project Lead for AAC Transformation.

AMC/ASC Join Efforts to Benefit Disabled Soldiers

Headquarters, U.S. Army Materiel Command (AMC) and the U.S. Acquisition Support Center (ASC) have formed a partnership to help disabled Soldiers prepare for their futures. AMC has established a program called "Always a Soldier," which provides service-connected disabled veterans opportunities to seek DOD employment. ASC has established a "Wounded Soldier" program for active duty disabled Soldiers. This program provides Soldiers who supported the global war on terrorism (GWOT), and have a 30 percent or

more disability, the opportunity to remain on active duty and work toward certification in the program management, life-cycle logistics or contracting career fields.

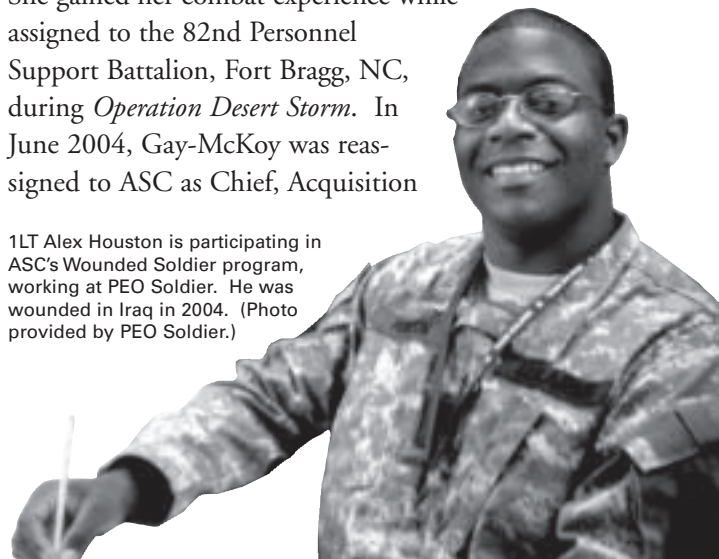
These new programs offer Soldiers the opportunity to build careers in areas that directly benefit warfighters. AMC and ASC leadership and the program coordinators have committed to providing our veterans and active duty Soldiers avenues that lead to career advancement and greater financial security.

AMC's Always a Soldier Program Coordinator is Steven Clark, previously known as Sergeant Clark. Clark, a veteran wounded in action during *Operation Iraqi Freedom*, spent nearly a year recovering from his combat injuries at Walter Reed Army Medical Center. While being treated, Clark looked for employment despite his disability. "I realize how important the promise of employment is toward the healing process," Clark stated, "work provides a sense of hope and personal worth."

Once Soldiers become disabled, they begin to think serving in the military is no longer possible and therefore initiate a search for viable employment outside active duty. AMC's Always a Soldier program gives Soldiers the closest civilian alternative to stay in the fight. Clark is working with the Department of Veterans Affairs to establish a process for disabled Soldiers to obtain employment at AMC through the program. Clark is also working with other organizations to promote program awareness. As a peer counselor at Walter Reed Army Medical Center, Clark visits the hospital weekly to provide support and raise awareness to his fellow comrades. "Showing the Soldiers how to thrive despite injuries is one of my main objectives," Clark stated.

ASC's program coordinator is CW3 Sabrina Gay-McKoy. She gained her combat experience while assigned to the 82nd Personnel Support Battalion, Fort Bragg, NC, during *Operation Desert Storm*. In June 2004, Gay-McKoy was reassigned to ASC as Chief, Acquisition

1LT Alex Houston is participating in ASC's Wounded Soldier program, working at PEO Soldier. He was wounded in Iraq in 2004. (Photo provided by PEO Soldier.)



Noncommissioned Officer Workforce. In July 2004, she became the program coordinator for the Wounded Soldier program. "It is a great honor for me to help our disabled Soldiers and inform them about this wonderful opportunity," said Gay-McKoy. As the program Coordinator, she implemented the Wounded Soldier program through the coordinated efforts of the Walter Reed Army Medical Center.

Gay-McKoy is also working with the Disabled Soldier Support System (DS3) to raise awareness and to change the Army's regulations, policies and procedures to enable disabled Soldiers to attend military schools, compete for promotion opportunities and, ultimately, deploy to less hostile areas. DS3 is the driving force in ensuring that the Department of the Army continues to make it possible for disabled Soldiers to remain on active duty if they choose to.

Currently, there are three Soldiers participating in ASC's Wounded Soldier program, pending their medical board results. The Soldiers range in grade from first lieutenant to staff sergeant. They are working in Army acquisition program executive offices and contracting offices in the National Capital Region to gain acquisition experience, mentorship and training. They are also taking online Defense Acquisition University courses to begin working toward certification in acquisition positions. Gay-McKoy is seeking men and women to participate in the Wounded Soldier program. She stated that there are some requirements for acceptance in the program. For example, the Soldier must have an excellent Official Personnel File, and must be at least 30-percent disabled as a result of GWOT.

Soldiers interested in participating in either program should contact Steve Clark at steven.clark@hqamc.army.mil or (703) 806-8140/DSN 656-8140 or CW3 Gay-McKoy at mckoy.gay@us.army.mil or (703) 805-1249/DSN 655-1249.



AHRC Notes



AY05/06 Senior Service College Slate Announced

The U.S. Army Human Resources Command recently announced that the following U.S. Army Acquisition Corps officers are slated to attend Senior Service College at the schools indicated during academic year (AY) 05/06.

Name	School
Arn, Mark LTC	University of Texas (UT)-Austin
Bass, James LTC(P)	UT-Austin
Clarke, Matthew LTC	UT-Austin
Colvin, Darryl LTC	Industrial College of the Armed Forces (ICAF)
Dukes, Beatrice LTC	Army War College (AWC)
Green, Allen III COL	ICAF
Hess, John LTC	ICAF
Holzman, Simon LTC	UT-Austin
King, Dion LTC	ICAF
Lewis, Bruce LTC(P)	ICAF
Olson, Thomas LTC	ICAF
Openshaw, Shane LTC	UT-Austin
Ostrowski, Paul LTC	AWC
Skinner, Eugene Jr. LTC(P)	ICAF

FY05 Lieutenant Colonel Reserve Component Acquisition Command Slate Announced

The U.S. Army Human Resources Command announced that the following U.S. Army Reserve and National Guard Army Acquisition Corps officers are slated to become product managers:

Name	Product or Command
Carr, Jeffrey MAJ	Sets, Kits, Outfits and Tools
Matthews, Horace LTC	Global Positioning Systems
Reynierse, Peter MAJ	Fire Support
Smith, Jay LTC	Mass Destruction Civil Support Systems
Swisher, Eugene MAJ	Distributed Learning Systems
Winberry, Jerry LTC	Trailers

Army Grooms Information Technology Managers

The first 12 graduates of the Army Knowledge Leaders (AKLeaders) program were recognized by LTG Steven W. Boutelle, Army Chief Information Officer (CIO)/G-6, Feb. 25 in Arlington, VA. All graduates now hold civil-service positions in Army information technology (IT).

The 2-year program includes four cycles of leadership training and developmental assignments at key Army locations. AKLeaders are first selected from a national pool of high-achievement university graduates and are outstanding scholars (3.45 grade point average or higher). They must be U.S. citizens and able to obtain secret clearances.

“The AKLeaders program is changing the paradigm on how the Army develops IT management professionals,” said Boutelle. “We are cultivating a new cadre that demonstrates leadership, business acumen, management skills, knowledge sharing, peer relationships and a strong commitment to public service.” The training program is aligned with the *Clinger-Cohen Act of 1996*, which requires government agencies to make sound IT investments and improve IT management and mission performance.

The CIO/G-6 is currently recruiting 12 to 15 AKLeaders for the Class of 2005, which begins in September 2005. For more information, contact Dr. Edward Fujimoto, edward.fujimoto@hqda.army.mil, (703) 604-2059.

Congratulations to the following AKLeaders program graduates, listed with the names of their organizations:

Class of 2002	Organization
Batelka, Daniel S.	CIO/G-6
Cassell, Joel W.	Army Information Technology Agency Integration Center
Henderson, Patricia A.	Network Enterprise Technology Command (NETCOM)
Houston, Sheila M.	NETCOM
Russell, Jerry H. Jr.	CIO/G-6
Sullivan, Tara M.	CIO/G-6

Class of 2001	Organization
Frank, Hortense D.	U.S. Army Corps of Engineers (USACE)

James, Lee A. III	Program Executive Office Enterprise Information Systems CIO/G-6
Lindsay, Zachary A. Nguyen, Loan H.	Headquarters Army Materiel Command (HQ AMC)
Rosado, Anabel Yeung, Sze-Ka	USACE HQ AMC

