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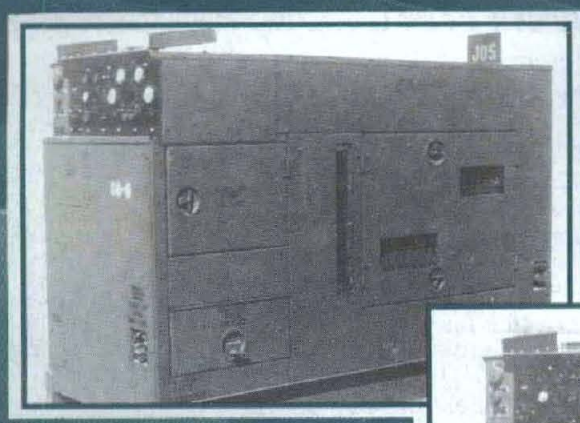
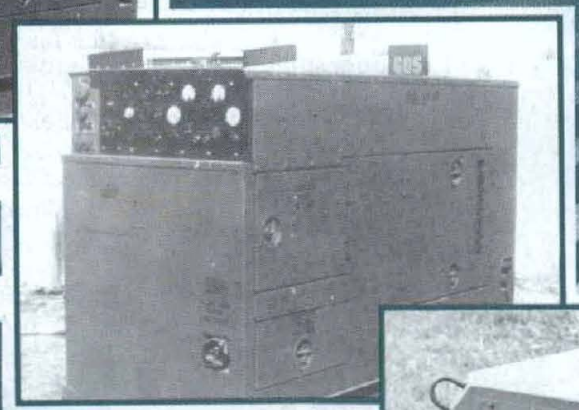
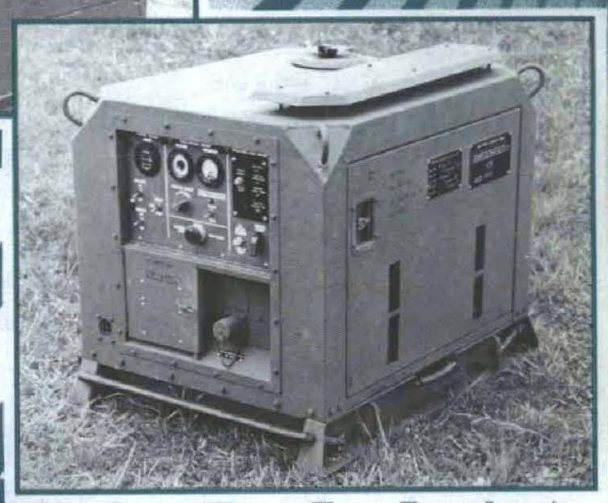
ARMY RD&A BULLETIN

JANUARY-FEBRUARY 1993







TACTICAL QUIET GENERATORS

JANUARY–FEBRUARY 1993
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By order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army
03174

Research
Development
Acquisition

ARMY RD&A BULLETIN

Professional Bulletin of the RD&A Community

FEATURES

DEPARTMENTS

COVER

Tactical Quiet Generator (TQG) sets are the new DOD standard family of electric power generators in sizes 3kW through 60kW. TQG sets will be fielded in a skid-mounted configuration as well as trailer mounted power units and power plants. Shown on the cover (beginning at top left) are skid-mounted 60kW, 30kW, and 3kW TQG sets.

Tactical Quiet Generators...

THE POWER OF THE FUTURE

By COL Lawrence J. Becker II

Introduction

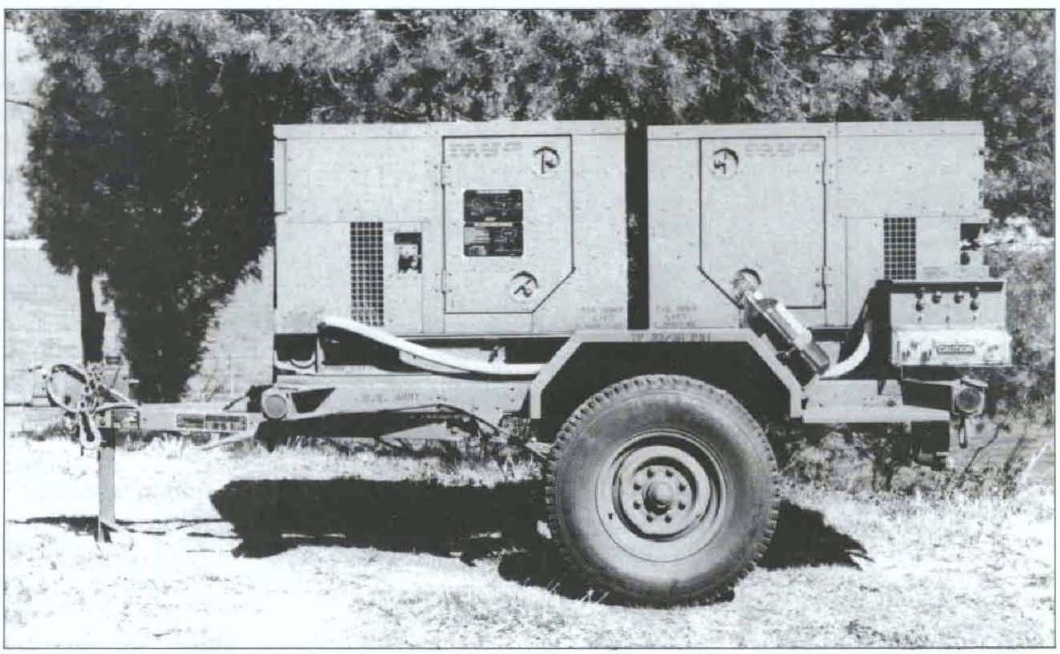
Ever since the Army replaced semaphore flags with telegraphs and telephones, there has been an increasing demand for tactical electric power. The ability to generate tactical electric power continues to be a critical linchpin in today's post-cold war Army. The Army must have reliable, cost effective power to project warfighting capability virtually anywhere in the world. The power requirements of our force projection Army range from compact portable generator sets required to run small electronic devices to huge multi-kilowatt plants required to light and operate complete base camps. With highly sophisticated weapons systems and greater numbers of power-consuming equipment entering the inventory, tactical power requirements have not only increased, but also have magnified the Army's dependence on mobile electric power. Figure 1 illustrates the number of generator assets in the current Army inventory.

With this in mind, the Department of Defense (DOD) has undertaken the development of a new DOD standard family of electric power generators. The new Tactical Quiet Generator (TQG) sets, built in sizes three kilowatts through 60 kilowatts, are quieter, more reliable, and lighter in weight than the current Military Standard (MIL-STD) sets. TQG set improvements include acoustic and infrared signature reduction, electromagnetic pulse protection, decreased fuel consumption, and elimination of gasoline engine-driven generators.

This article discusses the evolution of mobile electric power generating sources culminating in the program that promises to provide a reliable, dependable, and efficient source of electrical power—the Tactical Quiet Generator program.

Vietnam Lessons Learned

Quality mobile electric power sources have not always been available. For example, during the Southeast Asia conflict extensive proliferation of nonstandard generator sets caused each of the military services to face the threat of a breakdown in its ability to support the electric power requirements of the forces. Study of the power generation problems by a DOD Ad Hoc Working



AN/MJQ Power Plant

Shown mounted to the Improved M-116A3 Trailer is the newly fielded Tactical Quiet Generator, which replaces the old DOD standard family.

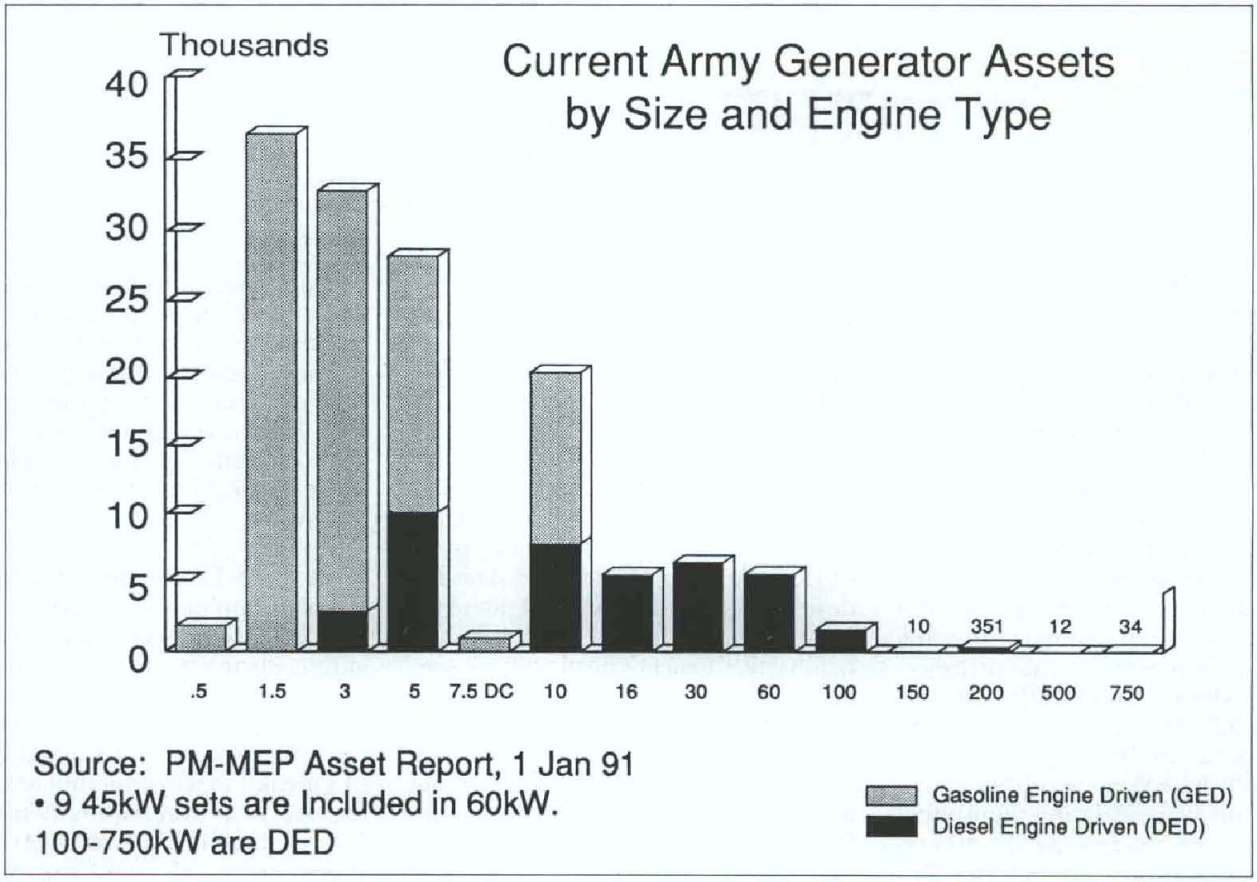


Figure 1.

Figure 2.

Power Units/Power Plants
Tactical Quiet Generator Sets

Name	Generator Set	Qty.	Chassis	Qty	Prime Mover	Replaces
AN/MJQ-42	3kW, 60Hz	2	3/4 ton M116A3	1	CUCV/HMMWV	
AN/MJQ-43	3kW, 60Hz	2	3/4 ton M116A3	1	CUCV/HMMWV	
PU-797	5kW, 60Hz	1	3/4 ton M116A3	1	CUCV/HMMWV	PU-409, 751
AN/MJQ-35	5kW, 60Hz	2	3/4 ton M116A3	1	CUCV/HMMWV	PU-620
AN/MJQ-36	5kW, 60Hz	2	1 1/2 ton M103A3	1	2 1/2 ton Truck	PU-618, 631 AN/MJQ-16
PU-798	10kW, 60Hz	1	3/4 ton M116A3	1	CUCV/HMMWV	PU-332, 753
PU-799	10kW, 400Hz	1	3/4 ton M116A3	1	CUCV/HMMWV	PU-375
AN/MJQ-37	10kW, 60Hz	2	1 1/2 ton M103A3	2	2 1/2 ton truck	PU-619
AN/MJQ-38	10kW, 400Hz	2	1 1/2 ton M103A3	1	2 1/2 ton truck	PU-656 AN/MJQ-18
PU-800	15kW, 400Hz	1	2 1/2 ton M200A1	1	5 ton truck	PU-732
PU-801	15kW, 50/60Hz	1	3/4 ton M116A3	1	CUCV/HMMWV	
PU-802	15kW, 50/60Hz	1	2 1/2 ton M200A1	1	2 1/2 ton & 5 ton truck	PU-405
AN/MJQ-39	15kW, 400Hz	2	2 1/2 ton M200A1	2	2 1/2 ton & 5 ton truck	AN/MJQ-15
PU-803	30kW, 50/60 Hz	1	2 1/2 ton M200A1	1	2 1/2 ton & 5 ton truck	PU-406
PU-804	30kW, 400Hz	1	2 1/2 ton M200A1	1	2 1/2 ton & 5 ton truck	PU-760
AN/MJQ-40	30kW, 50/60Hz	2	2 1/2 ton M200A1	2	2 1/2 ton & 5 ton truck	AN/MJQ-10
PU-805	60kW, 50/60Hz	1	2 1/2 ton M200A1	1	2 1/2 ton & 5 ton truck	PU-650
PU-806	60kW, 400Hz	1	2 1/2 ton M200A1	1	2 1/2 to & 5 ton truck	PU-707
AN/MJQ-41	60kW, 50/60 Hz	2	2 1/2 ton M200A1	2	2 1/2 ton & 5 ton truck	AN/MJQ-12

Group resulted in the deputy secretary of defense directing the establishment, in 1967, of a project manager, mobile electric power (PM-MEP) under the auspices of the secretary of the Army.

The primary focus of the new PM-MEP Office was to minimize future power generation problems with the development of standard families of generator sets which met present and projected electric power requirements of all of the military services. During the mid-1970s, PM-MEP fielded the initial DOD standard family, commonly known as the MIL-STD family of power generation equipment, which is still in use today.

Although the fielded MIL-STD family of generators was a significant improvement over the situation that existed in Southeast Asia, it cannot meet recently established battlefield requirements calling for, among other things, greater mobility, better reliability, enhanced survivability, reduced infrared and acoustic signatures, and easier maintainability. In February, 1988, PM-MEP

established the TQG program to create a new DOD standard family of mobile electric power generation equipment to satisfy these requirements.

Tactical Quiet Generators

The TQG program is designed to provide the Army, Air Force, Navy and Marine Corps, through Non-Developmental Item (NDI) acquisitions, with a family of skid- and trailer-mounted generator sets, sizes three kilowatts through 60 kilowatts, with several significant improvements to perform and survive on the modern, fast paced, lethal battlefield. A primary objective of the program is to comply with the "one fuel forward" concept, eliminating gasoline driven generator sets from the battlefield. TQGs are designed to:

- Reduce the ability of threat forces to detect and locate sensitive C3I systems, weapon systems, and command post complexes by reducing generator acoustic and infrared signatures;
- Increase equipment survivability through designed-in electromagnetic pulse protection;
- Enhance battlefield mobility by reducing generator set weights, decreasing fuel consumption and incorporating the M116A3 Army standard trailer chassis. The M116A3 uses an extended axle to improve tracking behind a High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) for all ¾-ton power unit and power plant configurations;
- Improve reliability, availability, and maintainability characteristics by increased reliability and reduced servicing requirements (maintenance intervals); and
- Reduce overall life cycle costs through reduced initial acquisition costs, lower fuel consumption, and fewer servicing and support burdens.

The planned configurations of TQG power units and power plants are shown in Figure 2.

You might ask yourself what does all this mean to a battlefield commander? Let's use, as an example, the 5-60kw generator set requirements of a typical mechanized infantry division and see what difference having TQGs provides.

First of all, with the reduced weight of the new TQGs over current MIL-STD generators, the division will be able to deploy to the theater of operations in 2½ fewer C-141 air lifts. Also, for the light infantry division commander, the new M116A3 trailer-mounted 5kw, 10kw, and lightweight 15kw generator sets

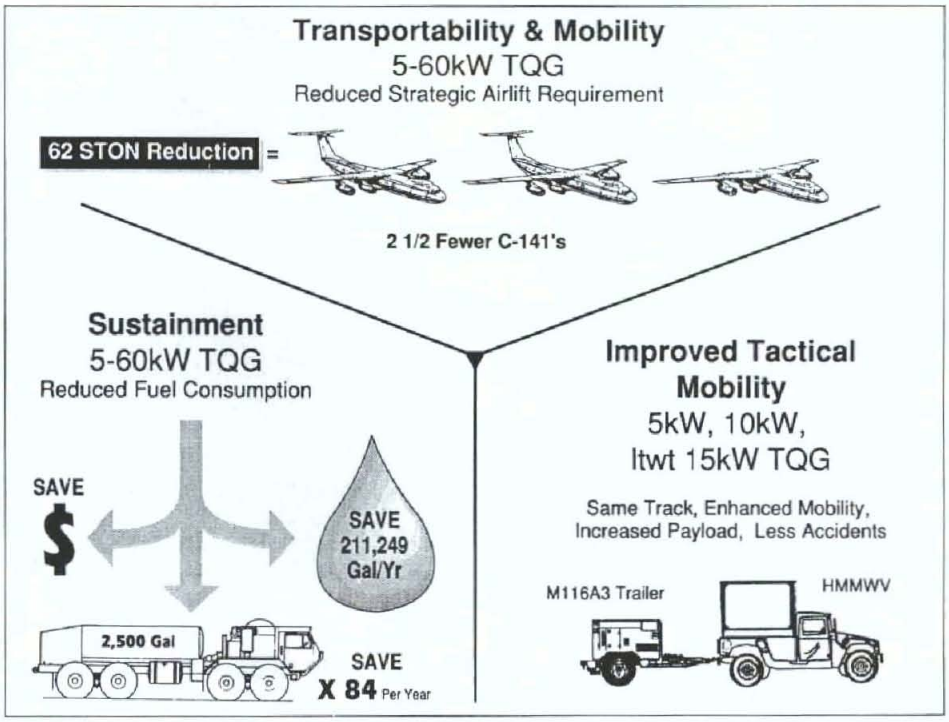


Figure 3.

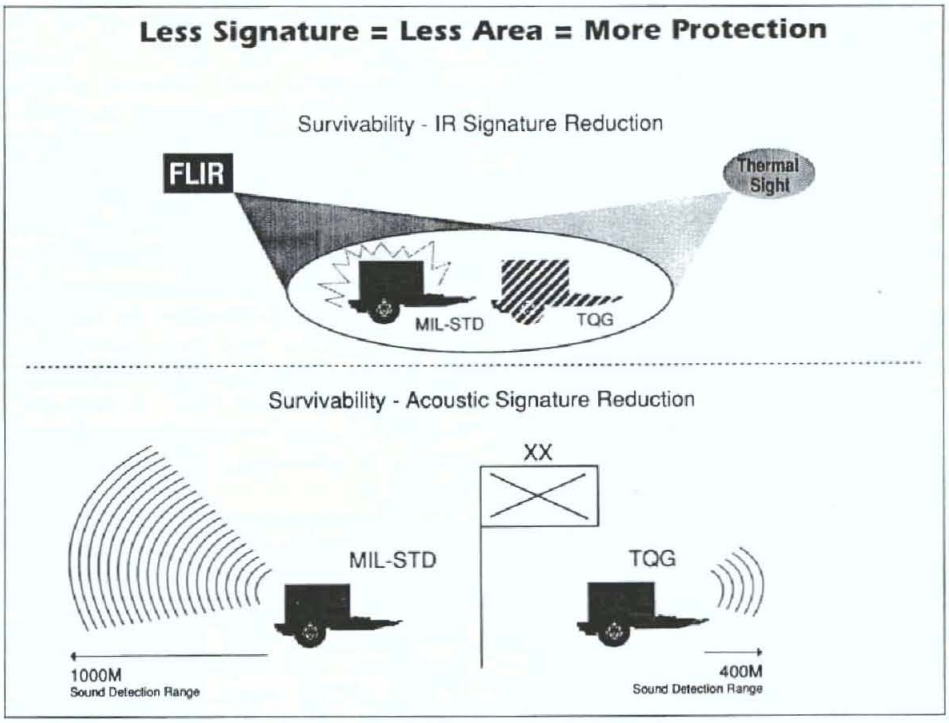


Figure 4.

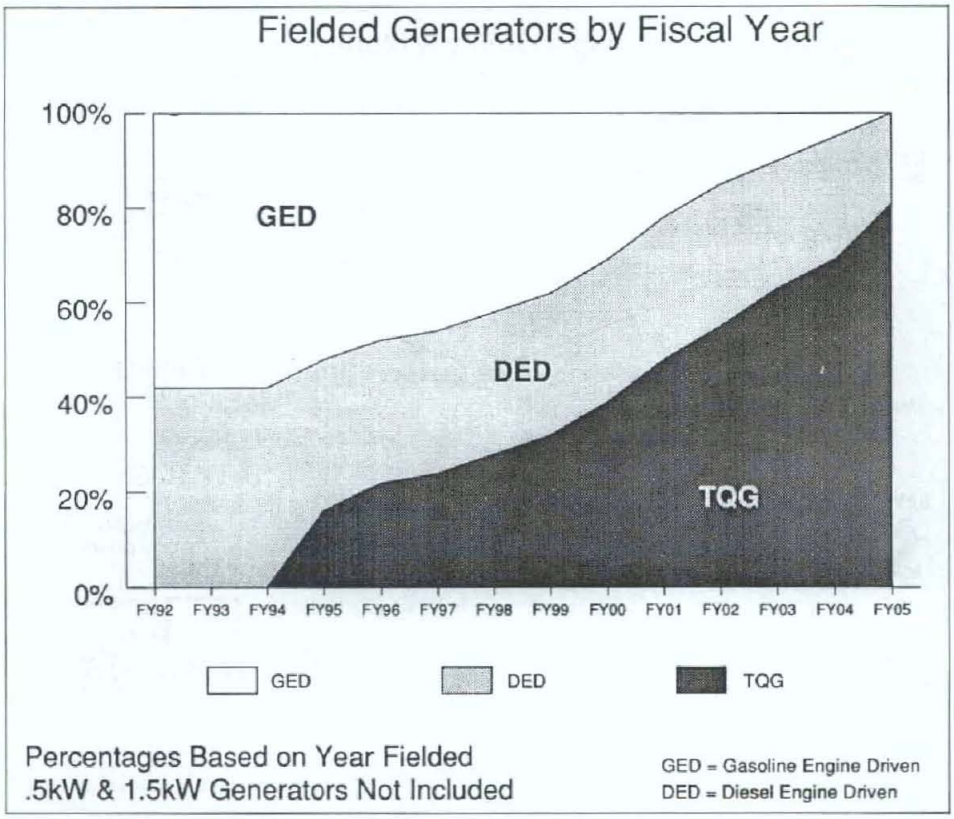


Figure 5.

will provide enhanced tactical mobility, increased payload, and much safer tracking behind a HMMWV.

TQGs aren't as thirsty as their MIL-STD counterparts either, which means the division's TQGs will consume about 210,000 fewer gallons each year and provide a substantial operation and support cost savings. From a warfighting standpoint, that's about 84 Heavy Expanded Mobility Tactical Truck (HEMTT) fuel tanker loads the division won't have to haul around each year to sustain its generator operating capability. (See Figure 3).

Survivability considerations are extremely important to a division operating in a combat environment on tomorrow's battlefield. For those who have spent time in the field, you know how loud the current MIL-STD generators are and how easy it is to locate them by sound, especially at night. If an enemy soldier could hear MIL-STD generators running from about one kilometer away, he would not be able to hear TQGs, which are sound deadened, beyond 400 meters. Or if you've ever looked through a Forward Looking Infrared (FLIR) target acquisition system you know how hot, running generators stand out like a beacon.

TQGs have greatly reduced infrared signatures making them a much smaller IR target. The division's enemies will have a significantly harder time trying to detect, monitor and target division command posts, key weapons systems, and other facilities that rely on generators for electric power. With TQGs, the division can significantly reduce perimeter security distances and guard requirements. In other words, TQGs help the division commanding general protect his force while economizing resources. (See Figure 4).

Speaking of resources, anybody who's been associated with generators knows how overworked the division's generator mechanics are keeping up with maintenance checks and generator downtime. TQG Mean Time Between Failure (MTBF) rates are expected to be in the 500-600 hour range as opposed to the 200-300 hours MTBF for current MIL-STD generators. The preventative maintenance checks and services workload and scheduled maintenance requirements will be significantly reduced. This is good news not only for the overworked generator mechanics but also is a critical consideration in today's environment of shrinking personnel assets.

Summary

In this article, we have discussed the evolution of mobile electric power generation sources and presented an overview of the Tactical Quiet Generator program. The new TQGs, in sizes from three kilowatts through 60 kilowatts, will be lighter, more reliable, quieter, easier to maintain, and will use diesel/JP-8 fuel instead of gasoline. Based on projected funding levels, 5-60kw TQGs are scheduled for initial fielding in the fourth quarter of FY93, continuing throughout the 90s. The three kilowatts TQG is scheduled for initial fielding in the third quarter of FY94. (See Figure 5).

With TQGs, warfighters will have improved equipment that will provide them increased capability to fight on the modern, fast paced, mobile battlefield. Stephen K. Conver, assistant secretary of the Army for research, development and acquisition, has said, "Today's Army is fully trained, highly motivated, and well-equipped. It is the finest, most capable fighting force in the world. Our challenge is to keep it that way." TQGs are designed to meet that challenge.

COL LAWRENCE J. BECKER II is the project manager for the DOD Mobile Electric Power (MEP) Project Office at Fort Belvoir, VA. He has held numerous project management positions with the Tank-Automotive Command, the Roland Missile Office, the M113 Family of Vehicles, and, prior to being selected as PM-MEP, with the Strategic Defense Initiative Office. He is a member of the Army Acquisition Corps and a graduate of the Defense Systems Management College. Becker has an M.S. degree in logistics management from the Florida Institute of Technology.

ARMY NAMES R&D ACHIEVEMENT AWARD WINNERS

Eighty-two Army scientists and engineers have been selected to receive Department of the Army R&D Achievement Awards for 1992. This award is given in recognition of outstanding achievements in research and development that have improved the capabilities of the U.S. Army and contributed to the nation's welfare during calendar year 1992.

The awards, presented in the form of individual wall plaques, will honor 69 personnel employed at activities of the U.S. Army Materiel Command; 11 employees of the U.S. Army Corps of Engineers; and two employees of the U.S. Army Medical Research and Development Command.

U.S. ARMY MATERIEL COMMAND

U.S. Army Armament Research, Development and Engineering Center (ARDEC)

Dr. Arthur J. Bracuti, a physical scientist, and Donald S. Chiu, a chemical engineer, will be cited for their research and development of the revolutionary new user-friendly PANDORA chemical kinetics computer model. This code is capable of modeling chemical reactions without *a priori* knowledge of reaction mechanisms and has direct application to Army propellant combustion and interior ballistics problems. In a wider sense, PANDORA has potential utility in basic research studies of chemical kinetics and for development efforts by the other services and academic and industrial groups.

The ARDEC team of Mark A. Johnson, an electronics engineer, Raymond D. Scanlon, a mathematician, and Michael A. Cipollo, a computer engineer, will be recognized for their innovative application of neural network technology to signal recognition problems in component and material inspection systems. Their efforts in the use of neural networks to identify and extract pertinent data from the complex, noisy signals produced by sensors in this application has led to a new method of determining the acceptable qualities of parts and material.

U.S. Army Chemical Research, Development and Engineering Center (CRDEC)

Hugh R. Carlon, a research physicist, and Mark A. Guelta, a physical science technician, will be recognized for their development of a safe smoke, Emery 3004, for use as an aerosol to replace the carcinogenic and more toxic dioctylphthalate (DOP) smoke in smoke penetrometers. Penetrometers are widely used for quality assurance testing of filters for individual and collective protection. Replacing DOP saves millions of dollars in equipment modifications, eliminates worker contact with this known carcinogen, and prevents soldiers from being exposed to residual DOP in filters while wearing their masks.

Joseph W. Hovanec and Johnnie M. Albizo, research chemists, will be honored for their outstanding research effort leading to the formulation of a multipurpose decontamination agent (DAM) for use on military equipment. It is anticipated that within two years, DAM will be ready to be the Army's first new chemical decontaminant in nearly 40 years.

U.S. Army Aviation Applied Technology Directorate (AATD)

David V. Nguyen-Phuc, an aerospace engineer, will be cited for the design, development, and flight qualification of an advanced IR suppressor for special mission applications. He successfully integrated this suppressor in a specific fielded helicopter. This represents a major contribution to the survivability of this particular craft in a threat environment, resulting in enhanced ability for the crew to perform its mission.

U.S. Army Night Vision and Electro-Optics Directorate (NVEOD)

An eight-member team from NVEOD, comprised of Dr. Stuart B. Horn, James E. Miller, Donald A. Ferrett, Robert E. Flannery, David A. Jackson Jr., Conrad W. Terrill, Dr. Robert C. Hoffman, and Elizabeth H. Nelson will be commended for development of uncooled focal plane arrays which have application in a number of future Army systems: perimeter surveillance, missile seekers, driver's vision enhancement, and rifle sights. The team's accomplishment, done with the cooperation of Texas Instruments, Inc. and Honeywell, Inc. marks a major milestone in thermal imaging which will eliminate many problems found with current IR cameras.

U.S. Army Atmospheric Sciences Laboratory (ASL)

Dr. Donald W. Hoock, a research physicist employed at ASL, will be honored for his advancement of realistic modeling of smoke and dust clouds on the modern battlefield. Dr. Hoock's work is directly applicable to opportune engagement of targets on the obscured battlefield and also provides a cost-effective method for training soldiers.

U.S. Army Ballistic Research Laboratory (BRL)

Dr. Austin W. Barrows, supervisory physical scientist, Dr. Brad E. Forch, research chemist, Dr. Andrzej W. Miziolek, research physicist, and Dr. Rosario C. Sausa, research chemist at BRL's Interior Ballistics Division, will be honored for their discovery of a new laser ignition technology based on a resonant multiphoton microplasma formation process. This technology is applicable to ignition of complex geometry multicomponent artillery and tank ammunition and represents an outstanding example of the transfer of in-house basic scientific research to the improvement of Army weapons systems.

U.S. Army Electronics Technology and Devices Laboratory (ETDL)

Terence Burke, Hardev Singh, and Walter Buchwald, electronics engineers, and Dr. Maurice Weiner, physicist, will be cited for establishing the feasibility of a new electron device with major implications for advancing the state-of-the-art in pulse power systems. The device, a high power optically activated gallium arsenide thyristor switch, promises to extend the limits of present thyristor technology well

beyond present boundaries. It is anticipated the new device will lead to highly efficient pulse generation capable of multi-kilovolt, kiloampere operation.

A team of four researchers from ETDL, comprised of Roland Cadotte, Erik H. Lenzing, Adan Rachlin, and Dr. William D. Wilber, will be cited for advancing the state-of-the-art of superconducting microwave and millimeter wave electronics. Their deposition techniques for producing high quality, high temperature superconducting thin films are applicable to devices and circuitry for use in radars, low-noise receivers, and phased array antennas. They have shown that high temperature superconductors promise to be a viable technology to improve existing Army electronic systems and provide new directions and capabilities for future systems.

Dr. Mitra Dutta, Dr. Jagadeesh Pamulapati, and Peter Newman from ETDL are cited for development of a novel optical modulator which advances the state-of-the-art in spatial light modulation technology for optical data processing and signal processing. Optical computing and signal processing promise extremely high (terahertz) computing rates. To realize this promise, however, robust affordable optoelectronic devices are needed which will generate, modulate, switch, detect and control optical signals. This team's work lays the groundwork for such devices. Dutta, for whom this is the first of two 1992 R&D Achievement Awards, is a research physicist at ETDL. Pamulapati is an electronics engineer, and Newman is a research physcial scientist at ETDL.

A six-member ETDL team, comprised of National Research Council (NRC) associates Dr. James F. Harvey and Dr. Weiman Zhou, and ETDL employees Dr. Robert A. Lux, and Dr. Mitra Dutta, research physicists, Melanie W. Cole, a research physical scientist, and Dr. David C. Morton, a physicist, will be honored for establishing a new technology for use in future Army communications/electronics systems, based on a new optoelectronic material, porous silicon. The new technology shows significant promise for use in advanced displays, fiber optics communications, and phased array radars. The advantages offered are reduced weight, reduced cost, ease of fabrication, and higher performance optoelectronic systems.

U.S. Army Harry Diamond Laboratories (HDL)

A multi-organizational team, comprised of Dr. Carl J. Campagnuolo, a development engineer at HDL, MG Wesley K. Clark, former commander of the Army National Training Center now with the U.S. Army Training and Doctrine Command, and Donald Gross of the Demilitarized/Environmental Office at CRDEC, is honored for the invention, development, and demonstration of a new family of training grenades and mines. These devices interface with the Multiple Integrated Laser Engagement System and significantly extend the Army's capability to train soldiers in more realistic battlefield environments.

Dr. Joseph N. Mait, an electronics engineer, will be cited for his contributions to the understanding and design of diffractive optical elements for optical processing and computing. Mait's contributions are leading the way to research and development of high-throughput, special-purpose interconnections and processors of significant benefit to the Army for radar processing and target recognition applications.

John McCorkle, an electronics engineer, will be honored for his contributions to the formulation, analysis, algorithm design, and test bed design of an innovative radar sensor. This sensor will provide the Army a revolutionary capability for all-weather, wide area detection, location, and classification of stationary tactical targets concealed in foliage and employing camouflage, concealment, and deception. His work will provide a tactical capability which does not now exist and which will directly support DOD's Precision Strike Initiative.

David L. Rodkey, an electronics engineer, will be cited for his technical leadership and engineering accomplishments in the development of the Anti-Tactical Missile version of the PATRIOT fuze. Rodkey's outstanding contributions have yielded a new fuzing system which has proven to be highly effective in flight testing and in battle.

U.S. Army Materials Technology Laboratory (MTL)

The adhesion research team at MTL, comprised of Dr. Stanley E. Wentworth, supervisory research chemist, Paul R. Bergquist and Dr. Michael S. Sennett, research chemists, and Dr. Walter X. Zukas, research chemical engineer, will be honored for contributions to adhesive bonding science and technology in support of the AMC Adhesive Bonding Improvement Initiative. Their research will provide the basis for service life predictive models of adhesively bonded structures in Army materiel. The research will also yield new joining techniques for metal matrix composites for use in fabricating Army systems of these materials.

U.S. Army Missile Command Research, Development and Engineering Center (MICOM-RDEC)

Robert E. Alongi, an aerospace engineer, is cited for research and development which has led to the creation of an innovative tool for modeling and evaluation of electro-optically guided weapons systems operating in realistic battlefield environments obscured by natural and man-made aerosols. Alongi's computer model, named the Battlefield Environment Weapon System Simulation, is an accredited analysis tool which the U.S. Army Materiel Systems Analysis Agency has adopted for analysis and evaluation of existing and emerging MICOM weapon systems.

U.S. Army Natick Research, Development and Engineering Center (NRDEC)

Alan B. Bennett and Dr. Andre G. Senecal, food technologists, and SGT Curtis B. Reed, a biological science assistant, will be commended for identification of a new processing technology for producing a high quality, low lactose, low fat milk powder. This product can be used by a wider military population than existing products and can be used in food preparation or as a high quality beverage to enhance individual and group operational rations.

Vicki Loveridge, Daniel Berkowitz, and Catherine Porcella, food technologists, Dr. Frederick M. Kramer and Dr. Laurie S. Lester, research psychologists, and Kathryn L. Rock, engineering psychologist, will be honored for developing a novel food processing technology resulting in a breakthrough in producing shelf stable foods. They successfully applied this technology in the accelerated development of highly popular food ration components for the Meal, Ready-to-Eat. This team's achievement has had a significant impact on increasing the overall quality,

acceptability and consumption of the MRE for all the services under combat conditions.

Donald W. Pickard and Glenn A. Doucet, mechanical engineers, will be cited for their development and successful testing of the M3 Multifuel Burner for field kitchen use. This invention represents the first major advance in non-powered field burners in five decades. Their innovative design is lighter, ignites faster, burns cleaner and quieter, and is much safer to operate than existing U.S. and foreign military burners. The development of the M3 is a major accomplishment that will significantly improve the safety, logistics, and battlefield sustainability of future field feeding systems.

The NRDEC team of Dr. Reginald A. Willingham and Dr. Dave M. Alabran, research chemists, Dr. John H. Cornell (deceased), Dr. David E. Remy, Joseph R. Roach, and Dr. Frank H. Bissett, supervisory research scientists, will be cited for development of practical eye protection against tunable lasers. They were able to synthesize and evaluate suitable materials (substituted tetrabenzoporphyrins) having the appropriate nonlinear optical properties and fast (picosecond) response times. Results obtained to date represent an important milestone in the development of a lightweight, passive protective device for use by soldiers against tunable lasers. The team dedicates the results of their research and this R&D Achievement Award to the memory of their late colleague, Dr. John H. Cornell, who was a research chemist at NRDEC.

U.S. Army Tank-Automotive Command (TACOM)

Dr. Douglas N. Rose, a research physicist, will be honored for his contributions in advancing the science of photoacoustic microscopy and thermal waves and their application to ceramic materials for air-breathing propulsion systems. He founded and leads TACOM's thermal wave laboratory dedicated to the investigation of ceramic materials for high temperature, low heat rejection engines.

U.S. ARMY CORPS OF ENGINEERS

U.S. Army Topographic Engineering Center (TEC)

F. Raye Novelle, a physical scientist, will be cited for a technical breakthrough in extracting elevation data from aerial imagery. His contribution, known as the Iterative Orthophoto Refinement (IOR) method, dramatically extends the state-of-the-art in this critical technology which provides vastly improved results at lower computational cost than previously known methods. There is little doubt Norvelle's IOR method will have a direct and dramatic impact on future military and civil mapping systems.

Melvin B. Satterwhite, a botanist, will be honored for his outstanding work in support of the Drug Enforcement Administration (DEA) and other federal agencies. He developed hyperspectral remote sensing techniques for predicting biomass of a vegetal stand and its potential yield. In addition to providing tangible assistance to counternarcotics efforts at the national level, Satterwhite's work has substantial potential for aiding the nation's (and world's) infrastructure in terms of solving problems associated with crop monitoring and detection of induced stress on crops due to flooding and pollution.

U.S. Army Waterways Experiment Station (WES)

The team of Dr. Alfred F. Cofrancesco Jr., a research entomologist, Joseph L. Decell, a civil engineer, and Dr. Edwin A. Theriot, a supervisory biologist, will be cited for development and implementation of environmentally safe, cost-effective biological agents to control major aquatic plant problems of the U.S. and other tropical and subtropical countries. These biological control agents are superior to the standard agents which have been used during the past four decades. As a result of the implementation of this technology, the worst two of four major aquatic plant pests in waterways of the southeastern U.S. have been reduced to minor problems.