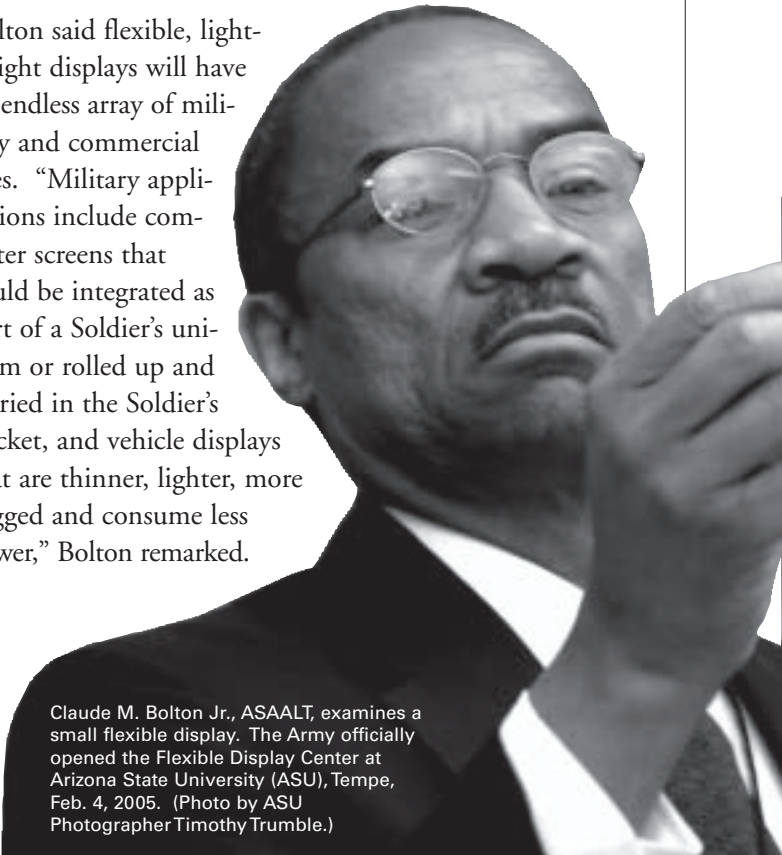
News Briefs

Army Opens Center to Research Flexible Computer Displays

MAJ Desiree Wineland

The Army officially opened a Flexible Display Center (FDC) at Arizona State University (ASU) Feb. 4, 2005, to develop thin computer screens that bend. Claude M. Bolton Jr., Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASAALT), joined Arizona state and university officials for a ribbon-cutting ceremony at the new center.

Bolton said flexible, lightweight displays will have an endless array of military and commercial uses. “Military applications include computer screens that could be integrated as part of a Soldier’s uniform or rolled up and carried in the Soldier’s pocket, and vehicle displays that are thinner, lighter, more rugged and consume less power,” Bolton remarked.



Claude M. Bolton Jr., ASAALT, examines a small flexible display. The Army officially opened the Flexible Display Center at Arizona State University (ASU), Tempe, Feb. 4, 2005. (Photo by ASU Photographer Timothy Trumble.)

The FDC is the result of a \$43.7 million cooperative agreement between the U.S. Army Research Laboratory (ARL) and ASU. The agreement, signed in February 2004, has a performance period of 5 years with an option for an additional \$50 million over an added 5-year period. Although the Army provides its core funding, the center's focus is on commercial applications. The Army is leading the effort because there is strong overlap between military needs and potential civilian markets.

The displays are extremely thin computer screens that will be integrated with computation, communications and global positioning subsystems, according to ARL Director John Miller, "to significantly enhance Soldiers' situational awareness, survivability and effectiveness."

Bolton called the development of the FDC a milestone. "The Army's Flexible Display Center, a unique collaboration of large and small businesses, the university and the Army, will provide our Soldiers and our Nation with revolutionary information technology capabilities," Bolton noted.

Bolton recalled the primitive displays used in cockpits when he served as an Air Force fighter pilot in Vietnam, saying he flew with computer displays that consisted of a flat glass panel. "All that is about to change," Bolton said, adding that maybe next year he'll be watching the Super Bowl on an FDC screen.

ASU President Michael Crow said that the new technology could improve situational awareness in the future for Soldiers. Crow added, "The FDC brings together academia, industry and government to develop what, in essence, will be revolutionary information portals — devices that are small, lightweight and rugged and consume very little power, but they will be very powerful in that they will hold the key to successful military operations — real-time information."

Rep. J.D. Hayworth, from Arizona's 5th Congressional District said the development of the FDC was about immediacy. "The FDC is about bringing the technology to the warfighter — now!" he said. "Whatever the war's duration, our mission is to ensure that we provide technology now to ensure freedom for the future."

BG(P) Roger Nadeau, Commanding General, U.S. Army Research, Development and Engineering Command, said his goal is to use technology to take care of Soldiers. "I need to provide them the best that money and technology can procure," he said. "Flexible displays are the next revolution in information



Dignitaries cut the ribbon at ASU's new FDC. From left, MSG Mark Brzezinski; a Soldier modeling the current uniform; ASAALT Claude M. Bolton Jr.; Rep. J.D. Hayworth, Arizona 5th Congressional District; Michael Crow, ASU President; and Soldiers modeling the Army's newest and possible future uniform systems. (Photo by ASU Photographer Timothy Trumble.)

technology that will enable lighter weight, lower power and more rugged systems for portable and vehicle applications."

The flexible display technology will enable new applications for Soldier and Army platforms that cannot be realized with current glass-based displays. The new applications will include body-worn displays that conform to the uniform and displays that can be rolled up and put in a pocket when not in use and unrolled for large-area, high-information content. Army engineers and scientists are also considering many other potential applications.

FDC Director Dr. Gregory Raupp said the technology would ultimately be developed to the commercial level. "There are multiple technological challenges to making these devices fully flexible, lightweight and extremely low power, but we have the right university, industry and government team in place and we are confident we can meet those challenges," he said.

"The outstanding capabilities of our facility and its manufacturing research and development infrastructure will enable us to work side by side with our partners to intensively develop new breakthrough technologies," Raupp concluded.

MAJ Desiree Wineland is a Public Affairs Officer, Media Relations Division, Office of the Chief of Public Affairs.



Deputy Under Secretary of the Army Thanks ATC Employees for Their Dedication to Soldiers

Susan Hagan

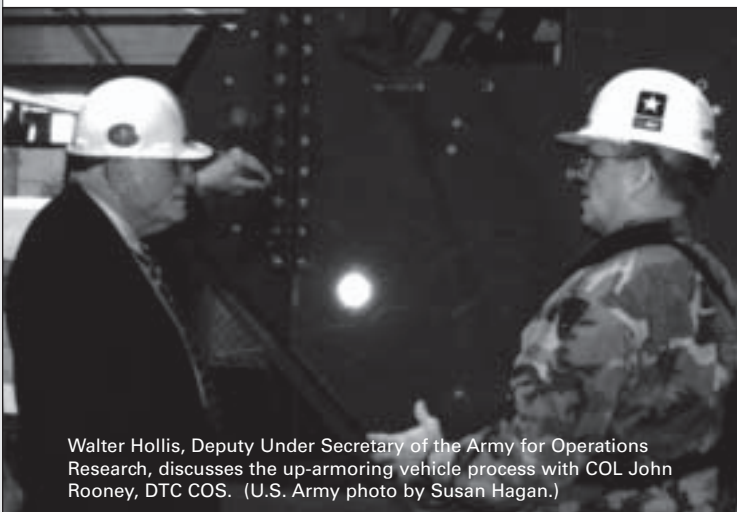
Deputy Under Secretary of the Army for Operations Research Walter W. Hollis thanked U.S. Army Aberdeen Test Center (ATC) employees Feb. 10, 2005, for their “dedication and service to the country and particularly to Soldiers.”

ATC employees worked on the Stryker slat armor program and the up-armored vehicle program, often 24/7, to complete the jobs as quickly as possible to ship necessary equipment to the area of operations (AO).

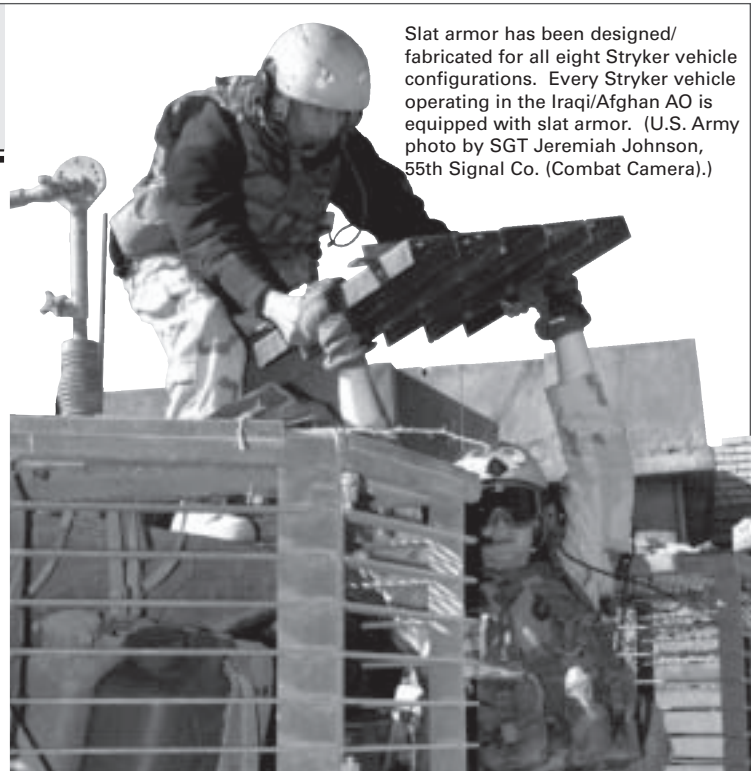
“It’s clear that you have dedicated yourselves to this work and that it’s been done well,” Hollis remarked. “The results speak for themselves, and we all appreciate very much what you do and thank you for it. I’m sure that if you found Soldiers in theater who benefited from your work, they would be more than pleased to shake your hand. This is a great team,” Hollis continued.

The up-armor team, led by COL John Rooney, Developmental Test Command (DTC) Chief of Staff (COS), has evaluated 268 solutions from 53 vendors since August 2003. Both ballistic and automotive tests are conducted to ensure that the armor will protect Soldiers from hazards such as small-arms fire and improvised explosive devices, and that automotive impacts are minimized.

“This effort continues to be massive,” Rooney explained. “We’ve received more solutions in the last 45 days than we’ve had over any other 45-day period.”



Walter Hollis, Deputy Under Secretary of the Army for Operations Research, discusses the up-armor vehicle process with COL John Rooney, DTC COS. (U.S. Army photo by Susan Hagan.)



Slat armor has been designed/fabricated for all eight Stryker vehicle configurations. Every Stryker vehicle operating in the Iraqi/Afghan AO is equipped with slat armor. (U.S. Army photo by SGT Jeremiah Johnson, 55th Signal Co. (Combat Camera).)

According to Rooney, more than 12,000 Humvee Armor Survivability Kits have been manufactured and approximately 11,000 installed on vehicles. These kits, combined with other medium and heavy tactical wheeled vehicle kits and the up-armored Humvees being manufactured, mean that more than 26,000 vehicles in Iraq have good protection levels.

In June 2003, ATC, DTC, Program Manager Brigade Combat Team (BCT), Army Research Laboratory and General Dynamics began to pursue a prototype slat armor package to protect Strykers from rocket-propelled grenades (RPGs). In just 7 weeks, slat armor was designed, fabricated, installed and tested for eight Stryker vehicle configurations. Each configuration was designed with minimal impact to the vehicle’s functioning. In some cases, improvements were made to the baseline vehicle.

ATC also worked in conjunction with Lima Army Tank Plant to fabricate slat armor for the 1st and 2nd Stryker BCTs and has completed production for the 3rd Stryker BCT.

“Every Stryker in theater is equipped with slat armor,” said Charles Valz, ATC Survivability/Lethality Director. “Since the deployment of the Stryker Brigades to Iraq in November 2003, slat armor has saved many lives from daily RPG attacks.”

Susan Hagan is a Mission Support Contractor Public Affairs Specialist for ATC.

Keller Named U.S. Army Military Tester of the Year

Nell M. Drumbheller

MAJ(P) Winfield Keller (he has since been promoted to lieutenant colonel), Executive Officer (XO) for the Ronald Reagan Ballistic Missile Defense Test Site Range, Kwajalein Atoll, was recently named the U.S. Army Military Tester of the Year by the National Defense Industrial Association (NDIA). NDIA is a nonprofit organization whose mission is to provide a legal and ethical forum for the interchange of ideas between the government and industry to resolve industrial problems of joint concern.

“As a test director, I am responsible for cost, performance and schedule in support of a test,” Keller explained. “The Reagan Test Site [RTS] team must conduct missions safely and on time, collect all required data and provide the data to our customer, all within budget.”

Tests are categorized as follows:

- Developmental — verifying the system design meets desired capability.
- Operational — evaluating operational effectiveness and suitability of a system under realistic operational conditions.
- Live-Fire Testing — assessment of the vulnerability/ lethality of a system prior to production.

In general, a tester can be anyone involved in testing a new system such as the test coordinator, data collector,



Then MAJ(P) Winfield Keller, RTS XO, Kwajalein Atoll, was selected as the U.S. Army Military Tester of the Year by the NDIA. Keller, who has been at RTS for 2 years, plans to stay there through summer 2006. (U.S. Army photo by Nell M. Drumbheller, USAKA/KRS.)

evaluator or test subject. “I am fortunate to have been able to conduct both developmental and operational testing in previous assignments and at RTS,” Keller remarked.

“Keller possesses and continually demonstrates outstanding leadership, management and problem-solving skills,” said LTC Anne Daugherty, Range Commander. “Keller is adept at understanding complex and interdependent test requirements, pulling together the right group of people to address those requirements, empowering the team to take action to meet requirements and then following up to ensure all issues have been addressed prior to mission execution. He constantly looks to see what issues could arise and takes early action to resolve or eliminate the potential for such problems to impact a test,” Daugherty continued.

Keller believes that a qualified, motivated team is critical to a tester. “RTS has created integrated product teams supporting each mission area,” Keller said. “Our ability to conduct tests would not be possible without people like Doug Peters and Merrie Beth Schad in Kwajalein Range Services (KRS) Plans and Operations, Claire Wittschiebe in KRS Logistics and other critical government, contractor and customer team members.”

Daugherty agreed with Keller. “Tests are team events, not executed by any one person or group,” she said. “Keller successfully coordinates with many diverse organizations, both internal and external to the command, to ensure timely test support. With the number of players involved in the kinds of tests we support at RTS, staying coordinated is a critical task. Keller enables communication within the team to ensure that when requirements change — and they always do — all test team members are aware and adjust their support and mission execution plans accordingly,” Daugherty stated.

Recognizing the importance of the mission tests, Keller added, “From the U.S. Army Kwajalein Atoll (USAKA) Commander down, regardless of your particular job, ultimately, we are all here to conduct or support testing.”

Keller’s Army career has spanned more than 18 years and he advises junior officers that the secret to a successful career is to enjoy what you are doing. “Get challenging jobs you will like,” Keller explained. “It’s a lot easier to do a job well if you are having fun.”

“At RTS, we serve the Army directly and DOD as well through the ballistic missile test support we provide other

services and DOD agencies,” Daugherty explained. “It is very important work. Some RTS tests support improved capabilities for systems the Army either operates or will operate, including the Patriot and Ground-based MidCourse Defense systems. Other tests support performance assessment of ballistic missile systems the Air Force and Navy operate,” she continued. “Since we fight as a Joint force, Navy and Air Force systems ultimately serve to protect and defend all warfighters, Army Soldiers included.”

“RTS test directors help make the DOD’s ballistic missile systems the best they can be, and as such it is truly an honor to serve here,” Daugherty concluded.

Nell M. Drumbeller is Editor of the Hourglass, USAKA/KRS.

Vice Chief Praises Tech Advances, Urges More

Ali Bettencourt



Army Vice Chief of Staff
GEN Richard A. Cody

A lone Soldier kneeling in the mud of Mosul, Iraq, was projected onto a screen larger than life for more than 500 conference participants to see. What at first looked like an extension of the mountains behind him came into focus as a heap of equipment borne on the Soldier’s back.

At the opening session of the February 2005 Association of the United States Army Winter Symposium in Orlando, FL, Army Vice Chief of Staff GEN Richard A. Cody asked the crowd why the photo, taken during the early days of *Operation Iraqi Freedom (OIF)*, doesn’t represent what “right looks like” for Soldiers on today’s battlefield.

“That Soldier will carry a 70-pound rucksack — he’s a good infantryman,” Cody said. “But 110 pounds? Is this Soldier equipped for agility against an adaptive enemy?” Pointing to the picture, Cody paused. “Never forget that he is your customer. Our job is to get this equipment right for our Soldiers,” he added

Cody spoke during the opening session of the symposium titled, “Science and Technology (S&T) Enablers for a Joint

and Expeditionary Army,” to a crowd of officers and civilians, contractors and industry and academic partners. He outlined Army advances since the global war on terrorism (GWOT) began and the work that still needs to be done. “During World War II, the Nation was shocked and horrified by German U-boat attacks on Allied fleets,” Cody said. “American ingenuity quickly found a solution with sonar and other technology. How will history judge our success against improvised explosive devices (IEDs), suicide bombers and other asymmetric threats?”

“This conflict calls for focus and intensity from the S&T communities,” Cody continued. “As you look at [Soldiers’ faces], ask yourself, ‘are we giving them everything they need and are we getting it to them quickly enough?’”

Cody praised advancements made over the last 3 years. Specifically, he highlighted the comprehensive, Joint and rapid work done to combat IEDs through the Joint IED Defeat Task Force; the improved individual Soldier equipment provided through the Rapid Fielding Initiative; and the introduction of new technological solutions to the battlefield through the Rapid Equipping Force initiative.

“This is a different Army today,” Cody said. “Our Soldiers aren’t afraid of new technology — they embrace it. They want us to push the envelope. In fact, they challenge us to push it.”

While visiting the Program Executive Office for Simulation, Training and Instrumentation (PEO STRI) in Orlando, Cody saw firsthand the cutting-edge work the Army is conducting in the live, virtual and constructive simulation training environments to help prepare Soldiers for combat.

Lockheed Martin and PEO STRI representatives demonstrated the new War Simulation (WARSIM) System — a computer-based simulation tool that supports brigade, Joint and coalition command- and staff-level training. WARSIM can simulate all levels of conflict — from a major theater of war to stability and support operations, providing commanders realistic, integrated and tough training.

“PEO STRI is a vital component to the Army’s combat readiness,” Cody commented. “These live, virtual and constructive simulation systems are helping to save lives in Iraq and Afghanistan.”

While addressing a crowd of more than 200 PEO STRI employees, simulation personnel from the other services and

contractor and industry partners, Cody praised the community's hard work and key contributions to the GWOT.

"Do not judge your relevance to this fight by your proximity to the battlefield," Cody said. "You are absolutely vital to this effort and to our Soldiers. If one of our [*Operation Iraqi Freedom* veterans] could be here today, they would stand up and thank you."