David L. Derrick, a research hydraulic engineer, and Thomas J. Pokrefke, a supervisory hydraulic engineer, will be commended for pioneering research in the development of revolutionary river training structures, known as bendway weirs. They have shown that a system of bendway weirs, when strategically placed in a riverbed, will greatly enhance navigation safety and efficiency by improving channel dimensions and alignment through problem bend reaches. The submerged rock weirs incorporated in their design preserve the river's natural beauty and improved fishery habitat.

The team of Dr. John M. Nestler, research ecologist, James L. Pickens, senior electronics technician, and Gene R. Ploskey, aquatic biologist, will be cited for their pioneering research on the use of high-frequency sound as the basis for fish protection. Their research has led to the first operational high-frequency sound fish protection system now in service at the Richard B. Russell Dam. Their work forms the basis of a fish protection technology which is being actively sought by the private sector both in the U.S. and abroad.

WES scientist Dr. Fred T. Tracy will be commended for his development of three-dimensional engineering computer models for solution of seepage and groundwater problems. His research is internationally recognized and has revolutionized the way practicing engineers do this type of analysis.

U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND

U.S. Army Biomedical Research and Development Laboratory (BRDL)

Dr. William D. Burrows, an environmental engineer, will be commended for his role in advancing his organization to pre-eminence in the field of environmental engineering relative to water quality problems throughout the Army's operations. He has made substantial contributions, not only to the Army, but to the nation at large as these relate to the important problem of field water quality and the cleanup of wastewater effluents at military installations.

Letterman Army Institute of Research (LAIR)

Dr. Kim D. Vandegriff, a research chemist, will be cited for her development of instrumentation and methods for hemoglobin measurement. Her research has made possible critical functional measurements of oxygen binding to hemoglobin. Her work represents a fundamental advance in the basic science of hemoglobin-based red cell substitutes.

APPLYING EARNED VALUE TO GOVERNMENT IN-HOUSE ACTIVITIES

By COL Leland H. Hewitt
and Michael J. O'Connor

Cost/Schedule Control System Criteria

More acquisition managers are specifying Cost/Schedule Control System Criteria (C/SCSC) in their contracts. One reason is the personal interest of the Defense acquisition executive. A better reason is that it is a good tool to manage complex projects. More and more program managers (PMs) and contractors are also embracing C/SCSC as their primary cost and schedule control system.

DODI 5000.2 requires application of C/SCSC on major contracts with an RDTE budget greater than $60M and procurement more than $250M. Nonmajor contracts may use a less formal accounting system and an abbreviated Cost/Schedule Status Report (CSSR) rather than the longer Cost Performance Report.

The CSSR should be appropriate for many government in-house activities. Unfortunately, we in the government do not always practice what we preach. CSSR is seldom used to manage and control in-house government activities.

Earned Value is defined as the dollar value of work performed during a given period compared to the budgeted value for the same work. In other words, as work proceeds against a budgeted project, we "earn" dollars as they are expended. This Earned Value is a measure of progress against our plan of action.

The Earned Value concept is key to the usefulness of C/SCSC. This article discusses an application of the concept to the test and evaluation (T&E) aspects of a major program. The application is interesting because it is used to manage cost and schedule performance of both government in-house activities and support contractor efforts.

Work Breakdown Structure

Application starts with a well-conceived work breakdown structure (WBS). A WBS is normally presented as a tree-like structure. It outlines a project as a hierarchy of work packages. The WBS serves as the basis for identifying interdependent activities and for development of additional management tools such as PERT charts. MIL-STD-881 describes the WBS in detail and gives examples for several project types. The manager must tailor the WBS for each specific project. The result is a list of many work packages defined as a desired outcome or product.

Detailed Budget

A detailed budget is then developed for each work package. The budget includes everything necessary to complete the package. This is a critical step because it establishes the baseline for the entire project. The budget addresses materials, labor, overhead, and schedule. This is the basic plan that will guide the entire program.

Expenditure and Progress Reports

As work proceeds, expenditure and progress reports are used to track each work package. Performance is measured by comparing three quantities: Budgeted Cost of Work Performed (BCWP), Actual Cost of Work Performed (ACWP), and Budgeted Cost of Work Scheduled (BCWS).

BCWP is the baseline measure of Earned Value against the overall plan for the project. Following each reporting period, BCWP is compared to ACWP for each work package to determine cost

performance (i.e., is the actual cost greater or less than the budgeted cost for each package?). BCWP is also compared to BCWS to determine schedule performance (i.e., is each package ahead or behind schedule?).

Figure 1 is a simple illustration of how a manager can interpret these figures. In this example, BCWS exceeds BCWP. This negative variance implies that the project is behind schedule. Likewise, ACWP is greater than the BCWP, indicating that the project is headed for an overrun.

Application to a Major Test Program

The Independent Evaluation Plan (IEP) and Test Design Plan (TDP) are crucial documents, since they serve as the "A level" documentation for T&E. They establish the scope and drive the cost of the test. It is extremely important that the PM, evaluator, and tester work together during development of the IEP/TDP.

If the evaluator is not cost conscious in the IEP/TDP, then the tester is forced to produce a Detailed Test Plan that may not be affordable. This results in rework as the test is down-scoped, renegotiated, and redesigned.

Figure 2 shows a portion of the WBS for an actual project [Joint Tactical Information Distribution System (JTIDS)] being tested at the U.S. Army Electronic Proving Ground (USAEPG). The WBS resulted from brainstorming within the test community, with participation from the Program Manager's Office.

The overall project had to be broken down into meaningful work packages to facilitate budget planning and performance measurement. Each work package had to be clearly defined by its contents and date of completion.

Three-Level Work Breakdown Structure

We wanted a WBS that provided enough detail to allow meaningful analysis and project control. However, we knew that too much detail and too many work packages would mean unnecessary reporting and information overload. We concluded that a three-level WBS provided the proper balance for this project.

Negotiated Cost Estimate

After the WBS was finalized, the test director developed a cost estimate for each work package. The estimate included labor, material, and other expenses (such as shipping, reproduction, leases, etc.). Detail is required because the test director must defend and negotiate all costs with the PM, who pays for the test, and the evaluator, who depends on the test results to perform an independent evaluation. This is a critical step. Not only does it determine allocation of available resources, it is the key to effective application of the Earned Value concept.

Performance Tracking

Tracking performance against the budgeted baseline is the next step. This may be difficult if the test activity does not have a reporting system that provides adequate detail and timeliness. This is particularly true if there are multiple government and contractor organizations participating in the test.

Detailed Cost Accounting

The government imposes strict cost accounting standards on contractors.

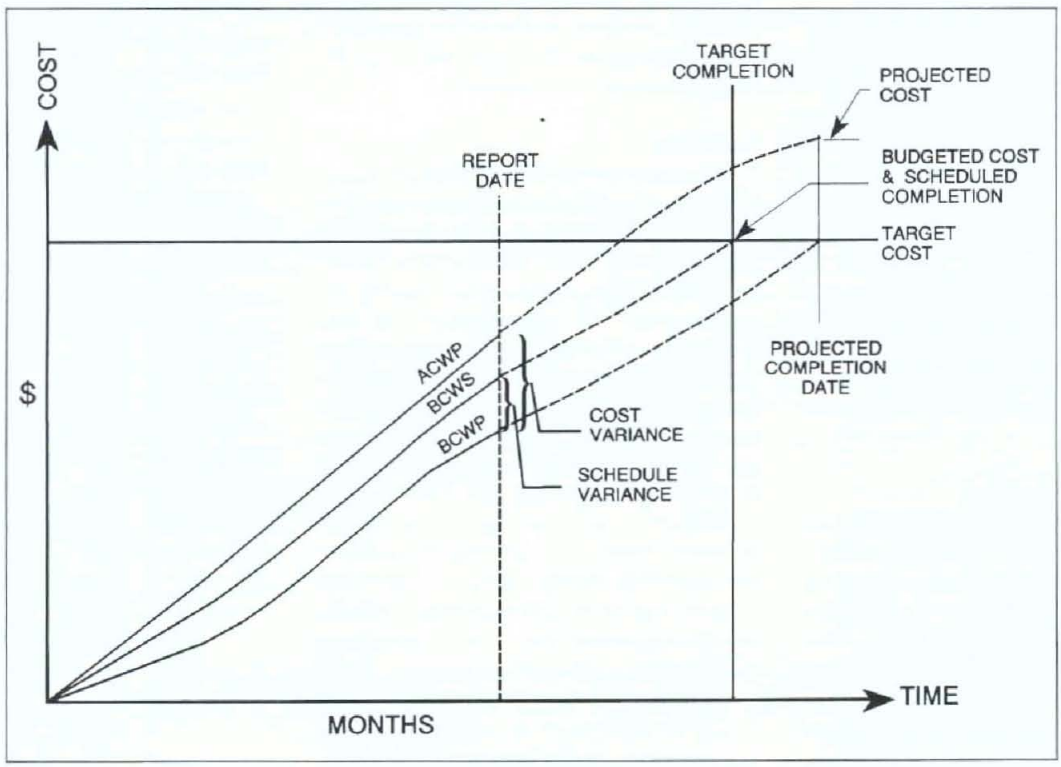


Figure 1.
Earned Value Analysis.

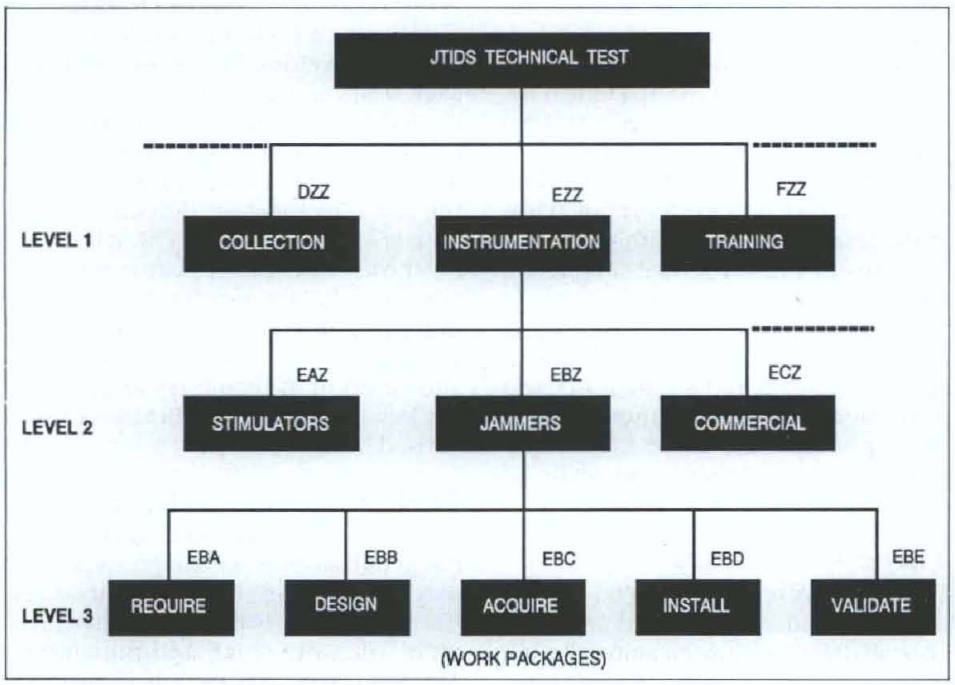


Figure 2.
Work Breakdown Structure.

The regulations include extensive rules and requirements for detailed records. Often, labor is accounted for down to a tenth of an hour (six minutes). This level of detail can be expensive.

A similar level of detail for government organizations is probably not required. Many organizations have labor reporting systems that can account for time in increments of one hour. This should be sufficient for most Earned Value applications, provided the system allows for reporting the time against individual work packages.

We use a labor reporting system at USAEPG that allows reporting in increments of 0.5 hour. It includes a three-character field which is used to report time expended against individual work packages.

Timely Reporting

The reporting system must be timely. Managers need to know when execution is not going according to plan. The reporting cycle should be carefully selected to balance the need for up-to-date information and reporting costs. For our purposes, we selected a monthly reporting cycle. Our in-house labor reports are available weekly. Other in-house expenditure reports are available on-call.

Our support contractor expenditure reports are provided monthly. However, the information is normally 2-3 months old because of the time it takes to process vouchers. This is not adequate for our implementation of the Earned Value concept. Accordingly, we arranged to obtain unaudited expenditure and progress reports from our support contractors. This has proven to be acceptable for our purposes.

Results

We implemented the Earned Value concept on a trial basis during the technical test of JTIDS. Results have been phenomenal. The initial effort to develop the WBS and budget required approximately 12 man-months. A one person level-of-effort is required for reporting and analysis. As a result of the increased visibility and control over the testing efforts, we expect to complete the project 25 percent under budget. This is a savings of more than $1M.

While the total savings cannot be attributed entirely to our application of the Earned Value concept, the increased planning effort, better visibility of expenditures, and resulting management attention clearly were contributing factors.

Any decision to use a management system such as this must balance the cost of implementation with the expected benefits. Based on our experience, we have concluded that the Earned Value concept makes sense for most of our large testing programs.

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MICHAEL J. O'CONNOR is director, Materiel Test Directorate, U.S. Army Electronic Proving Ground. He has a B.S. degree in electrical engineering from New Mexico State University, an M.B.A. from New York Institute of Technology and is a 1982 graduate of the Army War College. He is also a senior member of the Institute of Electrical and Electronic Engineers.

Yuma Proving Ground wildlife biologist Valerie Morrill (left) examines ancient Indian rock carvings with an Army photographer.

YPG PRESERVES NATURAL RESOURCES

By Chuck Wullenjohn

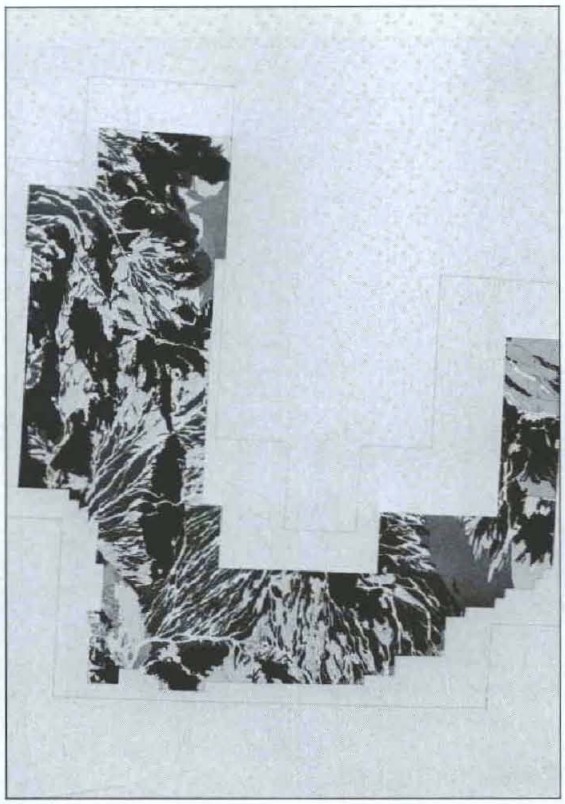
It is located in the midst of the largest, hottest and driest desert in North America. It's more than 800,000 acres in size, making it bigger than the state of Rhode Island and one of the largest military installations in the world. It is home to a wealth of pristine desert flora and fauna, including majestic bighorn sheep, rare tortoises, stands of unbelievably hard ironwood and a striking variety of prickly cacti. Ancient Indians once traversed this land, leaving behind pottery, weapons, artwork, and much more to remind us of their passing.

We're speaking of southwestern Arizona's 1300 square mile U.S. Army Yuma Proving Ground (YPG), site of the military's primary desert test center and research and development home for a wide variety of munitions and weapon systems. As dramatically shown by the lightning quick triumph of American forces in the harsh desert of the Persian Gulf during Operation Desert Storm, YPG testing is high quality, thorough and reliable. The proving ground conducts tests for all American military services and numerous friendly allied nations.

Though testing activities have been conducted on the site of today's YPG since World War II, a surprisingly large percentage of the installation's acreage is relatively unspoiled. According to YPG wildlife biologist Valerie Morrill, this unsullied land encompasses the majority of the proving ground's terrain and is attributable to the nature of the research and development mission and to the fact that it has been off-limits to other land uses for many years.

"Through the construction of roads, buildings, gun positions, parachute drop zones and munition impact areas, there has definitely been disruption of the natural desert," she said. "But this has been limited to very specific areas. As a matter of fact, compared to the overall large size of the proving ground, this amounts to a very small percentage."

Wahner Brooks, deputy director of YPG's Materiel Test Directorate, said



The Geographic Resources Analysis Support System (GRASS) allows land resource managers to graphically assemble computerized information. This map shows the soil at U.S. Army Yuma Proving Ground.

that environmental concerns play a prominent role in test plans. "If we didn't maintain a high quality desert environment here at Yuma Proving Ground, we'd basically have no reason for existence," he commented. "When we build roads to support temporary projects, for example, we often design them to travel through washes because these intermittent watercourses are self-restoring during times of rainfall. We make concerted efforts like this to avoid disturbing natural habitats in whatever we're doing."

Morrill arrived at YPG in 1988, fresh from the Fish and Wildlife Office at Fort Hood, TX. Although she realized that the proving ground's test mission differed significantly from Fort Hood's training mission, she knew that dramatic similarities still existed. One of the most obvious was that a detailed natural resource inventory needed to be performed at Yuma Proving Ground. Much of this information had already been gathered but a great deal remained to be done.

"A complete inventory demands that you catalog all animals, plant life, soils, etc. that exist within your boundaries," she explained. "The purpose of all this is to specifically identify natural characteristics and variables, with an eye toward enhancing our testing mission, abiding by all Army regulations and public laws, and preserving our unique environment. It's a big job, but a worthwhile one."

A major benefit of the natural inventory effort goes to weapon and munition testers, who may need information about their environment to identify test locations and control variables during tests. Testing a weapon system or new munition is a variable unto itself. By reducing variability, testers are able to enhance the reliability of gathered data.

One example relates to testing the fuzes of artillery projectiles. For testing the proper functioning of proximity, point detonated or timed fuzes, several types of terrain conditions are needed to ensure accuracy. Natural resource inventory data are used by test designers to identify appropriate soils (are they hard? soft? rocky?), all of which would be appropriate at various times. Other considerations affecting a test can also be determined. These include vegetative cover, elevations, cleared historic sites, environmentally sensitive areas, or information provided by others.

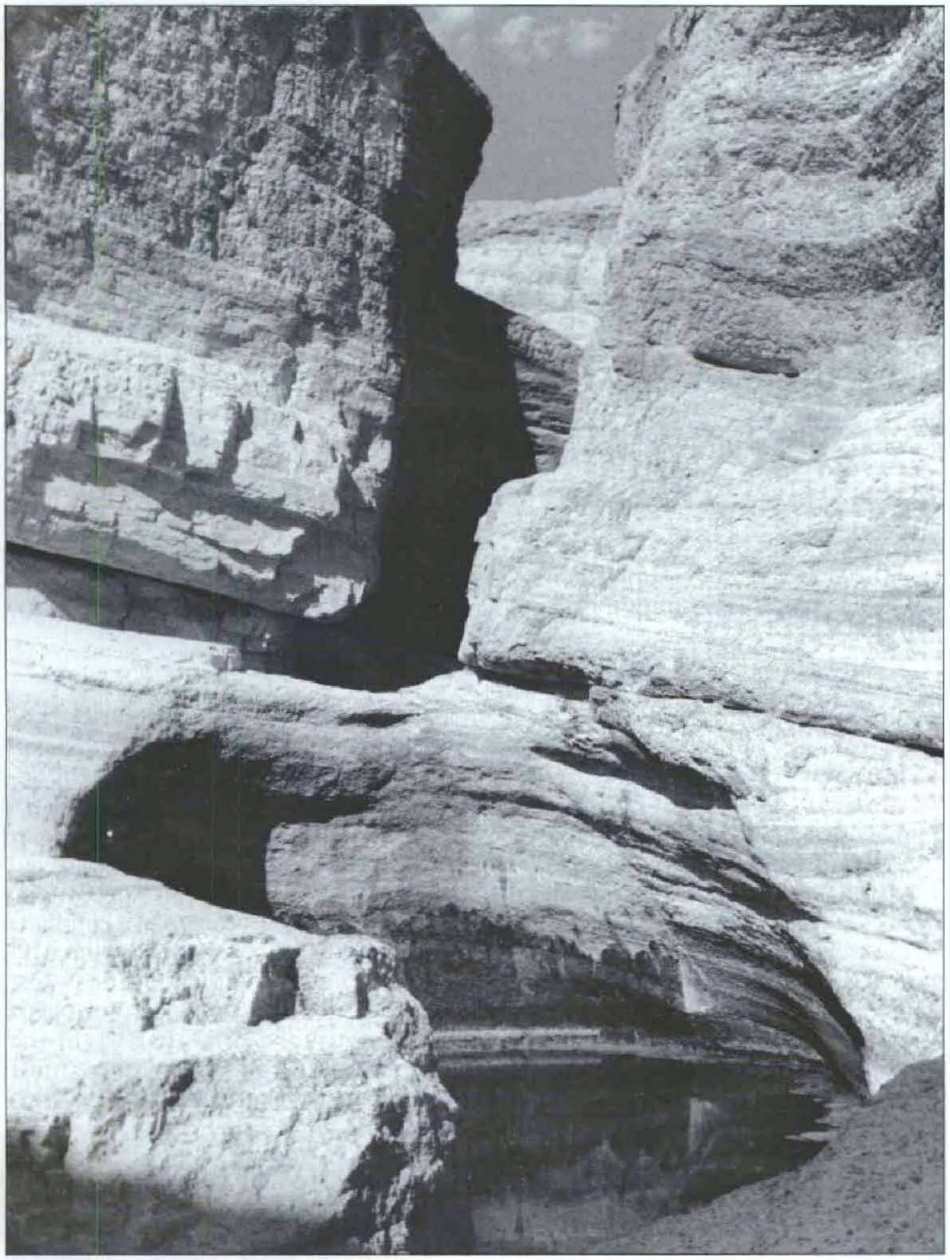
One highly significant testing variable revolves around climate conditions, which are important at all testing locations. Weather intelligence is provided several times each day by members of Yuma's meteorological team. This includes facts about temperatures, humidity, wind speed and direction, upper air data, solar radiation, visibility, and sky conditions.

Along with sister installations, White Sands Missile Range, NM, and Dugway Proving Ground, UT, YPG has been identified by the Department of the Army as an Integrated Training Area Management (ITAM) site. ITAM consists of component initiatives that are used together or in part to address all facets of organized and responsible land management. One of ITAM's most important components is a standardized Land Condition-Trend Analysis (LCTA) program, which entails data collection, analysis, and reporting. LCTA uses satellite imagery, ground-truthed by field survey, to describe the surface terrain within the boundaries of the installation.

Two hundred plots at Yuma Proving Ground have been randomly selected by computer for statistical validity. Many types of information are gathered at these sites. These include plant community classifications, plant density and compositions, disturbance indicators, slope and aspect, erosion indicators, and much more. The collected information is used to meet land and test management needs and to compare natural resources among many military installations over time.

LCTA data feeds into a powerful tool, a computerized decision-support system called GRASS, which stands for Geographic Resources Analysis Support System. GRASS allows resource managers to use LCTA inventory information to graphically assemble computerized data layers. Much as individual word processing or spreadsheet software systems allow users to manipulate words or numbers, GRASS allows managers to manipulate spatial data in a variety of formats to meet specific needs.

GRASS digitizes mappable information into raster, vector and point data. Raster layers map broad areas such as soils and vegetation types. Vector layers map linear data, such as mine shafts and towers. The great power of GRASS lies in its ability to mix and match all of these types of data, in varying combinations and scales, to meet specific needs. As things change over time, GRASS data can be easily updated. First released in 1985, GRASS has become the Geographic Information System (GIS) of choice for many government agencies and is well known throughout the GIS community.



The harsh Sonoran desert of Southwestern Arizona is an extremely dry area, but waterholes do exist—if you know where to look for them. This one, located in a remote section of U.S. Army Yuma Proving Ground, has been visited by local inhabitants for thousands of years.

"Once the ITAM program is fully implemented here, we may well be able to see things in the environment we never considered before," remarked Morrill. "It will be an excellent tool for us on the natural resource management side of the house, but also for test managers who will be able to tailor data for their own needs. It will aid in selecting test sites and quantifying variables, much as we already are able to do with meteorological data. ITAM also sets standards and will enable us to monitor and understand the environment better than ever before."

The desert is a harsh, unforgiving place, which helps make the Sonoran desert of Southwest Arizona ideal for testing weapons and munitions. The skies are clear and the rains are skimpy and short-lived, allowing testers to work around the year. At YPG, the terrain is varied and no major urban encroachment or noise problems exist.

Deserts cover approximately one-seventh of the earth's land surface, or about eight million square miles. They differ greatly in terms of size, vegetation, rainfall, animal life, temperature fluctuations, and much more. The typical desert teems with life of all kinds, though the untrained observer may not notice it at first glance. The Yuma Proving Ground desert closely resembles the world's mid-latitude deserts—the most significant in current socio-political terms.

"Though I personally do a lot of work in my office, my first love is exploring the desert," claimed Morrill. "It may be harsh, but that doesn't mean the desert isn't beautiful, for it is."

"I guess when you like something you don't question why. I've lived in Southwest Arizona on and off since I was five, and I'm very comfortable in the desert. It's my home."

As she explores the desert, Morrill often reflects on the area's volcanic past and marvels that the landscape appears very much as it has for hundreds of thousands of years. "Nothing seems to have softened," she said. "It looks like the dust just settled and time has not yet made its impact. It's a very harsh, very new and stunningly lovely place to work. I couldn't ask for more!"

Test manager Wahner Brooks said that many YPG employees are enthusiastic about the desert. "Generally speaking, people wouldn't be here if they didn't love the desert," he observed. "It's in our own best interest—both as a proving ground and as individuals—to diligently preserve it," he added.

"The desert is a fragile ecosystem and it doesn't take much to harm it. We still can easily see evidence of Patton's troops who came through here during World War II, and even the Pleistocene Indians who passed through long before them. It just takes a great deal of time for the desert to repair itself. It's our responsibility to manage this unique resource judiciously and wisely."

CHUCK WULLENJOHN is chief of the Public Affairs Office at the U.S. Army Yuma Proving Ground. He is a graduate of Humboldt State University in California.

On the Road...Again!...

ARMY EXECUTIVES REVISIT BUYING COMMANDS

By MAJ Tom Aeillo
and Kristine Harris

Background

During the spring of 1992, more than 20 senior Army and Army Materiel Command (AMC) executives travelled to several major buying commands within the Army community. Their purpose was to personally carry a philosophy of streamlining acquisition management to the upper management of the commands. (See "Hitting the Road," *Army RD&A Bulletin*, July–August 1992.) Emphasis was placed on stripping away unnecessary functional requirements and risk avoidance measures which ultimately inhibit the ability to get equipment in the hands of soldiers quicker and at lower cost.

During the travels of the Executive Roadshow, plans for a series of follow-on training visits had begun. These follow-on visits were designed to focus on explaining the acquisition improvement philosophy in greater detail. Based on this planning, several executives from DA and AMC began traveling back to the major buying commands in October 1992, carrying with them the initiative to improve Army acquisition.

These DA- and AMC-sponsored training sessions, dubbed "Roadshow II," are directed to the middle management of functional support staffs and program offices. The purpose of Roadshow II is to develop a cadre of leaders to take the initiative to improve Army acquisition. The intensive three-day workshop involves small group discussions, case study analysis, classroom lectures, and the detailed scrubbing of actual draft requests for proposal. The stronghold of this acquisition training is the family of 15 acquisition improvement principles presented on the first day of the workshop. These principles were extracted from the original Executive Roadshow and are intended, like the Principles of War in Army Manual 100-5, to be serious planning guides, not regulations. The message of Roadshow II is that everyone involved in acquisition consider and apply these principles whenever possible to reduce the cost and time of acquiring equipment throughout the acquisition process.

Most of the principles will not appear new to those who have been involved in acquisition for any length of time. The difference now is the degree of emphasis on streamlining, reducing functional requirements and support for the industrial base. It is and has been the goal of both Roadshow visits that we in the Army acquisition community must change in order to keep in step with changing conditions.

Times Are Changing... So Must We!

Today's world bears little resemblance to the recently ended cold-war era. In the past, we could easily identify the threat and principal geographical areas of concern. The possibility of a large-scale conflict provided stability to industrial base planning. This required

The purpose of Roadshow II is to develop a cadre of leaders to take the initiative to improve Army acquisition.

If we are to maintain the qualitative edge in equipment, we must change our acquisition management process. We simply cannot afford to continue with business as usual.

emphasis on measures to field a large armor heavy force and support it for a prolonged period. Today, the threat is uncertain, and the premium is on readiness for no-notice contingencies of relatively short duration.

Future funding of defense programs will clearly be at lower levels. Because of this, the challenge to maintain the technological edge on fielded equipment becomes greater. There will be far fewer full-development programs. Efforts for cheaper, faster technology insertion into existing systems will be more common. In addition, our industrial base will be significantly smaller, making competition fiercer, because with fewer defense programs come fewer purely defense contracts. Contractors who do not win awards will be forced to leave the defense industry to survive.

If we are to maintain the qualitative edge in equipment, we must change our acquisition management process. We simply cannot afford to continue with business as usual. Our challenge is to keep the decisive edge in equipping today's Army to meet changing war fighting needs. The 15 principles that follow must steer us toward smarter management of increasingly scarce acquisition resources. They must direct us toward the change necessary to achieve the goal of Army Modernization.

1. Use a multi-disciplined team approach to integrate acquisition product and process management. This principle reflects a concept that has been called "concurrent engineering." However, the concept is much broader than merely engineering. It must include resource management, contracting, logistics, and many other areas necessary for a successful acquisition. The concept is this: integrate all functional areas as well as all customer concerns early in the acquisition process. Such integration is the best way to ensure that problems are identified early, which can allow for relatively quick and inexpensive solutions. It optimizes the requirements refinement process and ensures that the Army gets great equipment in sufficient quantities that fulfills validated needs, works well, and is logistically supportable.

2. Reduce cycle times in all acquisition processes. This principal is not simply "field equipment faster." Rather, it addresses the time taken by each step and sub-process within the total acquisition time. In some instances, slowing a sub-process can decrease total time. For example, contracting officers are continually pressured to reduce procurement administrative lead time (PALT). The result is a rapidly prepared solicitation which reduces PALT but uses "boiler plate" and many standard clauses that do not apply to the acquisition. Solicitation packages including only those essential clauses take more time to prepare up front, but will reduce overall acquisition time significantly by providing contractors with clearly stated requirements for meeting the need. Early dialogue with users and with industry will help reduce cycle time, as can increasing the use of commercial products, components and software, and technology insertion. The key here is to look at the entire acquisition process.

3. Facilitate rapid introduction of technology advancements. Give advanced technology demonstrations priority, to reduce time and risk of using new technologies, and to gain early user suitability assessments. Prove out manufacturing processes during development.

4. Develop acquisition strategies which set priorities, involve the user, and identify streamlined paths to early fielding. The acquisition strategy developed by the program manager (PM) is the program's keystone planning tool. The PM must involve the user and functional experts while building the strategy. Gaining early consensus about priorities will empower the PM and can reduce problems later. Corollary impacts of decisions will be considered earlier, preventing costly mistakes resulting from decisions made under short time constraints. Accelerated approaches, such as combining non-developmental components, should be considered early and used whenever possible.

5. Reduce functional requirements in every aspect of an acquisition and eliminate all that add little or no value. Start an acquisition with only the minimum essential requirements. Creating a lean acquisition strategy, and later a lean solicitation, becomes far easier when a multi-functional team begins with no "boiler plate" requirements from an existing plan or document. Too often, acquisition programs are burdened with functional requirements and risk-avoidance measures that

ultimately inhibit our ability to get equipment into the hands of soldiers quickly and at low cost. It is not the intent of this principle to diminish the importance of well- tested and supportable programs. It is however, the intent to find a better, faster and more cost effective way of producing an acquisition.

6. Aggregate requirements into fewer and longer term contracts. Preparing solicitations and awarding contracts requires time, money, and personnel resources. By combining smaller acquisitions of similar technology into larger buys, we reduce government overhead and allow contracting offices to spend more time with each solicitation and contract, ensuring a quality product the first time. We achieve the same benefits by awarding multiple year contracts and gain an important additional benefit—a contractor sense of ownership of the item. Contractors planning to produce an item for extended periods of time will be more likely to improve their processes. This results in a better product and at a lower cost.

7. Base RFPs on product performance specifications. Remove barriers to dual-use technologies and simultaneous manufacturing. Army acquisition has traditionally been driven by the frequent use of extremely detailed military specifications. Significant cost reductions as well as an increase in quality can be achieved if we allow industry more flexibility to use components, materials, or processes which prove acceptable commercially. By working with the user and functional experts at the beginning of an acquisition, military standards and specifications will be eliminated whenever possible. Many times, the same performance capability will be obtained by using commercial or international standards. Finally, we must include only the absolute minimum essential performance requirements. We should tell industry what we want a system to do, and let industry propose how to do it.

8. Increase the use of best value contracting. Best value contracting is simply defined as any contract resulting from a solicitation which considers significant factors other than price. In other words, we don't always award the contract to the lowest offeror, but to the offeror with the best combination of price, performance, quality, and chance of producing our product well. We must carefully limit our selection criteria to a few key discriminators and clearly state them in the solicitation. Again, this requires careful, up-front work by multifunctional teams to select the right criteria to get best value for the Army.

9. Integrate cost effective testing throughout the life cycle by involving testers and evaluators early in the process. It is essential that we always focus on user needs and combine developmental and operational testing, take advantage of contractor testing whenever possible, and increase the use of computer modeling and simulation. This is only possible when testers and evaluators are involved up front allowing them to prepare logical test plans to ensure systems perform the way the user wants.

10. Make full use of international markets and technology. We must seek out worldwide technological developments to support Army needs. We should interact with U.S. users and international allies to harmonize requirements early in the life cycle to facilitate international sales later. International cooperative opportunities will be an increasingly important support to the future American industrial base. It is important that we plan for this and facilitate cooperative projects whenever possible. Again, early involvement of international experts will ensure that export policy, and technological security and transfer issues are addressed and solved.

11. Use acquisition planning to manage "right sizing" of the industrial base and protect critical segments. The defense business is getting smaller. We must remove barriers that prevent industry from off-setting declining defense business with commercial sales or the defense industrial base will decline to a few companies able to support themselves exclusively on government contracts. The Army must identify those few truly key industries that have no commercial counterpart and sustain them for next generation systems, technology insertions, and contingency needs.

12. Reduce operating and support costs throughout the life cycle. The bulk of any system's life cycle cost is actually incurred during operating and support of that system, though O&S costs become virtually fixed very early in system design. Because of this, O&S costs should be an evaluation factor in solitations. O&S cost reductions should also be a major consideration in re-engineering spares that cause high O&S costs on existing systems.

13. Promote quality through customer focus, process review, and continuous improvement. Everything we do must promote quality. Each of the acquisition improvement principles has the concepts of total quality at its core. The acquisition community as a whole must strive to continuously improve each of its processes as well as the products produced by these processes.

14. Institutionalize acquisition improvement principles at all levels. Train and operate in multi-disciplined teams. The Executive Roadshow this past spring began this process and Roadshow II is continuing it. The commitment to improving acquisition management begins with the AAE and flows through the Army acquisition hierarchy. The training and commitment will not end with Roadshow II. The Army Management Engineering College (AMEC) is preparing to take these principles back on the road and work until they are internalized throughout the workforce.

15. Use electronic media infrastructure as it becomes available to reduce cost and improve quality. Electronic media can increase efficiency greatly when properly used and managed. We should eliminate paper products when possible, as well as re-entering of data. The objective is to reach a standardized electronic interchange of information. Until universal standards have been achieved, we must apply common sense to minimize needless work, and emphasize product over paper in the acquisitions we manage. The Time to Change is Now!

These 15 principles, when accepted and applied by the entire acquisition workforce, will be a key to maintaining a strong Army. By answering the call to begin improvement in Army acquisition, the acquisition community will be accepting the challenge to keep the decisive edge in equipping today's Army with the necessary materiel and resources to meet changing war fighting and deterrence needs.

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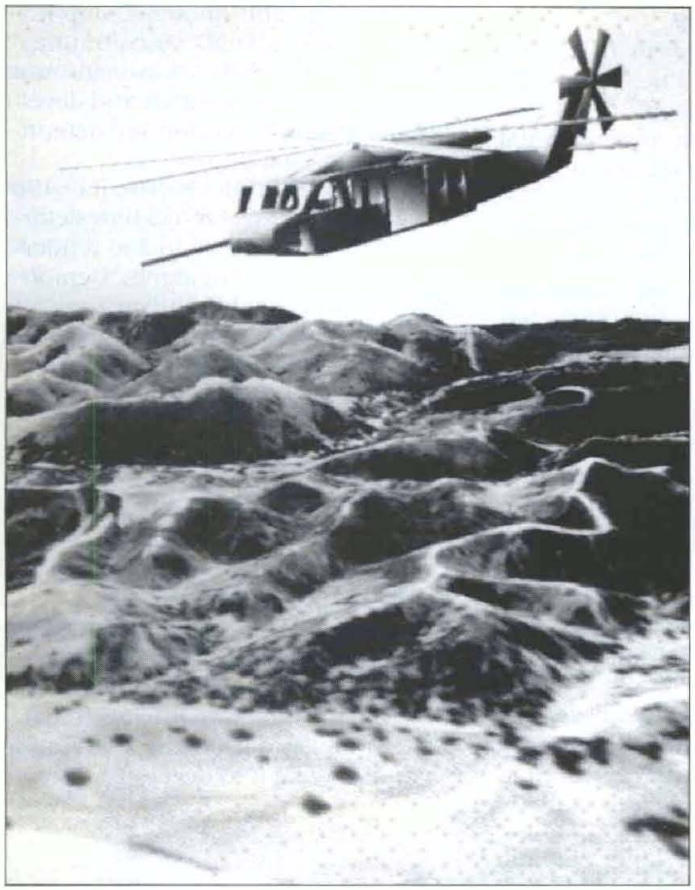
KRISTINE HARRIS is employed by Baum and Romstedt Technology Research Corporation as a research analyst providing professional services support for Roadshow II. She graduated in 1991 from West Virginia University with a B.S. degree in writing/editing and composition.



Simulation of an MH60K Blackhawk Helicopter flying over custom elevation of Fort Hunter Liggett, with a photographic overlay.

TOPOGRAPHIC ENGINEERING CENTER SUPPORTS SIMULATION AND TRAINING

By Valerie Kelly

Introduction

As the cost, complexity and environmental impact of live training exercises increase, the benefits of simulation become more practical and cost effective. The U.S. Army Topographic Engineering Center (TEC), located at Fort Belvoir, VA, is working to improve and standardize simulation and training methods.