Cody reminded the audiences that in the end, everything they do is for the Soldier — the Army's centerpiece. "All our Soldiers ask of us is great leadership, the right equipment and training. We can't let them down," he concluded.

Ali Bettencourt is a Public Affairs Specialist with the Office of the Army Chief of Public Affairs.

U.S. Military Academy and ERDC Sign Cooperation Agreement

The U.S. Military Academy (USMA), West Point, NY, and the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS, formally signed a memorandum of agreement Feb. 18, 2005, to promote joint research and information exchange opportunities between the two Army institutions. BG Daniel Kaufman, USMA Academic Board Dean, and Dr. James Houston, ERDC Director, both signed the agreement.

The agreement will provide for various official interactions between the two organizations, including opportunities for USMA faculty and cadets to work at various ERDC sites on



Dr. Drew Miller (left), ERDC, explains a special fisheries study to BG Kaufman and other USMA faculty members during an ERDC overview tour. (Photo courtesy of ERDC.)

joint research projects, and sabbatical opportunities for ERDC personnel to teach at USMA. The agreement will ultimately improve the visibility of ERDC and USMA research throughout the U.S. Army Corps of Engineers (USACE) and the Army as a whole.

ERDC's Vicksburg installation has informally hosted USMA faculty and cadets for short-term research visits for several years. This agreement will formalize and expand future cooperative efforts between the two institutions.

Representatives from various USMA departments accompanied Kaufman during his 2-day visit to ERDC. They received briefings and presentations on ERDC research capabilities, facilities and ongoing projects.

During the signing ceremony, Kaufman described the agreement's significance. "At the U.S. Military Academy, we teach and prepare our cadets for a changing world. It's natural for us to have collaborative efforts for our professors and cadets to work with some of the world's leaders in research and development (R&D). This will give our cadets insight into ERDC research to solve problems for the Army and our Soldiers. Only at ERDC could you see everything from the latest Cray supercomputer to zebra mussels."

Houston mentioned previous cooperative interactions, including short-term faculty and cadet research visits; USMA alumni at ERDC; and ERDC researchers who have served as USMA faculty. He also pointed out that COL Allen Grum, USMA's Engineering Department head, had served as ERDC Director in 1985-86 while on sabbatical.

"This agreement will strengthen and promote future collaborative efforts and aid both organizations," Houston continued. "But the greatest benefit may be the increased exposure



Dr. James Houston, ERDC Director, and BG Daniel Kaufman, USMA Academic Board Dean, sign the cooperation agreement between ERDC and the USMA. (Photo courtesy of ERDC.)

of new technologies and research capabilities to the cadets — the Army's future leaders. We are proud to be in this partnership.”

West Point was fortified in 1778 and is the oldest, continuously occupied military post in America. In 1802, legislation established it as an engineering school to train Army officers. Its mission is to educate, train and inspire cadets to become future Army leaders.

ERDC is the premier R&D facility for USACE. It consists of seven laboratories at four geographical sites, including Vicksburg; Champaign, IL; Alexandria, VA; and Hanover, NH. ERDC employs more than 1,800 workers, controls \$1.2 billion in facilities and conducts an annual research program of approximately \$700 million. It conducts research in both military and civil works mission areas for DOD and the Nation.

NEWS BRIEFS

Army's Drive to Find Newest Technology Leads to YPG

Phillip T. Washburn

In a bold move to find and acquire the latest vehicle technology the automobile industry has to offer, the U.S. Army invited a group of vendors to Yuma Proving Ground (YPG), AZ, for a first-ever Tactical Wheeled Vehicle (TWV) Component Demonstration.

Representatives from 42 companies across the Nation made the trip to southwest Arizona early this year and showcased 62 technologies for the Army to consider. The demonstration was hosted by YPG and the Program Executive Office for Combat Support and Combat Service Support's (PEO CS&CSS's) Program Manager for Tactical Vehicles. This was part of the Army's Expedited Modernization Initiative



Don Kyle, representing Modine Manufacturing of Wisconsin, explains how a new air conditioning/heating system works as government observers take turns riding in the up-armored M1114 Humvee, driven by Louie Madrid, a YPG test driver. (U.S. Army photo by Phillip T. Washburn.)

Procedure Program, which is designed to identify and leverage key technologies for TWVs.

Hosts of the multistage event deemed it a major success for the Army and industry, especially since it included a high percentage of smaller companies that usually don't get the opportunity to display their ideas and technologies directly to high-level decision makers. This was a unique attempt to identify what current industry technologies the Army could leverage in fielding its future fleet of TWVs, both in the short and long terms.

“This demonstration definitely exceeded our expectations for a first-year event,” PEO CS&CSS BG Patrick J. O'Reilly remarked on the final day of demonstrations. “Observation teams saw some technologies from smaller companies they might not otherwise have seen. These technologies would have taken a long time to get to my level,” O'Reilly explained, adding that his group was really pleased by some of the products they saw.

Drivers run vehicles through a tough test on a YPG course to demonstrate a new suspension system enhancement. (U.S. Army photo by Phillip T. Washburn.)



“This was not just a static display like we see in other venues,” he continued. “We actually got to work the equipment and see it in action, which made the event tremendously more valuable for us. It was also definitely worthwhile coming to Yuma, not only because of the favorable weather and ranges, but also because YPG has an environment similar to where American Soldiers are currently engaged,” he added.

Observation teams comprised representatives from different Army organizations involved in the modernization and acquisition of military systems. They carried clipboards, took notes, asked questions and were keenly focused on every aspect of the technologies presented.

During the 4-day process, O’Reilly joined other general officers in the hands-on and up-close assessments of various new technologies being displayed on YPG’s roads and ranges.

At many courses, vehicles were raised and lowered by remote control and tires deflated and inflated automatically. One truck chased another around the range displaying a collision alarm system. A Wisconsin business gave demonstration rides in a new air-conditioned Humvee. A large trailer hitch, designed to be faster and easier to operate, drew a crowd for the North Carolina company that designed it. A Texas firm presented an engine coolant designed to last for 750,000 miles or 7 years. One Michigan company bounced suspension demonstration trucks around the ranges and another displayed a new oil-saving device.

On hand to witness some of these demonstrations was LTG Claude V. Christianson, DA Deputy Chief of Staff for Logistics (DCSLOG). “Because the battlefield is



BG Kathleen M. Gainey, Director, Force Protection and Distribution, DCSLOG, gets instructions from Thomas Williams Jr. on a new trailer hitch designed by Williams Easy Hitch Inc., of North Carolina. (U.S. Army photo by Phillip T. Washburn.)



BG Patrick J. O’Reilly, PEO CS&CSS, observes a demonstration of a trailer hitch designed by Williams Easy Hitch Inc. Mark Wilkins provides the demo. (U.S. Army photo by Phillip T. Washburn.)

changing, the Army’s truck fleet must meet new requirements,” Christianson explained. “Force protection for the crew and passengers must be a first consideration. The crew must have network communications capability. The cost to operate these vehicles has to be reduced, and Army TWVs must be easier to maintain,” he said.

Other executive-level leaders included BG Kathleen M. Gainey, DCSLOG’s Director of Force Protection and Distribution, and MG William M. Lenaers, Commanding General U.S. Army Tank-automotive and Armaments Command, who took a first-hand look at the variety of potential TWV technologies.

Because this event was a demonstration, not a source selection or test, it allowed involvement, not just data collection. “One of the great things about this event,” O’Reilly continued, “was that it allowed representatives of many Army organizations involved in the process to come together, in one place, simultaneously to learn what industry has to offer the Army. We were so pleased with this demonstration that we are seriously considering doing it every year.”

“Nearly 100 of YPG’s personnel supported this event, with preparations beginning weeks in advance,” remarked Zack El Ansari, Division Chief, Combat and Automotive Systems Division. YPG provided everything the vendors and government team needed, including ranges, vehicles, instrumentation, audiovisual support, computers, escorts, transportation, cables, Internet access and registration,” El Ansari concluded.

Following the event, the observation teams produced reports for the Army and provided feedback to the industry participants.

Phillip T. Washburn is a Public Affairs Specialist at YPG.

Need for Hardening Vehicles Continues in Kuwait

MSG Hak Haskins

The 276th Maintenance Co.'s goal was to up-armor 300 vehicles in one day before the close of business Feb. 4, 2005. That single-day total wasn't going to set the benchmark for production — it was just another day's work.

Earlier this year, the 276th and its companion company up-armed 6,600 vehicles during a 1-month period in a production system that 276th Maintenance Co. Chief Warrant Officer Randal Joeckel called "an Army factory." That "factory-type" production has been taking place in Kuwait since December and was a major reason for an immediate decrease of 2,000 in the expected number of vehicles needed for *Operation Iraqi Freedom (OIF)*.

Units Meet Surge, Improve Design

The factory adhered to a strict production schedule and a daily inventory of armored parts. It improved the design of some armor pieces — including stronger hinges — and some of those changes have allowed the gaining units to install panels with bolts, instead of a welding torch.

"We have too many units coming here," said SSG Robert E. Cruz, the noncommissioned officer in charge of the 276th's production schedule. "I don't have time to weld [all the parts] so we came out with a new model. Even drivers from units who are waiting for up-armor are handed wrenches and put to work," Cruz remarked. "Also, units that need 10 or more vehicles upgraded must provide a working party."



SPC Christian Mena, 276th Maintenance Co., Army Readiness Command, Kuwait, fabricates up-armor for Army vehicles headed to Iraq. (U.S. Army photo by Curt Cashour.)

Welders Keep Torches Hot

To remain efficient "we have to keep our welding rods and cutting torches hot," said MAJ John Murillo, 158th Combat Support Battalion Support Operations Officer. In less than 3 months the three companies involved in up-armor work in theater — the 175th, 276th and 699th maintenance companies — used 12 tons of welding rods and 124,000 hardened bolts to fashion \$27 million worth of ballistic steel sheets into doors and panels to help keep Soldiers safer while on convoy missions.

Joeckel stated that his 10-Soldier allied trades shop gained an additional 10 to 20 Soldiers almost immediately and as many as 86 Soldiers were working the mission at its height.

The 276th, an Army Reserve unit from Juana Diaz, Puerto Rico, took over the 699th's mission in mid-January. More than half the unit's personnel were machinists, welders and inventory yard workers. "We canvassed the unit for machinists and wrecker operators, and trained them all to be metal workers in a couple of weeks," Joeckel said. "Then came the 'big push' to get all the vehicles up-armed. We haven't denied a vehicle yet that was headed north. I can't say enough of my Soldiers."

Navy Sends Hull Techs to Help

Even with Army machinists and welders working around the clock, they couldn't keep up with the demand, and five Kuwaiti machine shops were contracted to help out. Then the Navy stepped in to help. A volunteer crew of 15 hull technicians arrived in late January and was put to work immediately after undergoing Joeckel's cross-training program. Seaman Apprentice Brett Jones came to Kuwait from the USS Emory S. Land, a submarine tender stationed in Italy, to assist the Army in up-arming vehicles. "We have a lot of work to do out here, more than we thought," Jones said. "We've been working our tails off, and we're enjoying it."

When the Navy was asked to provide a crew to help its Army counterparts, it wasn't short on volunteers, said LTJG Chris O'Leary, the crew's Officer in Charge. The 15 slots were quickly filled. "We thought this was a great opportunity and we took it," said O'Leary.

Sailors Do a Ship-Shape Job

"We don't have any Humvees, but we do structural work and the welding is not much different than on ships," O'Leary said. "The 276th has a process and they showed it to us. We picked it up fast."

The Navy's impact was felt immediately when a senior chief petty officer made a suggestion for modifying one of the steel panels used for larger trucks. It was a design change that found its way into the template and has been used since. The Navy hull technicians also came with an advantage. "We're treating them like a brigade welding team even though they will only be here 45 to 60 days," Murillo said.

PO2 Roddey Zinda, a Hull Technician with 4 years of U.S. Navy service, said he volunteered because "it's a respected job, it's my trade and I know I am good at it. It makes sense to help if I can."

Officers Get Their Hands Dirty Too

All crew members work 24-hour shifts, including O'Leary, whose face was streaked with sweat and spent-welding-rod soot. "When you see the officer and the senior chief working with the crew, it boosts morale," Zinda said, "and shows us how important this is." That sentiment was echoed through the ranks.

PO3 Jessica Curtis said, "In Kuwait, you get to see a lot of your work and where it is going. This may help save many lives and it has a great sense of importance."

Types of Armor

There are three levels of armor for vehicles being used in the Central Command area of operations, said COL William Frunzi, the U.S. Army Training and Doctrine Command Systems Manager for tactical wheeled vehicle modernization. "Level III armor, the first measure taken by Soldiers to protect themselves from increased threats, is sheets of steel units bought and cut for their vehicles," Frunzi explained. The armor is usually fabricated and

applied in Kuwait. The biggest concern with Level III armor is whether the steel is up to the task being asked of it.

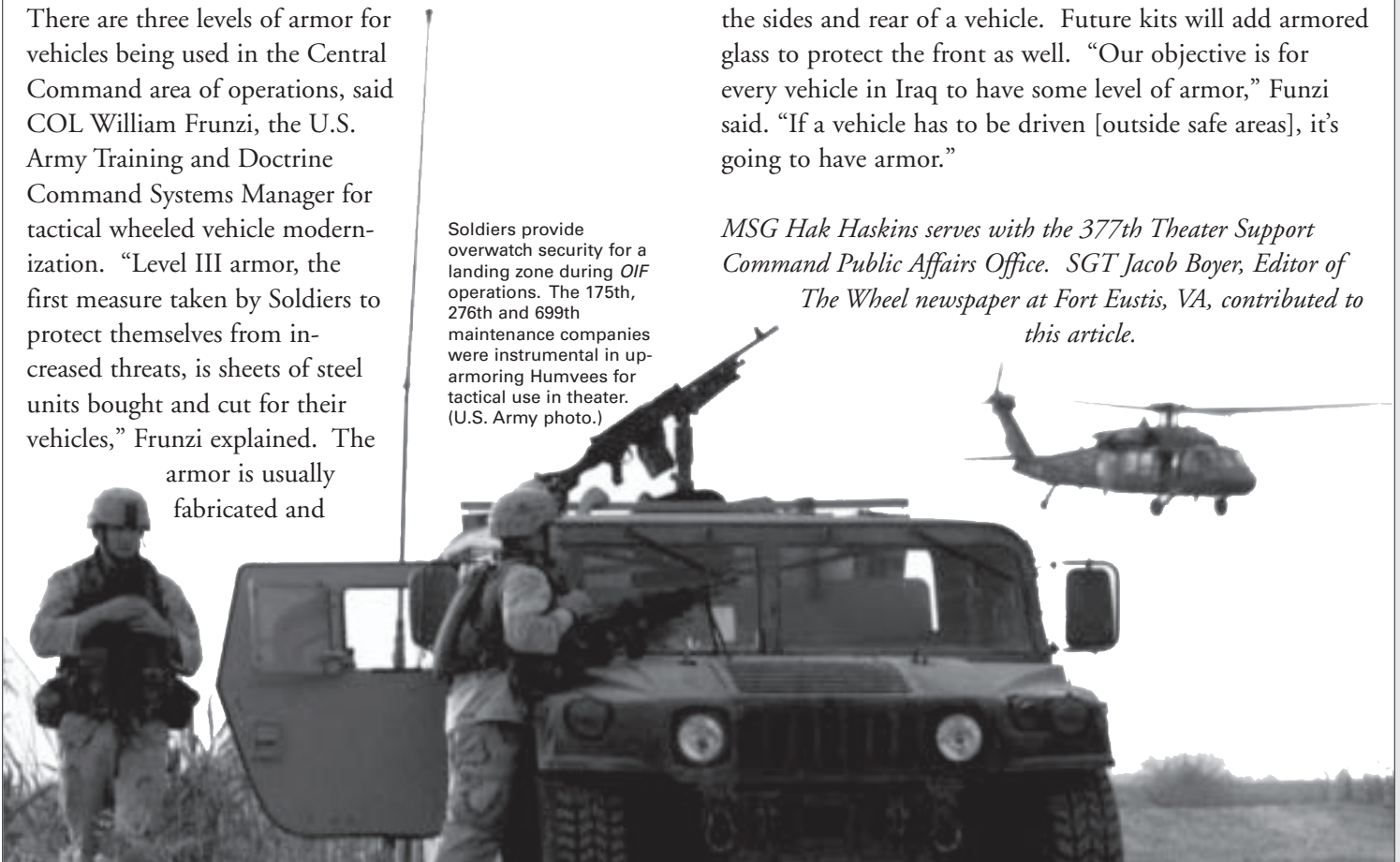
"Steel 'coupons' — sample squares of the steel — are sent to a test center at Aberdeen Proving Ground, MD, where scientists put them through a series of tests to determine their ballistic qualities," Frunzi continued. "The intent is to test and certify the steel. We want to make sure it's good. Level III armor typically protects the sides and rear of the vehicle and is a step up from what Soldiers in the field previously had," Frunzi remarked.

Both Level I and Level II up-armorings occur at factories in the United States. The former consists of the up-armored Humvee. There were a small number of these vehicles in theater at the onset of *OIF*, but most of them were assigned to military police units for security operations. Level I armor adds protection all around the crew compartment and provides both glass and armament protection.

Humvees are not the only tactical wheeled vehicles being used in Iraq, and not all of them can be replaced by their up-armored cousins. Level II armor, which consists of manufactured add-on kits, is attached to vehicles either at home stations before units deploy or once the vehicles arrive in Kuwait. Like Level III armor, Level II kits protect the sides and rear of a vehicle. Future kits will add armored glass to protect the front as well. "Our objective is for every vehicle in Iraq to have some level of armor," Frunzi said. "If a vehicle has to be driven [outside safe areas], it's going to have armor."

MSG Hak Haskins serves with the 377th Theater Support Command Public Affairs Office. SGT Jacob Boyer, Editor of The Wheel newspaper at Fort Eustis, VA, contributed to this article.

Soldiers provide overwatch security for a landing zone during *OIF* operations. The 175th, 276th and 699th maintenance companies were instrumental in up-armorings Humvees for tactical use in theater. (U.S. Army photo.)