What makes the new simulator training technology different is the application of the Distributed Interactive Simulation (DIS) concept. With the DIS concept, multiple computers at various locations are connected over local and wide area networks. Although separated geographically, these systems interact in the same virtual battlefield environment. This enables multiple units, located in different parts of the U.S. or overseas, to conduct joint operations training.

One of the most significant challenges in applying the DIS concept is to realistically represent, correlate and update terrain and environmental effects. The terrain and environment must be updated in near real time over a distributed network to all the players.

Another growth area for simulation is system development. As an alternative to the currently expensive and lengthy acquisition process, prototypes of a system can be simulated and tested before any development begins. With such a system, a cost preview can be obtained before actual system development begins. Additionally, system developers can make better informed decisions on the cost effectiveness of a system based on simulated performance. The most current and innovative technologies can be inserted, tested and evaluated, and a system could be modified without the associated risks, such as high costs.

To assist the Army training and simulation community, TEC established the Training and Simulation Applications Branch within its Battlefield Visualization Division. The branch provides topographic and visualization expertise, and transfers this technology to emerging simulation and training systems.

The branch is involved in the development of four Army simulation and training initiatives. They are the Close Combat Tactical Trainer, Dynamic Environment and Dynamic Terrain Modeling, Battlefield Distributed Simulation-Development and Project 2851.

Close Combat Tactical Trainer

The Close Combat Tactical Trainer (CCTT) is the first project in a series of trainers based on the Combined Arms Tactical Trainer (CATT) concept. With CATT, all elements of the combined arms battlefield can be simulated and exercised at one time.

CCTT is the largest Army simulator program. It will develop a network of more than 560 training simulators. CCTT's primary requirement is to train military units in crew and collective skills for command and control, tactical navigation, movement, coordination of fire, and weapons systems operation. The system will provide realistic visual scenes that will allow users to employ all standard military tactics for the full range of battle and environmental conditions.

TEC will serve as the executive agent for CCTT on all terrain-related issues. Technical expertise TEC will provide includes digital topographic data requirements analysis, data base generation and enhancement, geographic information systems applications, terrain and environmental analysis, visual data base generation, visualization techniques, technical management of the Phase I development contract, and software quality assurance. A memorandum of agreement is being coordinated with the CATT Program Office to define TEC's support.

Dynamic Environment and Terrain Modeling

To increase the realism of emerging simulation and training systems, the impact of weapons systems, engineering activities and changing environmental conditions needs to be accurately modeled, updated and portrayed. Most Department of Defense (DOD) simulation programs have documented requirements for dynamic environment capabilities, yet this ability has not been adequately developed and demonstrated.

To address this need, capabilities being developed include standards for protocol data units (PDUs) to communicate changes across a network, standard models and rendering techniques for dynamic environment effects, the initial standard architecture design required to support dynamic updates, and a demonstration of these capabilities.

Various DOD organizations are developing models and rendering techniques to accurately represent real-time dynamic environment effects. To maximize synergy and minimize duplication of efforts, DOD organizations, including TEC, will coordinate and leverage on-going research and development to jointly develop and demonstrate these capabilities.

Specific capabilities will include the techniques required for real-time deformation of existing terrain and rendering of battlefield obscurants. Demonstrations will include the creation of tank ditches, berms, craters and 30 different battlefield obscurants in a DIS environment. The capabilities developed will serve as a framework of initial standards for incorporating dynamic environment effects into existing and emerging DOD training and simulation systems.

Battlefield Distributed Simulation – Developmental

The Army's Battlefield Distributed Simulation-Developmental (BDS-D) program is producing distributed battlefield simulations for the 1990s and beyond. Its goal is to develop a system

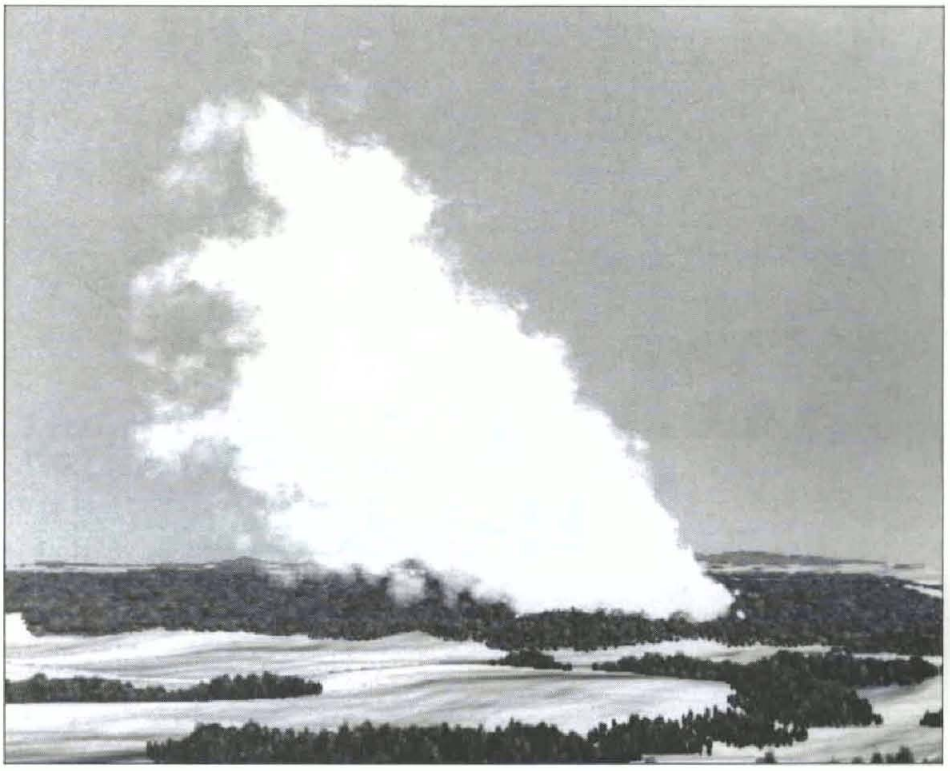
This scene illustrates smoke obscurants. Both the trees and smoke, which were generated using textured ellipsoids, are integrated with a synthetic terrain database.

of local area networks (LANs) consisting of low-cost battlefield simulators, and simulations of experimental and high-fidelity systems and Semi-Automated Forces (SAFOR). These simulators will all be linked together via a system of long-haul networks (LHNs) to provide a virtual combined arms and joint combat operations environment for materiel and combat development, and operational testing exercises.

The BDS-D program will provide an Army distributed simulation capability linking government, university and industry sites in an accredited, real-time, warfighter-in-the-loop simulation of the joint and combined battlefield. This program will support the development of the Future Battle Laboratory's (FBL) Advanced Battlefield Simulation (ABS) and training simulations via technology transfer.

One of the most significant technical challenges of this effort will be to realistically update and correlate the changing battlefield in a heterogeneous DIS environment. TEC will provide its topographic and visualization expertise in addressing this challenge.

TEC's Training and Simulation Applications Branch also chairs the BDS-D Battlefield Environment Working Group. The group's charter is to oversee the development and implementation of capabilities to adequately portray the battlefield environment and to provide guidance and recommendations to the BDS-D Program Management Office.



This forest fire simulation uses a simulated heat function to drive the growth of the fire and smoke ellipsoids.

Project 2851

Project 2851 is a standard DOD digital data base program initiated by the Air Force and endorsed by the other military services to develop a method to share simulator data bases effectively. Each service recognized the need to avoid repeated enhancement of Defense Mapping Agency (DMA) data in proprietary formats that could not be reused. The planned Project 2851 library facility at DMA's Aerospace Center will solve that problem.

Based on recommendations from the Project 2851 Working Group, changes and adjustments have been made to the program. A notable recent change is for the system to function primarily as an active library instead of as a production and transformation center. This change added a Standard Interchange Format (SIF) that provides two-way access to the Project 2851 library of source data used for simulator programs. Thus, all of the enhancements incorporated under simulator development contracts can be added to the library and can be made available to subsequent DOD programs.

TEC's support to Project 2851 includes technical assistance to the U.S. Army Simulation, Training and Instrumentation Command (STRICOM) regarding Army requirements; participating in the Generic Transformed Data Base (GTDB) and SIF Special Interest Groups (SIGs); developing software for GTDB input on the Battlefield Visualization Test Bed; and evaluating GTDBs.

To keep up with current trends toward open system architecture for hardware and software, TEC plans to convert the GTD B input software to a UNIX-based platforms. In addition, TEC plans to develop SIF input/output capabilities on a UNIX-based platform to use and contribute to the Project 2851 data base.

Conclusion

As the use and importance of simulators increases, the need for standard simulator data bases, models and network protocols to update the dynamic battlefield becomes more critical. TEC is committed to the development of these technologies and standards. In this way, we hope to insure consistent and valid simulation results necessary for effective DIS training and system development.

VALERIE KELLY is a scientist in the U.S. Army Topographic Engineering Center's Battlefield Visualization Division. She received a bachelor's of science degree from James Madison University and is working toward her master's in civil engineering at Virginia Polytechnical Institute and State University.

TEC employees Carlton Daniel and Chris Moscoso also contributed to the writing of this article.

ACQUISITION MANAGEMENT MILESTONE SYSTEM

By John D. Dixon
and Sherry Rowe

Introduction

How many nondevelopmental items are currently being acquired by the Army? How many weapon systems are scheduled for fielding to U.S Army Europe; Eighth, U.S. Army; U.S. Army Forces Command, or the Army Training and Doctrine Command during the next two years? How many items and what types of acquisition programs are currently in the production phase? What programs have solicitation documents due for release during the next 12 months? What is the typical timeframe for fielding certain types of materiel systems? How many programs have an upcoming program milestone review within the next 180 days?

All of these questions were recently posed to the Army Materiel Command Materiel Readiness Support Activity (MRSA). In each case, the answer was provided to the inquirer within the required suspense—many of which were extremely short!! How was MRSA able to respond to these and many other similar inquiries in such a rapid fashion? The answer is surprisingly simple—the Army Acquisition Management Milestone System, or AMMS.

MRSA manages and maintains the AMMS, which is the Department of the Army standard integrated life-cycle management milestone reporting system and centralized data base (CDB) for recording the status of weapon systems and equipment being acquired and fielded. AMMS provides the capability to effect timely and efficient coordination between the various development, deployment, and fielding communities responsible for the introduction of new items of equipment into the Army's inventory. It was designed for this coordination task and to provide the managerial oversight of individual program performance.

In addition, as a byproduct, AMMS creates a reservoir of historical information used to identify and highlight systemic integrated logistic support (ILS) program problem areas, base policy review and revision upon, and improve the overall conduct of the materiel acquisition process.

AMMS addresses and contains total Army system acquisition milestones that include tasks which are the responsibility of the materiel developer, combat developer, trainer, tester, gaining command, the Military Traffic Management Center, the Army Corps of Engineers, HQDA elements, and other activities involved in the materiel acquisition process. (Figure 1 depicts the AMMS processing environment.) It accommodates program planning and status reporting from the initiation of the Operational Requirements Document through fielding and beyond if the system is released conditionally.

AMMS milestones can be tailored to support a variety of acquisition strategies, including full or streamlined development, a nondevelopmental item, a materiel change, and a rebuy. Figure 2 depicts the current breakout by type of acquisition of active systems currently resident in the AMMS central data base.

Background

The AMMS program was established by HQDA, Office of the Deputy Chief of Staff for Logistics (ODCSLOG), in 1987, to provide the acquisition, logistics, and fielding communities a single source for planning, tracking, analyzing, and managing systems in the acquisition life cycle.

Established through consolidation of the Force Modernization and ILS Milestone Reporting Systems, AMMS is cited in AR 70-1, *Army Acquisition Policy*, as the Army's milestone reporting system to track and record selected milestones in the acquisition and fielding of systems. The Army proponent for AMMS is the ODCSLOG, while the U.S. Army Materiel Command (AMC) is the designated AMMS executive agent.

MRSA is the AMMS project manager (PM) with responsibility for system procedural documents and the design, maintenance, and improvement of the AMMS program and CDB, including establishment of interfaces to enrich AMMS, customer support, development of new users, and timely upgrades to embed the latest policy.

Milestone reporting of Army acqui-

sition programs is mandatory for systems and equipment meeting one of the following criteria:

- Materiel systems that are identified in the Army Modernization Memorandum or Force Modernization Master Plan;
- Systems that require AR 71-9, *Materiel Objectives and Requirements*, documentation such as an Operational Requirements Document;
- Modification items requiring documentation in accordance with AR 70-15, *Materiel Change Management*;
- Programs initially developed under the quick reaction capabilities process that evolve into programs having total Army application;
- Level I, II, and III Automated Information Systems as specified in AR 25-3, *Army Life Cycle Management of Information Systems*;
- Reprocurements when a second source of model change is being sought; and
- Training systems to be type classified.

System Features, Functions, and Products

As of this printing, there are 1,182 systems in AMMS; 531 active systems, 241 preconcept systems, and 410 systems being tracked for materiel release purposes (Figure 3 provides a breakout of systems by responsible reporting activity).

Preconcept systems have been added to AMMS within the past year through an interface with TRADOC's Materiel Development Automated Milestone (MADAM) System. This interface provides early identification of newly approved materiel acquisition programs, informs the program executive officer (PEO), PM, the surgeon general, the AMC major subordinate commands (MSC), and other materiel developers of the scheduled date for system proponency transition, and establishes a common system identifier (the common reference code) unique to each program to ensure connectivity of the data bases for effective information sharing.

Materiel release programs have also been added to the AMMS program within the past two years. AMMS is the sole source automated data base for tracking materiel releases. It provides real time data for scheduled and completed dates and narratives for full, conditional, and training releases. AMMS tracks the status of actions taken to overcome the impact of conditional release shortfalls in the initial fielding support package.

The AMMS data base maintains a historical file of systems that have completed all milestones to the satisfaction of the materiel developer or have been terminated at some point during the acquisition process. There are currently 866 systems in the AMMS historical file. This file is extremely valuable in identifying programmatic problems, verifying or establishing valid time constraints for events, identifying trends, revising policy based on empirical information, updating or developing logistics models, and responding to higher headquarters, audit agency, or

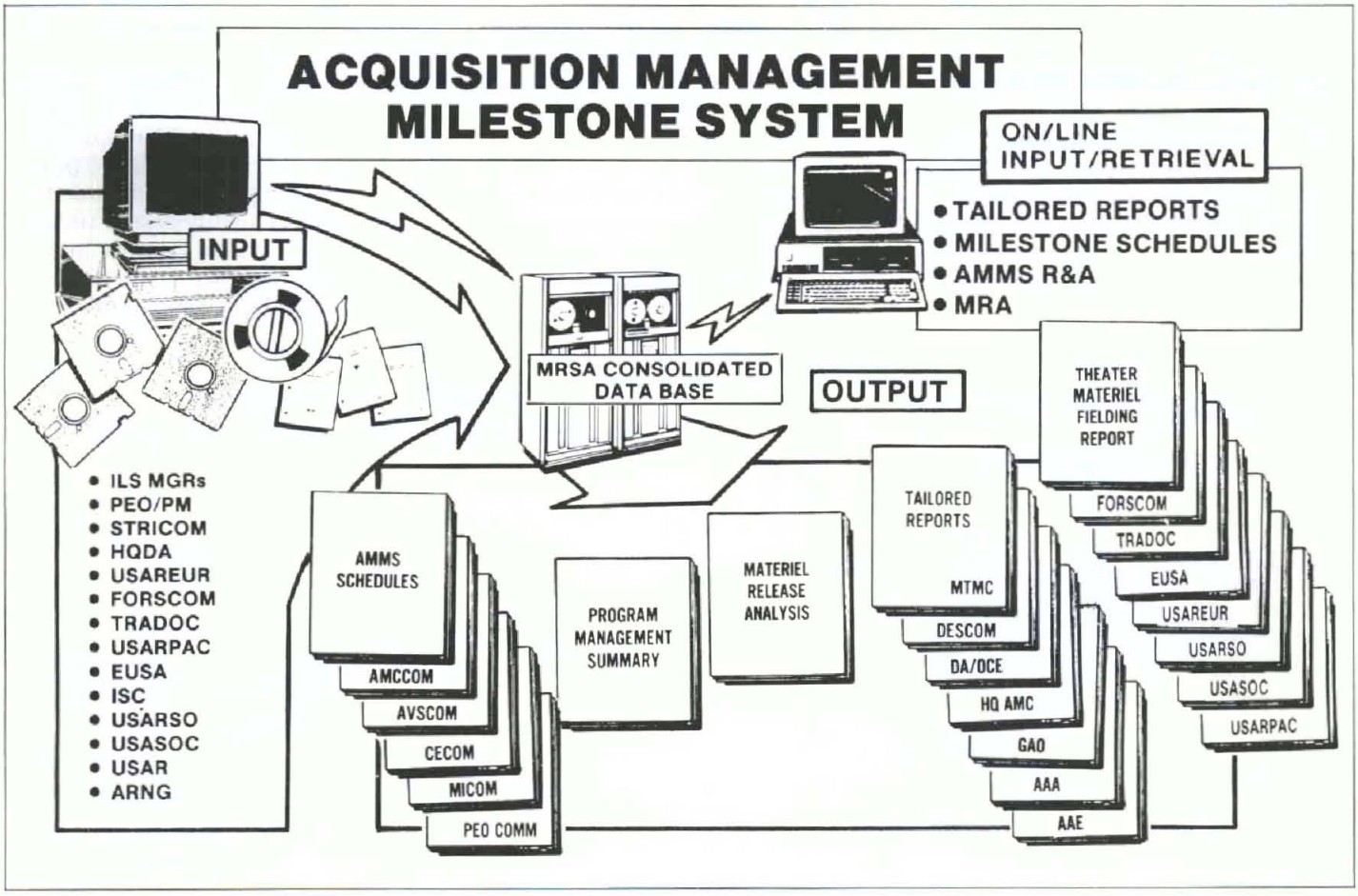


Figure 1.

congressional inquiries for acquisition program information.

The number of system users and proponent activities for events grows each year. New proponents added to the system during the past year include the U.S. Army Southern Command, the U.S. Army John F. Kennedy Special Warfare Center and School, the U.S. Army Special Operations Command, and the U.S. Army Nuclear and Chemical Activity. In addition, the capability to develop baseline milestone schedules for health services and command, control, communications, and computers programs was recently added to the AMMS program.

Several user satisfaction surveys and third party reviews of AMMS have been conducted during the past two years and have resulted in numerous system modifications to enhance system functionality.

For the PM on a specific acquisition program, AMMS offers a suite of capabilities, including: the ability to quickly establish an initial acquisition milestone schedule with only minimal system information; evaluate the average time required to complete similar acquisition programs; identify near-term events requiring action, update, review, or corrective efforts; analyze how well the program is progressing in relationship to existing regulatory requirements; and review the status of related subsystem or information development by an external activity which may impact their program.

Milestones contained in AMMS were chosen by the acquisition and logistics communities as those considered most critical to ensure effective planning, integration, and visibility of the acquisition logistics process. Figure 4 depicts the functional areas addressed by AMMS. The list of milestones is routinely evaluated for additions, changes, and deletions to ensure it accurately reflects changing requirements and policy guidance.

There are approximately 300 milestones in the current system. The milestones selected for any particular program can be tailored to satisfy the specific requirements of that program based on its acquisition strategy, program characteristics, and number of gaining commands. AMMS satisfies all milestone reporting requirements specified in AR 700-127, *Integrated Logistic Support*, and AR 700-142, *Materiel Release, Fielding, and Transfer.*

The AMMS program produces several standard reports, typically on a quarterly basis. Prepared and distributed by MRSA by the 20th workday following the end of each quarter, the standard reports include the following:

- *AMMS Report*—provides integrated milestone schedule for all active systems in AMMS; displays all scheduled and completed events; separate volumes by materiel developer.
- *AMMS MACOM Materiel Fielding Report*—contains events critical to fielding; targeted at gaining commands and logistics assistance representative fielding elements; notifies gaining command of other MACOM fieldings and availability of fielding after action and lessons learned reports; separate volumes by gaining command.
- *AMMS Program Management Summary Checklist*—prepared quarterly; lists events scheduled for completion within the next six months.
- *Developer, TRADOC, and MACOM Analysis Reports*—identifies systems with potential problems; explains problem and possible impact; offers corrective courses of action; assists in maintaining program on schedule in compliance with regulatory requirements;
- *Materiel Release Analysis*—supports product assurance requirements; provides conditional release information; tracks get well plans and events.
- *AMMS Point of Contact Listing*—lists office symbol and phone number of the PEO, PM, and ILS Manager for each AMMS system; updated and published biannually.

In addition to the standard reports, numerous tailored reports meet the specific needs of individual offices and commands. Development of these periodic or ad hoc report requirements can be accomplished through coordination with the system proponent or by accessing the AMMS CDB.

The online access software program allows users to develop system schedules; extract fielding, materiel release, and major decision review point reports; enter updates directly into the system; and personally design and extract tailored system and summary management reports.

Requests for the development of new

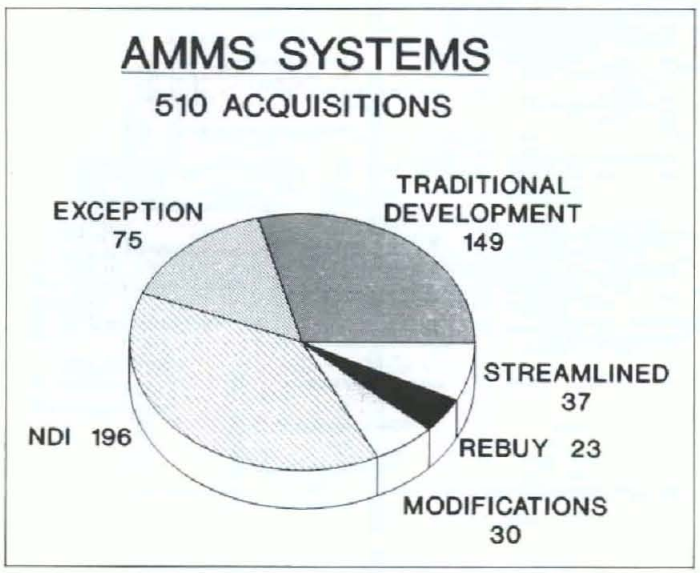


Figure 2.

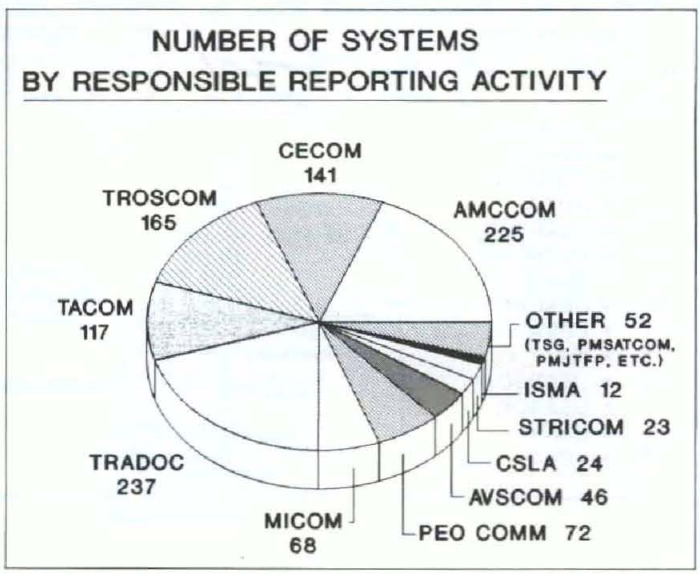


Figure 3.

recurring reports by MRSA can typically be accommodated within two weeks. Requests for special, one-time extracts of information are usually turned around within two days. The capability for system users to retrieve data and create unique reports through remote interface with the AMMS will be greatly enhanced this year as AMMS is rehosted on an AMDAHL mainframe computer and the data base is converted to the Model 204 Relational Data Base Management System (RDBMS).

System Usage

Like all data systems, the AMMS is dependent on the timeliness and accuracy of its data. Data may be submitted via MRSA's online update system (OLUS), the Commodity Command Standard System (CCSS) automatic digital network (AUTODIN) interface, computer tape, hard copy (DA Form 5096-R, Acquisition Management Milestone System), message, letter, or floppy disk. The input formats are available from Commander, USAMC Materiel Readiness Support Activity, AMXMD-EI, Lexington, KY 40511-5101.

The MRSA OLUS allows managers to enter their schedule, retrieve system information, and conduct analyses via a modem employing toll free or DDN accessibility. The PEO communications Systems utilizes the OLUS procedure to report directly to the AMMS central data base. This method is preferred because the user is immediately informed of data input errors, rejects, and data acceptance while still connected in the update mode.

CCSS input can be accomplished through assistance from the matrixed MSC ILS Office. Input is made to the CCSS local data base, batch processed locally, and transmitted to MRSA through AUTODIN communication procedures.

Future Enhancements

Numerous future enhancements are scheduled for AMMS. Principle among these are the rehosting to an AMDAHL mainframe computer and conversion of the data base to the Model 204 RDBMS. Many system improvements recommended by the using community will be adopted and programmed into the system commensurate with the conversion and rehosting process.

An interface with the Logistics Planning and Requirements Simplification System (LOGPARS) Schedule Advisor will be developed to provide users the capability of creating schedules with the LOGPARS program and simply producing an extract to upload AMMS. New users and interfaces with related data bases will be evaluated and pursued to increase and improve the coverage of the acquisition process provided by AMMS.

The Office of the Assistant Secretary of Defense for Production and Logistics is in the process of examining AMMS for extension to the other services for reporting and tracking nondevelopmental items.

Summary

AMMS provides the capability to establish an acquisition logistics-oriented schedule which meets regulatory reporting requirements, identifies the major events necessary to successfully develop and field a sustainable item of equipment/weapons system, tracks the progress of events, identifies and highlights potential program problems, and recommends solutions.

The AMMS integrates responsibilities and actions of the major organizations involved in an acquisition program and ensures they work to the same agenda. It serves as an aggregate source of information to analyze the acquisition process, revise policy, and rapidly respond to requests for information to support studies and inquiries. Planned enhancements and technological upgrades will further improve its utility and ability to assist PMs to conduct viable, timely, and economical acquisition logistics programs.

Additional information regarding AMMS can be obtained by reviewing DA Pamphlet 700-26, AMMS, or contacting the USAMC Materiel Readiness Support Activity, ATTN: AMXMD-EI, Lexington, KY 40511-5101, DSN 745-3925, or commercial (606) 293-3925.

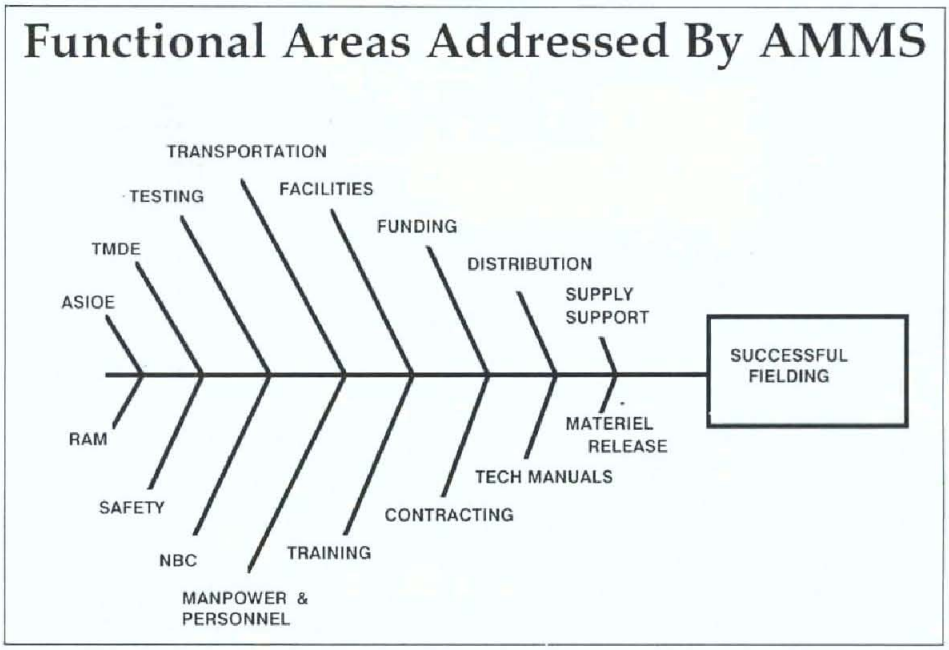


Figure 4.

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CIVILIAN AAC MEMBERS ATTEND CAREER MANAGEMENT WORKSHOP

LTG William Forster, director of acquisition career management, sponsored the conference.

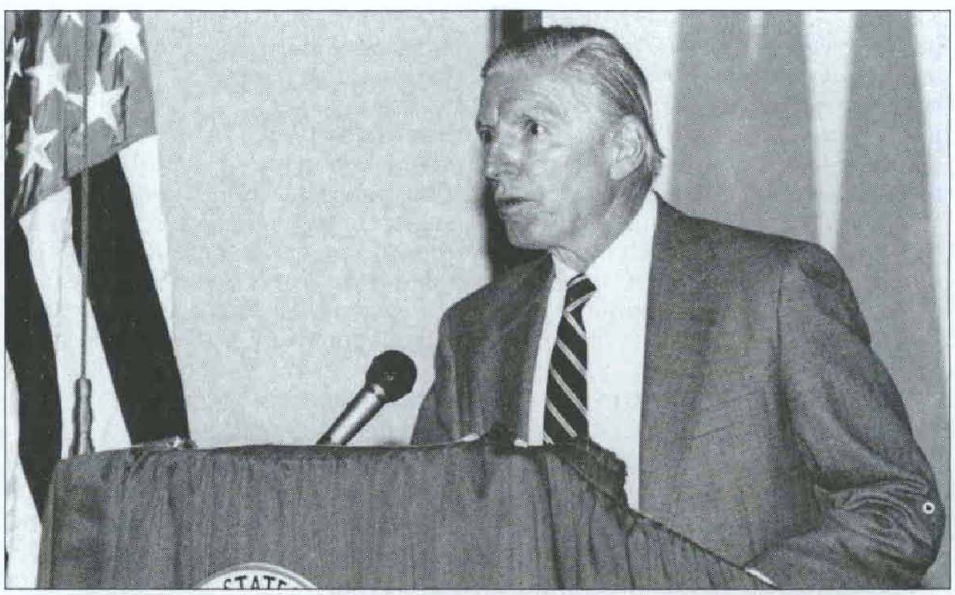
Nearly 150 civilian members of the Army Acquisition Corps (AAC) attended an Army Acquisition Career Management Workshop, Oct. 18-20, 1992, in Fairfax, VA. Sponsored by the director of acquisition career management, Office of the Assistant Secretary of the Army (RDA), the workshop was held to provide a discussion of acquisition subjects to assist the attendees understand their career field. Senior Army leaders briefed participants on the future of Army acquisition programs, leadership, training, education and career planning.

COL Al Greenhouse, deputy director, acquisition career management, welcomed the attendees, highlighting education, training and experience requirements of the Acquisition Corps. He said, "We are never going to lift the overall professionalism of the workforce unless we diligently pursue getting our people properly trained and educated. You have to make that commitment. That is what we seek from you here today—the commitment that you are going to insure that those for whom you are responsible are properly prepared to assume their duties."

Keynote speaker, George E. Dausman, deputy assistant secretary of the Army (procurement), provided an informative presentation on shaping the workforce for the future. He discussed the goal of achieving world-class status through avenues such as best value contracts and career development. "It's never too early to begin training your successors. Identify them—maybe not publicly—size them up and make sure you focus career development attention on those folks," Dausman said.

MG William S. Chen, program executive officer (PEO), Global Protection Against Limited Strikes, spoke on leadership roles in acquisition. He defined leadership as the art of influencing others to do what you want. He described the environment in which acquisition leaders must function as one of complex programs, constrained resources, bureaucratic processes and diverse organizations. Chen added that acquisition leaders need to hire and train good people, establish vision, be proactive, and influence decisions.

Chen was followed at the podium by George Williams, PEO Tactical Missiles, who discussed the challenges and rewards of being a program manager (PM). He stressed that PMs face challenges



George E. Dausman, deputy assistant secretary of the Army (procurement), gave the keynote address.

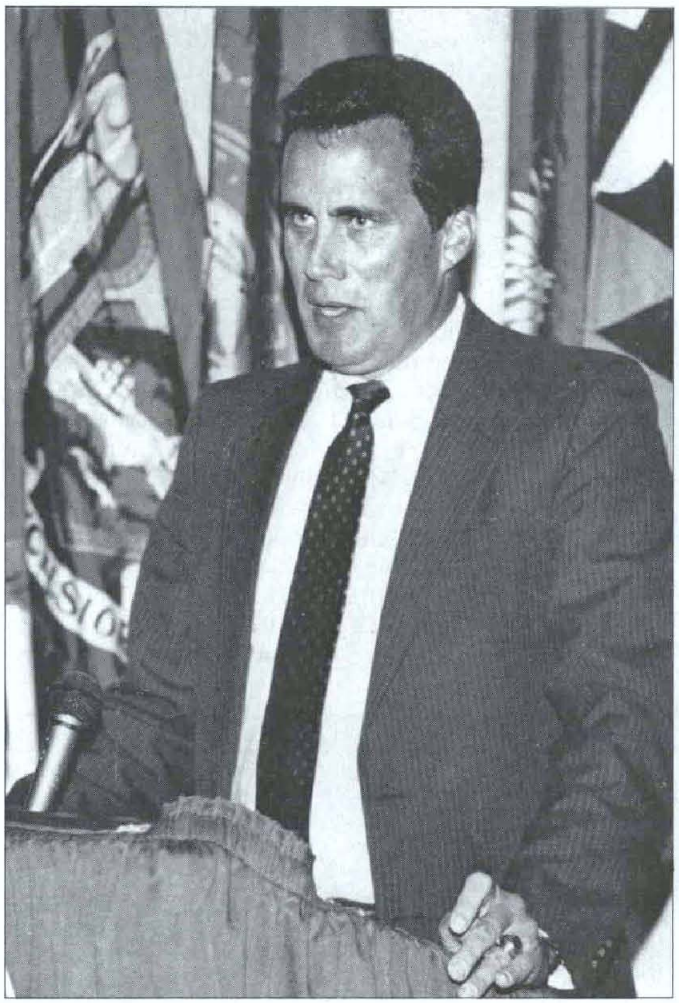
such as personal problems of staff members, grievances, time and money management, and downsizing. According to Williams, rewards of being a PM include career enhancement, service to country, and seeing a well-conceived program come together. He said, "You make a difference... I think most of you can tell your children what you do makes a difference in the defense of this country."

Joseph E. Galbraith, director, civilian personnel management, U.S. Total Army Personnel Command, provided a presentation on trends in civilian personnel management and tips in career planning. He discussed the effects of downsizing, such as fewer interns, fewer middle management jobs, and more competition for advancement. He appealed to the attendees to develop themselves through increased knowledge of the defense business operating fund, total quality management and through diversity management. Galbraith noted that leaders need drive, energy, intellect, and mental and emotional health. He also cited the benefits of mentorship in identifying strengths and weaknesses.

Conference sponsor and Director of Acquisition Career Management LTG William H. Forster gave the luncheon address. He stressed that the Army must be trained and ready for a decisive victory anytime, anywhere, just as it was for Operations Desert Shield and Storm and Hurricane Andrew. He indicated that downsizing means not only a smaller Army, but also demands new ways of doing things. "Be flexible in your thinking. Let's do things right, not just the way we've always done them," he added.

George T. Singley III, deputy assistant secretary of the Army for research and technology, spoke on future technologies. He stated that innovation and creativity are needed across the acquisition spectrum to deal with the growing deficit. He said that risk aversion leads to excessive audits and functional requirements, more process and less product, and proposed replacing it with risk management. Singley also discussed technology insertion and described the Battlefield Distributed Simulation Network.

In addition to general session presentations, the AAC workshop featured three seminars provided by Keystone Speakers and Seminars speakers bureau. Jay Riffenbary, president of Resource and Investment for Success, presented "No excuse—A Philosophy for Success." Thomas E. Martin, direc-



Assistant Secretary of the Army (Research, Development and Acquisition) and Army Acquisition Executive Stephen K. Conver presented the dinner address.

LTG Leo J. Pigaty, deputy commanding general, Army Materiel Command, discussed the future of AMC.

LTG Peter A. Kind, director, Information Systems for Command, Control, Communications and Computers, briefed attendees on the role of information systems in major acquisition programs.

tor of personnel, Abington School District, Abington, PA, led a discussion of diversity management, and Barbara Rudnicki, president, Rudnicki Communication Enterprises, discussed critical communication.

Assistant Secretary of the Army (Research, Development and Acquisition) and Army Acquisition Executive Stephen K. Conver presented the dinner address on improving the defense acquisition process. He encouraged open cooperation between government and industry, noting, however, that "arms-length" relations are necessary for business ethics. Relative to acquisition streamlining efforts he said, "The speed of the acquisition process and the quality of that process are not indeed mutually exclusive." Conver recommended that attendees shift their focus from process to product, and said, "Never lose sight of the fact that our reason for being is to field equipment to the American soldier. It is a solemn responsibility."

LTG Leo J. Pigaty, deputy commanding general, Army Materiel Command (AMC), opened the final day of the conference with remarks on the future of AMC. He said that future needs will include logistics power projection, such as the Army displayed during Operations Desert Shield and Storm and Hurricane Andrew; and technology generation and application. He urged his audience to challenge constraining and detailed requirements. Pigaty emphasized that even during the turmoil of reshaping, AAC members must maintain a vision of sustaining and supporting the force so that the Army will be ready should "another Desert Storm" occur.

Deputy Assistant Secretary of the Army (Plans, Programs and Policy) Keith Charles provided a presentation on the Army acquisition budget.

Deputy Assistant Secretary of the Army (Plans, Programs and Policy) Keith Charles provided an informative presentation on the Army acquisition budget. Charles noted that he supports manpower reductions primarily through attrition, and reducing the budget primarily in accounts which don't impact the workforce. Said he: "It is very hard to take a demoralized workforce—military or civilian—and make it very productive." Charles also stressed that proposed technical changes need to be carefully weighed against pay-offs on the battlefield to avoid costs which don't deliver.

Dr. James Edgar, assistant deputy director, acquisition career management, followed with a briefing on managing the workforce. He addressed several topics, including implementation of the Defense Acquisition Workforce Improvement Act, functional career boards, and acquisition functions.

Other conference highlights included an overview of training assets available at the University of Texas Institute for Advanced Technology (IAT), presented by Dr. Jerry Davis, IAT assistant director, and a seminar on effective communication, led by Dr. John A. Daly from the College of Communications at the University of Texas.

In addition, George Dausman chaired a panel discussion on issues such as the importance of long and short term training for a quality acquisition corps, reduction-in-force procedures, and AAC and career field certification.

An overview of the role of information systems in major acquisition programs was provided by LTG Peter A. Kind, director, Information Systems for Command, Control, Communications and Computers. He stressed the value of determining software needs in advance, to allow customized design. He said that the Army Interoperability Network can save time, money, and risk by testing software to determine whether it will do what the user wants.

LTG Forster closed the conference, expressing his dedication to a professional, unified Acquisition Corps. He said that in exchange for members' best efforts, imagination and innovation, the corps will provide them growth opportunities. Forster encouraged participants to "share the wealth" by passing on the information they had gained to AAC members at their home stations.

Sheila Helm, deputy director, civilian personnel management, PERSCOM participated in an acquisition career panel.

Computer-Aided Design...

CAN COMPUTERS "LEARN" TO WORK WITH USERS?

By Dr. Doris Shaw
and DerShung Yang

Introduction

The modern architect has abandoned manual design in favor of the powerful capabilities offered by computer-aided design (CAD). The U.S. Army Corps of Engineers, responsible for a multi-million dollar annual construction program, is no exception. The corps has adopted Intergraph's MicroStation as its standard CAD equipment and this system is now used to design construction projects for the Army and Air Force.

As CAD systems become more sophisticated, they include features that appeal to broader interests. While all of these options make the systems responsive to a larger market, they also complicate the design task for some users. Inexperienced users cannot comprehend and effectively use all of the CAD functions without training and extensive hands-on practice. Experienced users have to learn a new set of options each time a CAD updated version is released. As a result, the CAD system may not be used to its full potential.

One way to improve this situation is to facilitate communication between the computer and user. And since architects think and work in a graphic environment, what better way to communicate than graphically? The U.S Army Construction Engineering Research Laboratories (USACERL) is developing a system to help CAD programs "understand" the user's intent by recognizing objects drawn on the screen. The system takes advantage of neural network technology and allows the user and computer to interact for faster, more accurate design work.

Talking With Computers

In operating any computer program, the user must type in words that mean something to the computer or the machine responds with classic phrases such as "Abort, Retry, or Fail." Entering correct commands usually involves some degree of searching and guessing, which leads to frustration. Even programs with menus can be difficult to work through when they have the number of options available in CAD.

Among MicroStation's options are "cell libraries" that contain images such as "wall sections" and "shower stalls" that will be used in the design. These cells allow the architect to select pre-drawn components rather than re-creating each one anew—one of CAD's big advantages.

Knowing where each design element resides in the system is an exercise in memory. The corps, which uses standard design components, has over 1,000 cells in 16 different libraries in its on-line Standards Manual. Each standard design element has certain information associated with it.

If an architect attempts to draw an image rather than use the standard one,

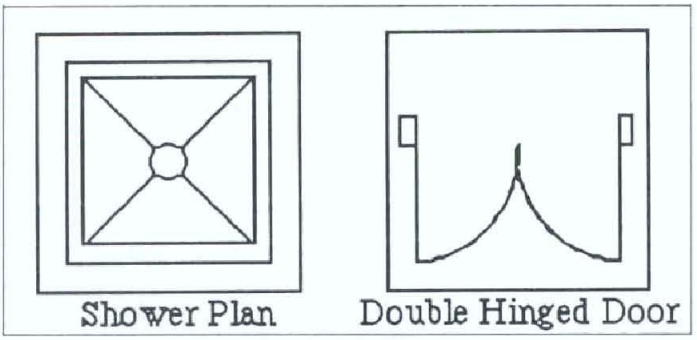


Figure 1.
Examples of "learned" cells.

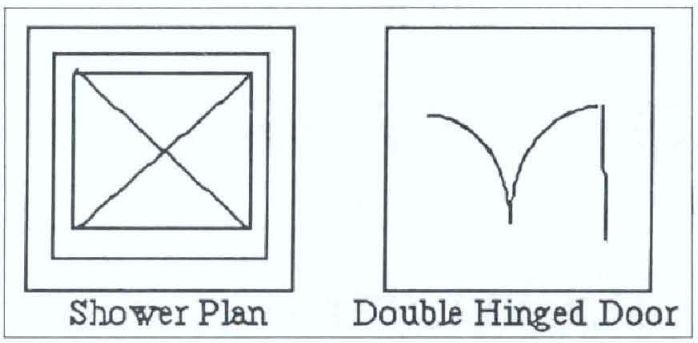


Figure 2.
Examples of correctly identified cells.

the new image will not convey the correct meaning to other participants in the design. Non-standard or incorrect information may lead to construction disasters. So corps users have no choice but to search out the standard design element. Finding it may involve scrolling through several menus or trying to remember which library to check.

An easier way to use the library cells would be to let the user sketch the image on the screen and have the computer recognize it. The stored images that come closest to matching the user's drawing would be presented for selection. This concept was the basis for USACERL's object recognition system. The goal was to have the computer understand what the user drew, which then would trigger an appropriate response—in this case, retrieval of the corresponding image in the standard cell libraries.

Neural Networks That Recognize Objects

If it is to "learn" what the user is trying to represent, the computer must be able to recognize the object drawn on the screen. To provide this recognition, USACERL developed a program using MicroStation Development Language (MDL—a C language) to implement a neural network embedded in MicroStation.

Neural networks attempt to simulate one of the ways people learn: recognizing patterns that are repeated in a series of examples. For instance, to young children, the letters b and d appear the same. After seeing many examples of each letter, they learn to differentiate between them, even though they may not realize how they learned it or be able to explain how the letters are shaped.

Neural nets are supposed to behave in much the same way. Since there is little understanding for how the human brain processes information, the best programmers can do is design computer systems that appear to give similar outcomes. The computer does this by taking input, assigning values, making calculations, evaluating the results, and comparing the findings with previous experience.

To understand USACERL's program, it is necessary to be familiar with the basic principles of neural networks. A brief overview is given below; a detailed discussion of this science is beyond the scope of this article.

Basics of Neural Networks

Neural network technology has been around for more than three decades. In essence, the network is trained by showing it correct examples. Then it compares new examples with the ones that it can recognize. If the patterns match, the new example is recognized and the training is reinforced by having one more example of the correct pattern. If the patterns do not match, the example is not recognized.

In a neural network, there are many "neurons," which are essentially simple processors that can accept inputs and give outputs. Between neurons are "connections" that carry numeric values called "weights," which roughly signify the correlation between two neurons. These weights determine whether or not there is a match.

Neural networks mimic this type of learning by executing many mathematical algorithms that have been programmed in. For practical use, these calculations require the large memories and high processing speeds available with today's computer technology. As these more sophisticated computers have emerged, the possibilities for neural networks have exploded.

The Zipcode Network

Researchers at AT&T in 1989 developed a neural network that can recognize handwritten zip code digits. Because of its ability to handle handwritten symbols—which would be similar to recognizing hand-drawn CAD images —it was selected as the basis for USACERL's object recognition program.

One drawback to using the Zipcode Net is its inability to recognize images when they are not placed correctly. To overcome this problem, the system was trained with four versions of the images that have been normalized in size and location, each rotated 90 degrees. These four positions are the ones used most often in CAD. It should be noted that the Zipcode Net can "generalize." That is, can recognize objects rotated by any angle close to one of the multiples of 90 degrees. To build in greater sensitivity, the system could be trained with objects rotated in ±5 degree increments.

The Prototype

USACERL's cell recognition system for MicroStation has three parts. The first part determines where the user is working and captures the screen

image surrounding the work area. The second part feeds the captured screen image to the Zipcode Net for recognition. The Zipcode Net then returns the indexes to the two cells that are most similar to what the user has drawn. The third part uses these indexes to bring the cell to the user's attention.

The Zipcode Net was programmed to be external to MicroStation with communication via a message-passing protocol. In this way, the Zipcode Net can run concurrently with MicroStation and avoid significant time delays for processing.

Capturing User-Drawn Objects

To be useful, the program has to allow the user to draw freely in a design window on the CAD system. Suppose the user draws three circles and four line segments in the window. Which group of circles and lines would constitute the object? The entity that the user is currently manipulating is obviously part of the object. However, what are the other parts of the object?

Two special characteristics associated with the CAD design process offered clues to this question. First, cells (objects) tend to be placed regionally. Therefore, entities close to the one the user is manipulating are considered part of the object. This characteristic is called "spatial proximity." Second, CAD users tend to finish drawing one object before starting another. This "temporal proximity" suggests that entities drawn recently should be included as the object.

The program does a series of mathematical calculations that take these two characteristics into account. The image defined by the results is captured. It is then converted into a 48 X 48 pixel bitmap image, converted to a standard size, and placed in the center of the input area before being fed into the Zipcode Net.

Displaying the Cells

After the neural net returns the two indexes for cells that most closely resemble the captured image, the program brings up the cells automatically. If the user thinks one of these cells is correct, he or she selects that cell, which is displayed on a "button." Each button shown is hooked to a special function that can automatically load the library, activate the cell shown, and invoke the "PLACE CELL" command. The user does not even have to know where the cell is located. However, the user can be shown where the cell resides if he or she wants to know for future use.

The current prototype program can recognize 23 cells that are used often in architectural floor plan design. The neural network was trained to recognize these objects. Figure 1 shows images that the user drew and Figure 2 shows the corresponding learned cells that were recognized correctly.

Understanding Between Humans and Computers

One way that people learn to understand each other is through "creating shared meanings." Research suggests that these shared meanings depend on having overlapping experiences, not on having exactly the same interpretations of symbols or using the "correct" symbols. It is quite possible for two people to have somewhat different meanings when they hear the word "car," but to have enough commonality to produce effective behaviors in certain contexts. If someone shouts "Car!" at a person crossing the street, almost everyone would respond by moving quickly to the nearest curb. In contrast, a person asked how long it takes to go from point A to point B by car might have a variable answer, depending on the individual interpretation of the word "car" (e.g., a Porsche or a Model T). These fine distinctions in meaning are sufficient for some purposes but not for others.

It is unlikely that a computer can experience a picture in the same way a person does. To a computer, a graphic is a collection of coordinates, points, and rules organized in a particular sequence in an identified place in memory. With this information, the computer can produce an image that a person can recognize as a specific object. The person can draw an object which the computer converts to coordinates, points, and rules and stores them in sequence. If the person and the machine are to share the meaning of a graphic, the experience of the graphic will no doubt be different. But if the user can show the computer the object he or she is thinking of and the computer can locate the object, display it for the user's selection, and retrieve it, an "understanding" has taken place.

Summary

CAD users in the Corps of Engineers encounter problems when they attempt to manually construct objects they would like to use in a design. The object-recognition system being developed by USACERL can recognize images that the user sketches on the screen; it then retrieves the two objects that look most like what has been sketched and allows the user to select the appropriate one. The object is placed into the design automatically.

This method of retrieving cells offers a comfortable option to users in that it is much like communicating with other humans. The system could eventually be trained to recognize the user's pattern of cell usage, which would increase the "partnering" opportunities even more.

The object-recognition system is currently a prototype that can recognize 23 cells. Eventually, the system will be able to recognize any set of cells as "trained" by the user.

For more information, contact the authors at USACERL, P.O. Box 9005, Champaign, IL 61826-9005, telephone (217)373-6729 or (217)352-6511, extension 361.

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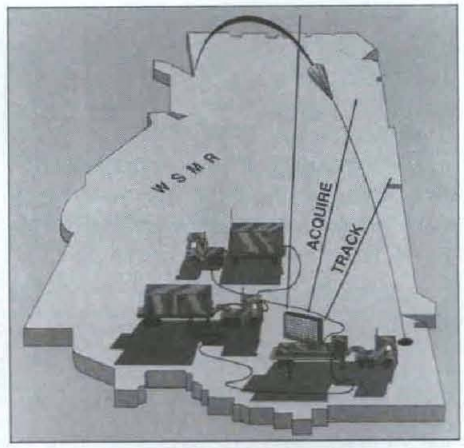
PROGRAM EXECUTIVE OFFICER— GLOBAL PROTECTION AGAINST LIMITED STRIKES, ARMY



GROUND BASED RADAR
The Ground Based Radar project, managed by the U.S. Army Strategic Defense Command, consists of a family of modular radars to support theater as well as global ballistic missile defense systems. The project is in the demonstration/validation phase and radars are planned for use at White Sands Missile Range, NM, and the U.S. Army Kwajalein Atoll in the Central Pacific.

PEO-GPALS

MG William S.C. Chen

MG William S.C. Chen holds a B.S.E. degree in engineering mathematics and an M.S.E. degree in aeronautical and astronautical engineering from the University of Michigan. He also holds an M.B.A. degree from Auburn University. His military education includes the Air Command and Staff College, Defense Systems Management College, and the Industrial College of the Armed Forces.

Chen is the first program executive officer, Global Protection Against Limited Strikes (PEO-GPALS) for the Department of the Army. The newly established PEO-GPALS is responsible for the development, acquisition and support for Army theater and national missile defense programs.

Chen assumes this assignment after having served as the commanding general, U.S. Army Missile Command (MICOM), Redstone Arsenal, AL. During Operations Desert Shield and Storm, he directed MICOM's acquisition and logistics support of Army missile systems in the largest deployment and combat use, ever, of Army missiles by U.S. forces. He has had experience in the operational use, program management, systems acquisition management and logistics support of missile and air defense programs.

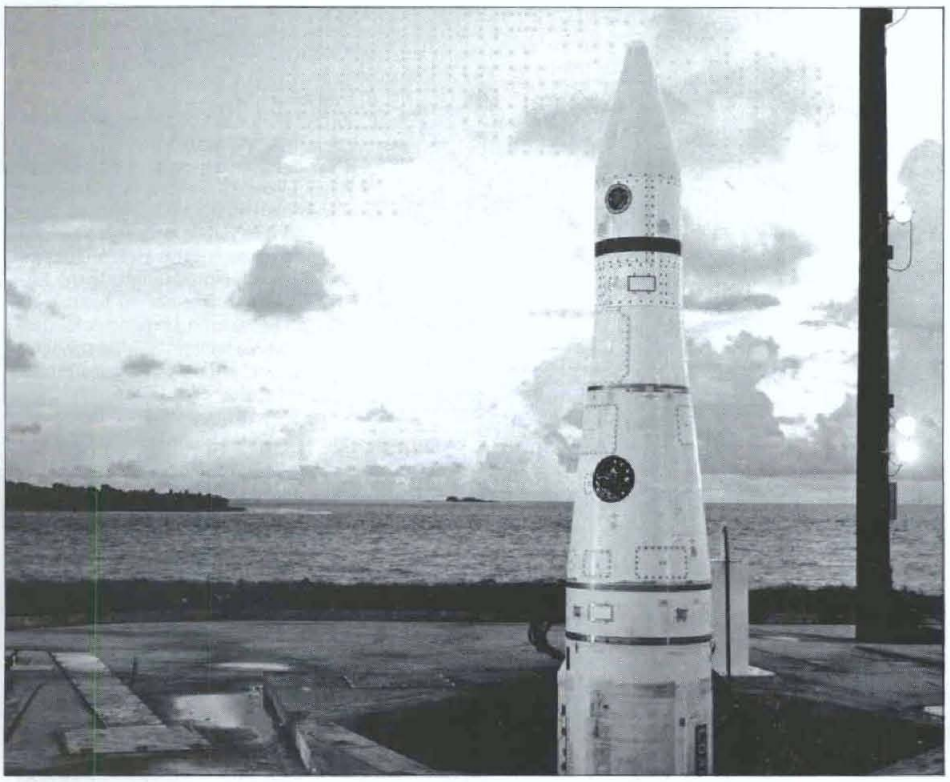
Other key assignments have included: director of program management oversight and assistant deputy for systems management, Office of the ASA(RDA); deputy director for weapons systems in the former Office of the Deputy Chief of Staff for RD&A, now ASA(RDA); operations research analyst, Program Analysis and Evaluation Directorate, Office of the Chief of Staff, Army; tactical officer Washington-Baltimore North American Air Defense Command (NORAD) Control Center/Army Air Defense Command Post; battery officer, NIKE HERCULES; project manager, CHAPARRAL; and project manager, Division Air Defense Gun; and program analyst, International Logistics Directorate, Office of the Secretary of Defense (Manpower, Reserve Affairs and Logistics). Chen has also taught weapons system acquisition and project management at the Defense Systems Management College. His overseas assignments have included Korea, Vietnam, Thailand and Laos. Chen is a recipient of the Distinguished Service Medal, Legion of Merit, Bronze Star Medal with Oak Leaf Cluster, Joint Services Commendation Medal with Oak Leaf Cluster and Army Commendation Medal with Oak Leaf Cluster.

Chen's management philosophy is based on decentralized management and total quality management. "I believe in decentralized management, at the same time centralized direction. I like to interrelate and communicate with my senior level managers. I've found through experience, that with this approach, I can better understand them and they can better understand my direction. I also believe in the need for detailed planning and attention to detail. Underlying this detailed process, regardless of the task, questions are raised, unknowns are raised. This allows us to focus on filling the holes and arriving at solutions. If you don't do this detailed look, managers will not know if they have problems. I also believe in the principles of TQM. Underlying this, we need to first understand the processes we're working with, so we can streamline these processes and provide for continuous improvement. We can then have a good understanding of the customer and attain customer satisfaction. Frequently in a large organization such as ours, we are our own customers."

Missions and Organization

The Army PEO-GPALS was established on July 29, 1992, as a result of a memorandum of agreement between the director of the Strategic Defense Initiative Organization (SDIO) and the services. This agreement strengthened the U.S. Army's ongoing commitment to the Strategic Defense Initiative effort to counter the threat of ballistic missile attack.

The GPALS architecture consists of theater missile defense, national missile defense and global missile defense segments. The Army is a major player in theater missile defense and national missile defense, including support of the initial deployment of a limited defense system for the continental United States.



GROUND BASED INTERCEPTOR
Building on successful Army technology for hit-to-kill intercepts in space, the PEO-GPALS is prepared to initiate competition for demonstration and validation of a GBI system. The effort includes an option to fabricate and deploy developmental interceptors at an initial national missile defense site. The objective of the demonstration/validation program is to produce a cost-effective, hit-to-kill, non-nuclear interceptor that can destroy long-range strategic warheads in space; while at the same time provide a continual infusion of advanced technology to guarantee growth and flexibility for the future.

Formation of a separate Army PEO-GPALS gives these SDI-funded programs emphasis within the Army acquisition structure. It also puts acquisition of all the Army GPALS elements under a single organization that works directly with the SDIO GPALS general manager. When SDIO shifted its focus from deterring a single massive Soviet missile attack to providing protection against limited ballistic missile strikes, the Army's missile interceptor and sensor projects remained key elements in the GPALS scenario.

Chen directs a headquarters staff at the Arlington, VA, location and the remaining bulk of his PEO staff in Huntsville, AL.

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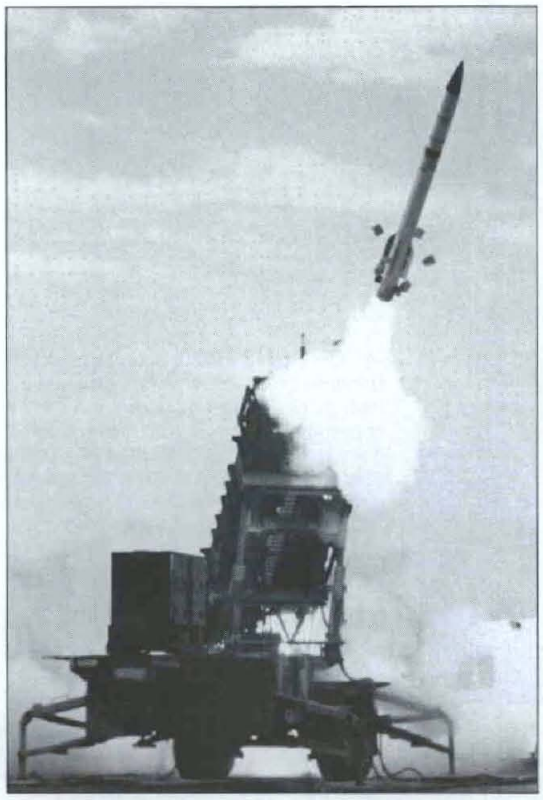
*Program managers are serving in an acting capacity until approval of the PEO-GPALS organization.

Army Theater Missile Defense Elements



EXTENDED RANGE INTERCEPTOR (ERINT)

The ERINT is a small, agile, hit-to-kill missile with an active seeker. It is a candidate for integration into the PATRIOT Air Defense System to provide enhanced lethality and firepower against a variety of targets. The ERINT launch canister will be compatible with the PATRIOT launcher, but will hold four times the number of missiles. Thus, the ready missile inventory is increased without increasing the force structure. The first two of eight ERINT flight tests were successfully completed in June and August 1992. Guided tests against ballistic tactical missile targets are on tap later and will be followed by tests against an aircraft-like drone and maneuvering missile targets.

PATRIOT

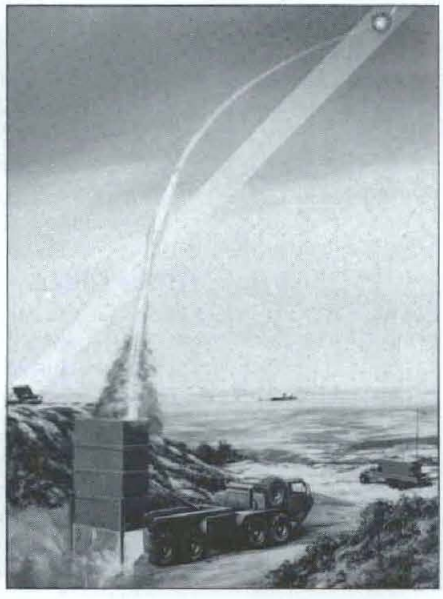
PATRIOT is a combat-proven, air defense system capable of countering aircraft, cruise missiles and tactical ballistic missiles. A cornerstone of the Army's high and medium altitude air defense architecture, it is now also an integral part of the GPALS architecture as well. Phased improvements to the PATRIOT radar and missile will provide increased lethality and expand defended areas against tactical ballistic missiles and improve performance against cruise missiles and aircraft. These improvements are part of the PATRIOT Advanced Capability Three program being managed by the GPALS-PEO and will ensure that PATRIOT maintains its edge over the advancing air and missile threat well into the future.

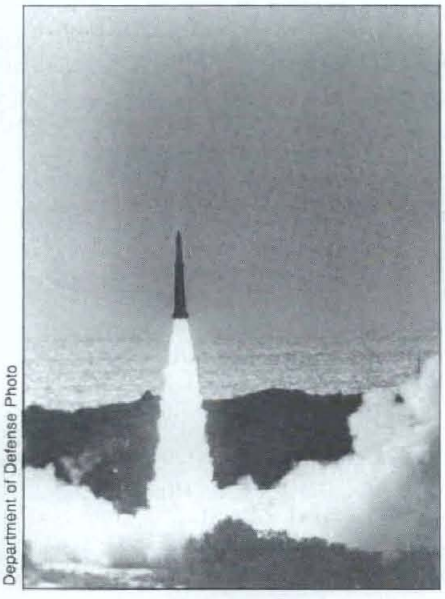
CORPS SAM

In the far term, GPALS calls for the addition of a corps level surface-to-air missile defense system. Now in the concept definition phase, CORPS SAM will be a survivable, lethal, highly mobile/transportable surface-to-air missile system with a high firepower-to-manpower ratio that can be deployed with forward, contingency or reinforcing forces. CORPS SAM will be effective against a variety of tactical missiles such as ballistic missiles, air-to-surface missiles, and anti-radiation missiles. It can also be used against air-breathing threats such as fixed and rotary wing aircraft, cruise missiles and unmanned aerial vehicles. Plans call for CORPS SAM to enter the active Army inventory around the turn of the century.

THEATER HIGH ALTITUDE AREA DEFENSE (THAAD)

The THAAD weapon system will be capable of defending critical military assets, troops and civilian population areas. It will provide an area defense against tactical ballistic missiles at high altitudes, furnishing an "upper-tier" overlay to lower-tier air defense systems. The transportable THAAD system, now entering a 48-month demonstration/validation program, will consist of missiles, launchers, battle management/command, control and communications and intelligence units, system common hardware, and a ground based radar (TMD-GBR).





Department of Defense Photo

ARROW

The ARROW Missile, an anti-tactical missile interceptor, is undergoing development by the U.S. and Israel. This missile is shown being fired from a test range in Israel to test the stability of the missile. Further tests of the ARROW are scheduled during the next year. The ARROW missile program is being jointly funded by the U.S. and Israel.

THE ARMY ACQUISITION CORPS: A CAREER DECISION FOR CAPTAINS

By CPT Dan Cottrell

The question is why a captain who has successfully completed command, is proud of his branch, and enjoys serving with soldiers should consider a career change? One that would take him from everything he knows and place him in a field where it appears the ink hasn't dried yet.

This is what I hope to explore and satisfactorily answer within the context of this article. An article which, in reality, is a written rationale of the decision I made.

Personal Reasons

Personal reasons to consider the Army Acquisition Corps (AAC) will obviously vary with each individual. For me, it was the opportunity to be challenged in a new and different manner. I was not bored with my basic branch of Armor. However, since my enlistment in the Army in 1979 all I ever wanted to do was to command a Cavalry Troop. Having done that successfully, I was in search of a new goal to strive for.

The goal of squadron/battalion command seemed distant and uncertain. I wanted to know of other possibilities which could provide me with a path toward a new goal, one as exciting and compelling as troop command.

I feel the AAC affords me that goal. It allows me the chance to be in the forefront of an entirely new program encompassing all branches of the military. It also permits a chance to be first in something new. This is an opportunity I enjoy.

There are some potential professional reasons for considering the AAC. However, I can honestly say that in a time of transition within the Army, it would be beyond my abilities to lay out an accurate assessment of all these reasons. I can say that from my perspective, the mere existence of a new corps offers exciting horizons for an Army career.

Additionally, in the legislation which created the AAC, Congress provided guidance on career progression for AAC officers. This specifies the time required in acquisition assignments necessary for consideration for "Critical Acquisition Positions."

Professionally, I feel that there are two ways to serve soldiers. One is the traditional career track leading to command at higher levels. A second, and I believe equally important, is that of a leader-manager in the Acquisition Corps. This involves managing systems toward the goal of placing the finest equipment in the hands of our soldiers.

A Candidate's View of the AAC

"Objective. Develop a dedicated pool of highly qualified military and civilian acquisition specialists to fill designated critical acquisition positions while ensuring that the development of systems reflects a balance between keen regard for operational realities and technical knowledge." — (PERSCOM Info Paper dated April 30, 1991)

What this means to me is that the AAC is an integrative approach. It uses

both military officers and civilians to ensure quality systems are developed for the Army of the future. By combining a military officer's operational experience and the technical expertise of civilians, this goal should certainly be achieved.

This is an opportunity to work in an area of great importance to the Army. An area which encourages professional development in many ways. Membership ensures opportunity for technical enrichment surpassing anything an officer could ever previously hope for.

The AAC provides a unique opportunity to complement tactical with technical proficiency. This is done by combining the skills developed through eight years of progressive branch assignments resulting in branch qualification and the future tactical training which service schools provide, with a technical proficiency in the systems of the future. This is the optimal opportunity to earn the title of a "tactically and technically proficient officer."

The Decision Process

The decision process to join the AAC begins with the assignment of a functional area (FA). I was assigned Research and Development (FA51). While awaiting word of my functional area duty assignment, I was made the proverbial "offer I couldn't refuse," a chance to go back to school for an MBA.

Many would jump at this. I had to think. As with all opportunities, there is a cost involved as well. The duty commitment of five years and six months was insignificant. The real cost was uncertainty. Representing the Armor Branch and developing weapon systems in the AAC sounded exciting. However, I was uncertain of a career path outside of Armor.

A driving force toward my consideration of the AAC was a conversation with someone I consider my mentor. He said that, "we need people like Dan Cottrell in acquisition. We need people who understand the soldier's perspective when it comes to acquiring and developing equipment for the Army of the future." Hearing that from a most respected source, feeling my talents were needed and always eager for a challenge, I jumped aboard.

Getting into an MBA Program for the fall, during late spring, was not easy. The assistance of the education folks at PERSCOM was tremendous. The University of Alabama's MBA Program staff was extremely helpful and eager for me to succeed. This was both necessary and appreciated under the circumstances I faced.

Almost immediately my commitment to this endeavor was severely tested. After scrambling to take the GMAT and get all required forms processed, I was on my way.

The challenge was more than I ever thought it would be. My first semester resulted in exactly one and a half days off. School or school work consumed the remainder of my time. I longed for a return to the 200 days in the field I was accustomed to.

My family was challenged as well. It is one thing to be gone to the field; it is quite another to be at home, but very busy. If it were not for a supportive Army family, willing to make sacrifices, this challenge might well have slipped into the "too hard to do box."

I feel confident in the analytical techniques and background my education provides me. I am also confident that my professional experience has well prepared me to appreciate the effects of equipment decisions on the level they impact most, the soldier. I am excited to be a candidate for a corps with requirements spelled out in its own Congressional legislation (The Defense Acquisition Workforce Improvement Act).

With all these positives how could anyone be apprehensive? If you were not, you would be less than truthful with yourself. A career change is always a difficult decision. Some apprehension is a natural consequence of this. However, an officer should explore different contexts by which he or she should complete their career.

I believe that the AAC is the appropriate context for the remainder of my Army career. I wish to be part of what LTG Cianciolo [retired former director of Army acquisition career management] vividly described as an "exciting program and an exciting field."

I also know that the hardest adjustment I have to make is being away from soldiers. I take counsel in the fact that my efforts in the AAC will focus on making better equipment for these soldiers. This will enable them to do their mission to higher and safer standards.

My commitment to the soldiers with whom I have had the honor of serving has been a major source of my motivation. A commitment to excellence, and not asking soldiers to do something I am not willing to do myself, are standards I bring with me. From all I have read and been told, this is what the AAC wants.

Conclusion

My decision to become an Acquisition Corps candidate required a lot of soul searching. I've attempted to detail the variables I considered.

To attempt to define the overall process in how I made my decision, I had to draw from several sources and I still fell short. I find it sufficient to say that it was decision making under uncertainty with a heavy reliance upon intuition or, in other words, a "gut feeling."

My decision to become an AAC candidate is an attempt at finding and selecting an optimal alternative. I believe that to do otherwise, in matters concerning my career, would be a disservice both to me and the Army.

The confidence gained by using sound reasoning and good analysis is hampered only by the uncertainty of the future. I am operating with the frame of mind that my operational experience and advanced education are the tools, and the AAC is the optimal alternative among competing opportunities. I look forward to the challenges ahead!

CPT DAN COTTRELL is the AAC Functional Area 51 captains assignments officer at PERSCOM. He has served both enlisted and commissioned service in USAREUR Cavalry units. Included among his various assignments is command of two units in the 11th Armored Cavalry Regiment. CPT Cottrell is a 1992 graduate of the Manderson Graduate School of Business at the University of Alabama.

DEVELOPING THE FUTURE SOLDIER SYSTEM

By Thomas A. Sklarsky

Introduction

The Army Science and Technology Program in soldier support is designed to enhance the soldier's winning edge with the use of state-of-the-art equipment and technology. Of paramount importance to the success of this science and technology is the development of the soldier system concept and the associated military benefits spawned from modern technology.

The soldier system consists of the individual soldier and the items or "component elements" that the individual soldier wears, carries and consumes. The chief of staff of the Army has expanded the definition to include all items and equipment that support the living and working conditions of soldiers in the field.

All the multiple components of the soldier system—the programs, organization, systems, technologies, and soldier types—interact and interrelate. Although the component elements are not as tightly interrelated as they would be in a traditional equipment "system," the interrelations and interactions among the elements are sufficiently linked, in purpose, function, and expenditures, to justify treating this aggregation as a major integrated system. The estimated funds spent by the Army on the components of what we have defined as a "soldier system" are $278 million per year in research and development.

Natick's Role

Numerous organizations and players at all levels affect the definition process and the related development and acquisition of soldier system equipment and clothing. The mission of the U.S. Army Natick Research, Development and Engineering (RDE) Center, Natick, MA, includes the technical development of individual equipment (such as the load bearing vest, laser and ballistic protective eyewear, sleeping system, field pack, and other items) and the efficient integration of every item the soldier carries, including items developed at other Army research facilities.

Not only is the Army faced with the challenge of managing a macro-engineering project consisting of research and development of subsystems, material management, innovative military engineering, and inter-facility coordination, but managing it in light of changing global environments and rapidly advancing technologies. Understandably, the soldier system is in transition and still developing.

SIPE

The challenge for all those involved in soldier support is to meet the goal of enhancing the operational effectiveness of the force, while providing effective threat protection and improved survivability for the individual soldier.

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threat protection and improved survivability for the individual soldier. With increased emphasis on low-intensity conflict worldwide, immediate attention must be placed on flexible, multifunctional soldier systems to support a variety of challenges. To accomplish these goals, the Natick RDE Center is leading an ambitious project, the Soldier Integrated Protective Ensemble (SIPE).

The SIPE is a science and technology program, based on the concepts and capabilities for future systems outlined in the Soldier Modernization Plan. The objective of SIPE is to develop, fabricate, and demonstrate a modular, head-to-toe individual fighting system for the ground soldier. The system provides improved combat effectiveness and enhanced survivability by providing protection against multiple battlefield hazards.

Advanced Technology Demonstration

Results of these efforts are being evaluated following an advanced technology demonstration at Fort Benning, GA which was completed on Dec. 4. Data collection is the responsibility of the Natick RDE Center. Representing the Training and Doctrine Command (TRADOC) is the U.S. Army Infantry School, Fort Benning, GA.

Due to the lack of a complete set of soldier system capability requirements, the current process to prioritize the technology for the soldier system has been primarily technology driven. The current Soldier Modernization Plan, combined with the Army Science and Technology Master Plan, represents a road map for addressing the concept of the soldier system.

Virtually all the technologies in the Army Science and Technology Master Plan, if developed to a sufficiently mature level, could enhance soldier system capabilities. In practicality, however, some technologies are likely to play a dominant role in the near term, such as chemical and biological sensors, expert systems, light weight power for electronics, materials such as composites, and microelectronics and optoelectronics.

Other technologies that are unlikely to mature sufficiently soon to enhance the soldier's capabilities in the near term include artificial intelligence, biomaterials, micro-climate cooling, modeling and simulation for the integrated soldier, pharmacologic aspects of neuroscience, variable complex task robotics, and biomaterials for chameleon-like camouflage.

It is possible to build upon the existing technology, both within and outside the Army, to considerably enhance the soldier's capabilities in the near term.

Expansion and Integration

Expansion and integration are the two key words that are considered in the development of the science and technology in support of the soldier. It is possible to build upon the existing technology, both within and outside the Army, to considerably enhance the soldier's capabilities in the near term. For example, by exploiting state-of-the-art microelectronics, and digital, sensor and materials technology, the soldier's capability can be significantly enhanced in such areas as navigation; communications, command and control; and aural sensors and protection.

It is also essential that systems integration receive careful consideration in the formulation of an effective science and technology. The interdependence of many of the technologies must be considered in the science and technology supporting the soldier system.

The soldier of the 21st century will be acting in a new and changing environment. The tools of soldiering (i.e., the technologies supporting command and communications, mobility, lethality, survivability, and sustainment) are so different that the very nature of warfare and threat, and ultimately even the strategies of defense, may be radically altered.

As a consequence of enhanced capabilities, the mission, role, and function of today's soldier will be significantly enlarged and changed. As we move forward, we must match technology vision, and therefore, science and technology, with the soldier's inherent capabilities.

Conclusion

Significant expertise relevant to the soldier system resides outside the Army in other services (e.g., the Air Force integrated helmet display) and agencies such as NASA (expertise on equipment integration), Defense Advanced Research Projects Agency, and Department of Energy laboratories. Other sources of relevant technologies may be found in industry, academia, and with our allies. There is insufficient coupling with these outside resources to leverage applicable investments into Army science and technology. Thus, achieving an integrated science and technology and applying the leveraging required to sustain it, is not an easy task.

To assist in this transition process, new approaches must be taken in reviewing the interactions between soldier, soldier systems, and soldier material. The need for this perspective provides the justification for, and a framework around which soldier support must be built. In this regard, a recent review by the U.S. Army Science Board was brought to closure with Dr. Christopher Green, team leader, stating that the overall presentation of Natick's business plan was, "Just perfect, a remarkable job and just what we needed to hear."

THOMAS A. SKLARSKY is manager of the Scientific and Technical Information Program at the U.S. Army Natick Research, Development and Engineering Center. He attended the University of New Haven and the University of New Mexico and holds degrees in physics and electrical engineering. His memberships include the Society for Technical Communication, Association for Business Communication, and the Society for Scholarly Publishing. He also organizes the Natick Science Symposium, which is held every two years.

THE ARMY MATERIEL COMMAND'S R&D INITIATIVES IN CENTRAL AND EASTERN EUROPE

By Michael F. Fisette
and MAJ Allan Trawinski

Editor's Note: This article was written prior to the formal division of Czechoslavakia into two separate states, which was set to occur Jan. 1, 1993.

Background

For 45 years following the end of World War II, the U.S. Army was geared to defend the West against a possible onslaught by the forces of the Warsaw Pact. Anyone who had served in Europe during this period knew the scenario well. The threat was formidable. The armies of these countries were well-trained and well-equipped. Their military R&D efforts consumed a large share of their national budgets. The military hardware that they fielded often served as the baseline against which the United States developed much of our own.

In 1989, the "Cold War" abruptly ended. It was an exciting time for personnel in the U.S. Army Materiel Command (AMC) field office in London, the U.S. Army Research, Development and Standardization Group—United Kingdom (USARDSG-UK), who had a ringside seat as the Berlin Wall fell. Seizing the initiative that the new peace in the East may have to offer, they immediately began a series of trips to the region, specifically to Poland, Hungary, and the Czech and Slovak Federal Republic (CSFR) in order to establish R&D contacts, investigate technologies, and assess the potential for possible future R&D cooperation that might be of benefit to the U.S. Army.

Following a series of positive reports from USARDSG-UK about those exploratory visits over a two-year period,

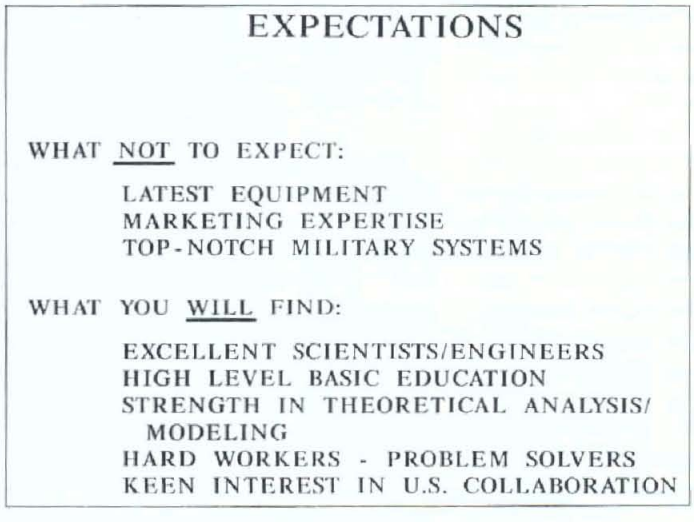


Figure 1.