Contracting Community Highlights



CONTRACTING COMMUNITY HIGHLIGHTS



In the “Contracting Community Highlights” section of *Army AL&T* Magazine, each feature article is intended to provide in-depth information relative to a contracting organization, mission or process. This issue’s feature article highlights the rapidly evolving area of dining facility contracts and the interpretation of *The Randolph-Sheppard Act* (Vending Facilities for Blind in Federal Buildings). Roger Neds, Chief, General Counsel, Army Contracting Agency (ACA) Northern Region Headquarters, presents an instructive analysis of various issues in this arena using a question-and-answer format.

In addition to the feature article and the regular “DAR Council Corner,” we pass on current news of note from a number of our contracting organizations — including the announcements of a new Director for the ACA Information Technology, E-Commerce and Commercial Contracting Center and a new Director/Principal Assistant Responsible for Contracting for the ACA Southern Region Headquarters.

We appreciate the continued support from the field in providing submissions for publication and we hope you find them informative and interesting. For more information on the topics presented, call or e-mail my office for the pertinent contact information.

Ms. Tina Ballard

Deputy Assistant Secretary of the Army
(Policy and Procurement)

Dining Facility Contracting

Roger Neds

Within the last year, there may not be any area of Army contracting that has undergone as many changes and legal challenges as the area of dining facility contracts and the

interpretation of *The Randolph-Sheppard Act (RSA)*. These changes have included new court rulings; a new provision in the *FY04 National Defense Authorization Act (NDAA)*; a rewriting of *Army Regulation (AR) 210-25, Vendor Facility Program for the Blind on Federal Property*, governing food service contracts; the legal death of the earlier Army policy guidance on *RSA* and the soon-to-be-released replacement guidance; and a DOD policy letter on the interplay between *RSA* and *Javits-Wagner-O'Day (JWOD)* preferences. This last area of contracting has been the source of an outbreak of litigation as both the various State Licensing Agencies (SLA) and *JWOD* offerors seek to protect their preferences and their programs. This article addresses some of these new legal changes. To focus on specific issues, I have structured this article in a question-and-answer format.

Q. Does it matter if the requirement is for full food services, dining facility attendants or both?

A. Based on a series of protest decisions from Fort Lewis, WA, the requirement’s nature can be critical in determining whether it falls under *RSA*. Any requirement involving food preparation falls under *RSA*. However, if dining facility attendant services is the only item being procured and the work does not involve any food handling or preparation (such as peeling potatoes), then *RSA* does not apply. Similarly, garbage or trash removal and clean-up do not constitute food handling. This gives the garrison commander and the servicing Directorate of Contracting some ability to make choices in this area. It is entirely proper to split the food service work from the dining attendant work. The procurement for the former would fall under *RSA*; the latter would not. On the other hand, it is perfectly legal to solicit both areas of work together. In that situation, the *RSA* preference would apply to the whole procurement.

Q. Who may authorize direct negotiations with the SLA?

A. Under the latest *AR 210-25*, the senior on-site official (the garrison commander) may authorize direct negotiations with the SLA. This is a change from past practice where the Principal Assistant Responsible for Contracting had to approve such negotiations. The upcoming ACA guidance states that the ACA prefers that such awards be competed, and that ACA Headquarters must be notified in a timely manner when the contracting officer (KO) learns that the on-site official desires to enter into direct negotiations.

Q. Which preference takes precedence — *RSA* or *JWOD*?

A. This issue has come before two different Federal Courts of Appeal in the past few years. In both cases, the court found that the *RSA* preference controlled. However, in

those acquisitions where a *JWOD* offeror may be able to offer some or all of the services, a KO should also refer to the Oct. 10, 2003, letter issued by the Director, Defense Procurement and Acquisition Policy, Applicability of the *Javits-Wagner-O'Day Program* and the *Randolph-Sheppard Act*. This letter addresses establishing required subcontracts by the SLA to a qualified *JWOD* firm. Likewise, prime contracts require that the contractor subcontract to a qualified *JWOD* firm.

Q. What if a *JWOD* firm is already performing food preparation services?

A. Although the *RSA* preference is the controlling preference, *Section 852, FY04 NDAA*, specifically provides that if a *JWOD* contractor is already performing those services, then all options may be exercised on such a contract and a new procurement does not need to be started until the entire term of the earlier contract has expired. However, when the follow-on acquisition occurs, the *RSA* preference will control.

Q. Can there be an award without discussion?

A. This is a question that raises a lot of confusion. On one hand, the preference to a “blind vendor” is tied to whether the vendor is in the competitive range, which is the trigger for discussions. On the other hand, the *Federal Acquisition Regulation (FAR)* authorizes award without discussion, and this has become a very popular streamlining practice. I believe the forthcoming ACA guidance addresses this issue adequately. With that in mind, I would suggest the following analysis:

- If there is no SLA offer, then an award without discussion to one of the private offerors can be made under the normal *FAR* procedures.
- Awarding to the SLA without discussion is permissible because the SLA is still, in effect, receiving the preference.
- If the SLA has made an offer but would not be in the competitive range if a range were established, then an award without discussion may be made to one of the private offerors. However, before that award is made, the procedures established in *AR 210-25* and in the forthcoming ACA guidance for deciding that an SLA offer is not in the competitive range must be followed.
- If the SLA has made an offer and is or would be within the competitive range, an award on initial proposals to another offeror would be improper. This would, in effect, be a way of circumventing the SLA's preference. As such, it would violate *Section 5b, AR 210-25*, which states that on DOD facilities “the blind will be given a priority award of contracts to operate cafeterias.” If there is a sound reason

not to award to an SLA who qualifies for inclusion in the competitive range, the procedure set forth in *AR 210-25, Section 6b(1)(c)* must be followed before an award to a private offeror can be made. In reality, if the SLA is already in the competitive range, I cannot conceive of a situation where we would attempt to award to another entity without at least conducting a round of discussions.

Q: Who decides protests of *RSA* acquisitions?

A. The Department of Education (DOE) is charged by Congress with responsibility for implementing the statute. They have established a mechanism for resolving disputes between the SLA and an agency. The Government Accountability Office (GAO) recently ruled in the Fort Lewis protests that the SLA must use the DOE procedure before they can protest to the GAO. Additionally, in a recent case at Fort Campbell, KY, one judge at the U.S. Court of Federal Claims also ruled that the SLA must initially use this alternate procedure as well. This ruling has been appealed by the SLA. For offerors other than the SLA, normal bid protest procedures apply.

While this article has summarized some of the more important changes in this area, it is still only an overview in an area that is constantly changing. Whenever you have a requirement to contract these services in the near future, speak with your legal advisor early in the process.

News From the Field

ACA-PR Supports Humanitarian Assistance in Laos. MAJ Luis Crespo, a Contingency Contracting Officer assigned to the 45th Corps Support Group at Schofield Barracks, HI, works at the Army Contracting Agency, Pacific Region (ACA-PR) at Fort Shafter, HI. He recently provided all contracting support to Exercises Bailey Leader II and III. These exercises are U.S. Pacific Command (USPACOM)-approved and -funded humanitarian assistance (HA) missions involving the solicitation, award and execution of several U.S. government construction contracts on behalf of USPACOM and the U.S. State Department. All contracts were awarded to local engineering and construction firms to build two schoolhouses in the Province of Savannakhet and a medical surgical center in the Province of Saravan in Laos. The completion of these projects will greatly benefit the Laotian people. Construction was designed to produce

turnkey facilities — functional for the intended purpose on completion, including all basic furniture. These facilities' designs were developed under the direction of the USPACOM's Assistant Chief of Staff for Engineering (ACSENG). Crespo was recently commended by Patricia M. Haslach, the U.S. Ambassador to Laos, for his contracting support during the past 2 years on the HA projects conducted there. These projects will produce some of the finest facilities in Laos and will greatly further U.S. policy goals by facilitating the recovery of American MIA remains and developing stronger relations with the Laotian government.



MAJ Luis Crespo, ACA-PR, and MAJ Robert Husbands, U.S. Army Pacific, ACSENG, conduct the solicitation conference for local engineering and construction firms. (Photo by Chaleunsouk Saprseuth of the U.S. Embassy in Laos.)

ARCC Seattle Presents Market Research Training. Mary Bonnell, a Contract Specialist with the Army Contracting Agency Army Regional Contracting Center (ARCC), Seattle, WA, Satellite Office, recently trained more than 400 military and civilian employees during the 70th Regional Readiness Command's Full Time Support Conference. Bonnell designed an interactive voyage of discovery — beginning with peanut butter and a used car as the ultimate requirements for the contracting office. Step-by-step, attendees who had little contracting knowledge, but a lot of influence on the procurement process as requirements generators, were guided through the market research process. Bonnell made market research more interesting while teaching regulatory policy and practical how-to advice. Conference feedback was outstanding.

NTC Takes Training to the Warfighter. When deployment schedules are accelerated, and the ACA-Northern Region (NR) National Training Center (NTC) at Fort Irwin, CA, is overcommitted supporting the global war on terrorism, how can the Army train those units prior to a deployment? For the 3rd Armored Cavalry Regiment at Fort Carson, CO,

NTC delivered a mission readiness exercise. To do that, the Directorate of Contracting's military and civilian professionals had an extremely short time to put in place nearly \$2.5 million of training infrastructure. The contracting personnel were formally recognized by the Commanding General, 7th Infantry Division, Fort Carson, and the garrison commander for making the exercise a huge success.

ACA-NR Supports 55th Presidential Inauguration Events.