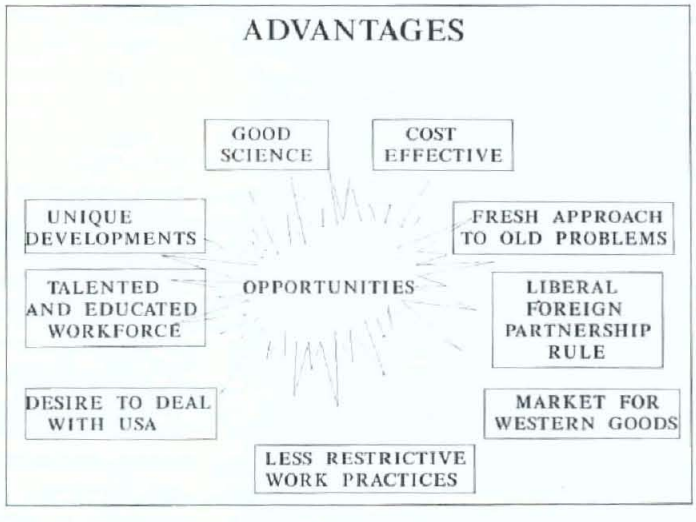


Figure 2

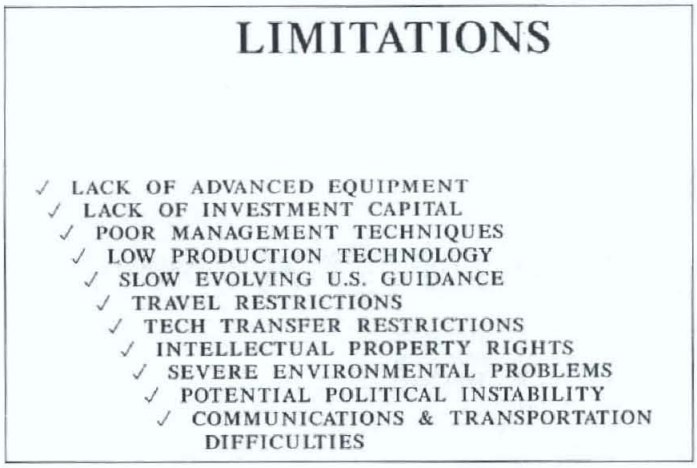


Figure 3.

Figure 4.

HQ AMC planned a follow-up visit by a team of technical experts from the U.S. to Poland, Hungary and CSFR. This visit took place from May 25 to June 1, 1992. The team visited 35 R&D activities in seven different cities and came away with 30 various proposals for possible near term cooperations for evaluation.

Discussion

We shall begin here with just a quick geography lesson. There are two regions in the territory of the former Warsaw Pact. Eastern Europe consists of the republics that made up the former Soviet Union (FSU). The people in the countries to the west of the FSU refer to themselves as Central Europeans. For convenience sake, we have further distinguished Central Europe into the Northern Tier (Poland, Hungary and CSFR) and the Southern Tier. To date, our focus has been mostly with the Northern Tier countries because these countries are viewed as being more stable—further along the road to democratic and economic reforms, more developed industrially and commercially, and traditionally more western in their outlook. Hence, the Northern Tier countries are viewed as being more likely candidates for near-term opportunities than the Southern Tier countries, which is not to say that the Southern Tier countries should be totally disregarded, because they also have some unique capabilities to offer.

Part of the problem that exists in doing business with these countries is our own lack of knowledge about them after so many years of having little or no open contact with them. Figure 1 addresses what one can expect to find, and not to find, in the Northern Tier region.

Due to restrictions imposed on these countries during the past decades, and their own lack of hard currency, their access to obtaining the latest in Western technology was limited. Much of their equipment is old and mostly of Soviet design. They lack the sophisticated computer hardware and software that we have in our R&D facilities. However, as a result of that situation, their scientists and engineers have become very adept at developing unique "long-hand" analytical and problem-solving skills. One could well equate the situation in this region to roughly the same as existed in Western Europe following World War II and into the mid-1950s. With foresight, we could see that our relationships with these countries in 20 years would be the same as those we have with Western European countries today. We only need to marry up our advanced technology and resources with the theoretical sophistication and creativity they possess.

Figure 2 depicts the advantages in opening the doors to do business with these countries. As already mentioned above, all of these countries possess a corps of scientists and engineers who have a tradition of excellence in many fields of endeavor despite the resource constrained environment that they have been forced to work under. They have learned how to maximize resources. A little foreign money goes a very long way over there. The average monthly salary for a first class scientist or engineer in one of these countries is only about $200–$400; for a worker in a defense-related industrial facility, far less.

In eagerness to establish market economies, they lifted most of their old commercial and customs restrictions and now offer numerous incentives for Western businessmen to invest in their industries and take profits out of country. Joint venture, partnership, and outright foreign ownership rules are very liberal.

With their different, but not to say "lax" health and safety laws to date, some R&D activities that cannot be conducted in the West or, are cost prohibitive, could be done for us over there.

With the end of the Warsaw Pact, these countries have been busy redefining their military doctrine and want to replace their current Soviet equipment, in the next generation, with Western equipment. In fact, they are attempting to convert some of their defense industries into producing consumer goods. As these countries build up hard currency, an attractive two way street could certainly develop between us.

It cannot be overemphasized that all of these countries are extremely eager to cooperate with the U.S. and have been very honest in all discussions so far. USARDSG-UK has already helped to obtain four Bobrawa laser warning devices that mount on combat vehicles from Poland for CECOM to evaluate. Each one costs only $6,500.00.

The above does not imply that there are no problems. Figure 3 lists some of those limitations. Keep in mind that up to just over two years ago these countries were our main adversaries. They

do lack modern equipment and facilities and need a large influx of capital investment to achieve Western standards in many respects. Prime examples are their poor communications and transportation infrastructures. One cannot simply place an overseas telephone call from there, nor drive between distant cities, as is done in the United States or Western Europe.

Following more than 45 years of a socialistic economy, management and work practices are out of step with those of the capitalistic West. A generation of training is needed. Finally, we must still be very careful to protect the potential unauthorized transfer of sensitive technologies since those countries continue to undergo a process of purging their past, hence the apparent slowness in lifting all of the policy restrictions that our own government had in place.

Figures 4 and 5 list technical areas of potential opportunities, by country, that may be deemed worthy of further exploration by AMC. These are not, however, all-inclusive lists. Rather, they are based on a limited number of visits and reports on technology areas of potential mutual interest and benefit.

The Future

We must move forward in a cautious manner, and recognize that the previous situation (to include existing policies) can't be changed overnight. AMC proposes the following R&D strategy:

- Continue the technical contacts between personnel in our countries through selected reciprocal visits;
- Conduct in-depth technical assessments of their capabilities by small teams of experts spending the requisite time in their respective facilities;
- Fund small (low dollar amount) basic research proposals;
- On a case-by-case basis, update outmoded regulations that still put restrictions against these countries;
- Subject to necessary approvals, establish master data exchange agreements with selected countries with the goal being to write specific annexes in programs such as nuclear, biological, chemical defense;
- Continue the search for off-the-shelf non-developmental items, such as the Bobrawa laser detectors, for weapons evaluation purposes.

Summary

Our president has stated that we won the "Cold War." That being the case, it is now in our own best interest to quickly capitalize on those benefits that the peace might bring. We owe it to ourselves to completely explore the opportunities for cooperative R&D efforts with these former hostile nations. This is in keeping with other aspects of our national policy towards the region to help those countries along the road to political and economic reforms. This will ultimately strengthen their friendly ties to us and insure a peaceful future between us.

One final aspect should be noted. Other Western countries, such as Germany, France, Italy and Japan, have been very quick to adapt to changes in the region and are already heavily engaged in activities there. The U.S. needs to pursue this program with vigor or it may be left out altogether.

MICHAEL F. FISETTE is the assistant deputy for international cooperative programs at Headquarters, U.S. Army Materiel Command. He was head of the delegation that visited Poland, Hungary and CSFR from May 25 to June 1, 1992. He previously served as the assistant deputy chief of staff and deputy program executive officer for ammunition. He has years of acquisition experience in project management offices, and has an engineering degree from the University of Massachusetts, a master's degree from Florida Institute of Technology, and is a U.S. Army War College graduate.

MAJ ALLAN TRAWINSKI is currently the AMC International Cooperative Programs staff officer responsible for emerging activities with Central Europe and the former Soviet Union. He spent the previous four years with USARDSG-UK where he initiated the series of R&D contacts in the region, having personally made 12 visits to the different countries in the region. He has held a variety of command and key staff positions in Field Artillery units in Germany, Korea, Alaska and CONUS. He is a graduate of the Command and General Staff Course and has completed the Materiel Acquisition Management Course.

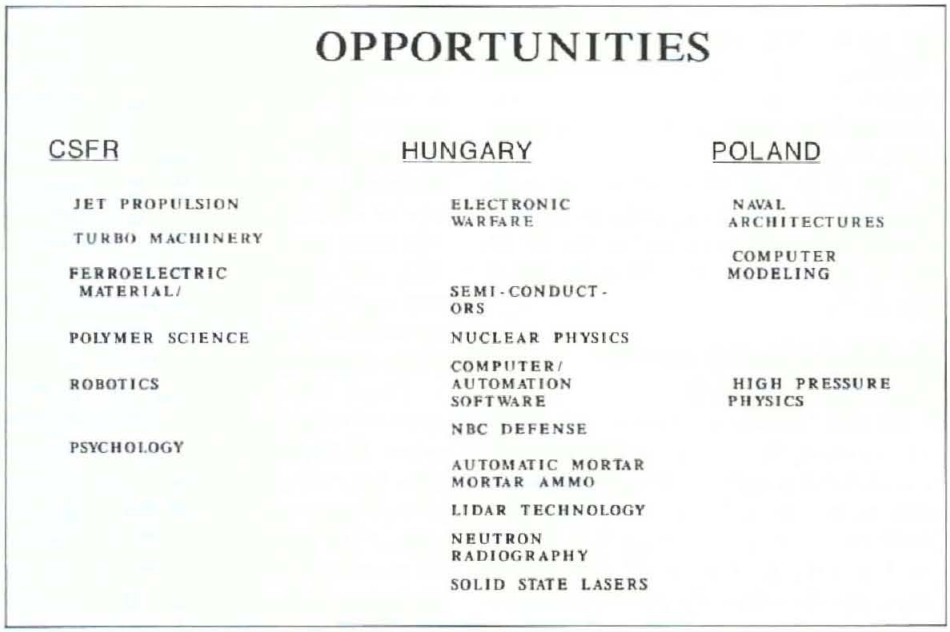


Figure 5.

IS THERE A ROLE FOR THE RESERVE COMPONENTS IN THE ARMY ACQUISITION CORPS?

By COL James L. Carney

This article reviews the purpose and function of the Army Acquisition Corps (AAC) and whether Army Reserve (USAR) and National Guard (ARNG) acquisition officers should also be members. The key issues are:

- Will participation in the Corps significantly enhance acquisition expertise;
- Is such enhancement needed for members of the reserve components (RC); and
- Should requirements be the same for both the active component (AC) and the RC.

Background

In his Defense Management Report of July 1989, Secretary of Defense Richard Cheney recommended establishing a dedicated corps of acquisition specialists within each military service. By early 1990, Secretary of the Army Michael Stone and then Chief of Staff Carl Vuono had endorsed the idea and directed creation of an Army Acquisition Corps (AAC).

The plan called for officers to enter the AAC as senior captains or majors, and for civilians to enter at the GS-13 level. There are no enlisted positions in the AAC.

Reserve Components Are Not Invited

In 1989-90, most of the emphasis in developing the AAC was on systems acquisition through the Program Executive Office (PEO)/Program Management (PM) Office structure, which had very little interface with the RC. There were no Individual Mobilization Augmentation (IMA) positions in any of these offices (and still none today). Out of 52 active Army organizations with designated AAC positions, only 14 had IMA positions with an AAC-related specialty. Seventy-seven of these positions were specialty coded "Research and Development, General" (51A), "Test and Evaluation" (51B), or "Combat Developments" (51C), and 44 were coded 97A, "Contracting and Industrial Management." There was one 53C, "Automation Management," which is the designated AAC specialty code.

Of the total of 122 IMA positions with AAC-related specialties, 75 were in the Army Materiel Command (AMC) and its major subordinate commands, 39 in the Office of the Assistant Secretary of the Army for Research, Development and Acquisition (OASARDA), six at the U.S. Army Logistics Management College (USALMC) and two with the U.S. Army Space Command.

The USAR's drilling Troop Program Unit (TPU) structure includes procurement positions, but none directly involved in the RD&A area. As of October 1990, there were 82 TPU positions in CONUS authorized in functional area (FA) 97, including four colonels, six lieutenant colonels, 40 majors and 32 captains.

Active Guard/Reserve (AGR) officers (full-time reservists) in the USAR with acquisition-related specialties currently number 11, with 10 in procurement and one in R&D. Five of these positions are located in OASARDA.

The Army National Guard, which has no IMA program, identified four AGR officers with AAC specialties, all 97s. In addition, the ARNG has two 97A LTC positions in OASARDA, only one of which is filled. However, the National Guard, in addition to a large number of purchasing and contracting civilians, has 54 National Guard United States Property and Fiscal Officers (USP&FO). These individuals are all colonels on full-time Army or Air National Guard duty occupying 97A positions and having significant responsibilities for acquisition and property disposal within their respective state or territory.

These numbers do not include reservists who occupy automation positions. As already noted, the AAC-related specialty for automation acquisition is 53C. There are a fairly significant number of 53C positions in the RC. Which of these are acquisition-related is undetermined at this point, but, certainly, some are.

In accordance with the system

manager concept of the AAC, all military members were required to attend the 20-week Program Managers Course at the Defense Systems Management College before they could be certified as fully qualified AAC members.

Given the almost complete lack of involvement of the RC in the PEO/PM business and their predominate focus on purchasing and contracting, rather than R&D, there appeared to be little justification for including them in the AAC. This conclusion was supported by the Army's decision to exclude many of its AC procurement and contracting officers from the Corps.

Defense Acquisition Workforce Improvement Act

The Army's initial narrow approach changed dramatically with passage of the 1991 National Defense Authorization Act on Nov. 5, 1990. Included in the Act was a section called the Defense Acquisition Workforce Improvement Act (DAWIA), P.L. 101-510, 104 Stat 1656, Sections 1201-1211, now codified in 10 U.S. Code 1701-1764.

The DAWIA applied a very broad brush in defining the scope of defense acquisition. The narrow focus on system managers was out. In was a wide sweep of "all acquisition-related positions" in 12 areas, including such major career fields as systems planning, research, development, engineering and testing; procurement, including contracting; logistics; and industrial property management. There is even a catch-all for acquisition-related positions in management headquarters activities and support activities.

Following enactment of the DAWIA, there was no longer any question whether all of the Army's senior 97A procurement specialists would be in the AAC. They would have to be. This was because the statute mandates that as of Oct. 1, 1993, all "critical acquisition positions" be filled only by members of the service's acquisition corps. Critical acquisition positions are defined in the law as any acquisition position at the grade of lieutenant colonel (05) and above for military, and GS-14 and above for civilian positions.

The DAWIA's expansive approach also has major implications for the reserve components. In terms of the broad acquisition policy thrust of the DAWIA, it seems clear that the reserves should be included. Many reserve officers would have meaningful acquisition responsibilities upon mobilization. Several were sent to perform contracting officer duties in support of Operation Desert Shield/Storm. There are numerous procurement slots within the TPU structure. A number of full-time AGR officers, plus those 54 USP&FO Guardsmen, have important acquisition responsibilities, at least if viewed broadly to include industrial base management, reserve equipment acquisition and distribution, and Congressional coordination.

When one considers the specific provisions of DAWIA, however, it seems equally clear that Congress did not intend its provisions to apply to part-time soldiers. Language which specifically included reserve officers was omitted prior to enactment. The rest of the statute is obviously directed to full-time acquisition careerists. For example, the requirement in section 1722 for coherent career paths to the "most senior acquisition positions" and for performance appraisal reviews by superiors in the same acquisition career field seem well removed from the limited acquisition mission and force structure to be found in the USAR and ARNG.

To design career paths which link the captain-major procurement positions in TPUs with the IMA contracting and RDA positions at the lieutenant colonel and colonel levels in AMC and OASARDA would require a dramatic change in reserve officer management. It seems unlikely that Congress intended such an effect after removing language which explicitly applied the act to the reserves.

Other provisions of the DAWIA are also inapplicable or even incompatible with USAR/ARNG implementation. Section 1731 requires, in effect, that promotion rates for Acquisition Corps officers be at least equal to rates for line officers in or below the zone. This could apply to reserve promotions as well except that there are no zones for USAR officers being considered for promotion.

Most telling of all, however, is section 1734 which requires that any person assigned to a critical acquisition position (any military acquisition position at the grade of lieutenant colonel or higher as of Oct. 1, 1993) must agree to remain on active duty in that position for at least three years. This obviously cannot apply to reservists who generally serve on active duty only two weeks per year.

Other requirements in section 1734, such as the five-year assignment review and rotation policy, the centralized job referral system and the interservice exchange program, also seem incompatible with non-full-time service.

OSD Says Yes to the Reserves

There are three key OSD regulations which implement the DAWIA and define DOD responsibilities and authority for managing the DOD acquisition workforce. These are *DoD Directive 5000.52, Defense Acquisition Education, Training, and Career Development Program,* Oct. 25, 1991; *DoD Manual 5000.52-M, Career Development Program for Acquisition Personnel,* Nov. 1991; and *DoD Instruction 5000.58, "Defense Acquisition Workforce,* Jan. 14, 1992. All of these regulations expressly state that their provisions are applicable to the reserve components of the military departments, except that DODI 5000.58 provides that "the National Guard is excluded from designating critical acquisition positions outside National Guard Bureau Headquarters." This was apparently intended to remove the 54 USP&FOs from the provisions of DAWIA and its implementing regulations. Its effect, according to the Office of the Assistant Secretary of Defense for Reserve Affairs, is to define positions outside NGB headquarters as not requiring fill by persons in the acquisition workforce. It is not clear what rationale supports the exclusion because the DAWIA and DODI 5000.58's definition of a critical acquisition position seems to admit no exceptions.

Other than DODI 5000.58's National Guard exception, none of the three DOD regulations significantly distinguishes between members of the active and reserve components. The regulations establish uniform requirements for all DOD elements, allowing limited discretion to the services, generally in those areas in which the DAWIA permits discretion. For the most part, therefore, the RC must play by the same rules as the AC, despite the reserve components' substantially greater limitations in time, resources and position structure.

For active component officers, entry into the AAC is an irrevocable career decision. Future assignments, training and expertise will all center on acquisition. For the reservist, however, this dedicated, centralized approach raises some difficult issues. For example,

Reservists who are mobilized must be able to perform their duties with the requisite level of expertise, in the field of acquisition as elsewhere.

reservists have generally been free to leave their reserve assignments whenever they wish, commonly for such reasons as relocation or change of civilian job. As they move about the country, reserve officers routinely change their military specialty, branch affiliation, or even component to fit themselves to different TPU vacancies in their new locations. This seems irreconcilable with a career pattern which conceptualizes a single, centrally-managed, progressive career track in acquisition.

Even AGR officers will not be immune from these difficulties. Although available for extended schooling and single tracking, they are limited by law to positions which are connected with organizing, administering, recruiting, instructing, or training the reserve components. Since comparatively few acquisition positions can be so characterized, it will be difficult, if not impossible, to design coherent AGR career paths in acquisition.

Conclusion

This article began by asking whether there is a role for the reserve components in the Army Acquisition Corps. I believe there is. Whether an acquisition career program like the AAC will improve acquisition expertise is no longer open to question. DOD and Congress have long since concluded that it will. Reservists who are mobilized must be able to perform their duties with the requisite level of expertise, in the field of acquisition as elsewhere. Full-time reservists with duties in acquisition have a peacetime need as well for such expertise. This logically points to participation in the acquisition training and careerist aspects of the AAC, as well as adherence to DAWIA's minimum educational and experience qualifications. However, there is little justification for imposing the same career progression and management requirements upon both the AC and RC. In so doing, the DOD regulations gloss over fundamental differences between the full-time force which has full responsibility for its acquisition programs and the part-time force which has a very small share in that responsibility. Accordingly, the following actions should be taken in the sequence shown:

- DOD should amend DODD 5000.52, DOD 5000.52-M and DODI 5000.58 to either specifically exclude the reserve components of the military departments or limit their requirement to meeting DAWIA's minimum experience and education standards.
- The Army should review all acquisition-related positions in its reserve force structure and determine which ones to retain as acquisition assignments and which ones to change to another specialty code or perhaps delete entirely. Acquisition training and experience requirements for retained positions must consider both peacetime and wartime responsibilities.
- The Army should determine what training requirements are appropriate for individual reservists in the acquisition field and ensure that appropriate resident/correspondence courses are available at DSMC and USALMC.
- The chief, Army Reserve should establish individual career guidelines for USAR officers in the AAC/RC, incorporating movement between TPU and IMA assignments, but also allowing reservists to withdraw from the acquisition field at any stage of their career. Similarly, qualified officers should be permitted to fill acquisition positions at any grade level if they can satisfy the AAC/RC position criteria, even if previous assignments have not been in acquisition.
- A similar career approach should be used for AGR officers, not restricting them to AAC single tracking as the active component does, but laying out a sufficient number of acquisition assignments to permit promotion to the grade of colonel. If such a career path cannot be rationally designed, certain AGR positions may have to be opened to individuals who acquire the necessary expertise in their civilian careers or while on regular active duty.
- A full-time AGR position at the lieutenant colonel level should be established within the Office of the Director for Acquisition Career Management, possibly in the Army Acquisition Executive Support Agency, to ensure that AAC changes and enhancements are appropriately mirrored in the AAC/RC.

The bottom line is that as of Oct. 1, 1993, the DAWIA and DOD regulations become fully applicable to all military acquisition positions.* The challenge before the Army today is to ensure that USAR and ARNG officers are appropriately trained and certified by that date.

*10 USC 1737(b) permits a six-month "grace period" before individual waivers are required. This would extend the "drop dead" date for AAC certification of RC members until April 1, 1994.

COL JAMES L. CARNEY is director for reserve affairs for the assistant secretary of the Army (research, development and acquisition), a position he has held since July 1990. He holds a J.D. degree from Harvard Law School and is a 1987 graduate of the U.S. Army War College.

Conceptualization of the planned WRAIR facility.

NEW WRAIR FACILITY PLANNED

By COL C. Fred Tyner, MC

Construction will begin soon on a facility that will enable the Walter Reed Army Institute of Research (WRAIR) to vacate the substandard converted classroom building it has occupied since 1923. Planned for a staff of 850 and at a cost of $147.5 million, the new facility will be located at the Forest Glen section of the Walter Reed Army Medical Center in Silver Spring, MD.

Ground-breaking is scheduled for the spring of 1993, with occupancy planned for early 1997. Encouraging signs indicate that the project will remain on schedule. For example, revisions of the master plan for Forest Glen were approved recently by the Maryland and National Capital Area planning commissions. In addition, strong joint Congressional support, in the FY92 Appropriations Bill, has resulted in rapid movement of the design process. Construction is currently on hold, pending receipt and analysis by Congress of the Defense Department's long-term plans for the restructuring of its medical facility infrastructure.

Founded in 1893 as the Army Medical School and called the nation's first school of public health, WRAIR has contributed to medical readiness and public health. Achievements include development of the technique for using chlorine to purify drinking water, determining the modes of transmission of yellow and typhoid fevers, developing the first standard test for syphilis, founding the science of wound ballistics, developing the first large-scale blood-banking system, proposing the Army's COHORT system, and conducting the world's largest and most diverse drug and vaccine development program on tropical and third-world diseases that pose significant threats to deployment. The WRAIR also leads DOD's program on prevention, diagnosis and treatment of human immunodeficiency virus (HIV) infection.

In addition to its activities in Washington, DC, the institute maintains permanent laboratories in Korea, Kenya, Brazil, Thailand and Germany. It is also a party to about 20 percent of the Army's Cooperative R&D Agreements and was named Laboratory of the Year in 1984 and the Army Research and Development Organization of the Year in 1988.

Efforts to find a new home began in the 1960s, but floundered due to lack of funding. The push for a new site was revived around 1985, due to serious deterioration of the current facilities in Building 40 on the main grounds at Walter Reed. Concerns include occupant safety, environmental hazards, and appropriate care of research animals.

The current plan for new construction accelerated with the added requirement to accommodate the Naval Medical Research Institute's infectious disease research program under the Base Realignment and Closure Act. Another factor accelerating the plan was completion of an economic analysis showing that renovation of the existing facilities would be prohibitively expensive.

The new WRAIR facility will be located on a dramatic site overlooking a wooded glen. Most of the laboratories will have windows, affording natural light. The decision to locate the new WRAIR at the Forest Glen section of Walter Reed was based on the availability of a long-term site adjacent to six current WRAIR buildings. This allows the new laboratory to be about 20 percent smaller than if it were built elsewhere.

The New York architectural-engineering firm of Haines, Lundberg and Waehler is currently designing the new WRAIR facility. The project is under the supervision of the Army Corps of Engineers, the Army's Health Facility Planning Agency, and the Department of Defense Medical Facilities Office.

The new building will have a below-ground, self-contained animal facility; three floors above-ground for laboratories, offices and research activities; and a fully-filtered, non-recirculating air system. Laboratories and scientist offices will be organized in standard-sized modules that, combined with a between-floors utility distribution system, will provide maximum flexibility to accommodate current and future military medical research and development as program evolution and consolidation continue.

Externally, the building will feature red brick with pre-cast concrete trim, consistent with the Walter Reed Army Medical Center Installation Design Guide.

After a thorough program review confirmed WRAIR's space requirements, a 475,000 gross square foot building was approved. It will be unusually efficient compared to civilian biomedical R&D facilities. Both the space per occupant and the construction cost per unit area will be below national norms. Usable (net) space will be an above average fraction of the total area.

The new institute's final total area will be nearly 10 percent less than is currently available, but will be offset by a much improved floor plan of labs, support spaces and offices.

Ground-breaking for the new WRAIR will be a key part of the centennial celebration of the founding of the institute. With the opening of this magnificent facility, the WRAIR will finally have a state-of-the-art facility to house its cutting edge research programs and highly skilled personnel. It will allow WRAIR to remain a key resource able to respond to emerging biomedical threats throughout the 21st century.

COL C. FRED TYNER, MC, is deputy commander of the U.S. Army Medical R&D Command. He served previously as director of the Walter Reed Army Institute of Research.

Composite Armored Vehicle...

TARDEC ENTERS THE COMPOSITE AGE

By CPT Richard Brynsvold

Introduction

What do you think of when you hear the words armored vehicle? What generally comes to mind is a massive vehicle, weighing up to 70 tons, heavily protected against ballistic events (tank rounds, shrapnel, etc.), and whose fuel usage is measured in gallons per mile as opposed to miles per gallon. Engineers at the U.S. Army Tank-Automotive Command's Research, Development and Engineering Center (TARDEC) are trying to change that perception with the development of the Composite Armored Vehicle Advanced Technology Demonstrator (CAV ATD).

The CAV ATD will show that it is possible to build an armored vehicle with a lightweight composite material structure that combines rapid worldwide deployability and survivability. These are key issues that were highlighted during the Desert Storm and Desert Shield operations—making it clear that the Army needs a vehicle which provides protection and can quickly get to a threat anywhere in the world.

The CAV ATD program is divided into two phases. The Phase I Composite Technology Survey and Integration Study is a preliminary design concept study, while Phase II is an in-depth development of design alternatives and construction and testing of the CAV ATD. The projected weight range for the CAV ATD is 17-22 tons (the M2/3 Bradley Fighting Vehicle weighs more than 30 tons and the M1 Abrams Main Battle Tank exceeds 65 tons). The integration of composites and signature management techniques will enable the attainment of the weight goal. Also being incorporated into the CAV ATD (but not developed under the CAV ATD program) are advanced lightweight armors, a two-man crew station, and current state-of-the-art propulsion and suspension systems.

The Composite Armored Vehicle Advanced Technology Demonstrator will show that it is possible to build an armored vehicle with a lightweight composite material structure that combines rapid worldwide deployability and survivability.

Phase I

Phase I study contracts were recently awarded to FMC Corporation and General Dynamics Land Systems Division. The contractors will investigate a wide variety of design and composite material approaches, perform a trade-off analysis to identify their strengths and weaknesses and conduct initial assessments of associated issues such as manufacturing, producibility, cost, and durability.

The reason for investigating a variety of designs is that this is the first composite combat vehicle structure to be designed from the ground up. The traditional structure of an armored vehicle is semi-monocoque (think of monocoque as an eggshell structure), thick section metal that also acts as armor (additional armor can also be attached). This traditional structure is evident not only in combat vehicles throughout history but also in the current M1 Abrams Main Battle Tank and M2/3 Bradley Fighting Vehicle. However, there are a variety of structural designs, which, when combined with alternative ways to use armor and signature management techniques, give some 30–40 or more possible designs (see figure). The goal is to determine the design that optimizes the performance of the CAV ATD through the integration of composite materials and signature management techniques.

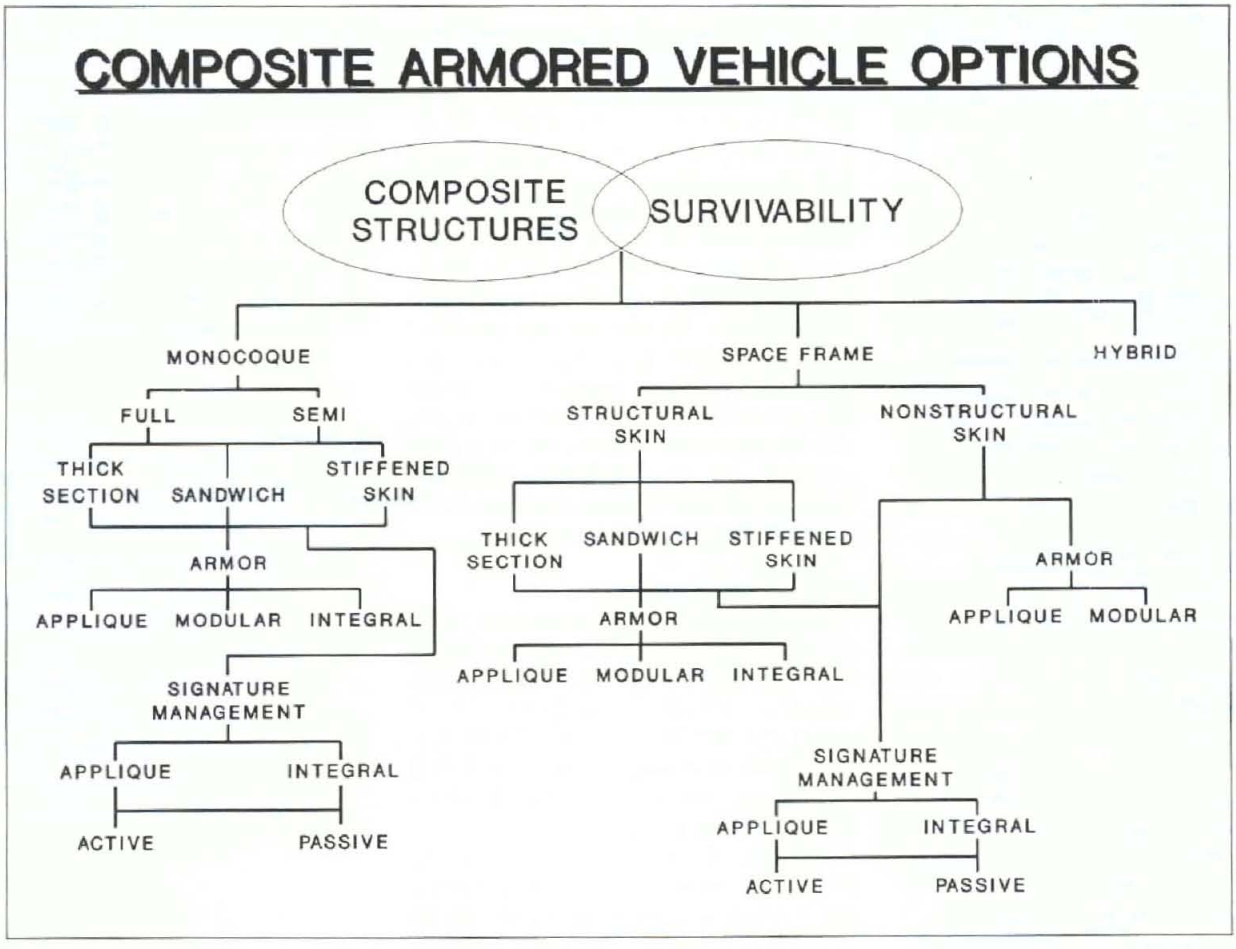
The contractors are taking a "clean sheet of paper" approach to the CAV ATD design which will enable them to explore the wide variety of possible designs. An example of one of the possible CAV ATD designs could consist of a hybrid space frame—semi-monocoque structure. Over the space frame portion could be a stiffened skin with modular armor and integral and applique signature management components. The semi-monocoque portion could be thick skin with built in signature management aspects and armor capabilities.

Another reason for taking the clean-sheet-of-paper design approach is that most ground vehicle composite material work to date has consisted of material substitution—substituting the composite material for the metal already in the structure. The result is that there has been little or no opportunity for redesign. Since composites have different properties than metals and are fiber-orientation-dependent, simple material substitution does not optimize the use of composite materials. Rather, TARDEC seeks high creativity and innovation to design and develop the CAV ATD.

Phase II

For Phase II, TARDEC will choose one contractor, who will conduct the design analysis through detailed design and actually build the CAV ATD that demonstrates the highest payoff technology by combining composite materials and signature management techniques in an armored vehicle. The exit criteria goals for the CAV ATD are to show that:

- A minimum of 33 percent weight savings is attained by using a structure made of composite materials and advanced lightweight armors in comparison with a standard aluminum structure with conventional armor of equal protection; and
- Signature management techniques are compatible with the composite material structure and advanced lightweight armor.



Since the goals for the CAV ATD are to demonstrate the effectiveness of composites and their compatibility with signature management techniques in a combat vehicle and not to build the next tank, scout vehicle, self-propelled howitzer, etc., the CAV ATD is non-mission specific.

What TARDEC engineers are doing is developing the technology that can be applied to any of these vehicle types. During testing, the CAV ATD will undergo a mission profile that is a combination of the mission profiles of combat vehicles. Additionally, to demonstrate that the structural composite materials can withstand shock loading, a surrogate weapon will be mounted on the CAV ATD and test-fired.

Another important aspect of the CAV ATD program is to show industry that the U.S. Army Tank-Automotive Command (TACOM), the ground vehicle proponent for the Army, is serious about the future use of composite materials in ground vehicles. Traditionally, the combat vehicle business has been entrenched in the conservative design—metal structural armor—approach.

As was shown by the deployment difficulties during Desert Shield, the government cannot always afford to conduct business as was done in the past. During the clean-sheet-of-paper design approach to the CAV ATD, the contractors will investigate such concepts as modular structures, replaceability as a hull structure repair option, and using a combination of composite materials in the structure (some composites are better structurally, some are better ballistically, different fiber weaves give different mechanical properties, etc).

What Are Composites?

In his book, *An Introduction To Composite Materials*, Derek Hull defines an acceptable composite material for structural applications as one consisting of two or more physically distinct and mechanically separable materials. It can be made by mixing these materials in a controlled way so as to achieve optimum properties that are superior, and possibly unique in some specific respects, to the properties of the individual components.

Generally, when referring to vehicle structural composites, the composite is composed of two materials—the fibers and the matrix. Fibers can be various types of glass (E, S, RH) or other types of ceramics, carbon, aramids (Kevlar) or boron to name a few. These are the load-bearing part of the composite. Fibers are then processed in a number of ways: bundled in tows, woven like cloth, chopped, impregnated with resin, etc.

The matrix is the material which holds the fibers together and spreads stress among the fibers by deforming under force. Some currently used matrix materials are epoxies, polyesters, vinyl esters and other plastics. One advantage of these fiber-reinforced plastic composites is that they have a higher strength and stiffness per unit weight (specific strength and stiffness) than do metals, potentially resulting in lighter parts or structures. Other advantages of using composites in vehicle structures are that they offer the ability to integrate signature management and they maintain cost competitiveness with traditional materials in manufacturing.

Other Applications

Although the CAV ATD is TARDEC's first venture into the use of composite materials for primary combat-vehicle structures, it is by no means the center's first venture into their application. Other applications have included the M1 Abrams driver's seat, HMMWV (High-Mobility Multipurpose Wheeled Vehicle) drive shaft, M1 Abrams air intake plenum, M1 Abrams Full Up Power Pack (FUPP) Container, the 9,600-gallon tanker, M1 Abrams stowage boxes, spall liners and seats and slats for cargo trucks. Another ongoing composite program at TARDEC is the M1 Abrams road wheels. Work is also planned on an improved, damage-tolerant HMMWV hood and on a composite containers program.

Real Life Issues

Though composite materials offer many benefits, they are not a panacea for solving all problems with current combat vehicles. Composites have many of their own inherent problems. One such problem is that automated composite manufacturing techniques are still relatively new.

Another difficulty with using composites is joints and attachments. Mechanically attaching parts (using bolts, rivets, etc.) requires that holes be drilled into the composites. Alignment of the holes is critical since composite materials do not tolerate misalignment and will not ductilely deform to redistribute stresses as do most metals. Adhesive bonding and other attachment methods are being developed for use with composites.

Repairability of composites is another issue. When metals are damaged, the damage is usually visual and confined to a specific area. When composites are damaged, the results are not always visually detectable. A laminated composite could be struck by something that leaves no physical mark, but could cause internal delaminations. These flaws are difficult to detect in the field and the delaminations could cover a large area requiring quite extensive repairs. Research is ongoing into field-capable non-destructive testing for damage, and for repair techniques. Further, once the manufacturing methods are worked out, it may turn out to be cheaper to replace damaged parts than to repair them. All repair options are being considered.

Conclusion

The CAV ATD will show that composite materials are a viable solution to the problem of manufacturing lightweight, deployable and survivable combat vehicles. Because several issues still need resolution, follow-on production of composite ground combat vehicles will probably not occur until 2005 or later. By looking for a whole-structure composite solution to designing combat vehicles, TARDEC has truly entered the composite materials age.

CPT RICHARD A. BRYNSVOLD is assigned to the Composite Structures Branch of the Mobility Technology Center at the U.S. Army Tank-Automotive Command's Research, Development and Engineering Center (TARDEC). A member of the Army Acquisition Corps, he has a B.S. degree in mechanical engineering from Santa Clara University and an M.S. degree in materials science and engineering from the University of Washington.

What Does the Army Acquisition Corps Offer You Relative to Your Career Goals?

Carolyn S. Thompson
Chief, Program and Acquisition Management Division
Anti-Satellite Joint Program Office
U.S. Army Space and Strategic Defense Command

The career objective at the top of my resume is "To serve as a Project Manager for a major weapon system within DOD..." The Army Acquisition Corps (AAC) is one more element that will help me achieve this goal.

The Defense Acquisition Workforce Improvement Act (DAWIA) which created the AAC also mandates the qualifications for project managers and deputy project managers of major weapon systems. I have had the basic qualifications since 1988, and now the AAC will enhance them in seminars and short courses at some of the country's most prestigious colleges and universities. These opportunities will give me a strategic and global perspective of the acquisition needs of the Army.

The DAWIA also includes stringent selection criteria for membership in the AAC. I take great pride in being a member of this elite professional corps, and that creates within me the desire and motivation to be one of the "best among the best."

In an environment of the shrinking defense dollar, having a highly qualified cadre of professional managers in critical acquisition positions becomes even more important. In addition, the DAWIA includes the impetus to "civilianize" more program manager (PM) and deputy program manager (DPM) slots, and all the positions will have to be "board certified." This should mean more opportunities for me to compete for DPM and PM positions.

The AAC also provides centralized intensive career management by a special Acquisition Management Office at the Personnel Command. As a member of the corps, I will be assigned an individual who can monitor my personnel files, my job assignments, training and career progression, and will provide advice and counsel that will enhance my career opportunities.

For these many reasons, I am convinced that membership in the Army Acquisition Corps will increase my opportunities to manage a major defense acquisition system.

David L. Thomas
Director, Plans and Programs
PEO STAMIS
Fort Belvoir, VA

Experience and education go hand-in-hand in developing a person into a valued asset. Experience has often been praised as the "best teacher." In order to analyze the experience though, one has to be smart enough to recognize what lesson has been taught by the experience. Education is the hallmark of self-improvement and the basis upon which an employee excels as an attribute to an organization. Without a doubt, it is this belief in education that sets the Army Acquisition Corps apart from many other organizations.

The Army Acquisition Corps has set high standards and qualifications for those who choose to enter a highly responsible career field. By setting high goals, the Corps intends to entice the best to join its ranks. Part of the lure is the extensive educational opportunities available to its members.

The Army Acquisition Corps offers its members the chance to get their first college degree, and also obtain an advanced degree, at top educational institutions. It also makes unique training opportunities available through developmental seminars meant to broaden perspectives and managerial skills. The only limit is set by the member and the desire to take advantage of what is available.

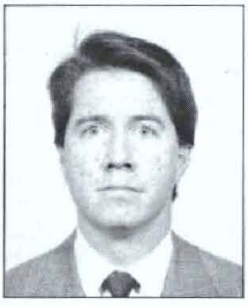
The goal of the Army Acquisition Corps is to encompass the best in the acquisition community, both by recruiting and by educating. Any goal, whether personal or organizational, is achieved by applying effort and thinking smart. The Army Acquisition Corps supplies the avenues to get smart, the member has only to supply the effort. Sounds like a good deal to me!

Suellen D. Jeffress
Procurement Analyst
U.S. Army Contracting Support Agency
Office of the Assistant Secretary of the Army (Research, Development and Acquisition)

The Army Acquisition Corps offers a number of educational and developmental opportunities. Educational opportunities available include seminars, such as those offered at Harvard University, The Wharton School, and The Brookings Institution. I plan to submit my application to compete for these prestigious offerings. In addition, the mandatory contracting courses and the rest of the acquisition curriculum under the Defense Acquisition University have been reserved for acquisition careerists. I plan to take several of the contracting courses in 1993.

The developmental opportunities available for members of the contracting community include developmental assignments as a member of the Army secretariat under the supervision of the Functional Chief's Representative for the civilian Contracting and Acquisition Career Program. Under this program, individuals can gain exposure to senior Army leadership, prepare and conduct briefings, draft policy, visit and work with major commands and major subordinate commands, and perform other critical staff functions. This is an ideal opportunity for promising members of the contracting community to work closely with me in guiding the full implementation of the Army Acquisition Corps initiative.

Educational and developmental opportunities such as these were not previously as readily available to members of the acquisition community as they are now. We should take full advantage of the managerial, technical and leadership doors that are now open to those of us whose goal it is to be among the senior Army leadership of the future.



Joseph A. Gormley
Associate Product Manager
Resource Management
Office of the Product Manager—Paladin

The Army Acquisition Corps offers all of its incumbent personnel a generic road map for career progression. Using that road map as a guide, the Army Acquisition Corps allows us to customize our path with brief excursions from which we acquire skill specific training or experience.

Those are fine words, but I think the one word that gives them validity is commitment. The Army Acquisition Corps and its supporting law, regulation and policy represent a firm commitment

by the Army to developing and maintaining a talented, knowledgeable, lean work force fully capable of doing more with less. The commitment takes the form of fenced training dollars, special opportunities for temporary appointments to senior Army offices, consideration for permanent Army Acquisition Corps positions, and a number of other "tools" for enrichment or progression.

The commitment, however, is not one-sided. In return we are asked to accept the tools offered by the Army Acquisition Corps and commit our time and efforts toward using them to forge a modernized defense base, economically and efficiently. As with anything else, different people will offer different degrees of commitment. I believe it is the level of our commitment which will determine the extent to which our progress within the acquisition work force is successful.

In the end, it is only when these two concepts are combined, i.e., the Army commitment to our development and our acceptance of opportunity, that we see a real product—increased value. One without the other will not get us there. The coming defense work force will be small and it will only make room for those who will share the responsibility for commitment. In this period of declining defense resources, lean staffing will be the rule and fierce competition for those positions will be common. Commitment to excellence will be the weapon with which we compete and it is our responsibility to accept every opportunity to sharpen our edge.

Janice Lee McKenzie
Acquisition Information Integration Specialist
Army Acquisition Corps/ Program Management Office
Office of the Deputy Chief of Staff for Acquisition

The Army Acquisition Corps offers me a better chance than I would otherwise have to maintain and improve my career position in a time of shrinking resources and Defense drawdowns. The Army Acquisition Corps does this in a number of ways.

The Army Acquisition Corps places real emphasis on training and education and provides the funding required to insure that corps members can attend the classes they need. I will have a better opportunity to attend short term training, professional seminars, short courses at some of the nation's most prestigious colleges and universities and long term training courses such as the Program Manager Course given by the Defense Systems Management College at Fort Belvoir. In addition, a strong emphasis on training and education from the top down will allow me to take advantage of these opportunities. There is also encouragement (and funding) for Corps members to begin (or complete) bachelor and graduate degrees if they haven't already done so.

The Army Acquisition Corps provides me with the prospect of periodic developmental assignments in areas that will enhance my job skills, allow me to broaden my horizons and bring new perspective to my job. This kind of opportunity is seldom offered outside the auspices of a program like this. Each developmental assignment is unique. Whether it's across the hall or across the country, seeing the Army from a new vantage point and becoming acquainted with the responsibilities and problems of a different job in a different area will be valuable and enlightening.

Another distinct benefit I will receive as a member of the Army Acquisition Corps is the opportunity to fill position vacancies that are designated at "Critical Army Acquisition Corps Positions." These positions, which include many of the senior management positions in the Army, will not be open to non-Army Acquisition Corps members.

As stated in DA PAM 600-3-1, the Army Acquisition Corps offers several advantages. For civilians these include centralized intensive career management, specialized training and education, an alternative career path, a competitive selection process and the opportunity for rapid advancement. In my opinion, the Army Acquisition Corps offers real benefits to its members.

John G. Appel Jr.
Technology Staff Officer
Office of the Assistant Secretary of the Army for Research, Development and Acquisition

That's a tough question to answer now, since the Army Acquisition Corps is so new, and there has been little accomplished along that line to cite as an example of what it *actually* offers me. Instead, I can address what I *hope* the Army Acquisition Corps can offer to help me achieve my career goals.

Like all of the military officers and civilians who have been accepted into the Army Acquisition Corps, I believe that the Corps provides *recognition* of special qualifications and skills and a commitment on my part to provide our soldiers with the very best products in a very austere resource environment. I would like to think that the recognition, in itself, says something about me as an acquisition manager that will lead to opportunities to serve in a variety of challenging assignments and provide a path to new career opportunities. If the Army Acquisition Corps is to help in creating these new opportunities, I believe it must retain a certain elitism (not arrogance) that makes us proud to be members and puts a mark on the wall for non-members to achieve.

My expectation is that the Army Acquisition Corps should provide opportunities for diversification to broaden my acquisition knowledge and experience and it should enhance my chances of upward mobility. The policy on rotation (i.e., members may remain in the same position no longer than five years without approval of the director), if implemented, will help, but it is not at all clear to me how it will be done. A recent Army Acquisition Corps workshop did not help clarify this issue, so the jury is still out. On a similar vein, limited resources to move members may make the mobility agreement issue somewhat mute, so I see many unknowns yet to be resolved.

I am now in a very challenging Acquisition Corps "critical position" that I enjoy and which, I believe, provides tremendous value added to the Army. When the time comes to move on, if the system works like I think it should, Army Acquisition Corps status should be a major factor in recruitment and selection. I would like to think that the Army Acquisition Corps Management Office will play an active role in helping place acquisition qualified people in job assignments somewhat along the lines of the military career pattern. It is gratifying to note that military Army Acquisition Corps members now have greater potential for promotion, command and senior service schools than in the past. If the centralized civilian personnel management office is run somewhat like the military personnel management office, then civilians may get some meaningful help in achieving career goals. As a final note on career opportunities, I am anxious to see how the centralized referral system will work.

Photo not available

Diane S. Sisson
Principal Assistant Responsible for Contracting
Headquarters, U.S. Army Corps of Engineers

Throughout my career in the acquisition workforce, I have always been extremely proud of the service I provided to this great country, and to the Army Corps of Engineers. This desire to serve, and my personal pride and professionalism, have given me many challenges over the years, and provided a certain degree of success.

SPEAKING OUT

The Army Acquisition Corps has not changed the value I place on service and professionalism; however, the corps has now defined professionalism with substantive goals and objectives. It has challenged me to continue professional growth through an advanced degree in contract management. The goals I set for myself today are better defined, and more clearly measured. I believe this is a significant improvement in my career planning.

As a member of the Acquisition Corps, I feel a personal responsibility to maintain the high standards of the Corps, and to assist others in becoming fully qualified members. Being a member of a respected professional group conveys a level of credibility on the individual, but I believe there is also a responsibility to give back to the profession some of what I have gained. The people in the Acquisition Corps make it the world class professional organization it is intended to be. Each of us, personally and individually, must pursue excellence in everything we do.

Dr. Kenneth A. Gabriel
Deputy Director
Research and Laboratory Management
Office of the ASA(RDA)

Photo not available

The intent of the recently-passed legislation is to ensure that professional paths for both civilian and military personnel who wish to pursue careers in acquisition are identified in terms of education, training, experience and assignments necessary for career progression. The Army Acquisition Corps has been established to implement the letter and the spirit of this legislation. Put succinctly, the corps promises to upgrade the standards of Army acquisition professionals by providing them the means for self-improvement through education and training and by offering them challenging experiences and professional growth opportunities.

Although the institution of the AAC has yet to impact me in a meaningful way, I anticipate that when this program is fully implemented across the Army acquisition community, I will be able to better apply my professional and academic policy and technical background toward effective management of Army acquisition programs. Having earned several advanced graduate-level degrees in the national and international security field, physical sciences, and engineering, I look forward to the opportunity to address the myriad of problems that face the defense acquisition community. One such challenge is to develop and implement policies that retain essential military industrial capabilities while dramatically reducing defense procurement budgets. Another challenge is restructuring the defense department to improve efficiency to offset significant budget cuts.

As a GM-15 serving in an acquisition-critical position within Headquarters, Department of the Army, I am confident that I will be better able to compete for senior executive positions within the Army acquisition community. I am also hopeful that significant opportunities for training and professional development will be made available for me and other AAC members. The AAC has recently announced an ambitious training program for Academic Year 1992–93. This program offers opportunities for pursuing fully-funded studies at academic and senior services colleges and institutions. Among these offerings are long-term training opportunities, and part-time and long-term graduate studies. I plan to take advantage of one or more of these opportunities in order to better position myself for assuming a leadership position within the AAC.

AWARDS

Heringer Cited for Efforts in Japan

LTC Wayne L. Heringer was recently presented a letter of appreciation signed by General Tetsuya Nishimoto, chief of staff, Japan Ground Self Defense Forces (JGSDF). Heringer was thanked for his "untiring efforts with consistent enthusiasm to strengthen the ties between the Japan Ground Self Defense Force and the United States Army, thus making a significant contribution to the full development of U.S.-Japan defense posture."

At the time, Heringer was concluding his assignment as commander, Science and Technology Center - Far East (STCFE), Tokyo, a separate reporting activity of the Headquarters, U.S. Army Materiel Command (HQ AMC).

In his letter of appreciation, General Nishimoto cited Heringer's great services in promoting the development of JGSDF research and development programs by identifying technology applications, coordinating the latest R&D information, highlighting Gulf War lessons learned with respect to future development, and enhancing the R&D relationship between the JGSDF and AMC.

Lieutenant General Mitsuyoshi Uchida vice chief of staff, Japan Ground Self Defenses Forces, made the presentation.

Heringer is an acquisition officer currently assigned to the Office of the Assistant Secretary of the Army (Research, Development and Acquisition).

Lieutenant General Mitsuyoshi Uchida, vice chief of staff, Japan Ground Self Defense Forces, presents a letter of appreciation to LTC Wayne L. Heringer for his efforts while assigned as commander, Science and Technology Center—Far East, Tokyo.

PERSONNEL

Linehan Assigned as AAC Proponency Officer

MAJ Patrick D. Linehan has been assigned as the Army Acquisition Corps proponency officer in the office of the deputy director, acquisition career management, Office of the Assistant Secretary of the Army (RDA), in the Pentagon. He served formerly as G-3 plans officer and battalion executive officer, 3rd Battalion, 68th Armor, 4th Infantry Division (Mechanized), Fort Carson, CO.

A 1977 graduate of the U.S. Military Academy, Linehan holds a master's degree in contract and acquisition management from the Florida Institute of Technology, and is a graduate of the Program Managers Course at the Defense Systems Management College, and the Command and General Staff College, Fort Leavenworth, KS.

AWARDS

Award Recipients Named

The following Army Acquisition Corps personnel are recent recipients of key awards. *Army Acquisition Executive Support Agency (AAESA)*: COL John R. Bramblett (recently retired), AAESA, Legion of Merit (LOM); LTC John J. Zepko, Program Executive Office—Intelligence and Electronic Warfare, LOM; CPT Charles San Filippo, PEO—Aviation, Meritorious Service Medal (MSM); SFC William S. Tobias, PEO—Aviation, MSM; CPT(P) Robert A. Brennan, PEO—Armaments (PEO-AR), MSM; MAJ Raymond H. Gaier III, PEO-AR, MSM; MAJ Steven J. Haynes, PEO-AR, MSM; LTC(P) Roy D. Lewis, PEO-AR, LOM; MAJ Mark S. MacLean, PEO-AR, MSM; CPT Gregory C. Edgin, PEO—Combat Support (PEO-CS), MSM; MAJ Edward B. Major, PEO-CS, MSM; MAJ Randolph A. Mathews, PEO-CS, MSM; LTC David S. Colkett, PEO—Tactical Missiles (PEO-TM), LOM; LTC John T. Dillard, PEO-TM, MSM; CPT Gregory L. Mattson, PEO-TM, MSM; CPT Willie M. Wheeler, PEO-TM, MSM; LTC(P) Joseph G. Girlando, PEO—Global Protection Against Limited Strikes (PEO-GPALS), MSM; MAJ Kenneth L. Jones, PEO-GPALS, MSM; COL Michael D. Jackson, PEO-Armored System Modernization (PEO-ASM), LOM; LTC Harry L. Kettler, PEO-ASM, LOM; LTC Walter B. Grimes, PEO-ASM, LOM; MAJ Michael F. Carney, PEO-ASM, LOM; MAJ James C. Hudson, PEO-ASM, MSM.

LETTERS

Dear Sir:

In response to Lindy R. Ford's comment on MTL's patent "Microcomputer Real-Time X-Ray Controller For Data Acquisition" (RD&A July–August 1992), I would like to point out that although the process employed in our invention for measuring the projectile velocity and automatically triggering the flash x-ray for radiographs is similar to Ford's, the implementation of this invention is based on the off-the-shelf PC hardware and the MTL-developed software. In other words, by taking advantage of the widely available PC hardware, this invention makes the art of high speed measurement and control into a software implementation.

Because of the flexibility in software implementation, any number of x-ray tube heads can be positioned at arbitrary locations relative to the two sensors along the projectile flight path. Furthermore, nonlinear projectile velocity measurement and control can be readily incorporated into the software algorithm to generate appropriate delay times for the control signals. Hardware implementation for nonlinear high speed measurement and control would be awkward, since there is such a wide variety of high speed acceleration/deceleration events.

It is our hope that MTL's invention will help the ballistic laboratories to exploit this nonlinear capability for new applications in precision timing control (e.g. control the timing of multi-stage EM gun, coupling the light-gas gun with the EM gun etc.).

This invention has turned an ordinary affordable office PC into a sophisticated high speed controller for data acquisition. In my opinion, this is hardly "wasteful and overkill."

Sincerely,
Dr. Albert L. Chang
U.S. Army Materials Laboratory
Materials Dynamics Branch

Dear Sir:

I continually find the Army RD&A an invaluable source of information in keeping me current. I concur with your "congratulations' to those officers selected for the AWCCSC as printed in the September–October 1992 edition (p.46) and for those selected for the residence course mentioned in a previous edition.

I believe that you should "congratulate" those of us who have completed a most demanding two year program, the graduates of the AWCCSC class of 1992. Being selected for AWCCSC does NOT automatically mean completion as does the residence course! The 231 graduates in the AWCCSC class of 1992 equates to a 63.8 percent completion rate, about average. This two year endeavor shaped each of us into better senior officers, willing to serve our country in this dynamic environment and defining our military forces for the twenty-first century. A little "press" by you would add to our continued motivation while providing additional incentive to those just entering the AWC and those who may be considering this difficult task.

Of the numerous articles addressing the Army Acquisition Corps, I can not recall one that discusses the role of the Army Reserves. Maybe this could be included in a future issue.

Sincerely,
Robert J. Bedell
LTC, SC, USAR
25D51A

Army RD&A Bulletin Responds:

Thank you for your letter. We concur with you that the two-year AWCCSC is a demanding program and want to extend our congratulations to all 231 graduates. Relative to your inquiry about the role of the Army Reserves in the Army Acquisition Corps, there is an article on the subject on page 40 of this issue of Army RD&A Bulletin.

Program Management Course Attendees Announced

The following Army civilians have been selected to attend Program Management Course 93-1, Jan. 25 - June 11, 1993, at the Defense Systems Management College, Fort Belvoir, VA.

Name	Grade/Series	Career Program
Adams, Alayne	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Allen, Edward	GS-801-13	Engineers & Scientists (Non-Constructon) (CP-16)
Avery, Wayne	GS-1102-14	Contracting & Acquisition (CP-14)
Bagwell, Thomas	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Bradley, Robert	GM-334-14	Automatic Data Processing (CP-23)
Browder, William	GS-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Bruno, Wayne	GS-896-13	Engineers & Scientists (Non-Construction) (CP-16)
Buckelow, Robin	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Chan, Kin	GM-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Coogan, Jack	GM-1102-14	Contracting & Acquisition (CP-14)
Crane, Del Roy	GS-855-14	Engineers & Scientists (Non-Construction) (CP-16)
David, Brian	GS-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Doyle-Booth, Kathleen	GS-861-13	Engineers & Scientists (Non-Construction) (CP-16)
Dwyer, Kevin	GM-334-14	Comptroller (CP-11)
Ford, Melba	GS-801-13	Engineers & Scientists (Non-Construction) (CP-16)
Freeman, Celeste	GS-861-13	Engineers & Scientists (Non-Construction) (CP-16)
Gierhart, Dale	GM-1101-14	Contracting & Acquisition (CP-14)
Granger, Bernard	GM-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Harris, Rose	GS-301-13	Materiel Maintenance (CP-17)
Hathaway, Jo Ann	GM-560-14	Comptroller (CP-11)
Haynes, Hillard	GS-346-17	Materiel Maintenance (CP-17)
Hollern, James	GM-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Jamison, Thomas	GS-346-14	Materiel Maintenance (CP-17)
Johnston, Larry	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Jones, Willie	GM-334-14	Automatic Data Processing (CP-23)
Keller, Christian	GS-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Kien, Michael	GS-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Kowalski, Robert	GS-801-13	Engineers & Scientists (Non-Construction) (CP-16)
Langford, Gilbert	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Lavella, Anthony	GM-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Lawrence, Olga	GS-345-13	Comptroller (CP-11)
Lee, Yat	GS-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Leen, John	GS-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Love, Kathleen	GM-1102-14	Contracting & Acquisition (CP-14)
Lowery, Carol	GM-340-15	Materiel Maintenance (CP-17)
Marks, Daniel	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
McDowell, Bernard	GM-855-15	Engineers & Scientists (Non-Construction) (CP-16)
McGuire, Dennis	GS-346-13	Supply Management (CP-13)
McGuire, Lawrence	GM-334-14	Automatic Data Processing (CP-23)
McKenzie, Janice	GS-301-14	Materiel Maintenance (CP-17)
Mead, Ann	GS-1515-13	Comptroller (CP-11)
Miller, Albert	GM-340-15	Materiel Maintenance (CP-17)
Moore, Thomas	GM-1102-14	Contracting & Acquisition (CP-14)
Moser, Karen	GS-1102-14	Contracting & Acquisition (CP-14)
Moy, Alex	GS-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Munday, Jackie	GM-343-14	Comptroller (CP-11)
Newcomb, Wallace	GS-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Nugent, Thomas	GM-855-15	Engineers & Scientists (Non-Construction) (CP-16)
Oldacre, A.Q.	GM-340-15	Materiel Maintenance (CP-17)
Patton, Michael	GS-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Phillips, Patricia	GM-334-14	Automatic Data Processing (CP-23)
Pruett, Stanley	GS-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Roberson, Bryan	GM-896-14	Engineers & Scientists (Non-Construction) (CP-16)
Savage, James	GM-1301-15	Engineers & Scientists (Construction) (CP-18)
Semon, Charles	GM-855-15	Engineers & Scientists (Non-Construction) (CP-16)

Name	Grade/Series	Career Program
Shannon, John	GM-340-15	Materiel Maintenance (CP-17)
Singh, Cajiner	GM-830-15	Engineers & Scientists (Non-Construction) (CP-16)
Somsel, John	GM-340-15	Materiel Maintenance (CP-17)
Talpas, Edward	GS-346-13	Supply Management (CP-13)
Tucker, Phillip	GM-301-14	Materiel Maintenance (CP-17)
Usechak, David	GM-896-15	Engineers & Scientists (Non-Construction) (CP-16)
Vance, Marlu	GS-301-14	Materiel Maintenance (CP-17)
Vickers, Susian	GS-334-13	Automatic Data Processing (CP-23)
Wagner, Joel	GM-340-15	Materiel Maintenance (CP-17)
Wesson, Wayne	GM-1515-15	Engineers & Scientists (Non-Construction) (CP-16)
Wolfe, Gary	GS-345-13	Comptroller (CP-11)
Wu, Thomas	GS-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Wummel, Ronald	GM-830-15	Engineers & Scientists (Non-Construction) (CP-16)
Zigler, Richard	GS-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Zweig, Susan	GM-560-14	Comptroller (CP-11)

The following individuals are alternate selectees to attend PMC 93-1.

Name	Grade/Series	Career Program
Aveta, Genarro	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Butler, Joseph	GM-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Clawson, Ronald	GM-405-14	Engineers & Scientists (Non-Construction) (CP-16)
Doty, Gary	GS-896-13	Engineers & Scientists (Non-Construction) (CP-16)
Etzinger, Michael	GM-855-14	Engineers & Scientists (Non-Construction) (CP-16)
Foley, Eileen	GM-896-14	Engineers & Scientists (Non-Construction) (CP-16)
Franklin, James	GM-854-14	Engineers & Scientists (Non-Construction) (CP-16)
Jones, Ronald	GS-343-14	Comptroller (CP-11)
Luft, Emil	GM-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Themak, Henry	GM-801-15	Engineers & Scientists (Non-Construction) (CP-16)
Verville, Michael	GM-301-14	Materiel Maintenance (CP-17)
Warren, John	GM-346-14	Materiel Maintenance (CP-17)
Whiteside, Kenneth	GM-801-14	Engineers & Scientists (Non-Construction) (CP-16)
Wissel, Edward	GS-1515-14	Comptroller (CP-11)
Zimmerman, Ted	GS-301-14	Materiel Maintenance (CP-17)

110 Graduate from MAM

Last September, 110 students graduated from the Materiel Acquisition Management Course at the U.S. Army Logistics Management College (ALMC), Fort Lee, VA. Research and development, testing, contracting, requirements generation, logistics and production management are examples of the weapon system acquisition work assignments offered to these graduates.

Keith Charles, deputy assistant secretary for plans, programs and policy, Office of the Assistant Secretary of the Army (RDA), gave the graduation address and presented diplomas. The distinguished graduate award was presented to MAJ Jerry L. Moran, U.S. Army Operational Evaluation Command, Alexandria, VA.

The nine-week Materiel Acquisition Management Course provides a broad overview of the materiel acquisition function. It covers national policies and objectives that shape the acquisition process and the implementation of these policies and objectives by the U.S. Army. Areas of study include acquisition concepts and policies; research, development, test, and evaluation; financial and cost management; integrated logistics support; force modernization; production management; and contract management. Emphasis is on developing mid-level managers so that they can effectively participate in management of the acquisition process.

FY93 Product Manager Selections

The following is a listing of product manager selectees. The average age of the selectees was 42 years; the average time in grade was 12.8 months; and the average time in service was 19 years. Ninety-five percent of the selectees have master's degrees, while 8 percent have Ph.D. degrees. Ten officers have worked on the Army staff (averaging 25 months), and six have joint staff experience (averaging 27 months). The average time with troops was 95 months, and the average time in acquisition positions was 76 months. All were Command and General Staff College graduates with one being enrolled in the Army War College Corresponding Studies Program.

Selectee	FA/BR	PEO/Program
BIRDSONG, George M.	51/74	Smoke
DEETER, Louis P.	51/91	Ballistic Missile Defense Space Payloads
DILLARD, John T.	51/11	Joint Advanced Special Operations Radio Systems
DOBECK, Kenneth R.	51/21	Heavy Assault Bridge
DRESEN, Thomas E.	51/91	Strategic Target System
ELLIS, Bernard E.	51/13	Advanced Field Artillery Systems—Munitions
FAST, William R.	51/91	Automatic Test Support Systems
FRITE, Steven A.	51/35	Enhanced Position Location Reporting System
HANFORD, Craig B.	53/15	Air Command Training Systems
IZZO, Paul	51/12	Combined Arms Training Systems
KIRSCH, Robert A.	53/25	Communications Management System
LANCE, Darell G.	35/15	Guardrail/Common Sensor
LANGHORST, Richard	51/15	Comanche Crew Support Systems
LEWIS, William D.	51/15	Special Project 132
MAUSER, George E.	51/12	Armored Gun Systems—Armaments
MERIWETHER, David P.	53/35	Ground Based Common Sensor—Light

CAREER DEVELOPMENT UPDATE

Selectee	FA/BR	PEO/Program
MOORE, Stephen C.	51/13	Army Field Artillery Tactical Data System
MURRAY, Joseph P.	51/91	Improved Recovery Vehicle Management Office
NADEAU, Roger A.	51/12	M1 Breacher
PRICE, Richard P.	97/21	Petroleum and Water Logistics
REININGER, Terrance	51/15	T-800 Engine Program
REEVES, Stephen V.	51/35	Ground Based Common Sensor—Heavy
SIGL, Robert R.	51/12	Ground Combat Identification
WELLS, James A.	51/91	Forward Area Air Defense Ground Based Sensors

AAC Captains and Majors 4M Positions

The following is a list of captains and majors 4M positions:

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
W00QAA	NGB	PROCURE OFCR	O4		97A00	1	NGB
W00YAA	HQ INSCOM	AUTO MGT OFCR	O4	MI	57B35	1	INSCOM
WO1HAA	USAG-VHFS	CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNTR MGT OFCR	04	SC	97A25	1	AMC
WO38AA	NATIC RDEC	CBT ARMS PRJ OF	04	IN	51A11	1	AMC
		CT ARMS PRJ OFCR	03	AR	51A12	1	AMC
		DEP DIR ACQ	04	QM	97A92	1	AMC
		R&D COORD	03	QM	51A92	1	AMC
		R&D COORD	03	QM	51A92	1	AMC
		SOF CRD/LNO	03	SF	51A18	1	AMC
WO41AA	COLD RGN TST	C&E ENGR	03	SC	51A25	1	AMC
		CH, TECH SPT	04	SC	51A25	1	AMC
		CH, TST OPNS	04		51A02	1	AMC
		INF TST OFCR	03	IN	51A11	2	AMC
		PLNS/OPS OFCR	04		51A00	1	AMC
WO4LAA	USA BRDEC	R&D COORD	03	EN	51A21	1	AMC
		R&D COORD	03	MP	51A51	1	AMC
		R&D COORD SYS	04	EN	51A21	1	AMC
		R&D COORD SYS	04	QM	51A92	1	AMC
		R&D COORD-LOG	03	EN	51A21	1	AMC
		R&D COORD-SYS	03	OD	51A91	1	AMC
WO4WAA		SYS AUTO OFCR	03	AD	53B14	1	AMC
		SYS AUTO OFCR	03	AD	53B14	1	AMC
		T&E OFCR	03	AD	51A14	2	AMC
		T&E OFCR	03	AD	51A14	2	AMC
		T&E OFCR	03	AD	51A14	4	AMC
		T&E OFCR	03	AD	51A14	5	AMC
		T&E OFCR	03	FA	51A13	1	AMC
		T&E OFCR	03	FA	51A13	1	AMC
		T&E OFCR	03	FA	51A13	1	AMC
		T&E OFCR	03	FA	51A13	3	AMC
		T&E OFCR	03	FA	51A13	3	AMC
		T&E OFFICER	04	AD	51A14	1	AMC
WO4XAA	USA YPG	PROJ OFCR	03	AV	51A15	1	AMC
		PROJ OFCR	03	AV	51A15	2	AMC
		PROJ OFCR	03	FA	51A13	1	AMC
		PROJ OFCR	03	FA	51A13	2	AMC
		TEST OFCR	03	AR	51A12	1	AMC
WO4XAA	USA YPG	TEST OFCR	03	FA	51A15	1	AMC
WO4YAA	USA EPG	C-E AUTO	03		53B00	1	AMC
		C-E ENGR	03	SC	51A25	1	AMC
		C-E ENGR	03	SC	51A25	1	AMC
		T&E COORD	03	SC	51A25	1	AMC
		T&E PRJ OFCR	03		53B00	1	AMC
		T&E PRJ OFCR	03	SC	51A25	1	AMC
WO51AA	EIGHTH ARMY	C, TECH	04		97A00	1	EIGHTH ARMY
		CNT/IND MGMT	03		97A00	1	EIGHTH ARMY
		CNT/IND MGMT	03		97A00	1	EIGHTH ARMY
		CNT/IND MGMT	03		97A00	1	EIGHTH ARMY
		CNT/IND MGMT	04		97A00	1	EIGHTH ARMY
WO5GAA	USA CNTR CMD	C, CNTR MGMT	04		97A00	1	USAREUR
		C, MGMT BR	04		97A00	1	USAREUR
		PROCURE OFCR	03		97A00	1	USAREUR
		PROCURE OFCR	04		97A00	1	USAREUR
		PROCURE OFCR	04		97A00	1	USAREUR
		PROCURE OFCR	04		97A00	1	USAREUR
WO96AA	USSOUTHCOM	ACQ SYS OFCR	04		53B00	1	USA SOUTH
		ACQ SYS OFCR	04		53B00	1	USA SOUTH
WOA5AA	USAG-PANAMA	CNTR OFCR	03		97A00	2	USA SOUTH
		CNTR OFCR	04		97A00	2	USA SOUTH
		DEP DIR CNTR	04		97A00	1	USA SOUTH
WOGWAA	HQ AMC	ACQ & LOG CRD	04		51A00	1	AMC
		ACQ & LOG CRD	04		51A00	1	AMC
		ACQ & LOG CRD	04		51A00	1	AMC
		ACQ & LOG CRD	04		51A00	1	AMC
		AJPO OFCR	04		53B00	1	AMC
		ASST CH SCI	04		51A00	1	AMC
		ASST EXEC OFCR	04		51A00	1	AMC
		CIM STF OFCR	04		97A00	1	AMC
		CIM STF OFCR	04		97A00	1	AMC
		R&D COORD	03		51A00	1	AMC
		R&D COORD	04		51A00	1	AMC
		R&D COORD	04		51A00	1	AMC
		STAFF OFCR	03		51A00	1	AMC
		STAFF OFCR	03	QM	51A92	1	AMC
		STAFF OFCR	04	AR	97A12	1	AMC
WOGWAA	HQ AMC	SYS MGT OFCR	04		51A00	1	AMC
WOH9AA	HQ MICOM	APM DEV HAWK	04	AD	51A14	1	AMC
		AUAV LOG OFCR	03	OD	51A91	1	AMC
		C, FT BLISS FO	04	AD	51A14	1	AMC
		C, GRD TOW SYS	04	OD	51A91	1	AMC
		C, TSO, ORLN	04		51A00	1	AMC
		CNT/IND MGMT	03	OD	97A91	1	AMC
		CNT/IND MGMT	03	OD	97A91	1	AMC
		CNT/IND MGT	03	OD	97A91	1	AMC
		CNT/IND MGT	03	OD	97A91	1	AMC
		CNTR/IND MGT	04	OD	97A91	1	AMC
		CNTR/IND MGT	04	OD	97A91	1	AMC
		COMP S&A OFCR	04	AD	53B14	1	AMC
		DEP PM BLK II	03	FA	51A13	1	AMC
		ENGR T&E OFCR	04		51A00	1	AMC
		FASTF OFCR	04	FA	51A13	1	AMC
		H/F FLDG OFCR	04	OD	51A91	1	AMC
		HK MSL AD/AR	04	AD	51A14	1	AMC
		ILS OFCR	03	OD	51A91	1	AMC
		INF OFCR, I&S	04	MI	51A35	1	AMC
		INT ENGR SMO	03	FA	51A13	1	AMC
		LOG STF OFCR	04	FA	51A13	1	AMC
		MAINT OFCR MLRS	04	CM	51A74	1	AMC
		MANPRNT COORD	03	OD	51A91	1	AMC
		MAT FLD OFCR	03	AD	51A14	1	AMC
		MLRD FLD OFCR	03	OD	51A91	1	AMC
		MLRS FLDG OFCR	04	OD	51A91	1	AMC
		MLRS FLDG OFR	04	OD	51A91	1	AMC
		MSL ENGR OFCR	03	FA	51A13	1	AMC
		PAT LOG OFCR	04	AD	51A14	1	AMC
		PAT LOG OFCR	04	AD	51A14	1	AMC
		PAT LOG OFCR	04	OD	51A91	1	AMC
		PROC OFCR	03		97A00	1	AMC
		R&D PRJ OFCR	03	OD	51A91	1	AMC
		SP ASST TO ENGR	03	FA	51A13	1	AMC
		SPT INT MGR	04		51A02	1	AMC
		STF INT OFCR	03	OD	51A91	1	AMC
		T&E OFCR	03	FA	51A13	1	AMC
		T&E OFCR	03	IN	51A11	1	AMC
WOH9AA	HQ MICOM	T&E OFCR ATACR	04	OD	51A91	1	AMC
		T&E OFCR AUAV	03		51A00	1	AMC
		T&E OFCR HAWK	03	FA	51A13	1	AMC
		T&E OFCR MLRS	04	FA	51A13	1	AMC
		TEST MGR	03	FA	51A13	2	AMC
		TEST MGR BAT	03	FA	51A15	2	AMC
		TEST OFCR ATG	03	OD	51A91	1	AMC
		TOW FLD OFCR	03	OD	51A91	1	AMC
		TST MGR ATACMS	04	OD	51A91	1	AMC
WOJ7AA	USA SFTY CTR	AERO ENGR	04	AV	51A15	3	CHIEF OF STAFF
		SAFETY ENGR	04		51A00	2	CHIEF OF STAFF
WOJEAA	HQ TECOM	SGS	04		51A00	1	AMC
		T&E COORD	04	AV	51A15	1	AMC
		T&E COORD ADA	04	AD	51A14	1	AMC
		T&E COORD ARM	04	AR	51A12	1	AMC
		T&E COORD FA	04		51A13	1	AMC
		T&E COORD FAP	04	FA	51A15	1	AMC
		T&E COORD TRP	04		51A02	1	AMC
		T&E CRD AR	04	AR	51A12	1	AMC
		T&E CRD AVN	04	AV	51A15	1	AMC
		T&E CRD FA/IN	04	IN	51A11	1	AMC
		CNT & MGT	03		97A00	1	AMC
		CNTR & MGT	03		97A00	1	AMC
WOK9AA	WVA	PRG CNT/PRD	03		97A00	1	AMC
		PRO CON/ENGR	03		97A00	1	AMC
WOL6AA	DESCOM	PROCUR OF CR	03	OD	97A91	2	AMC
WOLAAA	USA RDAISA	ADP OFFICER	04		53B00	1	ISC
WOLXAA	DESCOM	PROCUR OFCR	03	OD	97A91	2	AMC
WOMCAA	DESCOM	PROCUR OFCR	03	OD	97A91	2	AMC
WOMDAA	DESCOM	PROCUR OFCR	03	OD	97A91	2	AMC
WOMLAA	DESCOM	PROCUR OFCR	03	OD	97A91	2	AMC
WOMMAA	DESCOM	PROCUR OFCR	03	OD	97A91	2	AMC
WOSXAA	USA ISMA	PROJ OFCR	04		51A00	1	ISC
		PROJ OFCR	04		53B00	1	ISC
WOU5AA	USASIGNAL	ASST TSM	03	SC	51A25	1	TRADOC
		ASST TSM SATCOM	04	SC	51A25	1	TRADOC
		CD PRG OFCR	03	SC	51A25	1	TRADOC