The pomp and pageantry of the 2005 Presidential Inauguration would not have been as impressive without the Soldiers, Airmen, Marines, Sailors, Coast Guardsmen and civilians who took part performing, marching and guarding. Behind the scenes, there were hundreds of others who planned, coordinated and controlled this highly celebrated national event. MAJ Robert Shelton, Chief of Staff, ACA-NR and the Fort Myer Directorate of Contracting, served on the Joint Task Force-Armed Forces Inaugural Committee special staff and was responsible for ensuring that all military ceremonial support requests by the Presidential Inaugural Committee and the Joint Congressional Committee on Inaugural Ceremonies were properly staffed by legal, comptroller, Army Audit Agency and public affairs professionals. Such support included presidential escorts, military bands, salute guns, marching units, Joint color guards, aerial displays, communications support and overall command and control of various official events. For his efforts, Shelton was recently awarded the Joint Service Achievement Medal.

SMDC Supports Soldiers With the SSET-Light (L). In July 2002, the Space and Missile Defense Battle Lab took an initiative called *Tactical Space Initiative (TACSPACE)* to Millennium Challenge 2002. This initiative was very successful in showing the need for a Space Support Element (SSE) in the battlefield. The SSE is a communication device that provides information directly to warfighters in real time. It is Internet-based and downloaded directly from a satellite. From this initiative, further enhancements and capabilities were incorporated into the hardware and software supporting the SSEs. Through spiral development, new and improved versions of the SSE became a reality as Space Support Element Toolset (SSET). The current system is the SSET-L. This configuration was deployed during *Operations Iraqi and Enduring Freedom*. This design is being modified to allow for a mobile version within a Humvee called the Army Space Support Team Tactical Set. The project is tentatively scheduled to be transitioned to Program Manager, Army Space Project Office.

During SSET development, the Space and Missile Defense Command (SMDC) Contracting Division at the Army

Strategic Command, Colorado Springs, CO, processed, either by individual purchase order or via Streamlined Technology Acquisition Resources for Services Contract Delivery Order, 17 SSET systems totaling approximately \$8.5 million. A major part of this achievement was directly related to the Simplified Acquisition Team's streamlined approach to purchasing the necessary equipment and recognition of the overall mission importance. Items purchased were acquired by commercial practices using *Federal Acquisition Regulation Part 12.603*, which combines the synopsis and the solicitation into one document. Orders were processed on time and either met the delivery date requirements or, as in most cases, deliveries were made ahead of schedule. The SSET-L has achieved high visibility in the Army's progress toward protecting our Soldiers and country during a time of war.

USACCE Supports Battle of the Bulge 60th Anniversary Ceremonies. The Regional Contracting Office-Benelux (RCO-B) of the U.S. Army Contracting Command Europe (USACCE) provided the full spectrum of acquisition services to include planning, procurement and execution of the American portion of the ceremonies for the 60th anniversary of the Battle of the Bulge. The project involved discussions in three languages and detailed coordination with representatives of the Duchy of Luxembourg and Kingdom of Belgium. RCO-B awarded contracts for ceremonial facilities, a tactical operations center, facilities for distinguished visitors and honored veterans, transportation, latrines and a life-support area for 200 Soldiers.

The Secretary of the Air Force and U.S. ambassadors to Belgium and Luxembourg attended the ceremonies along with numerous other distinguished visitors. Both ambassadors

expressed their gratitude to Task Force Commander MG David Zabecki for the professional, responsive support provided. Zabecki noted the extraordinary support that the Task Force received from the regional contracting office. These efforts sometimes went beyond acquisition support. When a Soldier went down at Bastogne with possible hypothermia, Rene Peeters of RCO-B responded immediately by calling for a local ambulance and stationed himself outside in the bitter cold to intercept and guide the ambulance driver. Such dedication and service is typical of Peeters, who was recognized for these qualities with USACCE's Head of Contracting Award for Civilian Professional of the Year in 2003.

Zabecki has recommended that Peeters be awarded the Achievement Medal for Civilian Service for his efforts associated with this mission.

AMCOM Acquisition Center Maintenance and Overhaul (M&O) Contracting Team. During FY04, the Aviation and Missile Command's (AMCOM's) Acquisition Center M&O Contracting Team obligated \$370.7 million, encompassing more than 182 individual contracting actions, to support the Integrated Material Management Center in its M&O requirements. These requirements included M&O contracting support for Apache, Black Hawk, Kiowa, Cargo, Aviation Sets and Kits as well as all associated engine requirements for each of the aviation platforms, which involved four customers. These awards represented long-term (3- to 5-year) indefinite delivery, indefinite quantity contracts. Because of the complex nature of the M&O requirements and the competitive nature of the acquisitions, team members performed more than 25 source selection evaluations to ensure that the government obtained the best value for each of these actions. This team of contracting professionals exhibited tremendous dedication to Soldiers and to supporting the command's mission.

ACA-SR Participates in Industry Partner Conference. On Jan. 26, 2005, acquisition professionals from the Army Contracting Agency-Southern Region (ACA-SR) participated in a conference sponsored by Contract Services Association of America (CSA), the ACA's industry partner. The theme for the Atlanta, GA, event was "Opportunities and Initiatives in Government Services Contracting." Toni Gaines, Acting Director, ACA-SR, welcomed CSA to the Southern Region. Beverly Thomas, Chief, Contract Operations Division, led a panel discussion on SR contracting opportunities and initiatives. Other panel participants were: Timothy Tweed, Director, SR Contracting Center; Steve Sullivan, Liaison



Rene Peeters, RCO-B Procuring Contracting Officer, on the ground in Luxembourg providing contracting support for the Battle of the Bulge 60th Anniversary ceremonies. (USACCE Photo.)



ACA conference participants (standing, from left) Lenneia Jennings, Timothy Tweed, Steve Sullivan and Sharon Wilbon; (seated, from left) Beverly Thomas, Toni Gaines and Vicki Vandermier. (Photo by Steven Hunnicutt, ACA-SR.)

Networking Officer, Installation Management Agency Southeast Region; Lenneia Jennings, Chief, Innovations and Efficiencies Branch; and Vicki Vandermier, Procurement Analyst. The panel discussed the ACA-SR mission, function, objectives and business rules, and the future migration of selected acquisitions to the East and West Contracting Centers. The panel also discussed ACA-SR customers and current contracting opportunities, and the liaison mission to the Installation Management Agency, Southeast Region Office. Melissa Rider, Deputy Director, ACA, was the luncheon keynote speaker.

SMDC Interns Observe MRC SOW in Action. The U.S. Army Space and Missile Defense Command (SMDC) Contracting and Acquisition Management interns recently toured the Missile Recycling Center (MRC) at the Anniston Defense Munitions Center (ADMC) located at the Anniston Army Depot (ANAD), Anniston, AL. Tour guides were Gordon L. Williamson, ADCM Director; Dr. William S. Melvin, U.S. Army Aviation and Missile Research, Development and Engineering Center; and Dr. Earl Hughes, Amtec Corp. The tour provided firsthand exposure to missile recycling technologies that protect the environment, provide jobs to the local region and save taxpayer money by avoiding costly environmental remediation. The MRC does not handle chemical, nuclear or biological products and doesn't have a relationship with the Anniston Chemical Agent Disposal Facility, which is also located at ANAD. During the tour, ADCM MRC employees explained each processing station's work to SMDC interns. The SMDC interns found the site visit interesting and rewarding, and considered it an excellent opportunity to see how the SMDC contract scope of work (SOW) for the MRC is executed.

Congratulations to:

Michelle Currier – HQ, ACA. Michelle Currier, Headquarters, ACA, was recognized as one of the top 25 businesswomen of Hampton Roads, VA, with the Women in Business Achievement Award. Recognized for her continued contributions to the contracting profession, Currier is past National President of the National Contract Management Association and now serves as the National Vice President and Secretary.

Linda Van Collie – ACA-ITEC4. On Jan. 7, 2005, Linda Van Collie, Information Technology, E-Commerce and Commercial Contracting Center (ITEC4) Contracting Officer, was presented the Outstanding Program Manager of 2004 Award from the Defense Information Systems Agency. Van Collie was recognized for her accomplishments in supporting the Direct Communications Link program, commonly known as the "Russian Hot Line." Van Collie has played an important role as the program grew from the original hot line to today's multinational communications program that is critical to world security.

Toni Gaines – ACA-SR. Toni M. Gaines, Acting Director, ACA-SR, was featured as a *Javits-Wagner-O'Day (JWOD)* Champion in the March 2005 issue of NISH's *Workplace Magazine*. A *JWOD* Champion is a federal employee — a "point of influence," primarily in acquisition — who fully believes in the *JWOD* program's mission and is doing everything in his or her sphere of responsibility to provide employment opportunities for people with disabilities. Gaines' efforts have resulted in securing a tremendous volume and variety of *JWOD* projects, including administrative services, grounds maintenance, janitorial and food service contracts. In fact, more than 5,400 full-time equivalent jobs have been provided to people with disabilities every year, in part, because of Gaines' support.