CAREER DEVELOPMENT UPDATE

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		CD PRG OFCR	03	SC	51A25	1	TRADOC
		CD PRG OFCR	03	SC	51A25	2	TRADOC
WOU5AA	USASIGNAL	CD PRG OFCR	03	SC	51A25	3	TRADOC
		CD PRG OFCR	03	SC	51A25	4	TRADOC
		CD PRG OFCR	03	SC	53B25	1	TRADOC
		CD STF OFCR	03	SC	51A25	1	TRADOC
		CD STF OFCR	03	SC	51A25	2	TRADOC
		CD STF OFCR	03	SC	51A25	2	TRADOC
		CH PMO	04	SC	51A25	1	TRADOC
		CSS PRG OFCR	03	SC	51A25	1	TRADOC
		CSS PRG OFCR	04	SC	51A25	1	TRADOC
		PMO	03	SC	51A25	1	TRADOC
		SYS ANAL	03	SC	51A25	2	TRADOC
		SYS ANAL	03	SC	53B25	1	TRADOC
WOU9AA	USA AVN CTR	ASST TPO LOG	04	AV	51A15	1	TRADOC
		ASST TSM LOG	04	AV	51A15	1	TRADOC
		ASST TSM LOG	04	AV	51A15	1	TRADOC
		C, C31 BR	04	AV	51A15	1	TRADOC
		C, SR R&D STF	04	AV	51A15	1	TRADOC
		C, SR R&D STF	04	AV	51A15	1	TRADOC
		C, SR R&D STF	04	AV	51A15	1	TRADOC
		CD STF OFCR	04	AV	51A15	1	TRADOC
WOUSAA	USAG-MEADE	CONTR SPEC	04		97A00	1	FORSCOM
WOV8AA	ISMA/PMAIS	PROJ OFCR	03	SC	51A25	1	AMC
		PROJ OFCR	03	SC	51A25	4	AMC
		PROJ OFCR	03	SC	53B25	1	AMC
		PROJ OFCR	04	SC	51A25	1	AMC
		PROJ OFCR	04	SC	51A25	1	AMC
		PROJ OFCR	04	SC	51A25	4	AMC
WOVLAA	HQ USAEC	AUTO MGT OFCR	03	EN	53B21	2	TRADOC
		MAT DEV OFCR	03	EN	51A21	3	TRADOC
		SPV MAT DEV	04	EN	53B21	1	TRADOC
		SPV MIL DEV OFCR	04	EN	51A21	1	TRADOC
WOVPAA	USA CACDA	AVCATT PRJ OF	04		51A02	1	TRADOC
		CD STF OFCR	04		51A02	1	TRADOC
		CDIO	03		51A02	1	TRADOC
		CDIO	03	FA	51A13	1	TRADOC
		CDIO	04		51A02	1	TRADOC
		CMCS NET TM	03		51A02	1	TRADOC
		FUNCT INTGR	03		51A00	1	TRADOC
		MSN CNTG OFCR	03		97A00	2	TRADOC
WOVPAA	USA CACDA	PROJ OFCR	03	MI	51A35	1	TRADOC
		PROJ OFCR POSNAV	03	MI	51A35	1	TRADOC
		SR PROJ OFCR	04		51A02	1	TRADOC
		SR PROJ OFCR	04		51A02	1	TRADOC
		SR PROJ OFCR	04		51A02	1	TRADOC
		SR PROJ OFCR	04	FA	51A13	1	TRADOC
		SR PROJ OFCR	04	SC	51A25	1	TRADOC
		SRN MSN CNTG OF	04		97A00	1	TRADOC
WOY6AA	HQ ATCOM	APM LOE-PM COBR	04	AV	51A15	1	AMC
		AVN SYS MGR	03	AV	51A15	1	AMC
		AVN SYS MGR	03	AV	51A15	1	AMC
		AVN SYS MGR	04	AV	51A15	1	AMC
		C SLDR EQPT	04	QM	97A92	1	AMC
		C TRP SPT	04	QM	97A92	1	AMC
		C, BELL MNT	04	AV	97A15	1	AMC
		CHIEF NAS	04	AV	97A15	1	AMC
		CONF-FW	04	AV	51A15	1	AMC
		LOG OF-PM CIE	04	QM	51A92	1	AMC
		LOG OFCR	03	QM	97A92	1	AMC
		PROC OFCR	03	AV	97A15	1	AMC
		PROC OFCR	03	AV	97A15	1	AMC
		PROC OFCR	03	AV	97A15	1	AMC
		PROC OFCR	03	AV	97A15	1	AMC
		PROC OFCR	03	QM	97A92	1	AMC
		PROC OFCR	03	QM	97A92	1	AMC
		PROC OFCR	03	QM	97A92	1	AMC
		PROC OFCR	03	QM	97A92	1	AMC
		PROC OFCR	03	QM	97A92	1	AMC
		PROC OFCR	03	QM	97A92	1	AMC
		PROD OFCR	03	QM	97A92	1	AMC
		PROJ OFCR	03	OD	51A91	1	AMC
		PROJ OFCR	03	OD	51A91	1	AMC
		WSM AGSE	04	AV	51A15	1	AMC
WOZ1AA	ODCSINT	ADP STF OFCR	04	MI	53B35	1	CHIEF OF STAFF
WOZ2AA	ODCSOPS	STAFF OFFICER	04		51A00	1	CHIEF OF STAFF
		STAFF OFFICER	04		51A00	1	CHIEF OF STAFF
		STF TST COORD	04		51A00	1	CHIEF OF STAFF
WOZUAA	OCSA	PRGM ANAL	04	CM	51A74	1	CHIEF OF STAFF
		PROC PRG ANAL	04	OD	97A91	1	CHIEF OF STAFF
WOZZAA	ODCSPER	MNPRT STF OFCR	04		51A00	1	CHIEF OF STAFF
W1OYAA	DISA	APL SFTW ANAL	04		53B00	1	DOD AGCY
		SNR SFTWRE ENGR	04		53B00	1	DOD AGCY
W13BAA	USAE INT CTR	C, SYS ENGR	04		53B00	1	JOINT
W1A1AA	HQ DLA	PRGM MGT STF	04		97A00	1	DOD AGCY
		PROD MGT STF	04		97A00	1	DOD AGCY
		PROD MGT STF	04		97A00	1	DOD AGCY
		QA MGT STF OF	04		97A00	1	DOD AGCY
W1A3AA	DLA DFSC	ASST C SPEC FU	04		97A00	1	DOD AGCY
W1A7AA	DLA DCSC	C, PROD DIV	04		97A00	1	DOD AGCY
W1A8AA	DLA DPSC	C, DSO&S FAC	04		97A00	1	DOD AGCY
		CNTR OFF C&T	04		97A00	1	DOD AGCY
		CNTR OFF SE&F	04		97A00	1	DOD AGCY
W1A9AA	DLA DGSC	C, BR/DIV I	04		97A00	1	DOD AGCY

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		PROCURE OFCR	03		97A00	1	DOD AGCY
W1ACAA	DNA	AUTO MGMT OFCR	04		53B00	1	DOD AGCY
		R&D TST OPNS	04		51A00	1	DOD AGCY
		TEST MGMT OFCR	04		51A00	1	DOD AGCY
W1BOAA	ASARDA	STF OFCR	04		51A00	1	SEC ARMY
		STF OFCR	04		51A00	1	SEC ARMY
		STF OFCR	04		53B00	1	SEC ARMY
		STF OFCR	04	AD	51A14	1	SEC ARMY
		STF OFCR	04	AD	51A14	1	SEC ARMY
		STF OFCR	04	AR	51A12	1	SEC ARMY
		STF OFCR	04	AR	51A12	1	SEC ARMY
		STF OFCR	04	AV	51A15	1	SEC ARMY
		STF OFCR	04	AV	51A15	1	SEC ARMY
		STF OFCR	04	AV	51A15	1	SEC ARMY
		STF OFCR	04	FA	51A13	1	SEC ARMY
		STF OFCR	04	MI	51A35	1	SEC ARMY
W1B6AA	USA ELE JCS	ASST CHIEF	04		53B00	1	JOINT
		AUTO STF OFCR	04		53B00	1	JOINT
		OPS DEV ENGR	04	SC	53B25	1	JOINT
		SYS ANALYST	04		53B00	1	JOINT
W1BDAA	DLA DESC	C, CNTR SECT	03		97A00	1	DOD AGCY
		C, QA P&S	04		97A00	1	DOD AGCY
W1BEAA	DLA DISC	ASST C, CNTR	04		97A00	1	DOD AGCY
		C, CNTR SECT	03		97A00	1	DOD AGCY
W1BLAA	DLA	ASST C QA	03		97A00	1	DOD AGCY
W1BLAA	DLA	CNTR ADMIN	03		97A00	1	DOD AGCY
		CNTR ADMIN OF	03		97A00	1	DOD AGCY
		FLT OPNS OFCR	04	AV	97A15	1	DOD AGCY
		OFCR-IN-CHRG	04		97A00	1	DOD AGCY
		PROCURE OFCR	04		97A00	1	DOD AGCY
		PROCURE OFCR	04		97A00	1	DOD AGCY
		PROD PECR	04		97A00	1	DOD AGCY
		PROD OFCR	04		97A00	1	DOD AGCY
		PROD OFCR	04		97A00	1	DOD AGCY
W1BSAA	AE NAVY ACTY	DEV TST OFCR	04	AV	51A15	1	JOINT
		TM CH PGM DEV	04	FA	51A13	1	JOINT
W1BTAA	AE AF ACTY	DEV ENGR	04		51A00	1	JOINT
		PRG OFCR	04		51A00	1	JOINT
		RSCH COORD	04		51A00	1	JOINT
W1D2AA	USA ADA SCH	ANAL SR TAC	04	AD	51A14	1	TRADOC
		ATMD OFCR	03	AD	51A14	2	TRADOC
		C, C2 BR	04	AD	51A14	1	TRADOC
		C, FAAD BR	04	AD	51A14	1	TRADOC
		C, HIMAD BR	04	AD	51A14	1	TRADOC
		C2 OFCR	03	AD	51A14	1	TRADOC
		CD OFCR	03	AD	51A14	1	TRADOC
		CD OFCR	04	AD	51A14	1	TRADOC
		CONCEPTS OFCR	03	AD	51A14	1	TRADOC
		CONCEPTS OFCR	03	AD	51A14	1	TRADOC
		CONCEPTS OFCR	03	AD	51A14	2	TRADOC
		HIMAD PROJ	03	AD	51A14	1	TRADOC
		LOG OFCR C21	04	AD	51A14	1	TRADOC
		LOG OFCR LOSF	04	AD	51A14	1	TRADOC
		LOG OFCR LOSF	04	AD	51A14	1	TRADOC
		LOG OFCR LOSR	04	AD	51A14	1	TRADOC
		PROJ OFCR	03	AD	51A14	2	TRADOC
		SR CONCEPTS	04	AD	51A14	1	TRADOC
W1D4AA	USA OF CTR	C, LOG SYS BR	04	OD	51A91	1	TRADOC
		C, PROP SYS BR	04	OD	51A91	1	TRADOC
		PROJ OFCR T&E	04	OD	51A91	2	TRADOC
		R&E T&E OFCR	03	AR	51A12	1	TRADOC
		SR SYS STF OFCR	03	OD	51A91	1	TRADOC
		SR SYS STF OFCR	03	OD	51A91	1	TRADOC
W1D5AA	USA QM SCH	PO/C, FLD SVC	04	QM	51A92	1	TRADOC
		SMO/C, LOG SYS	04	QM	51A92	1	TRADOC
W1D7AA	USATSCH	MTR TR T&E MGR	04	TC	51A88	1	TRADOC
W1DXAA	USA ARMOR	ASST TSM TST	03	AR	51A12	1	TRADOC
		C, ACQN BR	04	AR	51A12	1	TRADOC
		CHIEF CCTB	04	AR	51A12	1	TRADOC
		CHIEF TECH BR	04	AR	51A12	1	TRADOC
		MAT DEV OFCR	03	AR	51A12	1	TRADOC
		MAT DEV OFCR	03	AR	51A12	1	TRADOC
		MAT DEV OFCR	03	AR	51A12	1	TRADOC
		MAT DEV OFCR	03	AR	51A12	1	TRADOC
		MAT DEV OFCR	03	AR	51A12	1	TRADOC
		MAT DEV OFCR	03	AR	51A12	2	TRADOC
		PO ACQN	03	AR	51A12	1	TRADOC
		PROG ANAL COST	03	AR	51A12	1	TRADOC
W1E0AA	USAJFKSWCS	A-I OFCR	03	SF	51A18	2	ARSOCOM
		AVN COM AMS	03	AV	51A15	1	ARSOCOM
		COMM OFCR	03	SC	51A25	1	ARSOCOM
		COMM OFCR	03	SC	51A25	1	ARSOCOM
		MATL OFCR	03	QM	51A92	1	ARSOCOM
		MGR/MATL	04	SF	51A18	1	ARSOCOM
		T&E OFCR	03	SF	51A18	1	ARSOCOM
		T&E OFCR	03	SF	51A18	2	ARSOCOM
W1E1AA	ALMC	AUTO STF OFCR	03		53B00	1	TRADOC
		PROC INSTR	04		97A00	1	TRADOC
		PROC INSTR	04		97A00	1	TRADOC
		PROC INSTR	04		97A00	1	TRADOC
		PROC INSTR	04		97A00	1	TRADOC
		PROC INSTR	04		97A00	1	TRADOC
		R&D INSTR	03		51A00	1	TRADOC

CAREER DEVELOPMENT UPDATE

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		R&D INSTR	04		51A00	1	TRADOC
W1E8AA	USA INT SCH	ASST TSM LOG	04	MI	51A35	1	TRADOC
		ASST TSM LOG	04	MI	51A35	1	TRADOC
		ASST TSM PERS	04	MI	51A35	1	TRADOC
		ASST TSM PERS	04	MI	51A35	1	TRADOC
		C-E AUTO OFCR	03	MI	51A35	1	TRADOC
		C, GRAND BR	04	MI	51A35	1	TRADOC
		MAT ACQ OFCR	03	MI	51A35	1	TRADOC
		MAT ACQ OFCR	03	MI	51A35	1	TRADOC
		SIGINT EW OFCR	03	MI	51A35	1	TRADOC
		SIGINT EW OFCR	03	MI	51A35	1	TRADOC
W1E8AA	USA INT SCH	TAC INTEL OFCR	03	MI	51A35	1	TRADOC
W1EAAA	MSL MUN CTR	C, PROD EVAL	04		51A03	1	TRADOC
		CD STF OFCR	03	OD	51A91	2	TRADOC
W1FBAA	USMA	INS/R&D	03		51A00	3	USMA
		INSTR/R&D	04		51A00	2	USMA
		INSTRUCTOR	04		53B00	1	USMA
		RSCH ANAL	04		51A00	1	USMA
		RSCH ANAL	04		51A00	1	USMA
		SR RSCH ANAL	04		51A00	1	USMA
W1HSAA	DLA	OFCR-IN-CHRG	04		97A00	1	DOD AGCY
		PRG/TECH SPT	04		97A00	1	DOD AGCY
W1NBAA	SHAPR	SYS ANALYST	04		53B00	1	SHAPE
		SYS ANALYST	04		53B00	1	SHAPE
W1Q8AA	DLA	ASST C, CNTR	04		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		COMMANDER	04	AV	97A15	1	DOD AGCY
		PRGM INTGR	04		97A00	1	DOD AGCY
		PRGM INTGR	04		97A00	1	DOD AGCY
		PRGM INTGR	04		97A00	1	DOD AGCY
		PRGM INTGR	04	AV	97A15	1	DOD AGCY
		PRGM INTGR	04	AV	97A15	1	DOD AGCY
W1SEAA	USAISC-PTN	C, IMO BR	04	SC	53B25	1	ISC
W1WKAA	DLA	ACQ MAT STF	04		97A00	1	DOD AGCY
		ASST C CNTR	04		97A00	1	DOD AGCY
		ASST C CNTR		04	97A00	1	DOD AGCY
		ASST C QA DIV	04		97A00	1	DOD AGCY
		ASST PRG/TECH	04		97A00	1	DOD AGCY
		COMMANDER	04		97A00	1	DOD AGCY
		COMMANDER	04		97A00	1	DOD AGCY
		OFCR-IN-CHRGE	04		97A00	1	DOD AGCY
		PRG SPT OFCR	03		97A00	1	DOD AGCY
W1WLAA	DLA	ASST C CNTR	03		97A00	1	DOD AGCY
		ASST C CNTR	04		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		COMMANDER	04		97A00	1	DOD AGCY
		FLT OPNS OFCR	03	AV	97A15	1	DOD AGCY
		FLT TST PLT	03	AV	97A15	1	DOD AGCY
W1WLAA	DLA	SYS PROC OFCR	04	AV	97A15	1	DOD AGCY
W1WWAA	DLA	ACQ MAT STF OF	03		97A00	1	DOD AGCY
		C CNTR MGMT	04		97A00	1	DOD AGCY
		C, PRG SPT	04	AV	97A15	1	DOD AGCY
		C, PRGM/TECH	04		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		CNTR ADMIN	03		97A00	1	DOD AGCY
		COMMANDER	04		97A00	1	DOD AGCY
		PRGM MGR	03	AV	97A15	1	DOD AGCY
		PRGM MGR	04	AV	97A15	1	DOD AGCY
		PRGM SPT OF	04		97A00	1	DOD AGCY
		PRGM SPT OF	04		97A00	1	DOD AGCY
		PRGM SPT OF	04		97A00	1	DOD AGCY
		PRGM SPT OF	04		97A00	1	DOD AGCY
		PRGM SPT OF	04		97A00	1	DOD AGCY
W24B05	USAISC-BEL	TEST OFCR	03		53B00	2	ISC
W248AA	USA ISEC	C-E SYS OFCR	05		53B00	1	ISC
		C-E SYS OFCR	04		53B00	1	ISC
		C-E SYS OFCR	04		53B00	1	ISC
		C-E SYS OFCR	04		53B00	1	ISC
		C-E SYS OFCR	04		53B00	1	ISC
		C-E SYS OFCR	04		53B00	1	ISC
		C-E SYS OFCR	04		53B00	2	ISC
		SFTWRE ENGR	04	SC	53B25	1	ISC
W262AA	ARL	ADA TECH MGR	04	AD	51A14	1	AMC
		ADA TECH MGR	04	AD	51A14	1	AMC
		AERO ENGR	03	AV	51A15	1	AMC
		AERO ENGR	03	AV	51A15	1	AMC
		ARM TECH MGR	04	AR	51A12	1	AMC
		ARTY TECH MGR	04	FA	51A13	1	AMC
		AV TECH MGR	03	AV	51A15	1	AMC
		AV VUL AS OFCR	04	AV	51A15	1	AMC
		AVN TECH MGR	04	AV	51A15	1	AMC
		CERAMIC ENGR	03		51A00	1	AMC
		CHEMIST	03	CM	51A71	1	AMC
		COMPUTER ENGR	03	SC	51A25	1	AMC
		COMPUTER SCI	03		53B00	1	AMC
		ELCT ENGR	03	SC	51A25	1	AMC
		ELCT ENGR	04		51A00	1	AMC
		ENGR PHYS	04		51A00	1	AMC
		ENGR TECH OF	04	EN	51A21	1	AMC

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		EXEC OFCR	04		51A00	1	AMC
		FA EW VUL ASS	04	FA	51A13	1	AMC
		FA TECH MGR	03	FA	51A13	1	AMC
		FA TECH OF	04	FA	51A13	1	AMC
		FA TECH OFCR	03	FA	51A13	1	AMC
		FA TECH OFCR	04	FA	51A13	1	AMC
		INF TECH MGR	04	IN	51A11	1	AMC
		INF TECH MGR	04	IN	51A11	1	AMC
		INF TECH MGR	04	IN	51A11	1	AMC
		INF VUL ASS OFCR	04	IN	51A11	1	AMC
		METALLUR ENGR	03		51A00	1	AMC
		METALLURGIST	03		51A00	1	AMC
		MI TECH MGR	04	MI	51A35	1	AMC
		OD TECH OF	04	OD	51A91	1	AMC
		PHYSICIST	03		51A00	1	AMC
		PHYSICIST	04		51A00	1	AMC
		PRG INTG & ANL	04		51A00	1	AMC
		ROBOTIC ENGR	03		51A00	1	AMC
		RSCH PHYS	03		51A00	1	AMC
		SC TECH OF	04	SC	51A25	1	AMC
		SF TECH MGR	04	SF	51A18	1	AMC
		SR EW VUL ASS	04	AD	51A14	1	AMC
		SYS AUTO ENGR	03		53B00	1	AMC
		TECH ASSESS OF	03		51A00	1	AMC
W27P01	PEO IEW	APM ACS	04	MI	51A35	1	SECARMY FOA
		APM GCID	04	AR	51A12	1	SECARMY FOA
		APM GCID	04	AR	51A12	1	SECARMY FOA
		APM GUARDRILL	04	MI	51A35	1	SECARMY FOA
		APM LOG/FLDNG	04	MI	51A35	1	SECARMY FOA
		APM LOG/FLDNG	04	MI	51A35	1	SECARMY FOA
		APM NCTR	04	AD	51A14	1	SECARMY FOA
		APM READINESS	04	AV	51A15	1	SECARMY FOA
		APM TEST	04	MI	51A35	1	SECARMY FOA
		APM TEST	04	MI	51A35	1	SECARMY FOA
		EXEC OFCR	04	MI	51A35	1	SECARMY FOA
W27P01	PEO IEW	T&E OFCR	04	AV	51A15	1	SECARMY FOA
		T&E OFCR	04	MI	51A35	1	SECARMY FOA
		T&E OFCR	04	MI	51A35	1	SECARMY FOA
		T&E OFCR	04	MI	51A35	1	SECARMY FOA
		T&E OFCR	04	MI	51A35	1	SECARMY FOA
W27P02	PEO AVN	APM AI ASE	04	AV	51A15	1	SECARMY FOA
		APM FRC MDRN	04	AV	51A15	1	SECARMY FOA
		APM INTL OPS	04	AV	51A15	1	SECARMY FOA
		APM IRCM ASE	03	AV	51A15	1	SECARMY FOA
		APM LOG/FLD	04	AV	51A15	1	SECARMY FOA
		APM MNPRNT	04	AV	51A15	1	SECARMY FOA
		APM R&D SOA	04	AV	51A15	1	SECARMY FOA
		APM R&D/T&E	04	AV	51A15	1	SECARMY FOA
		APM FDNS AAH	04	AV	51A15	1	SECARMY FOA
		APM REQMTS	04	AV	51A15	1	SECARMY FOA
		APM RQMTS	04	AV	51A15	1	SECARMY FOA
		APM RQMTS	04	AV	51A15	1	SECARMY FOA
		APM SP AVNS	04	AV	51A15	1	SECARMY FOA
		APM T ACQ EXEC	03	AV	51A15	1	SECARMY FOA
		APM T&E AAH	04	AV	51A15	1	SECARMY FOA
		AVN LOG OFCR	03	AV	51A15	1	SECARMY FOA
		AVN LOG OFCR	04	AV	51A15	1	SECARMY FOA
		AVN LOG OFCR	04	AV	51A15	1	SECARMY FOA
		AVN LOG OFCR	04	AV	51A15	1	SECARMY FOA
		AVN LOG OFCR	04	AV	51A15	1	SECARMY FOA
		EW OFCR	03	AV	97A15	1	SECARMY FOA
		LOG MGT OFCR	04	AV	51A15	1	SECARMY FOA
		LOG OFCR MAT	03	AV	51A15	1	SECARMY FOA
		LOG OFCR MAT	03	AV	51A15	1	SECARMY FOA
		MAINT OFCR	03	AV	51A15	1	SECARMY FOA
		MAINT TRNG	04	AV	51A15	1	SECARMY FOA
		MAT FLD CRD	04	AV	51A15	1	SECARMY FOA
		PROCURE OFCR	04	AV	97A15	1	SECARMY FOA
		R&D COORD	04	AV	51A15	2	SECARMY FOA
W27P03	PEO CCS	AES LNO	04	MI	51A35	1	SECARMY FOA
		APM COLTRL EN	04	MI	51A35	1	SECARMY FOA
		APM FS ADA	04	FA	51A13	1	SECARMY FOA
		APM READINESS	04	AD	51A14	1	SECARMY FOA
		C, FLD BR ASA	04	MI	51A35	1	SECARMY FOA
		DPM CN CMS	04	SC	53B25	1	SECARMY FOA
W27P03	PEO CCS	EXEC OFCR	04	SC	51A25	1	SECARMY FOA
		FED/IEAS	04	EA	53B13	1	SECARMY FOA
		FLD OFCR ASAS	04	OD	51A91	1	SECARMY FOA
		INTEROP OFCR	04	SC	53B25	1	SECARMY FOA
		OPS OFCR/LNO	04	SC	51A25	1	SECARMY FOA
		PGRM CONT GRP	04	MI	51A35	1	SECARMY FOA
		PROJ OFCR	04		51A00	1	SECARMY FOA
		PROJ OFCR FATDS	04	FA	51A13	1	SECARMY FOA
		SFTWRE ENGR	04	MI	53B35	1	SECARMY FOA
		SFTWRE INTR OFCR	03	SC	53B25	1	SECARMY FOA
		SFTWRE TST MGR	04	MI	51A35	1	SECARMY FOA
		SMR PROJ OFCR	03	MI	51A35	1	SECARMY FOA
		SYS ACQ OFCR	03	SC	53B25	1	SECARMY FOA
		SYS ACQ OFCR	03	SC	53B25	1	SECARMY FOA
		SYS ACQ OFCR	04	SC	53B25	1	SECARMY FOA
		TRN AUTO OFCR	04	MI	53B35	1	SECARMY FOA
W27P04	PEO ARM	APM AGS	04	OD	51A91	1	SECARMY FOA

CAREER DEVELOPMENT UPDATE

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		APM ARM EN	04	OD	51A91	1	SECARMY FOA
		APM LV FIRE	03	FA	51A13	1	SECARMY FOA
		APM MNPRNT	03	OD	51A02	1	SECARMY FOA
		APM T&E	03	AR	51A12	1	SECARMY FOA
		APM TECH INTR	03	OD	51A02	1	SECARMY FOA
		ARM SYS OFCR	03	OD	51A91	1	SECARMY FOA
		PEO REP	04	OD	51A91	1	SECARMY FOA
		PROJ MGT OFCR	03	OD	51A02	1	SECARMY FOA
		PROJ MGT OFCR	04		51A00	1	SECARMY FOA
W27P05	PEO CS	EXEC OFCR	04	OD	51A91	1	SECARMY FOA
		LOG OFCR MTV	03	TC	51A88	1	SECARMY FOA
		PRJ OFCR ESP	04	TC	51A88	1	SECARMY FOA
		PRJ OFCR HTV	03	TC	51A88	2	SECARMY FOA
		PRJ OFCR HTV	04	OD	51A91	1	SECARMY FOA
		PRJ OFCR LTV	03	OD	51A91	1	SECARMY FOA
		PRJ OFCR LTV	03	TC	51A88	1	SECARMY FOA
		PRJ OFCR LTV	04	TC	51A88	1	SECARMY FOA
		PRJ OFCR MTV	03	TC	51A88	1	SECARMY FOA
		PRJ OFCR MTV	04	OD	51A91	1	SECARMY FOA
W27P07	PEO TACT MSL	APM AGM	04	OD	97A91	1	SECARMY FOA
		APM DEV	04		51A00	1	SECARMY FOA
		APM PROD	03	OD	51A91	1	SECARMY FOA
W27P07	PEO TACT MSL	APM PROD	04	OD	97A91	1	SECARMY FOA
		ASST PEO	04		51A00	1	SECARMY FOA
		EXEC OFCR	03		51A00	1	SECARMY FOA
		LNO	04		51A00	1	SECARMY FOA
		PM REP EUROPE	04	OD	51A91	1	SECARMY FOA
		PM STF OFCR	03	OD	51A91	1	SECARMY FOA
		PROD OFCR	03	OD	97A91	1	SECARMY FOA
		R&D COORD	03	FA	51A13	2	SECARMY FOA
		TST OFCR HOMS	04	OD	51A91	1	SECARMY FOA
W27P08	PEO COMM	FLD OFCR	04	SC	51A25	1	SECARMY FOA
		FLD OFCR MSCS	04	SC	97A00	1	SECARMY FOA
		LNO CAL	04	SC	51A25	1	SECARMY FOA
		LOG OFCR ADDS	04	SC	51A25	1	SECARMY FOA
		OPNS OFCR	04	SC	51A25	1	SECARMY FOA
		OPNS OFCR	04	SC	51A25	1	SECARMY FOA
		OPNS OFCR	04	SC	51A25	1	SECARMY FOA
		PROD DEV OFCR	04	SC	97A25	1	SECARMY FOA
		PROJ OFCR GARS	04	SC	51A25	1	SECARMY FOA
		PROJ OFCR GARS	04	SC	51A25	1	SECARMY FOA
		PROJ OFCR GARS	04	SC	97A25	1	SECARMY FOA
		PROJ OFCR TMD	04	SC	51A25	1	SECARMY FOA
		PROJ OFCR TMD	04	SC	51A25	1	SECARMY FOA
		SFTWRE ENGR	03	SC	53B25	2	SECARMY FOA
		TST OFCR ADDS	04	SC	51A25	1	SECARMY FOA
		TST OFCR JTIDS	04	SC	53B25	1	SECARMY FOA
		TST OFCR TMD	03	SC	51A25	1	SECARMY FOA
W27P09	PEO AD	APM DEVLP	04	AD	51A14	1	SECARMY FOA
		APM INTGR	04	AD	51A14	1	SECARMY FOA
		EXEC OFCR	03	AD	51A14	1	SECARMY FOA
		LNO	04	AD	51A00	2	SECARMY FOA
		PEO AD COORD	04	AD	51A14	1	SECARMY FOA
		PROCURE OFCR	04	AD	97A14	1	SECARMY FOA
W27P10	PEO ASM	APM ACQ Q CMV	04	EN	97A21	1	SECARMY FOA
		APM LOG	04	OD	51A91	1	SECARMY FOA
		APM LOG FLDNG	04	EN	51A21	1	SECARMY FOA
		APM LOG/FLD	04	FA	51A13	1	SECARMY FOA
		APM LOG/FLD	04	OD	51A91	1	SECARMY FOA
		APM M2/M3 BFVS	04	FA	97A13	1	SECARMY FOA
		APM R&D SS	04	OD	51A91	1	SECARMY FOA
W27P10	PEO ASM	APM READ ABRAMS	04	OD	97A91	1	SECARMY FOA
		APM SYS AGS	04	AR	51A02	1	SECARMY FOA
		APM T&E AFAS	04	FA	51A13	1	SECARMY FOA
		APM T&E FARV	04	OD	51A91	1	SECARMY FOA
		APM TRN DEV	04	AR	51A12	1	SECARMY FOA
		ASST LNO	04	OD	97A91	1	SECARMY FOA
		EXEC OFCR	04	AR	51A12	1	SECARMY FOA
		LOG OFCR	04	AR	51A12	1	SECARMY FOA
		LOG/PRD OFCR	04		51A03	1	SECARMY FOA
		MAT CHING OFCR	04	OD	97A91	1	SECARMY FOA
		R&D COORD	04	OD	51A91	1	SECARMY FOA
		R&D COORD BM	03	OD	51A91	2	SECARMY FOA
		R&D COORD BM	04	AR	51A12	1	SECARMY FOA
		T&E OFCR AGS	04	IN	51A02	1	SECARMY FOA
W27P11	PEO STAMIS	AUTO MGT OFCR	04	SC	53B00	1	SECARMY FOA
		AUTO STF OFCR	04	SC	53B25	1	SECARMY FOA
		INFO SYS OFCR	04		53B00	1	SECARMY FOA
		MAT ACQ OFCR	03	SC	53B00	1	SECARMY FOA
		MAT ACQ OFCR	03	SC	53B00	1	SECARMY FOA
		MAT ACQ OFCR	04	SC	53B00	1	SECARMY FOA
		MAT ACQ OFCR	04	SC	53B00	1	SECARMY FOA
		MAT ACQ OFCR	04	SC	53B00	1	SECARMY FOA
		MAT ACQ OFCR	04	SC	53B25	1	SECARMY FOA
		PROJ OFCR	04	SC	53B00	1	SECARMY FOA
W27P15	UAV	APM UAV	04	MI	51A35	1	SECARMY FOA
W27PAA	AAESA	AAC MGR	03		51A00	2	SECARMY FOA
		AAC MGR	03		53B00	2	SECARMY FOA
		AAC MGR	03		97A00	1	SECARMY FOA
		AC PROP OFCR	04		51A00	1	SECARMY FOA
		FA51 PROP OFCR	04		51A00	1	SECARMY FOA
		RSCH DEV OFCR	03		51A00	5	SECARMY FOA
		RSCH DEV OFCR	04		51A00	5	SECARMY FOA

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		SYS ANL ENG	03	SC	53B00	1	SECARMY FOA
		SYS ANL ENGR	04	SC	53B00	1	SECARMY FOA
		SYS ANL INTR	04	SC	53B00	1	SECARMY FOA
W2EDAA	INSCOM	AV MAT/LOG OF	04	AV	51A15	1	INSCOM
		ENGR EQPT OF	04	EN	51A21	1	INSCOM
W2GJAA	USAMC IG	SYS AUTO INVS	03		53B00	1	AMC
W2HWAA	HQ AFCE	ACQ PRJ OFCR	04		53B00	1	SHAPE
W2HXAA	HQ AF SOUTH	AUTO SYS ENG	04		53B00	1	SHAPE
W2L5AA	USA INF SCH	ASST TSM ATMMD	04	IN	51A11	1	TRADOC
		ASST TSM TEST	04	IN	51A11	1	TRADOC
		ASST TSM TSIP	04	IN	51A11	1	TRADOC
		C, SPID	04	IN	51A11	1	TRADOC
		PROJ OFCR	03	AR	51A12	1	TRADOC
		PROJ OFCR	03	IN	51A11	1	TRADOC
		SUSTAIN OFCR	03	IN	51A11	1	TRADOC
		SYS STF OFCR	04	IN	51A11	1	TRADOC
W2NTAA	ISA FA SCH	CD STF OFCR	03	FA	51A13	1	TRADOC
	USA FA SCH	ASST TSM ATACMS	04	FA	51A13	1	TRADOC
		ASST TSM HIP	04	FA	51A13	1	TRADOC
		ASST TSM P/LOG	04	FA	51A13	1	TRADOC
		CD STF OFCR	03	AV	51A15	1	TRADOC
		CD STF OFCR	03	FA	51A13	1	TRADOC
		CD STF OFCR	03	FA	51A13	1	TRADOC
		CD STF OFCR	03	FA	51A13	1	TRADOC
		CD STF OFCR	03	FA	51A13	2	TRADOC
		CD STF OFCR	03	FA	51A13	2	TRADOC
		CD STF OFCR	04	FA	51A13	1	TRADOC
		CD STF OFCR	04	FA	51A13	1	TRADOC
W2TZAA	DEF SUP SER	PROCURE OFCR	03		97A00	1	DOD AGCY
W2USAA	INSCOM	RSCH DEV CRD	04	OD	51A91	1	INSCOM
W2Y2AA	CMPT SYS SEL	AUTO OFCR	04		53B00	2	SECARMY FOA
		AUTO OFCR	04		53B00	2	SECARMY FOA
		PROCURE OFCR	04		97A00	1	SECARMY FOA
W30MAA	USA DPG	PRJ OFCR, TROP	03		51A03	1	AMC
		PRJ OFCR, TROP	03		51A03	1	AMC
		TEST PROJ OF	04	CM	51A74	1	AMC
		TST PRJ OFCR	03	CM	51A74	1	AMC
		TST PRJ OFCR	03	CM	51A74	2	AMC
		TST PRJ OFCR	03	CM	51A74	3	AMC
		TST PRJ OFCR	03	FA	51A13	1	AMC
W319AA	INSCOM	R&D TM CH	04	MI	51A00	1	INSCOM
W31LAA	CCSA	C, CUST SPT	04		53B00	1	ISC
W34EAA	CAMO	C, SYS MGT BR	03	OD	53B91	1	AMC
W36NAA	DLA	C, D&M CNTR BR	04		97A00	1	DOD AGCY
		C, G P CNTR BR	04		97A00	1	DOD AGCY
W36PAA	USA SPO	ILS OFCR	04	QM	51A03	1	STAFF FIELD
		ILS OFCR	04	QM	51A03	1	STAFF FIELD
		R&D COORD	03		51A00	1	STAFF FIELD
		R&D COORD	03	SC	51A25	1	STAFF FIELD
		R&D COORD	03	SC	51A25	1	STAFF FIELD
		R&D COORD	03	SC	51A25	1	STAFF FIELD
		R&D COORD	04	MI	51A35	1	STAFF FIELD
		R&D COORD	04	MI	51A35	1	STAFF FIELD
		R&D COORD	04	SC	51A25	1	STAFF FIELD
		R&D COORD	04	SC	51A25	1	STAFF FIELD
		R&D COORD	04	SC	51A25	1	STAFF FIELD
W36WAA	OPM NUC MUN	EOD OFCR	04	OD	51A91	1	AMC
W37601	USA ATTC	C, R&D CRD	04	AV	51A15	1	AMC
		EXP TST PLT	03	AV	51A15	1	AMC
		EXP TST PLT	03	AV	51A15	1	AMC
		EXP TST PLT	03	AV	51A15	1	AMC
W376AA	HQ ATTC	AERO ENGR	04	AV	51A15	1	AMC
		C, FLT TST	04	AV	51A15	1	AMC
		C, FLT TST BR	04	AV	51A15	1	AMC
		C, OPNS DIV	04	AV	51A15	1	AMC
		EXP TST PLT	04	AV	51A15	1	AMC
		EXP TST PLT	04	AV	51A15	1	AMC
W37WAA	NAT DEF UN	CNTR OFCR	04		97A00	1	JOINT
W384AA	USA RSCH ASS	PROCURE OFCR	04		97A00	1	SECARMY FOA
		R&D COORD	04		51A00	1	SECARMY FOA
		R&D COORD	04		51A00	1	SECARMY FOA
		R&D COORD	04		51A00	1	SECARMY FOA
		R&D COORD	04		51A00	1	SECARMY FOA
		R&D COORD	04		51A00	1	SECARMY FOA
W3BDAA	SDC-LEE	C, SYS AUTO	04		53B00	1	ISC
		SYS AUTO ENGR	03		53B00	4	ISC
		SYS AUTO ENGR	03	EN	53B21	1	ISC
		SYS AUTO ENGR	03	OD	53B91	1	ISC
		SYS AUTO ENGR	03	OD	53B91	1	ISC
		SYS AUTO ENGR	03	OD	53B91	1	ISC
		SYS AUTO ENGR	03	QM	53B91	8	ISC
		SYS AUTO ENGR	03	QM	53B92	1	ISC
W3BDAA	SDC-LEE	SYS AUTO ENGR	03	QM	53B92	4	ISC
		SYS AUTO ENGR	03	QM	53B92	4	ISC
		SYS AUTO ENGR	03	QM	53B92	8	ISC
		SYS AUTO ENGR	03	TC	53B88	1	ISC
		SYS AUTO ENGR	04		53B00	1	ISC
		SYS AUTO ENGR	04	EN	53B21	1	ISC
		SYS AUTO ENGR	04	OD	53B91	1	ISC
		SYS AUTO ENGR	04	OD	53B91	1	ISC
		SYS AUTO ENGR	04	OD	53B91	1	ISC
		SYS AUTO ENGR	04	OD	53B91	3	ISC

CAREER DEVELOPMENT UPDATE

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		SYS AUTO ENGR	04	QM	53B92	1	ISC
		SYS AUTO ENGR	04	QM	53B92	11	ISC
		SYS AUTO ENGR	04	QM	53B92	6	ISC
		SYS AUTO ENGR	04	TC	53B88	1	ISC
W3E0AA	577 TAACOM	CNTR OFCR	04		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
W3E9AA	USATSC	MAT ACQ MGT OFCR	04		51A00	1	TRADOC
		MAT ACQ MGT OFCR	04		51A00	1	TRADOC
		OPFOR PRG DIR	04		51A00	1	TRADOC
		PROC & PROD OFCR	04		97A00	1	TRADOC
W3H8AA	USAISEC-EUR	AUTO SYS ENGR	03		53B00	1	ISC
		C, MINI/MICRO	04		53B00	1	ISC
		C, TERM & DATA	03		53B00	1	ISC
		C, THTR I S	03		53B00	1	ISC
		PROJ OFFICER	03		53B00	1	ISC
W3JCAA	AMSAA	FEDC R&D COORD	04		51A03	1	AMC
		R&D COORD	04		51A02	1	AMC
		R&D COORD	04		51A02	1	AMC
		R&D COORD	04		51A02	3	AMC
		R&D COORD	04		51A03	1	AMC
		R&D COORD	04		51A03	2	AMC
		SIG R&D COORD	04	SC	51A25	1	AMC
W3LB01	TRANSCOM	AUTO MGT STF OFCR	04		53B00	1	JOINT
W3LBAA	TRANSCOM	CMD ACQ OFCR	04		97A00	1	JOINT
W3P2AA	USA ELE SOCOM	SNTR/PROC OFCR	04		97A00	1	JOINT
		SYS ACQ MGR	04	AV	51A15	1	JOINT
		SYS ACQ MGR	04	IN	51A11	1	JOINT
W3Q220	TEXCOM	ACQ MGT OFCR	04	I	97A00	1	STAFF FIELD
		ADP OFCR	03		53B00	1	STAFF FIELD
W3Q220	TEXCOM	ADP OFCR	03		53B00	2	STAFF FIELD
		ADP OFCR	03	SC	53B25	1	STAFF FIELD
		ADP OFCR	04		53B00	1	STAFF FIELD
		C, NTWK SYS	04		53B00	1	STAFF FIELD
		C, SR INST OFCR	04		51A00	1	STAFF FIELD
		INST OFCR	03		51A00	3	STAFF FIELD
		OPNS OFCR	04		51A02	1	STAFF FIELD
		R&D OFCR	03		51A00	1	STAFF FIELD
		TEST OFCR	03		51A00	1	STAFF FIELD
		TEST OFCR	03		51A02	1	STAFF FIELD
		TEST OFCR	03		51A02	1	STAFF FIELD
		TEST OFCR	03	AV	51A15	1	STAFF FIELD
		TEST OFCR	03	CM	51A74	1	STAFF FIELD
		TEST OFCR	03	OD	51A91	1	STAFF FIELD
		TEST OFCR	03	TC	51A88	1	STAFF FIELD
		TEST OFCR	04		51A00	1	STAFF FIELD
		TEST OFCR	04		51A00	1	STAFF FIELD
		TEST OFCR	04		51A00	1	STAFF FIELD
		TEST OFCR	04		51A02	1	STAFF FIELD
		TEST OFCR	04		51A02	1	STAFF FIELD
		TEST OFCR	04		51A02	1	STAFF FIELD
		TEST OFCR	04		51A02	1	STAFF FIELD
		TEST OFCR	04	AR	51A12	1	STAFF FIELD
		TEST OFCR	04	AR	51A12	1	STAFF FIELD
		TEST OFCR	04	AR	51A12	1	STAFF FIELD
		TEST OFCR	04	AR	51A12	1	STAFF FIELD
		TEST OFCR	04	AV	51A15	1	STAFF FIELD
		TEST OFCR	04	IN	51A11	1	STAFF FIELD
W3Q222	TEXCOM	TEST OFCR	03	SF	51A18	1	STAFF FIELD
		TEST OFCR	03	SF	51A18	1	STAFF FIELD
W3Q223	TEXCOM	TEST OFCR	03	MI	51A35	1	STAFF FIELD
		TEST OFCR	04	MI	51A35	1	STAFF FIELD
		TEST OFCR	04	MI	51A35	1	STAFF FIELD
W3Q224	TEXCOM	TEST OFCR	03	AD	51A14	1	STAFF FIELD
		TEST OFCR	03	AD	51A14	1	STAFF FIELD
W3Q225	TEXCOM	C, TST COMP OPS	04		53B00	1	STAFF FIELD
		C, TST COMP SYS	04		53B00	1	STAFF FIELD
		C, TEST ENGR	04	SC	51A25	1	STAFF FIELD
		COMP SYS ANAL	03		53B00	1	STAFF FIELD
W3Q225	TEXCOM	ELCTR ENGR	03	SC	51A25	2	STAFF FIELD
		SR TEST OFCR	04		51A02	1	STAFF FIELD
		SR TST OFCR	04		51A02	1	STAFF FIELD
		TEST OFCR	04		51A00	1	STAFF FIELD
W3Q2AA	OPTEC	ADP OFCR	03		53B00	1	STAFF FIELD
		ADP OFCR	03		53B00	1	STAFF FIELD
		ADP OFCR	03		53B00	1	STAFF FIELD
		ADP OFCR	03		53B00	1	STAFF FIELD
		CH, CNTRT	03		97A00	1	STAFF FIELD
		COMP ANAL	04		53B00	1	STAFF FIELD
		EVAL OFCR	03	OD	51A91	1	STAFF FIELD
		EVAL OFCR	04		53B00	1	STAFF FIELD
		EVAL OFCR	04	AD	51A14	1	STAFF FIELD
		EVAL OFCR	04	AR	51A12	1	STAFF FIELD
		EVAL OFCR	04	AV	51A15	1	STAFF FIELD
		EVAL OFCR	04	EA	51A13	1	STAFF FIELD
		EVAL OFCR	04	OD	51A91	1	STAFF FIELD
		INST OFCR	03	AV	51A15	1	STAFF FIELD
		INST OFCR	04	EA	51A13	1	STAFF FIELD
		PROC OFCR	04		97A00	1	STAFF FIELD
		SUPV ADP	04	SC	53B25	1	STAFF FIELD
		TEST OFCR	04	MI	51A35	1	STAFF FIELD
W3R8AA	USAISC TRADOC	AUTO SYS ENGR	04		53B00	1	ISC
W3RBAA	HQ USARPAC	CNTR MGT OFCR	03		97A00	1	PACCOM
W3VSAA	PERSCOM	ASGN OFCR	04		51A00	1	PERSCOM

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		PERS ASG OFCR	04		97A00	1	PERSCOM
		PERS ASGN OFCR	04		51A00	1	PERSCOM
		PERS ASGN OFCR	04		53B00	1	PERSCOM
W3VVAA	DEF COML COM	ASST DEP DIR	04		97A00	1	DOD AGCY
		C, C&A PROC	04		97A00	1	DOD AGCY
W3XTAA	USACASCOM	COMM STAFF	03	SC	51A25	1	TRADOC
		CSS EVL OFCR	03		51A02	1	TRADOC
		LOG OFCR	04		51A03	1	TRADOC
		RQMT INTGR	03	OD	51A91	1	TRADOC
		RQMT INTGR	03	OD	51A91	1	TRADOC
		RQMT INTGR	03	OD	51A91	1	TRADOC
		RQMT INTGR	03	OD	51A91	1	TRADOC
		RQMT INTGR	03	OD	51A91	1	TRADOC
		RQMT INTGR	03	TC	51A88	1	TRADOC
		RQMT INTGR	04	OD	51A91	1	TRADOC
		RQMT INTGR	04	TC	51A88	1	TRADOC
W3XTAA	USACASCOM	SYS AUTO EGNR	03		53B00	1	TRADOC
W3YBAA	FORSCOM	PROCURE OFCR	04		97A00	1	FORSCOM
		PROCURE OFCR	04		97A00	1	FORSCOM
W3YDAA	INTEL THR	CNTR MGT OFCR	04		97A00	1	STAFF FIELD
W3YTAA	HQ TRADOC	CD COORD	04		51A00	1	TRADOC
		CD COORD	04		51A02	1	TRADOC
		CD COORD	04		51A03	1	TRADOC
		CD COORD	04		51A92	1	TRADOC
		CD COORD	04		51A92	1	TRADOC
		CD COORD	04	AD	51A14	2	TRADOC
		CD COORD	04	AR	51A12	1	TRADOC
		CD COORD	04	AR	51A12	1	TRADOC
		CD COORD	04	EN	51A21	1	TRADOC
		CD COORD	04	EA	51A13	1	TRADOC
		CD COORD	04	MI	51A35	1	TRADOC
		CD COORD	04	SF	51A18	1	TRADOC
		CD STF OFCR	03		51A00	1	TRADOC
		CD STF OFCR	03		51A00	1	TRADOC
		CD STF OFCR	03		51A00	1	TRADOC
		CD STF OFCR	03	IN	51A11	1	TRADOC
		T&E OFCR	04		51A00	1	TRADOC
W40JAA	DEF SECR AG	SEC ASST ANAL	04		97A00	1	DOD AGCY
W45TAA	STRICOM	APM	04		97A00	1	AMC
		APM	04		97A00	1	AMC
		APM	04	AD	51A14	1	AMC
		APM	04	AD	51A14	1	AMC
		APM	04	AR	51A12	1	AMC
		APM	04	AR	51A12	1	AMC
		APM	04	AR	51A12	1	AMC
		APM	04	AV	51A15	1	AMC
		APM	04	AV	51A15	2	AMC
		APM	04	AV	51A15	3	AMC
		APM	04	IN	51A11	1	AMC
		APM	04	IN	51A11	1	AMC
		APM	04	SC	51A25	1	AMC
		APM ITTS	04		51A00	1	AMC
		APM ITTS	04	IN	51A11	1	AMC
		DPM ITTS	04		51A02	1	AMC
		DPM ITTS	04	MI	51A35	1	AMC
W45TAA	STRICOM	EXEC OFCR	04	IN	51A11	1	AMC
		T&E OFCR	03		51A00	1	AMC
W47BAA	DEF COM AGCY	PROCUR ANAL	04		97A00	1	DOD AGCY
W47TAA	USA KUWAIT	CNTR OFCR	04		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
		PROCURE OFCR	03		97A00	1	FORSCOM
		PROCURE OFCR	03		97A00	1	FORSCOM
W48MAA	USA SAUDI	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
W4ARAA	HQ AMC	R&D COORD	04	IN	51A11	1	AMC
W4DJAA	JT FLTRWFRE	R&D COORD	04		51A00	1	JOINT
W4EYAA	SDC-ATLANTA	AUTO MGT OFCR	04		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC
W4EZAA	USAIRMICS	RSCH OFCR	03		53B00	1	ISC
		RSCH OFCR	04		53B00	1	ISC
		RSCH OFCR	04		53B00	1	ISC
W4FBAA	MUN PROD BASE	CNT/IN MGT	03		97A00	2	AMC
		CNT/INDUS MGT	03		97A00	1	AMC
		FAC CNSTR PM	04	EN	51A21	1	AMC
		FAC CONST R&D	03	EN	51A21	1	AMC
		PRD BAS R&D CRD	03		51A00	1	AMC
W4FDAA	AMCICP	INTL R&D COORD	04		51A02	1	AMC
W4FGAA	USAE CENTCOM	SYS ANALYST	04		53B00	1	JOINT
W4FHAA	USAISSC	ADP OFFICER	03		53B00	1	ISC
		ADP OFFICER	03		53B00	1	ISC
		AUTO MGT OFCR	03		53B00	1	ISC
		AUTO MGT OFCR	03		53B00	1	ISC
		AUTO MGT OFCR	03		53B00	1	ISC
		AUTO MGT OFCR	03		53B00	1	ISC
		AUTO MGT OFCR	03		53B00	1	ISC
		AUTO MGT OFCR	03		53B00	1	ISC
		AUTO MGT OFCR	03		53B00	2	ISC
		AUTO MGT OFCR	03		53B00	2	ISC
		COM/ELCT ENGR	04		53B00	1	ISC
		COMMANDER	03		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC

CAREER DEVELOPMENT UPDATE

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		SFTWR ENGR	03		53B00	1	ISC
W4FHAA	USAISSC	SFTWRE ENGR	04		53B00	1	ISC
		SFTWRE PRG OF	04		53B00	1	ISC
		SFTWRE PRG OF	04		53B00	1	ISC
		SFTWRE PRG OF	04		53B00	1	ISC
		SR SFTWR ENGR	04		53B00	1	ISC
		SR SFTWR ENGR	03		53B00	1	ISC
		SR SFTWR ENGR	04		53B00	2	ISC
W4G8AA	CECOM RDEC	ADO OFCR	03		53B00	1	AMC
		CHIEF	04		53B00	1	AMC
		PROJ OFCR	03		53B00	1	AMC
		PROJ OFCR	03	SC	51A25	1	AMC
		PROJ OFCR	04	SC	51A25	1	AMC
		R&D COORD	03	MI	51A35	1	AMC
		SW ENGR OFCR	03	FA	53B13	1	AMC
		SW ENGR OFCR	04	FA	53B13	1	AMC
		SYS ANALYST	03		53B00	1	AMC
		SYS ANALYST	03		53B00	1	AMC
W4GGAA	HQ TACOM	ABMS PROD OF	04	OD	97A91	1	AMC
		ABMS PROD OF	04	OD	97A91	1	AMC
		ABMS PROD OF	04	OD	97A91	1	AMC
		ABMS PROD OF	04	OD	97A91	1	AMC
		APM M113	04	OD	51A91	1	AMC
		C. PERS CAR	04	OD	97A91	1	AMC
		C. SPC PROD	04	OD	97A91	1	AMC
		C. SYS EQPT	04	OD	97A91	1	AMC
		C. SYS SEC	04	OD	97A91	1	AMC
		CIM OFCR	04	OD	51A91	1	AMC
		FLD LOG OFCR	03	AR	51A12	1	AMC
		FLD SITE CHIEF	03	QM	51A92	1	AMC
		FLD SITE CHIEF	04	AR	51A12	1	AMC
		FLD SITE CHIEF	04	AR	51A12	2	AMC
		LOG FLD OFCR	03		97A00	2	AMC
		LOG FLD OFCR	04	OD	51A91	1	AMC
		MANT TRNG OF	03	OD.	51A91	1	AMC
		OP/TRNG COORD	04	AR	51A12	1	AMC
		OPS/TNG COORD	04	AR	51A12	1	AMC
		PRJ OFCR CCE	04	OD	51A91	1	AMC
		PROC OFCR	03	OD	97A91	1	AMC
		PROC OFCR	04	OD	97A91	1	AMC
W4GGAA	HQ TACOM	PROCURE OFCR	04	OD	97A91	1	AMC
		PROJ OFCR CEE	03	EN	51A21	1	AMC
		R&D COORD	04	IN	51A11	1	AMC
		TEST OFCR	04	OD	51A91	1	AMC
		TEST SITE OFCR	04	OD	51A91	2	AMC
		TRAINING OFCR	04	AR	51A12	1	AMC
		TST SITE OFCR	04	AR	51A12	1	AMC
		TST SITE OFCR	04	OD	51A91	1	AMC
W4GHAA	TACOM RDEC	PROJ COORD	04	OD	51A91	1	AMC
		R&D COORD	03	AR	51A12	1	AMC
		R&D COORD	03	OD	51A91	1	AMC
		R&D COORD	04		51A02	1	AMC
		R&D COORD	04	AR	51A12	1	AMC
		R&D COORD AIPS	04	OD	51A91	1	AMC
		R&D COORD ENG	04	AR	51A12	1	AMC
		R&D COORD ENG	04	AR	51A12	1	AMC
		TECH INTG OFCR	04	OD	51A91	1	AMC
		WPN SYS MGR	03	AD	51A14	1	AMC
		WPN SYS MGR	03	IN	51A11	1	AMC
		WPN SYS MGR	03	OD	51A91	1	AMC
		WPN SYS MGR	03	OD	51A91	3	AMC
		WPN SYS MGR	04	AR	51A12	1	AMC
		WPN SYS MGR	04	FA	51A13	1	AMC
W4GKAA	JSOC	MGT INFO SYS	04	MI	53B35	1	JOINT
		PROCURE OFCR	04	QM	97A92	1	JOINT
W4GVAA	HQ CECOM	CHIEF	04	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	1	AMC
W4GVAA	HQ CECOM	CNT MGMT OFCR	03	SC	97A25	1	AMC
		CNT MGMT OFCR	03	SC	97A25	2	AMC
		CNT MGMT OFCR	03	SC	97A25	2	AMC
		CNT MGMT OFCR	03	SC	97A25	2	AMC
		CNT MGMT OFCR	03	SC	97A25	3	AMC
		CNTR MGT OFCR	04	SC	97A25	1	AMC
		CNTR MGT OFCR	04	SC	97A25	1	AMC
		CNTR MGT OFCR	04	SC	97A25	1	AMC
		CNTR MGT OFCR	04	SC	97A25	1	AMC
		CNTR MGT OFCR	04	SC	97A25	1	AMC
		CNTR MGT OFCR	04	SC	97A25	1	AMC
		CNTR MGT OFCR	04	SC	97A25	2	AMC
		FLD TM LDR	03	FA	51A13	1	AMC
		FLD TM LDR	03	FA	51A13	1	AMC
		FLD TM LDR	03	FA	51A13	2	AMC
		SYS MGMT OFCR	03	SC	51A25	1	AMC
		SYS MGMT OFCR	03	SC	51A25	1	AMC
		SYS MGT OFCR	04	SC	51A25	1	AMC
		SYS MGT OFCR	04	SC	51A25	1	AMC
		TEST OFCR	03	SC	51A25	1	AMC
		TEST OFCR	04	SC	51A25	1	AMC
		TEST OFCR	04	SC	51A25	1	AMC
		TEST OFCR	04	SC	51A25	1	AMC
W4HPAA	ACTV SPEC PROJ	PROJ OFCR (PROC)	04		97A00	1	ARSOCOM
		PROJ OFCR (SPOP)	04	SF	51A18	1	ARSOCOM
W4J9AA	NTC OPS GRP	PROC OFFICER	04		97A00	1	TRADOC
W4K8AA	USA MP SCH	CBT STF OFCR	03	MP	51A31	2	TRADOC
		SR MAT ACQ OFCR	04	MP	51A31	1	TRADOC
		SR SCTY ST	04		51A00	1	TRADOC
		SR T&E STF OFCR	04	MP	51A31	1	TRADOC
		T&E STF OFCR	03	MP	51A31	1	TRADOC
		T&E STF OFCR	03	MP	51A31	1	TRADOC
		T&E STF OFCR	04	MP	51A31	1	TRADOC
W4K9AA	USA CM SCH	C. DET/ALARM	04	CM	51A74	1	TRADOC
		C. PHYS PROT	04	CM	51A74	1	TRADOC
W4KBAA	USA DSMA	AI ROBOTICS	04		51A00	1	STAFF FIELD
		C. AI TECH MGR	04		53B00	1	STAFF FIELD
		CONTRACT SPEC	04		97A00	1	STAFF FIELD
		SR AI/SYS AUTO	04		53B00	1	STAFF FIELD
W4KVAA	TRADOC CNTR	PROCURE OFCR	04		97A00	1	TRADOC
W4LZAA	DEF MOB SYS	SYS ANLYST	04		53B00	1	DOD AGCY
W4MKAA	ARDEC	ARM SYS OFCR	03	AR	51A12	1	AMC
		ARM SYS OFCR	04	AR	51A12	1	AMC
		ARTY SYS OFCR	03		97A00	1	AMC
		ARTY SYS OFCR	03	FA	51A13	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		EL/ARM SYS	03	AR	51A12	1	AMC
		FS SYS OFCR	04	FA	51A13	2	AMC
		LT INF SYS OFCR	04	IN	51A11	2	AMC
		MORTAR SYS OFCR	03	IN	51A11	1	AMC
		OPN/PLANS	04	IN	51A11	1	AMC
		PLNS/OPNS OFCR	03	OD	51A91	1	AMC
		SMT WPN SYS OFCR	03	OD	51A91	1	AMC
		SYS INT OFCR	03	IN	51A11	2	AMC
		SYS MGR SM ARMS	03	IN	51A11	1	AMC
W4MKLAA	CRDEC	APM BDS	03	CM	53B74	1	AMC
W4KLAA	CRDEC	APM NBCDS	03	CM	51A74	1	AMC
		APM NRCDS	04	CM	53A74	1	AMC
		CML ENGR	03	CM	51A74	1	AMC
		DET RDYE OFCR	03	CM	51A74	1	AMC
		MUN RDTE OFCR	03	CM	53B74	1	AMC
		R&D COORD NBC	04	CM	51A74	1	AMC
		R&D CRD NBC FOC	03	CM	51A74	1	AMC
		RDTE STF OFCR	03	CM	51A74	1	AMC
W4MMAA	HQ AMCCOM	ARTY OFCR AM LOG	04	FA	51A13	1	AMC
		C&I MGMT OFCR	03		97A00	1	AMC
		C&I MGT OFCR	03		97A00	1	AMC
		C&I OFCR	03		97A00	1	AMC
		C. PDN OPNS	04		97A00	1	AMC
		C. SML ARMS	03		97A00	1	AMC
		C. SML PURCH	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
W4MMAA	HQ AMCCOM	CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	1	AMC
		CNT MGMT OFCR	03		97A00	2	AMC
		CNT MGMT OFCR	03		97A00	2	AMC
		CNT MGT OFCR	04		97A00	1	AMC
		MAINT STF OFCR	04	OD	51A91	1	AMC
		MANT STF OFCR	03	AR	51A12	1	AMC
		MANT STF OFCR	03	AR	51A12	1	AMC
		MANT STF OFCR	03	AR	51A12	1	AMC
		MAT DEV OFCR	04	FA	51A13	1	AMC
		MT MGT STF	04		51A00	1	AMC
		ORD OFCR AM LOG	04	OD	51A91	1	AMC
		PRJ OFCR AMMO/OG	03	FA	51A13	1	AMC
		PRJ OFCR M119	03		97A00	1	AMC
		WPN SYS MGR	03	AV	51A15	1	AMC
W4MXAA	CMD SYS INT	C/E ENGR	04	SC	51A25	1	SEC ARMY
		OPNS OFCR	04	SC	51A25	1	SEC ARMY
		SFTWRE MGR	04		53B00	1	SEC ARMY
		SNR SYS AUTO	04		51A00	1	SEC ARMY

CAREER DEVELOPMENT UPDATE

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
		SNR T&E OFCR	04	SC	51A25	1	SEC ARMY
		SNR T&E OFCR	04	SC	51A25	1	SEC ARMY
		SYS AUTO MGR	04		53B00	1	SEC ARMY
		SYS AUTO MGR	04		53B00	1	SEC ARMY
		SYS AUTO MGR	04		53B00	1	SEC ARMY
		SYS CE MGR	04	SC	51A25	1	SEC ARMY
W4NHAA	HQ USAISC	CNTR IND MGT	04		97A00	1	ISC
W4NJAA	ODISC4	STAFF OFCR	04		53B00	1	SEC ARMY
		STAFF OFCR	04	SC	51A25	1	SEC ARMY
		STAFF OFCR	04	SC	53B25	1	SEC ARMY
		STAFF OFCR	04	SC	53B25	1	SEC ARMY
W4P8AA	AFIT	MIL FACULTY	04		97A00	1	TRADOC
W4P8AA	AFIT	MIL FACULTY	04		97A00	1	TRADOC
W4PDAA	ARMY SPT	PROJ MGR	04		51A00	1	JOINT
W4PYAA	DLA	C, MAJ CNTR	04		97A00	1	DOD AGCY
W4QSAA	USA CNT SPT	PROCURE OFCR	03		97A00	1	SECARMY FOA
		PROCURE OFCR	04		97A00	1	SECARMY FOA
W4QUAA	USA CSTA*	C, ELCTR SYS	04		51A02	1	AMC
		PLN & TST	03		51A02	1	AMC
		MECH ENGR	03		51A02	1	AMC
		SR TST DIR	03		51A02	1	AMC
		SR TST DIR	03		51A02	1	AMC
		T&E OFCR	03		51A02	1	AMC
		T&E OFCR	03		51A02	1	AMC
		T&E OFCR	03		51A02	1	AMC
		T&E OFCR	03		51A02	1	AMC
		T&E OFCR	03		51A02	1	AMC
		T&E OFCR	03		51A02	1	AMC
		T&E OFCR	03		51A02	1	AMC
W4RTAA	SDIO	ASST EXEC OFCR	04		51A00	1	DOD AGCY
		CNTR OFCR	04		97A	1	DOD AGCY
		EXEC ASST PM	04		51A00	1	DOD AGCY
		PM INTR MGT	03		51A00	1	DOD AGCY
		PM SPC EXPMS	04		51A00	1	DOD AGCY
		PM SPC EXPMS	04		51A00	1	DOD AGCY
		PRGM INTEGR	04		51A00	1	DOD AGCY
		PROJ INTGR	03		51A00	1	DOD AGCY
		PROJ INTGR	04		51A00	1	DOD AGCY
		PROJ INTGR	04		97A00	1	DOD AGCY
		THR DF SYS ENG	04		51A00	1	DOD AGCY
W4T2AA	USAE CENTCOM	AUTO PLNS OFCR	04		53B00	1	JOINT
W4T4AA	USAE EUCOM	ARM COOP MGR	04		97A00	1	JOINT
		ARM COOP MGR	04		97A00	1	JOINT
W4T801	SDC	ANLYS/REQ OFCR	04		51A00	1	SDC
		C, BAL MSL FLD	04	AD	51A14	1	SDC
		C, FO LOCKHEED	04	OD	51A91	1	SDC
		C, FO BOEING	04	AD	51A14	1	SDC
		C, FO MC DOUG	04	AD	51A14	1	SDC
		CNTR OFCR	04	QM	97A92	1	SDC
		ENGR OFCR	03	AD	51A14	1	SDC
		ILS MGR/LOG	04	OD	51A91	1	SDC
W4T801	SDC	PLANS/ANLYS	04		51A00	1	SDC
		PLN/PRGM OFCR	04		51A00	1	SDC
		PLNS/PRG OFCR	04	AD	51A14	1	SDC
		PROJ OPN SYS	04	OD	51A91	1	SDC
		R&D COORD	03		51A00	1	SDC
		R&D COORD	04		51A00	1	SDC
		R&D COORD	04		51A00	1	SDC
		R&D COORD	04		51A00	1	SDC
		R&D COORD	04		51A00	1	SDC
		R&D COORD	04	AD	51A14	1	SDC
		R&D COORD	04	AD	51A14	1	SDC
		R&D COORD	04	AD	51A14	1	SDC
		R&D COORD	04	OD	51A91	1	SDC
		R&D COORD	04	OD	51A91	1	SDC
		R&D COORD	04	OD	51A91	1	SDC
		R&D COORD	04	OD	51A91	1	SDC
		R&D COORD	04	OD	51A91	1	SDC
		SYS INTG OFCR	04		51A00	1	SDC
		SYS INTG OFCR	04		51A00	1	SDC
		SYS INTR OFCR	04		51A00	1	SDC
		SYS RQTS OFCR	04	OD	51A91	1	SDC
		T&E OFCR	04	AD	51A14	1	SDC
		T&E OFCR	04	AD	51A14	1	SDC
		TECH INTR OFCR	04		51A00	1	SDC
W4T802	SDC	CHIEF	04		51A00	1	SDC
		MSN CNT OFCR	03	AD	51A14	1	SDC
		MSN CNT OFCR	03	AD	51A14	2	SDC
W4T8AA	SDC	EXEC OFCR	04	AD	51A14	1	SDC
		PEO REP	04	AD	51A14	2	SDC
		STF OFCR	04		51A00	3	SDC
W4ULAA	PERSINCOM	C, KEYSTONE	04		53B00	1	ISC

UIC	UNIT NAME	DUTY TITLE	GRADE	BR	PRC	4M	MACOM
W4USAA	USAISC HFMN	C, ADP COMM	04		53B00	1	ISC
W4W6AA	JRTC	PROC OFFICER	04		97A00	1	TRADOC
W4X2AA	USA EQPT EVL	PROCURE OFCR	04		97A00	1	JOINT
W4X3AA	EXER SPT ACT	PROCURE OFCR	04		97A00	1	JOINT
W4XQAA	SPACECOM	C2 OFFICER	04	SC	53B25	1	STAFF FIELD
		GPS OPS OFCR	04	AD	51A14	1	STAFF FIELD
		SPACE OPS/NASA	04	AV	51A15	1	STAFF FIELD
		SPACE R&D/ACQ	04	SC	51A25	1	STAFF FIELD
W4ZOAA	SDC-WASH	C, SYS AUTO	03		53B00	1	ISC
W4ZOAA	SDC-WASH	C, SYS AUTO	03		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC
		SYS AUTO ENGR	03	AG	53B42	1	ISC
		SYS AUTO ENGR	03	AG	53B42	9	ISC
		SYS AUTO ENGR	04		53B00	1	ISC
		SYS AUTO ENGR	04	AG	53B42	3	ISC
		SYS ENGR	03		53B00	1	ISC
W4Z2AA	SDC-HUACH	SFTWR ENGR	03		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC
		SFTWR ENGR	03		53B00	1	ISC
		SR SFTWR EN	04		53B00	1	ISC
WA96AA	593 SPT GRP	PROCURE OFCR	03		97A00	1	FORSCOM
WAB8AA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WABEAA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WAGKAA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WAHHAA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM*
		CNTR OFCR	04		97A00	1	FORSCOM
WAJ7AA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WAK1AA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WANQAA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WAQSAA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WAT199	HQ HHC ARMY	PROCURE OFCR	04		97A00	1	USAREUR
WBG2AA	4 MAT MGT	CNTR MGT OFCR	04		97A00	1	FORSCOM
		CNTR MGT OFCR	04		97A00	1	FORSCOM
WBGUAA	1 CORPS SPT	CNTR MGT OFCR	04		97A00	1	FORSCOM
WBGZAA	2 MAT MGT	CNTR MGT OFCR	04		97A00	1	FORSCOM
		CNTR MGT OFCR	04		97A00	1	FORSCOM
WCOGAA	21 TAACOM	PROCURE OFCR	04		97A00	1	USAREUR
WC3BAA	355 CNTR SPT	PUR/CNT OFCR	03		97A00	1	FORSCOM
WC3KAA	390 CNTR SPT	PUR/CNT OFCR	03		97A00	1	FORSCOM
WC9EAA	22 SPT CMD	CNTR MGT OFCR	04		97A00	1	FORSCOM
WC9EAA	22 SPT CMD	CNTR MGT OFCR	04		97A00	1	FORSCOM
WCRQAA	28 SPT CMD	PUR/CNTR OFCR	03		97A00	1	USAREUR
WCY2AA	101 SPT GRP	CNTR MGT OFCR	03		97A00	1	FORSCOM
WD1HAA	7 GRP TERM	PUR/CNTR OFCR	03		97A00	1	FORSCOM
WD8ZAA	HHC DISCOM	CNTR OFCR	03		97A00	1	FORSCOM
		CNTR OFCR	04		97A00	1	FORSCOM
WDF9AA	507 SPT GRP	CNTR MGT OFCR	03		97A00	1	FORSCOM
WDHEAA	43 CORPS SPT	CNTR MGT OFCR	03		97A00	1	FORSCOM
WEXDAA	46 CORPS SPT	CNTR MGT OFCR	03		97A00	1	FORSCOM
WFJIAA	13 CORPS SPT	CNTR MGT OFCR	04		97A00	1	FORSCOM
WG66AA	TC DET CNTR	PUR/CNTR OFCR	03		97A00	1	USAREUR
WG8699	5 SIG CMD	AUTO STF OFCR	03		53B00	1	ISC
		CNTR MGT OFCR	03		97A00	1	ISC
		SYS ANAL	03		53B00	1	ISC
		SYS INTGR	03		51A00	1	ISC
WH4U99	7 SIG CMD	C, NETWORK	04	SC	53B25	1	ISC
	HHC AUG COMM	PROCURE OFCR	04		97A00	1	ISC
WHEBAA	140 CNTR SPT	PUR/CNTR OFCR	03		97A00	1	FORSCOM
WHECAA	160 CNTR SPT	PUR/CNTR OFCR	03		97A00	1	FORSCOM
WJB8AA	41 AREA SP GRP	PROC OFCR	03		97A00	1	USA SOUTH
WJDQAA	20 MAT MGT CTR	CNTR MGT OFCR	04		97A00	1	FORSCOM
WJEMAA	65 CORPS SPT G	CNTR MGT OFCR	03		97A00	1	FORSCOM
WJENAA	64 CORPS SPT G	CNTR MGT OFCR	03		97A00	1	FORSCOM
WQMODL	STRICOM	APM	03		97A02	1	AMC
		APM	04		97A02	1	AMC
		APM	04	AR	97A12	1	AMC
		APM	04	AV	53B15	1	AMC
		APM	04	AV	97A15	1	AMC
		APM	04	FA	53B13	1	AMC
		APM	04	IN	53B11	1	AMC
WXXXXX	SPEC PRGMS		03		51A00	1	
			04		51A00	4	
			04		53B00	5	
			04		97A00	4	

1992 Index of Articles

This index is a headline listing of major articles published in *Army RD&A Bulletin* during 1992.

FROM THE ARMY ACQUISITION EXECUTIVE

It has been a tremendous experience to serve as the Assistant Secretary of the Army (Research, Development and Acquisition) and as the Army Acquisition Executive for the last 34 months. The changing international security environment and declining defense budgets have changed substantially the way we conduct our business. While our research, development, test and evaluation (RDT&E) funding remained fairly level, our procurement budget fell from $14 billion to less than $7 billion in two budget years. Despite this 50 percent funding reduction, the Army procurement budget was restructured to emphasize the fielding of new technology. If I could leave the men and women of the Army acquisition community with a single thought, it would be this: our main, and perhaps only, job is to put superior equipment in the hands of our soldiers.

In the RDA arena, we are steadfast in our commitment to maintain an Army that is well-equipped. We have executed our major Army acquisition programs with particular attention to cost, schedule, and technical performance. We terminated several flawed programs, and we achieved budget-driven program restructures with minimum impact on program progress.

Based on a suggestion from one of our PEOs, we established a "Team Concept" to improve government and industry execution of major acquisition programs. In my opinion, the only way to do business is to encourage our contractors to come to us with problems—not with fear, but with the understanding that we will work them out together. The concept is intended to foster cooperation and openness, while maintaining the arms length relationship mandated by ethics and business considerations. We and our suppliers share the common goal of developing and producing quality equipment for our soldiers, and it seems obvious that we can meet this common goal better by working cooperatively.

We have worked with TRADOC and OPS to put in place user-developer negotiation procedures to insure that new system requirements are both demanding and executable. Our acquisition problems often have been caused by a disconnect between the user's requirements and the acquisition strategy adopted or technology available to meet that requirement.

We have adopted a new Army modernization strategy that emphasizes the fielding of new technology through upgrades. We will strive to incorporate new technology, like digital electronics, into all appropriate platforms using a concept known as "horizontal integration." Our goal is still to provide our soldiers with world-class equipment in sufficient quantity and in the shortest possible time so that they can win decisively, quickly, and with minimum casualties.

We have significantly improved the Army development contracting process by putting in place a number of significant changes. Among the most significant is that we are insisting that our contractors submit realistic offers, thereby reducing the perceived incentives that led contractors to "buy into" development contracts with the expectation of "getting well" in procurement. The goal here is to develop production-ready systems within the original schedule and cost.

We have also made great strides in streamlining the Army acquisition process by eliminating unnecessary functional requirements and paperwork burdens. We are trying to do everything possible to eliminate inefficient and ineffective government contributions to cost, just as we expect our industry partners to reduce their overheads and other unnecessary costs. Many acquisition programs have been burdened with excessive functional requirements and risk avoidance measures that have inhibited our ability to get equipment into the hands of our soldiers quickly and at low cost. The burden of proof is now properly placed on those who would add functional requirements to a program, and we have empowered the PEOs and PMs to challenge those inefficiencies.

To use our scarce resources more effectively, we have taken bold steps to reduce the Army acquisition infrastructure. I am particularly proud of the successful consolidation and streamlining of the Army laboratories and of the changes proposed for our engineering centers.

We continue to be concerned about the future industrial capabilities that we will need to design, develop, produce, and sustain our weapons systems of the future. We have proposed to the Office of the Secretary of Defense (OSD) a comprehensive industrial base policy to promote active government involvement in managing the downsizing of the defense industrial base. Within the Army, we are actively looking at the allocation of workload between depots and the private sector. Much remains to be done on these defense industrial base policies and practices.

I am proud of our participation in an innovative initiative under which major Army suppliers are establishing "mentor-protege" relationships with selected small and disadvantaged businesses (SDBs). The law provides incentives for major contractors (mentors) that receive over $100 million in DOD contracts annually to assist SDBs (proteges) in enhancing their capabilities to do subcontracting work. I am equally proud of our initiatives to strengthen the traditional ties between the Army and historically black colleges and universities and minority institutions (HBCUs/MIs). In 1992, we selected two HBCUs as Army centers of excellence. Clark-Atlanta University's center will specialize in information science and provide the Army with the support needed to collect, sort, integrate, manage, and evaluate the increasing quantities of automation used in battle management and combat operations. The center at Morris Brown College will specialize in research to insure that future Army soldiers are trained to the highest proficiency for a wide range of military operations.

The first priority of the Army acquisition community is to attend to the warfighting needs of the soldier by fielding world class equipment. I have no doubt that what we have accomplished together will lead to success on the battlefields of the future. Thank you all for a job well done, and best of luck in accomplishing all that remains to be done. It has been my greatest honor to serve with you all—the fine men and women of Army acquisition.

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