Matthew J. Franzen and Donald E. Alexander – TACOM AC. Franzen and Alexander, of the Tank-automotive and Armaments Command (TACOM) Acquisition Center (AC) in Warren, MI, each received an Achievement Medal for Civilian Service for exceptional performance of duty Oct. 1-29, 2004, in support of the First U.S. Army. Prior to this period, the First U.S. Army did not possess a continuous, mobile and secure communications capability. Franzen and Alexander were part of a cross-functional team of TACOM Integrated Logistics Support Center and G-8 associates who were able to provide two command and control vehicles within a matter of days to the First Army. Franzen and Alexander were cited for their thorough technical expertise, extraordinary efforts and keen sense of urgency in filling this

critical mission void. A portion of the personal message from Doug Ricker, Deputy Chief of Staff, G-8, First U.S. Army, follows: "I had no idea how to acquire these command and control vehicles. I had exhausted every local command source with no success. Someone suggested that I address the issue to TACOM. Within a matter of days, the vehicles were parked in front of the First Army headquarters. To those within your headquarters, this action may not appear to be significant. Most likely, it was probably nothing more than routine to you. However, I can tell you that it is the most professional and thorough action I have seen in my 30-plus years of service to the Army. Please note that the previous sentence does not state 'one of the most professional actions' but the singular 'the most professional action.' I am very pleased to know that we have such an outstanding corps of professionals such as you and to recognize you with these awards."

For additional citations, please see the May-June 2005 Web Edition of *Army AL&T* Magazine at <http://asc.army.mil/pubs/alt/default.cfm>.

ACA-SR Announces New Director and PARC



Carol Lowman, new Director and PARC for ACA-SR.

The Army Contracting Agency (ACA) is pleased to announce the selection of Carol Lowman as the new Director and Principal Assistant Responsible for Contracting (PARC) for the Southern Region (SR) Headquarters, Fort McPherson, GA. Lowman began her acquisition career at Fort Ritchie, MD, and then moved on to Fort Gillem, GA. She has served at Fort McPherson since 1994 with the Army Atlanta Contracting Center, Forces Command Contracting Division, and, most recently, as the ACA-SR Business Systems Division Chief. She was a vital member of the team that created and implemented the ACA and is currently participating on the Deputy Assistant Secretary of the Army for Policy and Procurement Contracting Study Team that is recommending how ACA will transform for the future. Lowman has a master of public administration degree and expects to complete her Ph.D. from the University of Georgia this year.

ACA-ITEC4 Announces Senior Executive Service Selection

Bryon J. Young has been officially appointed Director for the U.S. Army Contracting Agency (ACA) Information Technology, E-Commerce and Commercial Contracting Center (ITEC4) after several months as Acting Director. In his previous assignment, Young served as ACA Deputy Director. Young retired from the U.S. Army in January 2003 after 27 years of service.

Sandra O. Sieber, ACA Director, hosted a promotion ceremony for Young Dec. 16, 2004, to formally recognize his selection as a member of the Senior Executive Service (SES). During the ceremony, Sieber and Young's wife, Mary, administered the Oath of Office and presented him with an SES certificate.



Sandra O. Sieber, ACA Director, presents the SES selection certificate to Bryon J. Young during his promotion ceremony. (Photo by DA staff photographer.)

As the ITEC4 Director, Young is responsible for executing ACA's worldwide mission for the procurement of all common-use information technology (IT) hardware, software and services. This includes direct procurement support for the Army's Network Enterprise Command, the Program Executive Office Enterprise Information Systems and the Army Chief Information Officer/G-6. Additionally, ITEC4 supports designated key Army and Joint IT and related programs.

Young graduated from the University of Delaware and earned an M.S. in business administration from Boston University. An Army Acquisition Corps member, he is Level III certified in contracting and program management. His professional education and training includes the Defense Systems Management College Program Manager's and Executive Program Manager's Courses, the U.S. Army War College and the U.S. Army Command and General Staff College.

Competitive Professional Development Opportunities

The Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology is offering 1-year developmental assignments to all DA employees at the GS-12 level (or Acquisition Demonstration broadband equivalent) in the Contracting and Acquisition Career Program (CP-14). The Contracting Career Program Office funds travel and temporary duty costs. For details, see the June 29, 2004, memorandum *FY2005 Competitive Professional Development (CPD) Announcement for the Contracting and Acquisition Career Program (CP-14)*.

The U.S. Army Acquisition Support Center at Fort Belvoir, VA, has additional information about this opportunity. Contact Sally Garcia at (703) 805-1247, DSN 655-1247 or e-mail Sally.Garcia@us.army.mil. For more information, go to <http://asc.army.mil/programs/cp/opportunities.cfm>.

The DAR Council Corner

Business Partner Network

As part of the Integrated Acquisition Environment (IAE) e-Government initiative, the Business Partner Network (BPN) established a single source for vendor data for the federal government and companies seeking to do business with it. The BPN — located at <http://www.bpn.gov> — is a Web-enabled capability for identifying federal and industry trading partners. The BPN creates a one-stop source for Central Contractor Registration (CCR), Federal Agency Registration (FedReg), Online Representations and Certifications Application (ORCA), Past Performance Information Retrieval System (PPIRS), Excluded Parties List System (EPLS) and Equal Employment Opportunity (EEO) Pre-award Clearance.

BPN Web site features include:

Under the CCR link, the Marketing Partner Identification Number (MPIN), Government Business point of contact (POC) and the Alternate Government Business POC are now mandatory for all CCR registrations. The MPIN is a personal code that allows access to other government applications such as the PPIRS, Federal Business Opportunities

System, Federal Technical Data Solutions, ORCA and Grants.govSM.

FedReg collects information about federal government offices that act as trading partners, using BPN numbers as unique identifiers for individual federal locations. The FedReg sends this data to the exchange system so that information about each participant is included with each transaction.

ORCA is an e-Government initiative that was designed by the IAE to replace the paper-based representations and certifications process. In conjunction with the required registration in the CCR database, prospective contractors need to complete electronic annual representations and certifications at <http://orca.bpn.gov>.

PPIRS is a Web-enabled, governmentwide application that provides timely and pertinent past performance information to the federal acquisition community for use in making source selection decisions. PPIRS assists federal acquisition officials in making source selections by serving as the single source for contractor past performance data.

EPLS integrates the Department of Treasury's Office of Foreign Assets Control (OFAC) list and the Department of Commerce's Bureau of Industry and Security (BIS) lists into one database. Users will no longer need to check separate lists within EPLS for excluded parties. These lists do not replace the lists available at the OFAC and BIS Web sites.

EEO Pre-award Clearance provides the national pre-award registry information concerning federal contractors that have been reviewed by the Office of Federal Contract Compliance Programs (OFCCP). These federal contractors have been found to be in compliance with the EEO regulations that the OFCCP enforces. The information contained in this registry is for the 2-year period preceding the current date and facilities reviewed more than 2 years ago are removed as new ones are added. This system does not provide information on parent organizations or other facility locations that have not been reviewed within the past 2 years. If a given facility is found to be in compliance, this does not imply that sibling facilities under the same parent organization received the same favorable finding. This registry provides a search engine and allows you to download the entire registry.

This information is provided by the DAR Council Army Policy Member Barbara Binney.

1

1st Annual Army Life Cycle Logistician of the Year Award

1st Annual Army Life Cycle Logistician of the Year Award

The Army Life Cycle Logistician of the Year Award provides recognition of significant contribution for excellence in the field of Life Cycle Logistics (LCL) and achievements in improving the Total Life Cycle Systems Management process. The Army Acquisition Executive/Assistant Secretary of the Army for Acquisition, Logistics and Technology will annually recognize one military or civilian logistician with this award in recognition of significant LCL achievements.

All Army military and civilian personnel are eligible for the award, and nominations are open to all Life Cycle Logisticians residing in program executive offices, program management offices, the U.S. Army Materiel Command, the U.S. Army Training and Doctrine Command and other acquisition logistics and sustainment organizations. However, individuals participating in the selection process are ineligible. All Army personnel whose LCL contribution for excellence occurred between June 30, 2004, and June 30, 2005, are eligible for the Army Life Cycle Logistician Award. Contributions may be materiel, information, weapon system or process related. Applicable dates for the nomination process are listed below.

- May 18, 2005:** Open data call for nominations.
- July 15, 2005:** Suspense date for nominations to be submitted to the U.S. Army Acquisition Support Center (ASC).
- Oct. 2, 2005:** Award ceremony for the Army Life Cycle Logistician Award to be held concurrently with other major acquisition awards (e.g., Program Manager of the Year and Acquisition Commander of the Year).

Nominations must be submitted to ASC, which will coordinate the award process with the Deputy Assistant Secretary of the Army for Integrated Logistics Support. Nominations may be faxed to ASC at (703) 805-5245 or mailed to the address below:

Acquisition Support Center
ATTN: SFAE-LOG
9900 Belvoir Rd.
Building 201, Room 201
Fort Belvoir, VA 22060-5567

For additional information, contact either Larry Hill at (703) 604-7450, DSN 664-7450 or larry.w.hill1@us.army.mil or Marcos Gonzalez at (703) 604-7448, DSN 664-7448 or marcos.a.gonzalez@us.army.mil.

To review specific criteria and guidelines for the Army Life Cycle Logistician of the Year Award, go to <http://asc.army.mil/info/awards/default.cfm>.



ARMY ACQUISITION, LOGISTICS & TECHNOLOGY

ISSN 0892-8657

DEPARTMENT OF THE ARMY
ARMY AL&T
9900 BELVOIR RD SUITE 101
FT BELVOIR, VA 22060-5567

<http://asc.army.mil>



ASC ACQUISITION SUPPORT CENTER

PREPARING FOR THE FUTURE